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Brazil's Energy Policy and Regulation

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BRAZIL'S ENERGY POLICY AND REGULATION

*Stephen Sewalk**

I. INTRODUCTION

Brazil is the world's fifth largest country by landmass¹ and ranked among the top ten economies by size of GDP.² Like any other economy, it is dependent on constant energy flows to sustain and grow its economy. Brazil is one of the United States' greatest trading partners, and sometimes competitor, in terms of energy sources like petroleum and ethanol. For decades, it was heavily dependent on other nations for its energy sources. After thirty-five years of policies to promote domestic energy resources, Brazil is a net energy exporter, producing more energy than it consumes.³ In 2011, Brazil exported \$5.8 billion USD worth of oil and \$567 million worth of ethanol; in comparison, the United States is a net importer of oil, but exported refined oil products worth \$4.5 billion and \$791 million of

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1. *Countries of the World (By Largest Land Area, Including Indigenous Waters)*, WORLD ATLAS (Feb. 2006), <http://www.worldatlas.com/aatlas/populations/ctyareal.htm>.

2. *Gross Domestic Product 2012*, WORLD BANK, <http://databank.worldbank.org/data/download/GDP.pdf> (last updated May 7, 2014).

3. John Daly, *BRIC's Achilles Heel—Energy*, OIL PRICE (June 27, 2012, 9:38 PM), available at <http://oilprice.com/Energy/Energy-General/BRICs-Achilles-Heel-Energy.html>.

ethanol.⁴ Brazil is the tenth largest producer of energy but also the eighth largest consumer.⁵ In comparison, the United States is the second largest global producer but also the top consumer,⁶ while China is the world's largest gross energy consumer.⁷ Both countries are dependent on constant influxes of energy to sustain and grow their economies.

In pursuing energy security, Brazil has run into some significant challenges throughout its recent history. Chief among these are (1) having insufficient ethanol for cars (in the early 1990s),⁸ (2) droughts resulting in less hydroelectric power (in the early 2000s),⁹ and (3) believing that relying heavily on regional energy supplies (from Bolivia and Argentina for natural gas) would increase energy security.¹⁰ In relying on regional energy suppliers, Brazil was surprised by Bolivia's decision to nationalize its oil and gas fields against a country such as Brazil (a fellow colony), especially since

4. BRAZ.-U.S. BUS. COUNCIL, BOLSTERING SECURITY, GROWTH, AND JOB CREATION 3 (2012), http://www.brazilcouncil.org/sites/default/files/Brazil_EnergyReport.pdf.

5. *Brazil*, U.S. ENERGY INFO. ADMIN. 1, <http://www.eia.gov/countries/analysisbriefs/brazil/brazil.pdf> (last updated Oct. 1, 2013).

6. *Countries: Top World Oil Producers 2012*, U.S. ENERGY INFO. ADMIN., <http://www.eia.gov/countries> (last visited Apr. 11, 2014); *Countries: 2012 World Oil Consumption*, U.S. ENERGY INFO. ADMIN., <http://www.eia.gov/countries/index.cfm?view=consumption> (last visited Apr. 11, 2014).

7. *China*, U.S. ENERGY INFO. ADMIN. 1, <http://www.eia.gov/countries/analysisbriefs/China/china.pdf> (last updated Feb. 4, 2014). China is the world's largest (gross) energy producer because it produces coal in great abundance. However, on a net basis, energy and power derived, the United States is the world's top producer as there are significant energy losses with coal.

8. Don Hofstrand, *Brazil's Ethanol Industry—Part Two**, IOWA STATE UNIV., <http://www.extension.iastate.edu/agdm/articles/hof/hoffeb09.html> (last visited May 20, 2014).

9. *See id.* at 3, 8, 17.

10. *See generally Energy Security in Latin America: Hearing Before the Committee on Foreign Relations*, 109th Cong. (2006) (statement of Hon. Domingo Cavallo, Chairman and CEO, DFC Associates, LLC, and former Minister of Econ. for Arg., available at <http://www.gpo.gov/fdsys/pkg/CHRG-109shrg34697/html/CHRG-109shrg34697.htm>) [hereinafter *Energy Security in Latin America*]. The South American region was pursuing energy integration in the belief that local sources would provide greater energy supply security. Several countries signed energy integration protocols to restructure their energy sectors to a common vision and common regulatory principles. *Id.*

Brazil did not consider itself a colonial power.¹¹ The nationalization particularly startled Petrobras, the national oil company of Brazil,¹² which had \$1 billion of investments in Bolivia.¹³ Its other supplier of natural gas, Argentina, was adopting policies that could limit the country's ability to meet its natural gas export commitments. Relying on suppliers for a stable energy is not a strategy, however, by putting in place the right policies to promote energy production and diversification, Brazil will be able to overcome these difficulties and make significant progress by promoting energy security. Part II of this article examines the background of Brazil's history and economy, and Part III presents relevant information pertaining to Brazil's energy consumption and production. In Part IV, this article examines the history of Brazilian oil, Petrobras, and nationalization. Then in Part V, the article explores how the petroleum laws needed to change to encourage foreign investment, while Part VI explains Brazil's openness to foreign investment. Part VII looks at the relationship between U.S. and Brazilian energy, and finally, Part VIII concludes.

II. BACKGROUND

Due to Brazil's large land mass and its economy that has been ranked between the 8th and 10th largest in the world over the past forty years, over 400 of the Fortune 500 companies have operations

11. See generally Carin Zissis, *Bolivia's Nationalization of Oil and Gas*, COUNCIL ON FOREIGN REL. (May 12, 2006), <http://www.cfr.org/world/bolivias-nationalization-oil-gas/p10682>. Brazil had nationalized its energy resources because it perceived European and American companies to be extensions of EU and U.S. colonial power. Brazil, being one of the colonies, did not expect a fellow Latin country to expropriate Brazilian ownership, since it did not see itself as a colonial power like Spain, Portugal, or the United Kingdom.

12. *Our History*, PETROBRAS, <http://www.petrobras.com/en/about-us/our-history> (last visited Apr. 11, 2014). Petrobras was established October 3, 1953 with the signature of the President of Brazil, Getúlio Vargas and was the outcome of a popular campaign slogan "the oil is ours" that began in 1946. Established as the national oil company of Brazil, it is publicly traded, but a majority of the shares are owned by the government. Fabiana Frayssinet, "*The Oil Is Ours*"—*But Its Secrets Are the NSA's*, INTER PRESS SERV. (Sept. 16, 2013), <http://www.ipsnews.net/2013/09/the-oil-is-ours-but-its-secrets-are-the-nsas>.

13. See Paulo Prada, *Bolivian Nationalizes the Oil and Gas Sector*, N.Y. TIMES, May 2, 2006, <http://www.nytimes.com/2006/05/02/world/americas/02bolivia.html>.

in Brazil.¹⁴ Opportunities abound for those willing to take risks, but like many other rapidly developing countries, there are unforeseen risks that may arise, among them the several currency crises of the past fifty years.

In a “Latin” (Spanish, Portuguese, French, and Italian) model of development, many of the countries discovered or conquered by these countries have a tendency to develop a bureaucracy and legislation that are not particularly user friendly, but, as in many other countries, there is the “jeitinho”—or way of working around the legislation and bureaucracy to get quicker results.¹⁵ In 2005, Brazil ranked 59th of 146 countries according to the Global Corruption Report 2005.¹⁶ However, by 2013, Brazil had fallen to 72nd of 177 countries on the list.¹⁷ The “jeitinho” approach is based on knowing the government bureaucracy, understanding the rules, having someone else stand in line for you, and people helping each other navigate around the bureaucracy created by legislators.¹⁸

A. History

Brazil was discovered by a Portuguese expedition led by Pedro Álvares Cabral on April 22, 1500.¹⁹ Spain and Portugal, under the direction and consent of the Pope, agreed to the Treaty of Tordesillas on June 7, 1494, dividing the world for exploration.²⁰ The

14. Eric Green, *Foreign Investment Up in Latin America, Caribbean, Report Says: United Nations Says Brazil Led Region in Foreign Investment in 2004*, IIP DIGITAL (Mar. 16, 2005), available at <http://iipdigital.usembassy.gov/st/english/article/2005/03/20050316115745aeneerg0.4523584.html>.

15. See generally Fernanda Duarte, *Exploring the Interpersonal Transaction of the Brazilian Jeitinho in Bureaucratic Contexts*, 13 ORGANIZATION 509 (2006).

16. Ana Luiza Fleck Saibro, *Brazil*, in TRANSPARENCY INT'L, GLOBAL CORRUPTION REPORT 2005, at 109, 109 (2005), available at http://archive.transparency.org/publications/gcr/gcr_2005.

17. *Corruptions Perceptions Index 2013*, TRANSPARENCY INT'L, <http://www.transparency.org/cpi2013/results> (last visited Apr. 11, 2014).

18. This appears to be a common approach in most developing countries to which I have traveled. I was very surprised that this also existed in Russia.

19. *Pedro Álvares Cabral*, ENCYCLOPAEDIA BRITANNICA, <http://www.britannica.com/EBchecked/topic/87709/Pedro-Alvares-Cabral> (last updated Mar. 21, 2013).

20. Treaty of Tordesillas, ENCYCLOPAEDIA BRITANNICA, available at <http://www.britannica.com/EBchecked/topic/599856/Treaty-of-Tordesillas> (last visited Apr. 11, 2014).

expeditions were primarily to find wealth to bring back to the mother countries. Unlike the driving force behind the development of the United States, people who chose to go to Brazil were seeking fortune, not freedom. However, Brazil did not develop highly advanced civilizations, such as the Incas, Aztecs, and Mayas.²¹ As a result, the local civilizations did not mine for minerals such as gold and silver, unlike in other countries such as Mexico and Peru where these advanced civilizations lived.²² Because the explorers of the time did not see the visible (mined) mineral wealth in Brazil, they instead regarded Brazil as a plantation colony.²³ Due to this lack of obvious mineral wealth, Brazil's growth was delayed until the Portuguese, threatened by Spanish and French expeditions and incursions, chose to set up a government and settle the land.²⁴ Soon after, the Portuguese discovered the abundance Brazil had to offer.²⁵ By 1600, the country (through African slave labor) became the world's leading sugar producer, a title it has retained to this day,²⁶ and the second largest ethanol producer behind the United States.²⁷ In the late 1600s and early 1700s, large mineral deposits were discovered, which led to further interior development.²⁸ In 1822, Brazil, essentially in its present geographic shape, declared independence and established a monarchy.²⁹ The United States was the first country to extend

21. *Brazil: History*, LONELY PLANET, available at <http://www.lonelyplanet.com/brazil/history> (last visited Apr. 11, 2014).

22. LESLIE BETHELL, *THE CAMBRIDGE HISTORY OF LATIN AMERICA VOLUME 1: COLONIAL LATIN AMERICA* 3–36 (1984); LESLIE BETHELL, *THE CAMBRIDGE HISTORY OF LATIN AMERICA VOLUME 2: COLONIAL LATIN AMERICA* 105–52 (1984);

23. *Brazil: History*, GEOGRAPHIA, <http://www.geographia.com/brazil/brazilhistory.htm> (last visited Apr. 11, 2014).

24. *Portuguese Colonisation of Brazil*, BRAZIL.ORG.ZA, <http://www.brazil.org.za/portuguese-colonisation-of-brazil.html> (last visited Apr. 11, 2014).

25. *Id.*

26. Blair Euteneuer, *World's Top 10 Sugar-Producing Countries in 2010–2011*, BLOOMBERG NEWS (Oct. 6, 2011, 2:45 PM), <http://www.bloomberg.com/news/2011-10-06/world-s-top-10-sugar-producing-countries-in-2010-2011-table-.html>.

27. *Ethanol*, SUGARCANE.ORG., <http://sugarcane.org/sugarcane-products/ethanol> (last visited May 11, 2014).

28. *Brazil: History*, *supra* note 23.

29. *Timeline of Brazilian History*, CHAGALA.COM (Apr. 1997), <http://www.chagala.com/ibla/brazil/timeline.htm>.

diplomatic recognition to Brazil as an independent country.³⁰ Although initially a country ruled by an emperor, Brazil eventually established the first republic in 1889.³¹

Throughout its history, Brazil experienced several economic booms. The mineral wealth boom of the 1700s was superseded by a rubber boom that began in 1876.³² Brazil dominated the rubber industry until 1913 when rubber trees were smuggled to Asia.³³ This was followed by the coffee and cattle ranching expansion. This boom and bust cycle comprised a significant period in the history of Brazilian economic development.³⁴

In short, Brazil's government began as a monarchy in 1822 (which lasted until 1889), then changed into a republic (from 1889 to 1930), turned into a military dictatorship (from 1930 to 45), returned as a second republic (from 1945 to 64), then into another military dictatorship (from 1964 to 1985) and finally transformed into a democratic government.³⁵

B. Flag of Brazil

The Brazilian Flag is composed of three major sections. The outer color is green to represent Brazil's green fields and forests. The diamond is yellow to represent Brazil's vast mineral wealth (gold), and the blue inner circle with stars arranged in the same pattern of the night sky over Rio de Janeiro on the day Brazil became a republic, November 15, 1889 and includes the Southern Cross.³⁶ There are now twenty-seven white five-pointed stars, one for each of the states and the Federal District (Brasilia). The flag was updated on May 11, 1992, but prior to this there were only 21 stars.³⁷ The banner states

30. See generally Gregory Weeks, *Almost Jeffersonian: U.S. Recognition Policy toward Latin America*, 31 PRESIDENTIAL STUDIES Q. 490 (2001).

31. *Timeline of Brazilian History*, *supra* note 29.

32. Randolph R. Resor, *Rubber in Brazil: Dominance and Collapse, 1876–1945*, 51 BUS. HISTORY REV. 341 (1977).

33. *Id.*

34. *Id.*

35. *History of Brasilia*, ABOUT BRASILIA, <http://www.aboutbrasil.com/facts/history.php> (last visited Apr. 11, 2014).

36. *Brazil Flag*, WORLDATLAS, <http://www.worldatlas.com/webimage/flags/countrys/samerica/brazil.htm> (last visited Apr. 11, 2014).

37. *Brazil Flag*, MAPS OF THE WORLD, <http://www.mapsofworld.com/flags/brazil-flag.html> (last visited Apr. 11, 2014).

“Ordem E Progresso” which translates to “Order and Progress,” qualities necessary for a country to become great. The language of the country is Brazilian Portuguese and is as different from Portugal’s Portuguese as American English is from British English.

C. Economy

Prior to World War I, the Brazilian economy was primarily dependent on farming and mineral wealth. Mineral and agricultural products tend to have a boom-bust cycle; for Brazil, this resulted in an economy that was either in a bust with the ensuing deep recession or in a boom with a significant inflationary cycle. Because of great farm and mineral wealth, there was a significant dependence on imported manufactured goods.³⁸

With United States Export-Import Bank assistance, Brazil built its first steel plant in the 1940s.³⁹ Brazil decided to pursue a policy of import substitution to become less dependent on imported manufactured goods and to develop its own local industry to compete abroad. This policy was implemented in the 1950s and continued through the 1970s. This encouraged many foreign companies to enter Brazil and develop a local industry, which is a major reason why almost 200 of the Fortune 500 are located in Brazil today.⁴⁰ Companies such as Volkswagen, Ford, and GM dominate the local auto industry, while local corporations set up by foreign industrial companies similarly dominate other industrial areas, such as pharmaceutical and chemical. This was brought about by import-substitution, which encouraged foreign manufacturers to set up locally to continue to supply the marketplace. This import substitution-led growth resulted in the “Brazilian Economic Miracle,” with growth rates averaging approximately 7.4% from the 1950s

38. Werner Baer, *Import Substitution and Industrialization in Latin America: Experiences and Interpretations*, 7 *LATIN AM. RES. REV.* 95, 96–97 (1972), available at http://isites.harvard.edu/fs/docs/icb.topic925740.files/Week%203/Baer_Import.pdf.

39. *Brazilian Economy*, EMBASSY OF BRAZIL IN WELLINGTON, <http://www.brazil.org.nz/page/brazilian-economy.aspx> (last visited Apr. 11, 2014).

40. *U.S. Corporations in Brazil*, GLOBAL RIGHTS, http://gr.convio.net/site/DocServer/LA_Fact_Sheets_USCorpBrazil.pdf?docID=2603 (last visited May 11, 2014).

through the 1970s,⁴¹ and it also increased energy consumption (and energy imports) significantly.

The oil price increases of the Organization of Petroleum Exporting Countries (OPEC) in the 1970s, however, significantly altered the equation. Although the economy continued to grow strongly during the 1970s, this growth and resulting oil imports were all financed with external debt.⁴² Brazil depended on oil imports for over eighty percent of its domestic needs.⁴³ This resulted in a ballooning debt and a significant balance of payments problem not only for imports, but also in the cost of servicing the debt as interest rates rose globally at the end of the 1970s to combat inflation.⁴⁴

Like many Latin American countries, Brazil experienced hyperinflation throughout its history. From 1889 to 1990, Brazil's price level multiplied thirty-two quadrillion times (32×10^{15}), while world prices rose twenty-three times, a record period of sustained global inflation. From 1960 until 1991 prices rose 1.9 billion times in Brazil, which means that an item that cost one Cruzeiro in 1960 would now cost 1.9 billion "1960 Cruzeiros."⁴⁵ In an effort to manage hyperinflation from 1980 through 2000, Brazil would adopt eight different plans for monetary stabilization, institute six price and wage freezes and print four different currencies;⁴⁶ further they would develop and apply eleven official indexes in an attempt to measure

41. Jose Roberto Mendonca de Barros & Douglas H. Graham, *The Brazilian Economic Miracle Revisited: Private and Public Sector Initiative in a Market Economy*, 13 LATIN AM. RES. REV. 5 (1978).

42. Eliana A. Cardoso & Albert Fishlow, *The Macroeconomics of the Brazilian External Debt*, in DEVELOPING COUNTRY DEBT AND THE WORLD ECONOMY (Jeffrey Sachs ed., 1989).

43. *Brazil Ethanol Market*, ALTENERGYMAG.COM, http://www.altenergymag.com/emagazine.php?issue_number=07.08.01&article=brazil (last visited May 11, 2014).

44. Peter T. Kilborn. *Brazil's Economic 'Miracle' and Its Collapse*, N.Y. TIMES, Nov. 26, 1983, <http://www.nytimes.com/1983/11/26/business/brazil-economic-miracle-and-its-collapse.html>.

45. Robert Plummer, *Colour-Code Clue to Brazil's Inflation Past*, BBC NEWS (Oct. 27, 2010), <http://www.bbc.co.uk/news/business-11477974>.

46. During the time I was there the currencies we used were the Cruzeiro, the New Cruzeiro, and the Cruzado and when I visited later the Real. Bank accounts and wages were indexed quarterly, meaning inflation from the previous quarter was added to your account or salary the following quarter. This approach actually always left one behind, but more importantly continued to fuel inflation higher, which meant that wages and interest could never catch up to inflation.

inflation; managed to conduct business in spite of fifty-five changes in price control guidelines;⁴⁷ they would enact fifteen different wage policies; and make eighteen changes to foreign exchange rules. This was done while successive governments announced twenty-one decrees of fiscal austerity, twenty-two proposals to renegotiate the foreign debt,⁴⁸ along with six plans to tighten credit, and a great confiscation of financial assets simply in an effort to stop hyperinflation and bring about a normal financial system.⁴⁹ Even with all these attempts to stabilize inflation and promote growth, Brazil experienced the lost decade of the 1980s and minimal growth throughout the 1990s.⁵⁰

The experience with OPEC and the dependency that Brazil faced with oil imports significantly changed the direction of the country's development. In like fashion to its import substitution policy for manufacturing of the past, Brazil developed policies and put strategies in place to reduce its dependency on foreign oil by (1) intensifying the effort to explore for more oil and gas domestically, (2) expanding hydroelectric power, and (3) developing the "PROÁLCOOL" program to produce sugar cane into alcohol for automobiles.⁵¹ These policies were adopted as Brazil sought a domestic solution to its energy and financial crisis, the financial crisis brought on by the energy crisis. Gasoline prices were set high by the

47. Plummer, *supra* note 45; see also Chana Joffe-Walt, *How Fake Money Saved Brazil*, NPR.COM (Oct. 4, 2010, 3:13 PM), <http://www.npr.org/blogs/money/2010/10/04/130329523/how-fake-money-saved-brazil>.

48. See André Roncaglia de Carvalho, *Inflation, Structural Change and Conflict in Post-Disinflation Brazil: A Structuralist Appraisal* (FEA-USP Dep't of Econ., Working Paper No. 2013-25, 2013), available at <http://www.fea.usp.br/feaecon/RePEc/documentos/AndreRoncagliaCarvalho25WP.pdf>; Leslie Evans, *How Brazil Beat Hyperinflation*, UCLA INT'L. (Feb. 22, 2002), <http://www.econ.puc-rio.br/gfranco/How%20Brazil%20Beat%20Hyperinflation.htm>; Márcio Garcia et al., *The Monetary and Fiscal History of Latin America: Brazil*, BECKER FRIEDMAN INST. (2014), https://bfi.uchicago.edu/sites/default/files/research/140331_text_merged_0.pdf.

49. Thayer Watkins, *The Hyperinflation in Brazil, 1980–1994*, SAN JOSÉ STATE UNIV. DEP'T OF ECON., <http://applet-magic.com/brazilinfl.htm> (last visited Apr. 11, 2014).

50. Hofstrand, *supra* note 8.

51. *National Alcohol Program (PROÁLCOOL)*, WORLD RES. INST., <http://projects.wri.org/sd-pams-database/brazil/national-alcohol-program-proalcool> (last visited Apr. 11, 2014).

Brazilian government in the 1970s⁵² especially relative to ethanol in order to reduce consumption, while this increased gasoline prices, this appeared to have minimal effect on gasoline consumption as consumption continued to increase.⁵³ Additionally, Brazil's ethanol program had nothing to do with saving the environment, as Brazil also continued to cut down the Amazon.

Table 1: Economic Growth and Income per Capita

National Accounts	2009	2010	2011	2012	2013
▲ % GDP	-0.3%	7.5%	2.7%	0.9%	2.5%
Nominal GDP (US\$ millions)	1,621,700	2,141,900	2,473,500	2,252,400	2,280,200
GDP per Head (US\$)	8,599	11,226	12,829	11,569	11,604
Population	188.6	190.8	192.8	194.7	196.5
GDP by Sector				100.0%	
Agriculture				5.2%	
Industry				26.3%	
Services				68.5%	
Inflation Rate	4.3%	5.9%	6.5%	5.8%	6.0%
Budget Balance	-3.2%	-2.3%	-2.6%	-2.4%	-3.1%

A table showing economic growth and GDP in nominal U.S. dollars⁵⁴

As global inflation was tamed, Brazil developed a plan to introduce the Plano Real (Real Plan) that would result in the creation and

52. *Brazil: Petroleum*, COUNTRY DATA, <http://www.country-data.com/cgi-bin/query/r-1744.html> (last visited Apr. 11, 2014).

53. *Brazilian Energy Analysis—1970 to 2002 Period*, 40 *ECON. & ENERGY*, Oct.–Nov. 2003, available at http://ecen.com/eee40/brazilian_energy_analysis-1970_to_2002_period.htm.

54. *Brazil*, BLADEX, <http://www.blx.com/latam-info/brazil> (last updated Apr. 11, 2014).

introduction of a “fake currency to beat inflationary expectations.”⁵⁵ The concept was to introduce a Unit of Real Value that would not change and have all prices listed in this unit. The currency initially remained the Cruzeiro, but eventually changed to the Real once consumers got accustomed to seeing a stable fixed price on a regular basis.⁵⁶ Once stable prices became a fact of life, at least in Units of Real Value, then the Real became the new national currency during the 1990s, and Brazil succeeded to reduce inflation to reasonable levels. Inflation levels were reduced with the requirement that the Real be backed by hard currency (U.S. Dollars) along with the elimination of indexing on wages and bank accounts. However, in many cases, changing one’s selling prices still required government approval. The U.S. Dollar-Real link broke down in 1998 and in 2001 due to the Asian currency crisis and local crisis leading to a decline in GDP measured in nominal dollars. By 2012, the GDP per capita of Brazil rose to \$11,340.⁵⁷

The balance of trade has also improved significantly since the 1970s and 1980s with a greater focus on exports and with the successful development of several oil fields and the Pro-Alcohol program minimizing energy imports. While the United States is still Brazil’s largest trading partner, other countries are declining in importance as China imports record amounts of minerals (iron ore in particular)⁵⁸ and agricultural products (chief among them soy and wheat).⁵⁹

The tables on the next page provide an illustration of this transformation—China has increased its imports and now imports more than any other country from Brazil. China’s growing imports (added revenues to Brazil) and Brazil’s lessened dependence on energy imports (spending less cash on foreign energy) means that the overall balance of trade in goods and services, as well as financial transactions, has moved solidly into the black (positive) for Brazil.

55. Joffe-Walt, *supra* note 47.

56. *Id.*

57. *GDP Per Capita (Current US\$)*, WORLD BANK, <http://data.worldbank.org/indicator/NY.GDP.PCAP.CD> (last visited Apr. 11, 2014).

58. Du Juan, *Brazilian Iron Ore Imports at Record*, CHINA DAILY (Jan. 27, 2014, 6:10 AM), http://usa.chinadaily.com.cn/world/2014-01/27/content_17259987.htm.

59. *Brazil*, OBSERVATORY OF ECON. COMPLEXITY, <http://atlas.media.mit.edu/profile/country/bra> (last visited Apr. 11, 2014).

The balance of payments is a statement that summarizes how a country is fairing compared to the rest of the world in terms of trade (goods and services) and financial transactions (income or payments of interest and financial transfers).⁶⁰ Since 2001, Brazilian goods exports have increased from \$58.3 to \$242.6 billion (2012), however, imports have grown just as quickly from \$55.6 to \$223.1 billion (2012).⁶¹ Solely considering crude petroleum oils (category 2709), imports increased from \$3.2 to \$13.4 billion while exports increased from \$0.7 to \$20.3 billion, this shows Brazil's mismatch between its oil production and the oils its refineries can refine (light vs. heavy).⁶²

Table 2: Foreign Trade

Foreign Trade (2011)			
Exports		Imports	
By countries		By countries	
China	17.3%	China	15.9%
US	10.1%	US	15.2%
Argentina	8.9%	Argentina	7.8%
Netherlands	5.3%	Germany	7.1%
By products		By products	
Primary products	47.8%	Intermediate & raw mat.	43.1%
Manufactured products	36.0%	Capital goods	20.2%
Semi-manufactured prod.	14.1%	Consumer goods	16.9%

60. Herbert Stein, *Balance of Payments*, LIBRARY OF ECON. & LIBERTY, <http://www.econlib.org/library/Enc/BalanceofPayments.html> (last visited Apr. 11, 2014).

61. *International Trade in Goods—Exports 2001–2013*, INT'L TRADE CENTRE, <http://www.intracen.org/itc/market-info-tools/statistics-export-country-product> (last visited May 20, 2014) (Click on “Brazil,” look under “Exports,” “Time period 20 years,” and “Export,” “Time period 20 years”).

62. *Id.*

Others	2.1%	Fuels & lubricants	15.3%
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Table 3: Balance of Payments

Balance of Payments (US\$ mill.)	2009	2010	2011	2012	2013
Exchange rate: BRL / US\$ (end of period)	1.74	1.67	1.88	2.04	2.17
Exports of goods	152,995	201,915	256,040	242,580	245,783
Imports of goods	127,705	181,769	226,247	223,164	240,322
Trade & Services Balance	6,044	-10,689	-8,139	-21,629	-33,909
% GDP	0.4%	-0.5%	-0.3%	-1.0%	-1.5%
Income Balance	-33,684	-39,486	-47,319	-35,448	-42,282
% GDP	-2.1%	-1.8%	-1.9%	-1.6%	-1.9%
Current Transfers Balance	3,338	2,902	2,984	2,846	2,883
% GDP	0.2%	0.1%	0.1%	0.1%	0.1%
Current Account Balance	-24,302	-47,273	-52,474	-54,231	-73,308
% GDP	-1.5%	-2.2%	-2.1%	-2.4%	-3.2%
Net Direct Investments flows	36,033	36,919	67,689	68,093	48,745
% GDP	2.2%	1.7%	2.7%	3.0%	2.1%
Net portfolio Investments flows	27,168	25,193	915	-27,833	2,021
% GDP	1.7%	1.2%	0.0%	-1.2%	0.1%

Tables for Brazil's exports and imports along with the balance of payments.⁶³

The significant improvement in Brazilian trade has resulted in a decline in Brazil's total indebtedness, reducing the debt-to-GDP ratio while improving the economic outlook.

Table 4: Foreign Debt and Debt Service

	2009	2010	2011	2012	proj. 2013
Foreign Debt Stock	281,651	352,440	404,317	428,411	473,807
% GDP	17.4%	16.5%	16.3%	19.0%	20.8%
Foreign Debt Service	44,528	45,881	59,072	67,375	68,333
Principal repayments	30,474	32,024	41,777	56,387	57,190
Interest payments	14,054	13,857	17,295	10,988	11,143

Table of Brazil's foreign debt and debt service.⁶⁴

Surprisingly, although the United States is Brazil's second largest trading partner, there is no tax or bilateral investment treaty between the two countries.⁶⁵ The Clinton administration began negotiations with Brazil on a treaty, but it was never finalized. Each year the U.S.-Brazil council proposes to both governments that there needs to be a priority at the highest level to finish negotiating a Brazil-U.S.

63. *Brazil*, *supra* note 54.

64. *Id.*

65. See *United States Bilateral Investment Treaties*, U.S. DEP'T OF STATE, <http://www.state.gov/e/eb/ifa/bit/117402.htm> (last visited Apr. 11, 2014).

bilateral tax treaty to increase bilateral investment and trade.⁶⁶ This has continued with the Obama administration.⁶⁷

Brazil was a founding member of Mercosul (The Southern Common Market), a trade agreement between Brazil, Argentina, Paraguay, and Uruguay. A common market adopts a common external tariff (in this case, seventeen percent) and eliminates all barriers (under Mercosul) to trade in goods among its members.⁶⁸ Furthermore, the establishing treaties of Mercosul and the Andean Community note that to grant the status of associate member, a country must sign a free trade agreement with the community. Because the Andean countries signed Economic Complimentary Agreements Nos. 36 (adding Bolivia), 58 (adding Peru) and 59 (agreement with CAN—Columbia, Ecuador, and Venezuela), they became associate members within Mercosul.⁶⁹ The Andean Council of Foreign Ministers expanded its association by granting Associate Membership to Argentina, Brazil, Paraguay, and Uruguay.⁷⁰ Mercosul is in the process of negotiating a free trade agreement with the European Union as part of a bi-regional Association Agreement.⁷¹ The United States has been trying to encourage the Free Trade Agreement of the Americas (FTAA)⁷² to move forward; however, most Mercosul countries are not as interested, instead preferring a WTO solution.⁷³

66. BRAZ.—U.S. BUS. COUNCIL, 2008 PROGRAM OF WORK 5 (2008), available at <http://www.brazilcouncil.org/sites/default/files/Brazil%20Council%20Program%20of%20Work%202008.pdf>.

67. See Gabrielle Trebat, *Calling for a Brazil-U.S. Tax Treaty*, FREE ENTERPRISE (Mar. 13, 2009), <http://www.freeenterprise.com/2009/03/calling-for-a-brazilus-tax-treaty> (discussing the call of the U.S.-Brazil Business Council for a bilateral tax treaty as Presidents Obama and Lula da Silva prepared to meet).

68. Gatti & Associates, *FAQ: Trade Agreements/Preferential Duty Programs*, FINDLAW (Mar. 26, 2008), <http://library.findlaw.com/2000/Jul/1/128983.html>.

69. *CAN-Mercosur*, COMUNIDAD ANDINA, <http://www.comunidadandina.org/ingles/Exterior/mercosur.htm> (last visited May 8, 2014).

70. *Id.*

71. *Countries and Regions: Mercosur*, EUR. COMM'N, <http://ec.europa.eu/trade/policy/countries-and-regions/regions/mercosur> (last updated May 5, 2014).

72. *Free Trade Area of the Americas*, ACTRAV-TURIN LABOR EDUC. PROGRAMME, <http://actrav.itoilo.org/actrav-english/telearn/global/ilo/blokit/ftaa.htm> (last visited May 8, 2014).

73. Mary Robinson, *FTAA: Latin America Deserves Better*, INT'L HERALD TRIB. (Nov. 18, 2003), available at <http://www.commondreams.org/views03/1118-11.htm>.

III. ENERGY CONSUMPTION AND PRODUCTION: AN OVERVIEW

Brazil is a net energy exporter, producing more energy than it consumes. Brazil is the tenth largest world producer of energy but also the eighth largest consumer. The table below shows Brazil's historic Total Primary Energy Consumption (TPEC) and Production (TPEP) in Quads (quadrillion BTU).

Table 5: Total Annual Primary Energy Production and Consumption

	2011	2010	2009	2008	2007	2006	2005	2004	2003	2002	2001
Production	9.93	9.47	8.93	8.56	8.32	8.01	7.67	7.15	7.06	6.70	6.15
Consumption	11.66	11.30	10.43	10.34	10.13	9.70	9.36	9.00	8.66	8.55	8.45

Source: U.S. Department of Energy / U.S. Energy Information Administration⁷⁴

A. Petroleum (Oil)

Brazil discovered oil in 1939 and nationalized its infant oil industry in 1953 with the creation of Petrobras.⁷⁵ With proven reserves of approximately thirteen billion barrels, Brazil now has the second largest reserves in South America.⁷⁶ The largest Brazilian reserves are located offshore in the Campos basin north of Rio de Janeiro—the largest known as Lula is the fifth largest offshore field in the world.⁷⁷ Several of these resources were identified after the

74. *Brazil*, U.S. ENERGY INFO. ADMIN., <http://www.eia.gov/countries/country-data.cfm?fips=br> (last updated May 30, 2013).

75. Peter Millard, *Petrobras Steps Up Drilling at Site of 1939 Discovery*, BLOOMBERG (Feb. 8, 2010, 3:17 PM), <http://www.bloomberg.com/apps/news?pid=newsarchive&sid=aPulE7CJg03w>; see also *Our History*, *supra* note 12.

76. In 2012, Brazil was the largest producer of liquid fuels in South America, and as of January 2013, Brazil had 13 billion barrels of oil reserves. *Brazil*, *supra* note 5, at 2–3.

77. William Pentland, *World's Five Largest Offshore Oil Fields*, FORBES, Sept. 7, 2013, <http://www.forbes.com/sites/williampentland/2013/09/07/worlds-five-largest-offshore-oil-fields>.

1970s energy crisis, but the technology to exploit them only came into existence in the 1980s and beyond; in some cases the technology is still being developed as the fields are in deep offshore waters.⁷⁸ Prior to the 1970s, no major resources of oil and gas had been identified in Brazil. With its small oil resources, the country did not seem to have bright prospects for finding oil, and it produced only around twenty percent of its own daily needs while importing the remainder. Imports peaked at eighty-three percent of total supply. Due to OPEC, Brazil moved as quickly as it could to minimize its dependency on oil imports.⁷⁹ OPEC price increases significantly affected Brazil as it needed to borrow heavily to purchase oil imports. Beginning in the 1980s, Brazil implemented policies to change this energy and economic insecurity.⁸⁰ Petrobras, the national oil company, was encouraged to seek and find domestic resources. As a result of new discoveries, Brazilian oil production rose from 172,000 barrels per day (1979) to over 2.1 million barrels per day of crude (2012) and 2.6 million barrels per day of total liquid products.⁸¹ Brazil has gone from needing to import eighty percent of its oil in the 1970s to a brief period of self-sufficiency from 2008 to 2011 and back to importing approximately ten percent of its total liquid fuels needs.⁸² The U.S. Energy Information Administration estimates that Brazil will produce over 5 million barrels per day by 2021. This is a

78. See generally Giorgio Romano Schutte, *Brazil: New Developmentalism and the Management of Offshore Oil Wealth*, 95 *EUR. REV. OF LATIN AM. & CARIBBEAN STUD.* 49 (2013).

79. Lei No. 2.004, de 3 de Outubro de 1953, *DIÁRIO OFICIAL DA UNIÃO [D.O.U.]* de 3.10.1953 (Braz.) (repealed by Lei No. 9478/97), available at <http://nxt.anp.gov.br/nxt/gateway.dll/leg/leis/1953/lei%202.004%20-%201953.xml>.

80. Tiffany Stecker & ClimateWire, *How the Oil Embargo Sparked Energy Independence—in Brazil*, *SCIENTIFIC AM.* (Oct. 17, 2013), <http://www.scientificamerican.com/article/how-the-oil-embargo-sparked-energy-independence-in-brazil>.

81. *BP Statistical Review of World Energy June 2013*, BP (2013), http://www.bp.com/content/dam/bp/pdf/statistical-review/statistical_review_of_world_energy_2013.pdf; A significant fraction of international petroleum data is in million metric tons. To convert a metric ton of oil into barrels, use the conversion factors at <http://www.bp.com/en/global/corporate/about-bp/energy-economics/statistical-review-of-world-energy-2013/using-the-review/Conversionfactors.html>, 0.1364 metric tons are one barrel.

82. *Brazil: Overview*, U.S. ENERGY INFO. ADMIN., <http://www.eia.gov/countries/cab.cfm?fips=BR> (last updated Oct. 1, 2013).

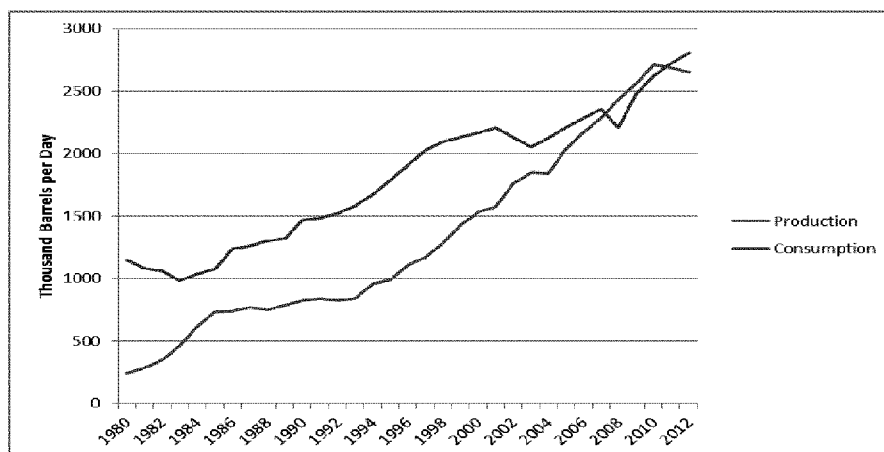
significant increase from today's levels, which will allow Brazil to be a solid oil exporter.⁸³

Table 6: Petroleum Production and Consumption in Brazil,
2002–2012
(In thousands of barrels per day)

	2012	2011	2010	2009	2008	2007	2006	2005	2004	2003	2002
Production (total)*	2,652	2,685	2,712	2,562	2,431	2,284	2,169	2,038	1,839	1,847	1,758
Production (Crude Oil only)	2,061	2,105	2,055	1,950	1,812	1,748	1,723	1,634	1,477	1,496	1,455
Consumption	2,807	2,722	2,622	2,481	2,205	2,355	2,287	2,206	2,123	2,056	2,132

*Total liquid products from oil, natural gas liquids and refinery gains.

Figure 1: Petroleum Production and Consumption in Brazil,
1980–2012



Source: U.S. Department of Energy / U.S. Energy Information Administration⁸⁴

83. *Id.*

Towards the end of this paper, a complete section is offered on Petrobras and the laws relating to the exploration and development of oil and natural gas in Brazil. This section will discuss this topic in greater detail and explain how Brazil's government has changed laws to promote energy security and encourage greater participation of foreign energy companies in finding the energy resources for the future of the country.

B. Natural Gas

Without large natural gas resources, Brazil has lagged behind other countries in the consumption of natural gas. However, in pursuing a policy to diversify its resources and gain for itself greater energy security, Brazil has rapidly increased its use of natural gas. This occurred for several reasons: (1) the intensified search for domestic energy resources led to discoveries of both oil and gas. As of 2013 Brazil had proved reserves of around 14.73 trillion cubic feet (TCF).⁸⁵ (2) Argentina and Bolivia, Brazil's neighboring countries, are rich in natural gas and were willing to export, and Brazil determined that having countries nearby supply natural gas would increase its energy security.⁸⁶ (3) Natural gas is a great energy source for industry and for electricity generation. It is typically cheap and provides a clean burning energy source with great heat content. Electricity demand occurs in cycles with a base and a peak, and natural gas power plants can be fired up quickly making it a great source of peaking power.

Through the early 1990s, Brazilian consumption and production grew in lockstep; however, with the construction of pipelines to supply gas to Brazil from Argentina and Bolivia, it now consumes over 1,000 billion cubic feet (BCF) per year while producing 601

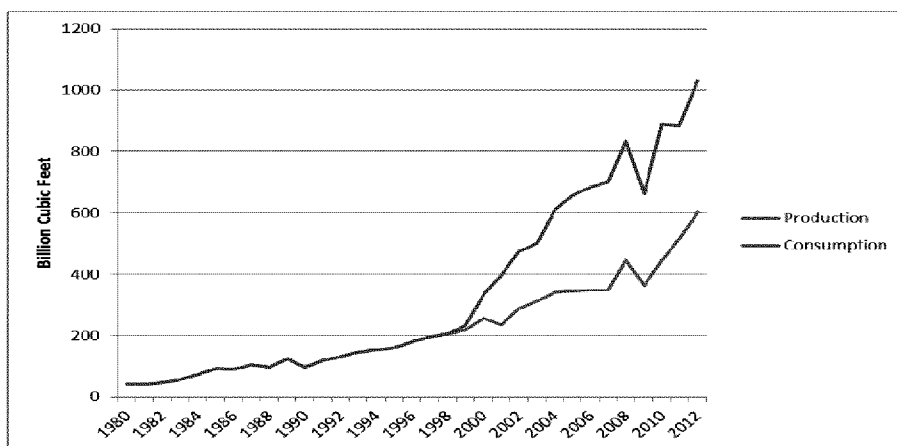
84. *Brazil*, *supra* note 74.

85. *Id.*

86. See generally ADILSON DE OLIVEIRA, INT'L INST. FOR SUSTAINABLE DEV., ENERGY SECURITY IN SOUTH AMERICA: THE ROLE OF BRAZIL (2010), http://www.iisd.org/tkn/pdf/energy_security_south_america.pdf. The South American region was pursuing energy integration in the belief that local sources would provide greater energy supply security. Several countries signed energy integration protocols to restructure their energy sectors to a common vision and common regulatory principles. *Id.*

BCF.⁸⁷ The greatest demand for this gas—and a primary reason why demand grew so rapidly—was due to the greater reliance on gas fired power generation. Due to its heavy dependence on imported oil, Brazil pursued several energy sources, including hydroelectric power. As a result, hydroelectric power now provides over eighty-five percent of electricity generated in Brazil.⁸⁸ This overdependence on hydroelectric power led to power shortfalls because of severe shortages of water (lack of rain) in recent years, meaning the country could not generate sufficient electric power where it was needed, leading to many gas-powered electricity plants and a dependence on imported natural gas, including liquefied natural gas.⁸⁹

Figure 2: Brazil's Natural Gas Production and Consumption, 1980–2012



Source: U.S. Department of Energy / U.S. Energy Information Administration⁹⁰

87. *Brazil: Overview*, *supra* note 82 (natural gas constitutes only a small portion of Brazil's total energy consumption).

88. Hayley Moller, *Hydropower Continues Steady Growth*, EARTH POLICY INST. (June 14, 2012), http://www.earth-policy.org/data_highlights/2012/highlights29.

89. Luis Barrucho, *Brazil Drought Stokes Worries over Energy Shortages*, BBC (Jan. 18, 2013), <http://www.bbc.com/news/world-latin-america-21055803>.

90. *Brazil*, *supra* note 74.

Although a very reasonable and logical step at the time, these new power plants required more natural gas. This pushed Petrobras to build gas pipelines to Brazil from Argentina and Bolivia. Because Argentina and Bolivia are rich in natural gas, this seemed to be a good diversification strategy and a secure source of energy. However, proceeding events would prove this incorrect. Argentina had an economic crisis at the turn of the millennium resulting in its failure to pay foreign debts.⁹¹ This led to a severe economic recession and many companies pulling out or limiting their investments in the country, including energy investments.⁹² Gas production stalled, and with growing domestic demand, the amount of gas available to export to Brazil and Chile grew tighter, and fears that Argentina would not live up to its gas export commitments increased.⁹³ Bolivia too became a major seller of gas to Brazil, with Brazil taking around fifty percent of Bolivia's gas exports. However, energy became a political issue in Bolivia with the election of President Evo Morales in 2005 who decided to nationalize the gas fields in early 2006. Petrobras invested heavily in Bolivia (over \$2 billion) but has publicly stated that it will not invest further.⁹⁴ Thus, two once-reliable suppliers of natural gas have now become unreliable, and the Brazilian strategy of increasing natural gas usage to create a more secure energy diversification strategy away from hydroelectric power may have resulted in a different source of energy insecurity.

C. Electricity and Hydroelectric Power

In pursuing a policy of energy independence, Brazil has made significant strides over the past forty years to increase hydroelectric

91. *Timeline: Argentina's Road to Ruin*, WASH. POST., <http://www.washingtonpost.com/wp-srv/business/articles/argentinatimeline.html> (last visited Apr. 11, 2014).

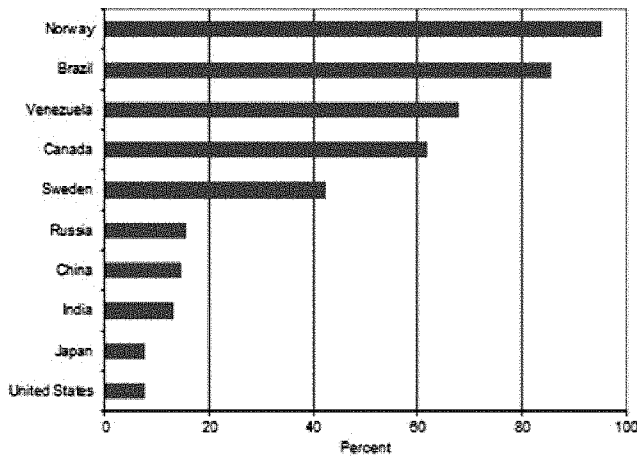
92. See generally *Results of Electricity Sector Restructuring in Argentina*, CTR. FOR ENERGY ECON., http://www.beg.utexas.edu/energyecon/new-era/case_studies/Results_of_Electricity_Sector_Restructuring_in_Argentina.pdf (last visited Apr. 11, 2014).

93. *Toward Energy Security in Chile* 6 (Americas Society/Council of the Americas Energy Action Group, Working Paper, 2012), available at <http://www.as-coa.org/sites/default/files/TowardEnergySecurityInChile.pdf>.

94. Sidney Weintraub, *Bolivia's Natural Gas Nationalization*, ISSUES IN INT'L POL. ECON., May 2006, available at <http://csis.org/files/media/isis/pubs/issues200605.pdf>.

power production from its vast river systems. The Itaipu hydroelectric dam in the south of the country was built in cooperation with Argentina and Paraguay. It is rated at 12,600 MW_e, with its eighteen generating units making it the largest hydroelectric power plant in the Americas and second largest in the world.⁹⁵ In 2012, it produced twenty-five percent of Brazil's electricity consumption and seventy-eight percent of Paraguay's consumption.⁹⁶ Several hydroelectric power plants have also been developed along the Amazon and its tributaries. As a result, Brazil supplies over ninety percent of its electricity with hydroelectric power, a percentage only exceeded in 2011 by Norway as seen in the graph below.⁹⁷

Figure 3: Hydroelectric Power as a Percentage of Total Electric Power



Source: Earth Policy Institute⁹⁸

Due to droughts, it was necessary to implement an energy-rationing program in 2001 to prevent blackouts.⁹⁹ The emergency energy rationing plan was introduced to cut consumer electricity use

95. *Itaipu Binacional*, <http://www.itaipu.gov.br/en> (last visited May 8, 2014).

96. *Itaipú Hydroelectric Power Project, Brazil and Paraguay*, BUILDING THE WORLD, <http://blogs.umb.edu/buildingtheworld/energy/itaipu-hydroelectric-power-project-brazil-and-paraguay> (last visited May 8, 2014).

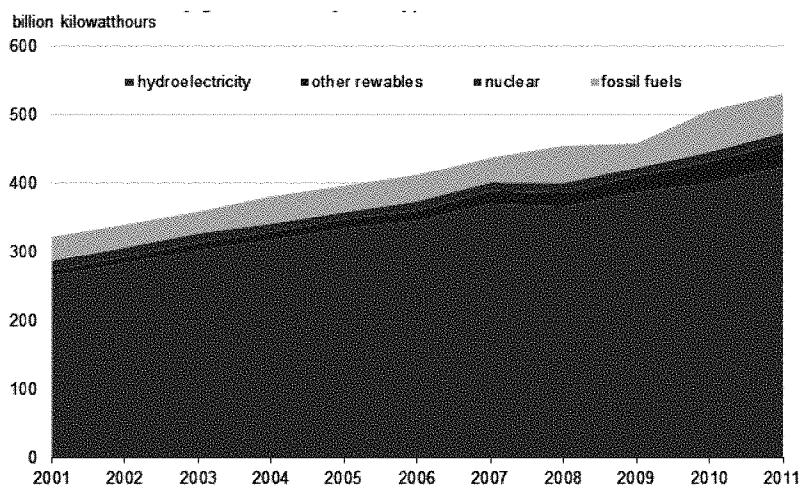
97. Moller, *supra* note 88.

98. *Id.*

99. Hofstrand, *supra* note 8.

by twenty percent.¹⁰⁰ This happened at a bad time as environmental groups were pressuring the government to more carefully examine the environmental impacts of more dams in the Amazon.¹⁰¹ A significant number of gas-fired plants were ordered and installed; however, with renewed rains, several of the power plants were not completed.

Figure 4: Brazil's Electricity Generation, by Source



Source: U.S. Department of Energy / U.S. Energy Information Administration¹⁰²

While Eletrobras¹⁰³ controls half of the generating capacity and other state-owned enterprises account for a significant portion of the remainder, the largest independent power producer is Tractabel

100. *Id.* at 3.

101. *Brazil Reviewing Big Amazon Hydroelectric Plant*, PLANET ARK (Aug. 3, 2001), <http://www.planetark.com/dailynewsstory.cfm/newsid/11890/newsDate/03-Aug-2001/story.htm>.

102. *Brazil*, *supra* note 5, at 10.

103. Eletrobras' official name is Centrais Eléctricas Brasileiras S.A. and was created on June 11, 1962. *About Us*, ELETROBRAS, <http://www.eletrabras.com/elb/data/Pages/LUMIS482AEFCFENIE.htm> (last visited Apr. 11, 2014).

Energia, a subsidiary of France's Suez.¹⁰⁴ Brazil is an electrified country, ninety-seven percent of the population is connected to the electricity network.¹⁰⁵ In order to develop the energy sources that the country needs, Brazil has become very friendly towards foreign energy companies, allowing them to become involved in domestic energy production and ownership of those production resources.¹⁰⁶

D. Bio-Energy, the Pro-Alcohol Program

The Brazilians realized early that they were not blessed with oil and natural gas reserves. As a result, they have been searching for alternative fuels since the 1920s. The focus on bio-energy is due to Brazil having significant agricultural and forest resources. But it would take a crisis to gain the national commitment to implement a bio-fuel program. This happened during the energy crisis of the 1970s when energy prices quadrupled in 1973–74 and tripled in 1979, and Brazil found itself heavily dependent on imported oil for over eight percent of its needs.¹⁰⁷ Feeling insecure, with mounting trade deficits and a balance of payments crisis, the Brazilian government created the National Alcohol Program (PROÁLCOOL) in the 1970s.¹⁰⁸ The program would rely heavily on government subsidies for its implementation.

Implementing the program was very challenging. No country had ever previously implemented an alternative fuels program except in war and economic isolation. The program required that alcohol eventually replace gasoline as a transportation fuel for the automobiles in Brazil. This plan was developed because Brazil is the world's leading producer of sugar from cane sugar, which is cheaper

104. *Centrais Eletricas Brasileiras S.A.*, ENERGY BUS. REV., http://www.energy-business-review.com/companies/centrais_eletricas_brasileiras_s-a-_gd_28146 (last visited May 12, 2014).

105. ORG. FOR ECON. COOP. AND DEV., OECD ECONOMIC SURVEYS: BRAZIL 100 (2005), <http://www.oecd.org/dataoecd/12/11/34427493.pdf>.

106. See generally Erik J. Woodhouse, *The Experience of Independent Power Producers in Developing Countries* (Program on Energy and Sustainable Development, Seminar Draft, 2005), <http://iis-db.stanford.edu/docs/59/Report.pdf>.

107. Nancy I. Potter, *How Brazil Achieved Energy Independence and the Lessons the United States Should Learn from Brazil's Experience*, 7 WASH. U. GLOB. STUD. L. REV. 331, 331 n.2, 341 n.81 (2008).

108. *National Alcohol Program (PROÁLCOOL)*, *supra* note 51.

and far more efficient than sugar from corn (maize).¹⁰⁹ However, Brazil did not have in place the complex infrastructure needed to become an economy run on alcohol. This infrastructure included large sugar cane plantations (industrialized farming), the refining, distribution and sale of large amounts of ethanol, and more importantly, cars adapted or capable of running on ethanol or on gasoline-ethanol blend. By itself, ethanol is highly corrosive to most of the insides of a car engine, evaporating rapidly and at a higher octane rating (less knock, hotter burn), but with a lower energy content (less miles per tank of fuel).¹¹⁰ In order to create a profitable sugar cane-ethanol economy, the Brazilian government had to require automobile manufacturers to develop vehicles capable of running on ethanol.¹¹¹

The program was without comparison worldwide because the infrastructure needed was different from other programs, such as those by Germany and South Africa, which developed programs to produce oil from coal. In the case of Germany and South Africa, once coal was converted to oil it could then be used in the gasoline-diesel based economy. In creating an alcohol-based transport system, however, it would be necessary to re-engineer the car and the gasoline stations and refine a new product. By the mid-1980s, the PROÁLCOOL program was a tremendous success with Brazil producing 10.7 billion liters/year of ethanol (approximately 2.9 billion gallons) and ninety-two percent of new cars being sold in the country that were capable of being powered by this fuel.¹¹² In May 1979, the first sixteen-ethanol stations opened in Brazil, supporting more than 2,000 ethanol-adapted cars.¹¹³ Two months later, Brazil developed the first modern commercial ethanol-power car, the Fiat

109. *Id.*

110. James R. Healey, *E15 Alcohol Fuel Can Wreck Engines, Auto Groups' Data Say*, USA TODAY, May 16, 2012, <http://content.usatoday.com/communities/driveon/post/2012/05/e15-alcohol-wreck-engines-tests-dispute-epa-growth-energy/1>.

111. CLARE R. SEELKE & BRENT D. YACOBUCCI, CONG. RESEARCH SERV., RL34191, *ETHANOL AND OTHER BIOFUELS* 8 (2007).

112. L. G. Oliveira & A. Hira, *The Evolution and Replicability of Biofuels in Brazil: Model or Exception?*, WOODROW WILSON INT'L CTR. FOR SCHOLARS 6 (2009), http://www.wilsoncenter.org/sites/default/files/de%20Oliveira%20-%20final%20version%20-%20The_Evolution_and_Replicability_of_Biofuels_in_Brazil2.pdf.

113. *Id.*

147. Brazil achieved this success by requiring the major auto companies, among them GM, Ford, VW, and Toyota, to develop flex fuel (gasoline-alcohol) and alcohol-only cars. This push prompted the development of this technology and explains why it is presently available in other countries, such as the United States.

However, the program almost failed in the late 1980s and 1990s. Because of a combination of declining international oil prices, increases in the international price of sugar, removal of government subsidies, government intervention in the productive chain of ethanol (excess regulation), and the automobile industry's lack of interest (motivated by profit) to produce ethanol-powered cars that could only be sold in Brazil.¹¹⁴ The auto industry lacked the desire to produce cars because (1) the technology to prevent alcohol from corroding auto parts was expensive and required significant investments; (2) declining oil prices (gasoline prices) combined with rising sugar prices decreased the incentive for consumers to buy ethanol-powered cars; and (3) without government intervention, the number of cars produced and sold that were solely ethanol-powered declined to 0.08% of the cars sold in Brazil by the year 2000 (from a high of ninety-two percent).¹¹⁵

In recent years, ethanol has surged in popularity for the following reasons: (1) U.S. renewable fuel standard (RFS), (2) increasing gasoline/oil prices, (3) the development of a global flex-power engine,¹¹⁶ and (4) the Kyoto Protocol to the United Nations Framework Convention on Climate Change.¹¹⁷ In the United States, under the Energy Independence and Security Act (EISA) of 2007,¹¹⁸ the Renewable Fuel Standard (RFS)¹¹⁹ was expanded to include diesel (as well as gasoline) and increased the volume of renewable fuel blended into transport fuels from nine to thirty-six billion gallons from 2008 to 2022 to reduce greenhouse gases. Under Directive

114. *Id.* at 2.

115. *Id.* at 7.

116. Nicholas Zeman, *Brazil's Flex Power*, ETHANOL PRODUCER MAG. (Feb. 9, 2007), <http://www.ethanolproducer.com/articles/2736/brazils-flex-power>.

117. Kyoto Protocol to the United Nations Framework Convention on Climate Change, Dec. 10, 1997, 37 I.L.M. 22.

118. Energy Independence and Security Act of 2007, Pub. L. No. 110-140, 121 Stat. 1492 (codified as amended in scattered sections of U.S.C.).

119. *Renewable Fuel Standard (RFS)*, U.S. ENVTL. PROT. AGENCY, <http://www.epa.gov/OTAQ/fuels/renewablefuels> (last updated Dec. 10, 2013).

2009/28/EC, the European Union has mandated that bio-fuels be at least ten percent of gasoline by 2020,¹²⁰ which is a boon for the two largest producers of ethanol: the United States and Brazil.¹²¹

Brazil's ethanol production has fluctuated in recent years because of drought conditions¹²² and the global credit crunch has made it more difficult for farmers to obtain loans to replant their sugarcane fields.¹²³ However, the Brazilian government vowed to invest approximately \$30 billion per year from 2011 to 2015 in order to increase ethanol levels.¹²⁴ As the result of decreased sugarcane planting, the minimum ethanol standard in Brazilian gasoline blends has also fluctuated between twenty to twenty-five percent.¹²⁵ In 2011, the Brazilian government lowered the standard to twenty percent but increased it to twenty-five percent in 2013.¹²⁶

As shown in Figure III.B.2-1,¹²⁷ Brazil is currently the largest worldwide exporter of ethanol. Assuming no major changes in the sugarcane industry or political environment, it will likely continue to be a top producer of ethanol.

120. *Renewable Energy: Biofuels and Other Renewable Energy in the Transport Sector*, EUR. COMM'N (July 1, 2013), http://ec.europa.eu/energy/renewables/biofuels/biofuels_en.htm.

121. CHRISTOPH BERG, *WORLD FUEL ETHANOL ANALYSIS AND OUTLOOK* (2004), available at <http://www.distill.com/World-Fuel-Ethanol-A&O-2004.html>.

122. SERGIO BARROS, U.S. DEP'T AGRIC., NO. BR110016, *BRAZIL SUGAR SEMI-ANNUAL 2011 GAIN REPORT 1-2* (2011), http://gain.fas.usda.gov/Recent%20GAIN%20Publications/Sugar%20Semi-annual_Sao%20Paulo%20ATO_Brazil_10-3-2011.pdf.

123. *Regulation of Fuels and Fuel Additives: 2013 Renewable Fuel Standards*, 78 Fed. Reg. 49,794, 49,817 (Aug. 15, 2013) (codified at 40 C.F.R. pt. 80).

124. Guilherme Kfoury, *Brazil to Inject \$30 Billion through 2015 to Prop Up Ethanol Supply*, PLATTS (Feb. 27, 2012, 11:54 AM), <http://www.platts.com/latest-news/oil/london/brazil-to-inject-30-billion-through-2015-to-prop-8987702>.

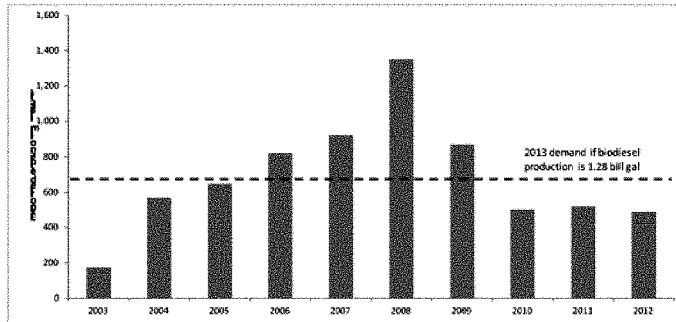
125. Dom Phillips, *Brazil to Raise Ethanol Mix in Gasoline to 25% from 20% May 1*, PLATTS (Mar. 1, 2013, 11:53 AM), <http://www.platts.com/latest-news/oil/riodejaneiro/brazil-to-raise-ethanol-mix-in-gasoline-to-25-8194390>.

126. *Id.*

127. *Regulation of Fuels and Fuel Additives: 2013 Renewable Fuel Standards*, 78 Fed. Reg. 9,282, 9,299 (proposed Feb. 7, 2013) (to be codified at 40 C.F.R. pt. 80).

Figure III.B.2-1

Total Worldwide Exports of Ethanol from Brazil



Sources: USDA Foreign Agricultural Service, "Brazil Biofuels Annual, Annual Report 2012", August 21, 2012,

BR12013. Constanza Valdez, "Brazil's Ethanol Industry: Looking Forward", BIO-02, ERS, USDA, June 2011

The government has continued to promote alternative energy sources. In 2002, the Ministry of Science and Technology implemented the Brazilian Program for the Technological Development of Biodiesel (PROBIODIESEL).¹²⁸ In July 2003, Brazil's new federal government enacted a decree to create an inter-ministerial working group to analyze the possibility of producing and using bio-diesel.¹²⁹ The group concluded that producing Bio-diesel was not only viable but could bring social, environmental, economic and strategic benefits.¹³⁰ With law 11.097 (01/13/2005), bio-diesel was officially introduced in Brazil.¹³¹ The law defined bio-diesel as a

128. *PROBIODIESEL—Brazilian Program of Technological Development for Biodiesel*, WORLD RES. INST., <http://projects.wri.org/sd-pams-database/brazil/probiodiesel-brazilian-program-technological-development-biodiesel> (last visited Apr. 11, 2014).

129. Danielle Torres et al., *The Brazilian Ethanol Industry: An Overview of Its Production, Technology, Location, Land Use, Regulations and Future Prospects*, Presentation at the 15th ICABR Conference: Sustainability and the Bioeconomy 11 (Frascati, Italy, June 26–29, 2011), available at <http://ainfo.cnptia.embrapa.br/digital/bitstream/item/46185/1/The-brazilian-ethanol-TORRES-MARTHA.pdf>.

130. *Id.*

131. Lei No. 11.097, de 13 de Janeiro de 2005, DIÁRIO OFICIAL DA UNIÃO [D.O.U.] de 14.1.2005 (Braz.) (ruling on Biodiesel introduction among Brazil national energy sources). The law was amended by Law No. 11.116 on May 18, 2005. Lei No. 11.116, de 18 de Maio de 2005, DIÁRIO OFICIAL DA UNIÃO [D.O.U.] de 19.5.2005 (Braz.). The law is further explained in Elisa Morgera et al., FAO

“[b]io-fuel derived from the renewable biomass for use in ignition or compression internal combustion engines, or according to regulation, to the generation of another kind of energy, that can replace partially or totally the fossil fuels.”¹³² Biomass is “all plant and plant-derived material.”¹³³ Biomass can be directly burned to produce energy, blended with gasoline to produce a slightly cleaner fuel, or made into a synthetic fuel.¹³⁴

Further legislation was enacted creating tax incentives for bio-diesel production, specifically, Law 11.116 (05/18/2005).¹³⁵ However, the tax incentives are directed at the poorer regions of the country to encourage development and as a form of social welfare. This was done by limiting the incentives to raw materials purchased from family farmers. The incentives depend on the type of oil plant (palm and castor oils are preferred) used and on the region of the country where the plant is cultivated. As an example, the greatest tax benefit can be achieved by producing bio-diesel from castor or palm oil that was cultivated by family farmers living in the poorest regions of the country (North, Northeast, and Semi-Arid).

This is a program that the government intends to use as part of its social policy to promote jobs and economic growth in the distant regions of the country. PROÁLCOOL, on the other hand, was created during a dictatorship, designed to benefit big farmers and plant masters and as an import substitution policy. Another significant difference is that PROBIODIESEL differs from PROÁCOOL regarding subsidies. Whereas the latter was heavily subsidized, the former has no subsidies. According to Law 11.097, as of 2008, any diesel sold in the country will need to have a minimum

Legal Office, Case Studies on Bioenergy Policy and Law: Options for Sustainability 97 (FAO Legislative Study 102, 2009), <http://www.fao.org/docrep/012/i1285e/i1285e03.pdf>.

132. Catherine Aliana Gucciardi Garcez & João Nildo de Souza Vianna, *Brazilian Biodiesel Policy: Social and Environmental Considerations of Sustainability*, 34 *ENERGY* 645, 645.

133. U.S. DEP’T OF ENERGY & U.S. DEP’T OF AGRIC., *BIOMASS AS FEEDSTOCK FOR A BIOENERGY & BIOPRODS. INDUS.: THE TECHNICAL FEASIBILITY OF A BILLION-TON ANNUAL SUPPLY* 16 (2005), https://www1.eere.energy.gov/bioenergy/pdfs/final_billionton_vision_report2.pdf [hereinafter *BTS REPORT*].

134. *Id.* at 16.

135. Gucciardi Garcez & de Souza Vianna, *supra* note 132.

of two percent bio-diesel by content.¹³⁶ This two percent represents over 800 million liters/year. This content mixture increased by law to five percent in 2013, which results in demand for over two billion liters/year of production.¹³⁷ The law led to the planning and construction of many bio-diesel plants in the country; however, bio-diesel may be very expensive in comparison with diesel made from petroleum.

IV. HISTORY OF BRAZILIAN OIL (PETROBRAS)

The history of petroleum in Brazil began in 1858 in the state of Bahia when Decree No. 2266 was signed to allow the extraction of bitumen (oil shale) for the purposes of making kerosene oil for lamps.¹³⁸ In the following decades, a few wells were drilled but no oil was found; rather, the drilling only resulted in dry holes. Up until 1938, the Brazilian oil law would have allowed any company or person from any country to own, operate, produce and distribute oil and its derivative products. However, due to favorable concessions in Mexico, Venezuela, and the Middle East, combined with the unfavorable geology of Brazil, none of the oil majors of the time (Standard Oil and its offspring, along with Royal Dutch Shell) chose to invest in exploration and production in Brazil.¹³⁹

Prior to 1938, any refined products used in Brazil were imported. In 1938, the Brazilian government decided to decree that any potential riches that lie below the surface are owned by the country, and it created the National Petroleum Council (CNP, Conselho

136. Solange Teles da Silva & Carolina Dutra, *Brazilian Policy of Biodiesel: Alternative to Mitigate Effects of Climate Change*, in IUCN CLIMATE LAW IN DEVELOPING COUNTRIES CONFERENCE (2008), at 1, available at http://www.iucnael.org/en/documents/doc_download/99-teles-da-silva-and-dutra-brazilian-biodiesel-policy-mitigation-of-cc-.html.

137. *Id.*

138. Eva C. S. Nunes & Assed N. Haddad, *Waste Management in the Oil and Gas Industry by Brazilian Guideline for Environmental Audits*, 2 AM. J. ENVTL. PROT. 170, 171 (2013).

139. *A História do Petróleo no Brasil [The History of Oil in Brazil]*, CLICK MACAÉ, <http://www.clickmacae.com.br/?sec=109&pag=pagina&cod=98> (last visited Apr. 11, 2014).

Nacional do Petróleo).¹⁴⁰ This would allow for the development of concessions and royalty payments. The first oil deposit was discovered in the region of Lobato in the state of Bahia in 1939.¹⁴¹ While this find was not economically viable, it would lead to further exploration and to finding the first commercial oil fields in the same region in 1941.¹⁴² In 1953, with a daily consumption of 150,000 barrels almost entirely imported, Brazil, under military rule, decided it needed its own oil company.¹⁴³ The industry was nationalized creating Petrobras. In 1954, there were only five refineries in the nation, the largest with a capacity of 20,000 barrels of oil per day (bpd). This led to the construction and opening of a larger refinery with 45,000 bpd of capacity in 1955.¹⁴⁴ Daily production of crude oil was 25,000 bpd.¹⁴⁵ The nationalization and creation of Petrobras left the distribution of the derivative products (i.e., gasoline and diesel) in the hands of the multinationals.¹⁴⁶ With Brazil being highly dependent on oil imports, the development of refining capacity allowed Brazil to regain some control of its destiny in the oil markets and minimize any premium on refined products.¹⁴⁷

The premium existed due to the extra cost of shipping refined products (more volatile, more dangerous) and having to purchase these overseas (imports). These extra costs implied that more hard currency (i.e., U.S. Dollars) would be needed. The concept in Brazil of import substitution was one of (1) more domestic jobs, and (2) the need for less hard currency, as they had a monopoly on the production of their own money.

On October 3, 1953, Law 2.004 was passed, establishing Petrobras as the government's monopoly in all oil and gas activities, including exploration and production, refining, and transport by sea and by pipe.¹⁴⁸ It was passed with ease due to a general feeling among the

140. Erjia Joy Guan, *Understanding Brazil's Oil Industry: Policy Dynamics and Self-Sufficiency*, 2 J. EMERGING KNOWLEDGE ON EMERGING MARKETS 77, 78–79 (2010).

141. *A História do Petróleo no Brasil*, *supra* note 139.

142. *Id.*

143. *Id.*

144. *Id.*

145. *Id.*

146. *Id.*

147. *Id.*

148. *Our History*, *supra* note 12.

people that the military leaders reflected in the popular statement “O Petróleo é Nosso” (“The Oil is Ours”).¹⁴⁹

With these laws the right to find and develop oil was restricted to Brazilians. There were a few rare intervals when foreign companies were allowed to have service contracts with Petrobras. Using foreign consultants in the 1950s and 1960s, Petrobras found fifty-five significant fields. In the 1970s as exploration moved offshore, some very large significant fields were found. Due to OPEC I and II, Brazil moved as quickly as it could to minimize its dependency on oil imports. In 1975, Brazil only produced 200,000 bpd while consuming 835,000 bpd, importing approximately seventy-five percent of its needs.¹⁵⁰ During this period Brazil launched risk contracts designed to encourage foreigners to invest in the discovery of oil within the country and as a means of raising capital. During the 1970s and 1980s, foreign companies would be invited to participate under risk contracts.¹⁵¹ Because Petrobras kept the best exploration areas to itself and sold those that were marginal to foreigners, only a very small oil field was found by foreign investors while Petrobras found ninety fields. As a result, the foreign companies left. This was also encouraged by a new constitution in the 1980s that again prohibited foreign investment in exploration. The offshore finds paid off, and Petrobras has become one of the leading deep-water field producers in the world. As a result, oil production increased nine percent per year to almost 1,000,000 bpd by 1998.¹⁵²

During the 1970s and 1980s, oil companies were actively seeking non-OPEC alternatives both to increase production (and profits) as oil prices were high, and to increase reported reserves. As a result of this and also due to losing reserves in OPEC countries where their

149. Carlos Vogt, *O Petróleo é Nosso [The Oil is Ours]*, COM CIENCIA [IN SCI.], <http://www.comciencia.br/reportagens/petroleo/pet01.shtml> (last updated Dec. 10, 2002).

150. Ronaldo Seroa da Motta et al., *Hydrocarbons in Latin America—Case of Brazil*, INSTITUTO DE ESTUDIOS SUPERIORES DE ADMINISTRACIÓN [INSTITUTE OF ADVANCED MANAGEMENT STUDIES] 11, 42 (2008), http://servicios.iesa.edu.ve/Portal/CIEA/brazil_damotta_d1.pdf.

151. Erjia Joy Guan, *Understanding Brazil's Oil Industry: Policy Dynamics and Self-Sufficiency*, 2 J. EMERGING KNOWLEDGE ON EMERGING MKT. 77, 82 (2010).

152. L. F. Ivanhoe, *Petroleum Positions of Brazil and Venezuela*, HUBBERT CENTER NEWSL., no. 99/3, 1999, at 1, 1–2, available at http://hubbert.mines.edu/news/Ivanhoe_99-3.pdf.

assets had been nationalized, the companies were willing to invest in places such as Brazil.

In 1968, the Brazilian government sold part of Petrobras on the Bovespa (The Sao Paulo Stock Exchange).¹⁵³ The Brazilian government has since reduced its share from 81.7% to 46%, with foreigners owning 35% (allowed to own up to 49.9%) and the remaining 19% owned by investors in Brazil, with American depository receipts listed on the New York Stock Exchange since 1999.¹⁵⁴

With the passing of the New Petroleum Law (described below), Petrobras lost its monopoly to explore and produce inside of Brazil. As a result, the country decided to pursue opportunities in foreign markets. In 2004, Petrobras produced 1.8 million barrels of oil equivalent per day (BOE/D) of oil and natural gas in Brazil while producing 260,887 BOE/D in eight countries, including: Bolivia, Venezuela, Ecuador, and the United States.¹⁵⁵ In August 2005 Petrobras won rights for fifty-three blocks in the Gulf of Mexico, with plans to invest over \$56 billion during the next five years globally to find reserves and raise its global production to 3.4 MM bpd.¹⁵⁶ Despite Brazil achieving self-sufficiency and becoming an oil exporter, Brazil will continue to import lighter crude oil because most domestic refineries can only refine lighter oil.¹⁵⁷ This is because the refineries were built for light oils from the Middle East which

153. Adilson de Oliveira, *Brazil's Petrobras: Strategy and Performance*, in *OIL AND GOVERNANCE: STATE-OWNED ENTERPRISES AND THE WORLD ENERGY SUPPLY* 515, 515–53 (David G. Victor et al. eds, 2012).

154. *Buy Petrobras: Why this \$10 Oil Stock Bargain Could Once Again Be Trading for \$50 in 6 Years*, SEEKING ALPHA (Mar. 19, 2014, 2:05 PM), <http://seekingalpha.com/article/2098233-buy-petrobras-why-this-10-oil-stock-bargain-could-once-again-be-trading-for-50-in-6-years>.

155. *Petrobras Production Falls 0.4% in 2004*, BUS. NEWS AMERICAS (Jan. 12, 2005), http://www.bnamericas.com/news/oilandgas/Petrobras_production_falls_0_7*_in_2004.

156. Genaro Arriagada, *Petropolitics in Latin America: A Review of Energy Policy and Regional Relations* 15 (Dec. 2006) (Inter-American Dialogue, working paper), available at http://www.thedialogue.org/PublicationFiles/1114_IAD%20Andean_Arriagada.pdf.

157. Aditya Malhotra, *Brazil's Oil Future: The New (Big) Kid on the Block*, JOURNAL OF ENERGY SEC. (Apr. 19, 2012), http://www.ensec.org/index.php?option=com_content&id=346:brazils-bright-oil-future&catid=123:content&Itemid=389.

produce lighter fuels, among them gasoline, while Brazil produces heavier oils. The refineries will be upgraded to handle heavy crude oils in the future, but this takes time (shutting down refineries results in greater refined imports) and significant capital investments.

V. THE NEW PETROLEUM LAW OF BRAZIL (1997) LAW No. 9.478

In 1997, a new era of the petroleum industry was launched in Brazil. With the passing of Law No. 9.478 (Petroleum Law), the Petrobras monopoly was terminated and the National Agency of Petroleum was created. This followed the passage of the Constitutional Amendment No. 9 in 1995, which made it possible to contract with state and private companies to carry out the activities defined in Article 177 of the Federal Constitution.¹⁵⁸ These were: (1) exploration and production of oil and natural gas deposits; (2) refining of oil domestically; (3) import and export of products and derivatives pertaining to the first two; and (4) the transport of crude oil and its derivatives by ocean or pipeline. The most important change was that the new § 1 of Article 177 does not discriminate between local or foreign capital interested in participating in a project. This new law attracted significant interest from foreign oil companies who set up Brazilian operations.¹⁵⁹

Law No. 9.478 (Petroleum Law) established concession agreements for the extraction of oil from Brazilian sedimentary basins by foreigners through a bidding process.¹⁶⁰ Under the concession agreement, the foreign entity would agree to take the risk of exploration in exchange for the exclusive right of use to a block auctioned by the National Petroleum Agency (ANP).¹⁶¹ The ANP was created specifically to supervise the bidding process for oil concession agreements and to regulate petroleum activity in the country, for both upstream and downstream activities. The Petroleum Law has three major requirements for foreign oil companies

158. Marilda Rosado de Sá Riberio, *The New Oil and Gas Industry in Brazil: An Overview of the Main Legal Aspects* 36 TEX. INT'L L.J. 141, 144 (2001).

159. See generally BAKER & MCKENZIE, *DOING BUSINESS IN BRAZIL* (2006), available at http://www.csb.uncw.edu/people/eversp/classes/BLA361/Intl%20Law/Additional%20Research/dbi_brazil2006.pdf.

160. Lei No. 9.478, de 6 de Agosto de 1997, DIÁRIO OFICIAL DA UNIÃO [D.O.U.] de 7.8.1997 (Braz.).

161. *Id.* art. 26.

interested in bidding and, subsequently, extracting oil from Brazil. First, the foreign entity must incorporate and maintain headquarters in Brazil as well as meet the country's technical, economic, and legal requirements.¹⁶² The National Fuel Department was immediately dissolved and its assets and liabilities were transferred to the ANP.¹⁶³

Although Petrobras is no longer wholly an extension of the Brazilian government, the government and its agencies still own a fair amount of shares in the company (48.89%).¹⁶⁴

A. Opening of Lottery / Bid Process for Concessions

In 1999, the government, under the ANP, re-opened petroleum exploration to the private sector through concession and tendered twenty-seven exploration blocks. Then on June 7, 2000, the ANP successfully auctioned an additional twenty-three onshore and offshore exploratory blocks to consortiums representing forty-four companies, marking a second successful round of licensing for the government. In two short years the Brazilian Petroleum industry underwent a significant transformation with the entrance of foreign multinationals and subsequent competition. The result is an industry more integrated into the global market, leading to self-sufficiency.¹⁶⁵

B. All Bidders Treated Equally

By opening up to foreign and domestic capital, Brazil has an excellent opportunity to become self-sufficient in petroleum production. The National Petroleum Agency was created as an independent agency responsible for supervising Petrobras, guarding the public interest, carrying out national energy policies (taken away from Petrobras), and issuing concessions that are open to free

162. Giovanni Loss et al., *Oil & Gas 2013 Reference*, *LATIN LAWYER* (May 1, 2013), <http://latinlawyer.com/reference/topics/47/jurisdictions/6/brazil>.

163. See PAULO CÉSAR RIBEIRO LIMA, *PETROLEUM CONTRACTS FOR BRAZILIAN PRE-SALT EXPLORATION*, http://www.aslegis.org.br/aslegisoriginal/images/stories/artigospeessoais/Publicacoes-Artigos-pessoais-Politica-Energetica-IV/Apresentacao_Subsea_Rio_Setembro_2009.pdf (last visited Mar 21, 2014).

164. PETROBRAS, *ANNUAL REPORT (FORM 20-F) 112 (2013)*, available at <http://investidorpetrobras.com.br>.

165. See generally Michael Nelson Veiga Zazzaro, "O Petróleo É Nosso!" (The Oil is Ours): An Investigation of Brazil's Petrobras, (unpublished honors thesis, Wesleyan University), available at http://wescholar.wesleyan.edu/cgi/viewcontent.cgi?article=2129&context=etd_hon_theses.

competition. The only exception to the policy of free competition on all concessions is Article 34, which reserves for Petrobras those areas where it has already made considerable investments.¹⁶⁶ The Petroleum Law has three major requirements for foreign oil companies interested in bidding and, subsequently, extracting oil from Brazil.

First, the foreign entity must incorporate and maintain headquarters in Brazil as well as meet the country's technical, economic, and legal requirements.¹⁶⁷ Second, the ANP receives signing bonuses, royalties, and payment for occupation of the area from the foreign bidder under Article 45.¹⁶⁸ The signing bonus is established in the notice to bid and will be payable upon the concession agreement's execution.¹⁶⁹ Royalties vary between five and ten percent, depending on geological risks and production expectations.¹⁷⁰ The level of royalties is established by the ANP when the notice to bid is published.¹⁷¹ The payment for occupation or retention is made annually and is calculated by per square kilometer of the contracted block.¹⁷² The special participation is established in cases where high profit or production volume is anticipated. Individual landowners have the right to proportional participation at a rate that will vary between 0.5 to 1% of the petroleum or natural gas production. Third, foreign entities must agree to use a minimum percentage of goods and services from Brazilian suppliers.¹⁷³ For each round of bidding,

166. The Regulation of the Petroleum Industry in Brazil: Law No. 9478 of August 6, 1997, available at http://www.anp.gov.br/brasil-rounds/round1/Docs/LD OC01_en.pdf; ANP, LEGISLATION FOR EXPLORATION AND PRODUCTION OF OIL AND NATURAL GAS (2010), <http://www.eisourcebook.org/cms/Brazil,%20Exploration%20and%20Production%20of%20Oil%20&%20Gas%20Legislation.pdf>.

167. Giovanni Loss et al., *Brazil*, LATIN LAWYER (Apr. 11, 2013), <http://latinlawyer.com/reference/topics/47/jurisdictions/6/brazil>.

168. Lei No. 9.478, de 6 de Agosto de 1997, DIÁRIO OFICIAL DA UNIÃO [D.O.U.] de 7.8.1997 (Braz.).

169. *Id.* art. 46.

170. *Id.* art. 47.

171. *Id.* art. 47, § 1.

172. *Id.* art. 51.

173. Victor Galante, *Local Content in Brazil*, in MAYER BROWN GLOBAL ENERGY INDUSTRY REVIEW 3, 3–4 (Marc Folladori et al. eds., 2013), http://www.mayerbrown.com/files/Publication/e438b649-0ecb-489b-b678-fb34c1804891/Presentation/PublicationAttachment/dde38aad-f0f2-467b-b0e4-b429832d8f06/GEI-Review_Spring-2013.pdf.

the minimum local content is reproduced in Table 6.¹⁷⁴ Each foreign company must identify in its bid the local content percentage intended during the exploration and development phases.¹⁷⁵

Table 7: Minimum Percentage of Local Content Required under Tender Rounds¹⁷⁶

Rounds	Deep Water		Shallow Water		Onshore	
	Exploration	Development	Exploration	Development	Exploration	Development
1st–4th	0	0	0	0	0	0
5th–6th	30%	30%	50%	60%	70%	70%
7th–9th	37%–55%	55–65%	51%–60%	63%–70%	70–80%	77–85%
10th	–	–	–	–	70–80%	77–85%
11th	37%–55%	55%–65%	51%–60%	63%–70%	70–80%	77–85%

All concessions are issued through a bid process. There are two parts to the concession, the first being an exploration phase. If successful the company owning the concession moves to the second phase, development and production, for which plans are due to the ANP for approval during the 180-day approval period.¹⁷⁷

Further instructions and definitions of the State Participation as described above are contained in Decree No. 2705 (issued August 3,

174. *Id.* at 4. The Eleventh Round was updated with the following: AGÊNCIA NACIONAL DO PETRÓLEO, GÁS NATURAL E BIOCOMBUSTÍVEIS, PRELIMINARY TENDER PROTOCOL FOR GRANTING CONCESSION CONTRACTS FOR EXPLORATION AND PRODUCTION OF OIL AND NATURAL GAS 37 (2013), <http://www.mattosfilho.com.br/DraftTender.pdf>. www.mattosfilho.com.br/DraftTender.pdf.

175. João Luis Ribeiro de Almedia & Katherine E. Gibson, *Brazil Onshore Private Oil & Gas Transactions*, 18 ROCKY MTN. MIN. L. INST. 10 (2011).

176. Victor Galante, *Local Content in Brazil*, in MAYER BROWN GLOBAL ENERGY INDUSTRY REVIEW 3–4 (Marc Folladori et al. eds., 2013), http://www.mayerbrown.com/files/Publication/e438b649-0ecb-489b-b678-fb34c1804891/Presentation/PublicationAttachment/dde38aad-f0f2-467b-b0e4-b429832d8f06/GEI-Review_Spring-2013.pdf.

177. Lei No. 9.478, de 6 de Agosto de 1997, DIÁRIO OFICIAL DA UNIÃO [D.O.U.] de 7.8.1997 (Braz.).

1998).¹⁷⁸ This decree establishes definitions of terms and any technical issues, such as how ANP will control monies received from production until they are transferred to the Federal Government.¹⁷⁹

C. Termination of Contracts

Termination of contracts may occur under the following conditions: (1) if no petroleum is found; (2) if the concessionaire during exploration chooses to quit and return its concession; (3) if the contractual period expires; (4) by agreement between the concessionaire and the ANP; and (5) by the termination clauses within the concession contract. Reviewing the concession contract is very important prior to signing (there seems to be flexibility before the final drafting of the agreement) as the ANP will follow the contract strictly to ensure equality among participants, and there will be no recourse.¹⁸⁰

D. Natural Gas

Law 9.478 covers not only petroleum, but also natural gas. Natural gas can be found in separate fields or as an associated product in an oil field. The rules and procedures to be followed for natural gas are the same as those for petroleum. The only difference between oil and natural gas in Brazilian law is that to-date natural gas provides a small fraction of the energy needs of Brazil, around eight percent, but is expected to grow. Natural gas may provide the greatest opportunities for investors due to projected demand levels and the current modest supply. With the opportunities to invest private capital into exploration and transportation, the concessionaire has the ability to take part in a developing and rapidly growing industry.

E. Concession Areas / Potential

In a 2005 study, the Federal University of Bahia (UFBA) along with the State University of Campinas (Unicamp) analyzed potential claims Petrobras could request from the ANP on concessions where it

178. Rafael Schechtman, *Government Take Under the Oil Law*, AGÊNCIA NACIONAL DO PETRÓLEO, <http://www.anp.gov.br/brasil-rounds/round1/Rnd1Restricted/Docs/govttake.pdf>.

179. *Id.*

180. *Id.*

has extensive investments. The study concluded that Petrobras could retain around sixty-eight percent of its initially claimed areas, covering 10.5% of the sedimentary basins existing in Brazil. Following the ANP concession grant, only 7.1% of the sedimentary basins remain under Petrobras control, making almost ninety-three percent of the sedimentary basins in Brazil available for bids and concessions.¹⁸¹

F. Bidding / Lottery News Update

The ANP has successfully offered concessions in eleven rounds, and companies have been jumping over each other to participate. One hundred fourteen domestic and foreign companies qualified to bid for 1,134 exploratory blocks in thirty-four sectors of the country's fourteen sedimentary basins during the first seven bids.¹⁸² Forty-four of the companies are participating in Part A of the auction, the exploratory blocks with risk potential.¹⁸³ Of the 114 companies that are eligible, ninety are domestic and twenty-four are foreign.¹⁸⁴ Many of the domestic companies are participating for the first time. Among the foreign companies are: Esso (Exxon), Shell, Chevron, Amerada Hess, Devon, El Paso, ENI, Kerr-McGee, Repsol, and Total.¹⁸⁵

In Round 7 alone, 251 blocks (exploratory blocks with risk potential) were offered. Of those, Petrobras bid and won the most, a total of ninety-six. Also participating and winning were BG Group, Repsol-YFP, and Devon Energy, seeking blocks with the highest potential for natural gas. Approximately 1.09 billion Reals was paid (\$484 million) for the concessions.¹⁸⁶ Several blocks were

181. BNDES, CHANGES IN THE BRAZILIAN PETROLEUM INDUSTRY, NO. 29, at 1 (1998), http://www.bndes.gov.br/SiteBNDES/export/sites/default/bndes_en/Galerias/Download/studies/petro.pdf.

182. *Former Rounds Overview*, NAT'L PETROLEUM AGENCY, http://www.anp.gov.br/brasil-rounds/round8/geral_english/RESUMO_geral_R8.asp (last visited Apr. 11, 2014) (click "Brasil Round 0 (1998)" through "Brasil Round 7 (2005)").

183. *Id.*

184. *Id.*

185. Nielmar de Oliveira, *Oil Exploration Bidding in Brazil Brings Record Number of Companies*, BrazzilMag (Oct. 2005), <http://www.brazzilmag.com/news/29/4228-oil-exploration-bidding-in-brazil-brings-record-number-of-companies.html>.

186. *Former Rounds Overview*, *supra* note 182 (click "Brasil Round 7 (2005)").

particularly interesting due to their proximity to large known reserves. Some of the bidders teamed up together to share the risk and rewards.

G. Production Sharing Agreements

Since Brazil discovered a potentially lucrative new source of oil in the pre-salt regions, it enacted two new laws in 2010 to manage oil extractions in those areas. Law 12.304 created the agency, Pre-Sal Petroleo S.A. (Pre-Sal), to administer the new Production Sharing Agreements (PSA).¹⁸⁷ Article 10 of Law 12.351 established a joint venture between Petrobras and foreign oil companies with the equity percentages being thirty percent and seventy percent, respectively, on all pre-salt blocks auctioned.¹⁸⁸

The eleventh round of bidding in October 2013 was the first time Brazil used the new PSAs.¹⁸⁹ Foreigners must bear all the risks for developing the newly found area,¹⁹⁰ which is estimated to total over \$82 billion USD over the 35-year terms of the PSAs.¹⁹¹ If oil is discovered in the pre-salt block, the development and production expenses will be reimbursed from a percentage of oil sales.¹⁹² The remaining profit will be shared between Pre-Sal and the state.¹⁹³ Unlike the Concession Agreement, Pre-Sal only requires a signature bonus to be paid after signing the PSA and royalties, both of which cannot be reimbursed by oil revenue.¹⁹⁴ Like the Concession Agreement, there are also minimum local content requirements for the pre-salt block bidding.¹⁹⁵

187. Lei No. 12.304, de 2 de Agosto de 2010, DIÁRIO OFICIAL DA UNIÃO [D.O.U.] de 3.8.2010 (Braz.).

188. Lei No. 12.351, de 22 de Dezembro de 2010, DIÁRIO OFICIAL DA UNIÃO [D.O.U.] de 23.12.2010 (Braz.).

189. Cameron McKenna et al., *Brazil—Results of the 1st Pre-Salt Licensing Round*, LEXOLOGY (Oct. 24, 2013), <http://www.lexology.com/library/detail.aspx?g=b0eec86d-015b-4028-8b85-26848d4e5545>.

190. Luciana P. Braga & Alexandre S. Szklo, *The Recent Regulatory Changes in Brazilian Petroleum Exploration and Exploitation Activities*, 7 J. WORLD ENERGY L. & BUS. 120, 132 (2014).

191. McKenna et al., *supra* note 189.

192. *Id.*

193. *Id.*

194. Braga & Szklo, *supra* note 190, at 16.

195. McKenna et al., *supra* note 189.

Because of the onerous requirements by Pre-Sal, there were few bids for the pre-salt regions in comparison to the Concession offshore sedimentary basins' seventy-one bidders.¹⁹⁶ Eleven foreign entities registered, but only one consortium bid.¹⁹⁷ The consortium consisted of the sharing of equity stakes by Royal Dutch Shell (twenty percent), France's Total S.A. (twenty percent), China National Petroleum Corporation (ten percent), China National Offshore Oil Corporation (ten percent),¹⁹⁸ and the remainder to Petrobras as required by law. There was speculation that the Chinese oil companies did not bid in the Concession sedimentary basin round because they were planning to target the PSA pre-salt round,¹⁹⁹ but it appears that most Chinese companies also declined to participate in the more risky PSA bidding process.²⁰⁰ Since oil sales from the pre-salt region will probably not be available until 2021,²⁰¹ most foreign entities are probably taking the more conservative "wait and see" approach.

Overall, the lottery rounds have been a great success. Beginning in 1999 with Round 1 and continuing through October 2013 with Round 11, the rounds have resulted in additional revenue to the government, successful actions, and significant foreign interest and participation. More lotteries are planned, and it is believed that many more companies will participate.

H. Operating in Brazil

Prior to the New Petroleum Law of 1997, Petrobras had a monopoly on the upstream (the refining of oil and distribution of refined products). Foreign companies were able to participate in the

196. *Brazilian 11th Licensing Round 2013—Results*, DELOITTE, http://www.psg.deloitte.com/newslicensingrounds_br_130520.asp (last visited Apr. 11, 2014).

197. McKenna et al., *supra* note 189.

198. *Id.*

199. Speculation confirmed by Magda Chambriard, Brazil's oil and gas regulator. Cameron McKenna et al., *Results of the 11th Oil and Gas Licensing Round*, LEXOLOGY (May 16, 2013), <http://www.lexology.com/library/detail.aspx?g=3735b66c-3eb8-4013-ac0e-054813cacc3c>.

200. *Id.*

201. Peter Millard, *US Producers Skip Brazil's Biggest Oil Find as Chinese Compete*, BLOOMBERG (Sept. 19, 2013, 9:07 PM), <http://www.bloomberg.com/news/2013-09-20/us-producers-skip-brazil-s-biggest-oil-find-as-chinese-compete.html>.

downstream, and it was common to see Esso, BP, Shell, and other name brand company gas stations, along of course with Petrobras. With the law, foreign companies are now able to participate in the upstream. As part of the law, the economy underwent deregulation of oil and gas prices. The consumer market pays world prices, and now so do the refineries. Trade restrictions are removed on the export of oil and gas as long as one participates in the concession process. Brazil does not have the refineries to process all of the heavy crudes produced, but does offer a ready large market for lighter crude oils. Foreign companies can export and import crude oil and derivative products as long as they are in compliance with all government requirements. As of 2006, the corporate income tax rate is fifteen percent; this is the standard rate. If a company makes more than R\$ 240,000,²⁰² there is a ten percent surcharge. There is also an eight percent social contribution on net income.

Compared to other Latin American countries, Brazil is very well placed as a growth market and as a market to invest in for exploration and production, as the table below illustrates.

Table 8: Rating South American Countries in Terms of Energy Opportunities

Country						
	Control	Operating Framework	Privatization	Pricing and Sales	Trade Restrictions	Fiscal Framework
Argentina	C	C	C	C	D	A
Brazil	A	A	A	B	B	C
Columbia	A	A	A		A	A
Ecuador	A	B/D	A	C	D	A
Venezuela	A	A/D/B	A	A	C	A

202. R\$ is a sign for Reals, the currency of Brazil.

Table rating key players in South America from World Energy.²⁰³

According to World Energy, when it comes to control, operating framework, and privatization, Brazil performs very well. With pricing and sales along with trade restrictions eliminated these ratings will be upgraded to As. The primary challenge is the fiscal framework, as Brazil has a history of monitoring and controlling foreign exchange. However, this was changed with the new legislation and therefore companies participating in the auctions were given the right to send foreign exchange abroad. This legislative change, combined with the opportunity to export (oil), should ease the minds of many foreign companies, and this may be the primary reason so many participated in the seven rounds to-date.²⁰⁴

Brazil's tax structure is not a simple one. Companies such as Shell and BP are working to overcome these issues by presenting proposals to the Minister of Mines and Energy to simplify the tax structure to encourage further investment. The concern with the current tax structure is that it seems that Brazil does not take into account the different grades of oil and water depth (offshore exploration) in determining tax rates, royalties, and other payments. The ANP agreed and seems to be supportive of this effort.²⁰⁵ By taking into account different grades of oil and the different costs to explore fields, both onshore and offshore would be taken into consideration, thereby equalizing the opportunities.

In the first Round, ANP put in place rules that were quite restrictive. These included taxes on imported equipment for prospecting (increases costs of finding oil, lowers bid prices) and the length of time that winners will have to declare their blocks commercially viable. In most of the cases, companies (including Petrobras) were granted less than three years to prospect and

203. *The Benefits and Deficiencies of Energy Sector Liberalization: Upstream Oil and Gas*, WORLD ENERGY COUNCIL, available at <http://igs.nigc.ir/STANDS/ARTIC/NG-57.PDF>.

204. *Id.*

205. *Shell and IBP Work to Overcome Brazil's Difficult Tax Structure*, ALEXANDER'S OIL & GAS CONNECTIONS (Apr. 9, 2003, 2:00 AM), <http://www.gasandoil.com/goc/company/cnl31856.htm>.

research.²⁰⁶ If they failed to do so, they were required to return the property rights to ANP.²⁰⁷ However, after companies complained about these restrictions, cooperation between the government and foreign companies sought to reduce the tax burden to encourage increased investment.²⁰⁸ Taxes on imported equipment were lifted until Jan 1, 2006, while others were lessened. This was further extended due to complaints by foreign oil companies investing in Brazil and by ANP realizing that the taxes reduce the value of bids and interest of companies in participating in the auction process. Additional changes were also made to encourage companies to begin extraction quickly rather than wait and fail to produce the resources. Perhaps the most surprising to analysts was that the ANP was willing to listen and change as needed.

VI. CONVENTIONS, AGREEMENTS, AND BRAZIL'S OPENNESS TO INVESTMENT²⁰⁹

Companies sign a standard contract with the ANP, and the majority of the details relating to the deal are posted prior to the bidding. However, there is a process that allows a firm to discuss final terms prior to signing the contract. The ANP does not participate in operating decisions, rather environmental and other laws need to be followed, and companies may do as they wish with the oil after paying royalties, taxes, and costs. In order to increase domestic oil production, Brazil has encouraged openness to foreign investment.

A. Foreign Investment Openness

The 1962 Foreign Capital Law and subsequent amendments govern most foreign investments. Foreigners have been able to invest

206. See generally SPECIAL TENDER COMMITTEE, ANGÊNCIA NACIONAL DO PETRÓLEO—ANP, FINAL TENDER PROTOCOL: BRAZIL ROUND (1999), http://www.anp.gov.br/brasil-rounds/round1/Docs/Edital_en.pdf.

207. *Id.*

208. Denis Allan Daniel, Chairman of the Rio Legal Committee, British Chamber of Commerce and Industry in Brazil, Conclusions from the Tax Workshop held by the Rio Legal Committee (Sept. 15, 2004) (“The Impact of Taxation of Investments in the Energy Sector.”).

209. *Brazil: 2005 Investment Climate Statement*, CABLEGATE SEARCH, <http://www.cablegatesearch.net/cable.php?id=05BRASILIA119> (last visited Apr. 11, 2014).

in the stock market since 1991. In 1995, the Brazilian Congress approved legislation eliminating the distinction between foreign and domestic capital.²¹⁰ Overall investment is encouraged, and areas such as petroleum, telecommunications, mining, power general, and transport have been opened to investors. Although there are restrictions on the banking sector and these are only approved on a case-by-case basis, it seems most proposals for entry or expansion have been approved. Foreign banks account for around a third of the assets. From 1991 to 2002, Brazil sold more than \$100 billion in assets, the world's largest privatization drive.²¹¹ However, since then privatization has slowed. In the early 1990s, Brazil needed foreign direct investment (FDI) to assist its balance of payments; however, since moving to surplus, this is no longer a priority. Trade barriers have declined significantly, with tariffs declining from an average of sixty percent in 1987 to fifteen percent by 1998.²¹²

B. Conversion and Transfers

Few restrictions exist on converting or transferring funds that are associated with an investment. Foreign investors can freely convert Brazilian currency to other currencies. However, investors must register their investment with the Central Bank within thirty days of the inflow of resources into Brazil. Once registered, dividends can be remitted along with capital gains and royalties. These can be carried out by submitting documentation that applicable taxes have been paid.

Foreign loans no longer need advance approval, and neither do payments of interest and capital. Any capital gain remittances will be subject to a fifteen percent withholding tax to ensure taxes are paid.²¹³ However, the repatriation of the initial investment is exempt

210. *Brazil: A Primer for Canadian Exporters and Investors*, THE CAN. TRADE COMM'R SERV. (Sept. 2013), <http://www.tradecommissioner.gc.ca/eng/document.jsp?did=146246&cid=723&oid=136&pedisable=true>.

211. *Brazil: 2006 Investment Climate Statement*, U.S. DEP'T OF STATE, available at <http://2001-2009.state.gov/e/eeb/ifd/2006/61964.htm> (last visited Apr. 11, 2014).

212. NINA PAVCNİK ET AL., TRADE LIBERALIZATION AND LABOR MARKET ADJUSTMENT IN BRAZIL 2 (2002), <http://elibrary.worldbank.org/doi/pdf/10.1596/1813-9450-2982>.

213. KPMG, BRAZIL 2 (2011), <http://www.kpmg.com/Global/en/IssuesAndInsights/ArticlesPublications/Documents/thinking-beyond-borders-2011/ies-tbb-2011-brazil.pdf>.

from income tax. While Brazil has no double taxation treaty with the United States,²¹⁴ it does have in place these treaties with several other countries from Europe, along with Canada and Argentina.

C. Expropriation and Compensation

Brazil has never expropriated property; however, there is a case where a state government sought and obtained a court ruling canceling contractual obligations.²¹⁵ These land expropriations by state agencies have proceeded through Brazilian courts and been judged by those courts in favor of the U.S. citizens involved. However, because of appeals by the states, no compensation has been paid, and as the Brazilian justice system moves slowly, these appeals remain undecided.²¹⁶

D. Dispute Settlement

Brazil signed (Aug 5, 1979) and ratified (August 31, 1995) the Inter-American Convention on Extraterritorial Validity of Foreign Judgments and Arbitral Awards.²¹⁷ However, Brazil is not a member of the International Center for Settlements of Investment Disputes. Brazil did sign the New York Convention in 1958 on the recognition and enforcement of foreign arbitration awards. Arbitration clauses are not automatically enforced, yet the government signs these contracts and abides by them. Due to legal controversy over whether a sovereign can sign these, however, the Bilateral Investment Agreements that Brazil has with fourteen countries (not including the United States) have been upheld (not implemented but followed).²¹⁸

214. Patrick Temple-West & Alonso Soto, *U.S.-Brazil Tax Deal Advances Anti-Tax Evasion Dragnets—Lawyers*, <http://www.reuters.com/article/2013/03/22/usa-tax-brazil-fatca-idUSL1N0CCDN120130322>.

215. USA INT'L BUS. PUBL'NS, BRAZIL TAX GUIDE: VOLUME 1, STRATEGIC AND PRACTICAL INFORMATION 170 (2013).

216. *2013 Investment Climate Statement—Brazil*, U.S. DEP'T OF STATE (Feb. 2013), <http://www.state.gov/e/eb/rls/othr/ics/2013/204608.htm>.

217. Inter-American Convention on Extraterritorial Validity of Foreign Judgments and Arbitral Awards, May 8, 1979, 18 I.L.M. 1224.

218. Leany Barreiro Lemos & Daniela Campello, *The Non-Ratification of Bilateral Investment Treaties in Brazil: A Story of Conflict in a Land of Cooperation*, CONTEXTO INTERNACIONAL (forthcoming).

Additionally, a bankruptcy code exists, modeled on the U.S. bankruptcy code, allowing for debtors to negotiate a restructuring with creditors outside of the courts.²¹⁹

E. Tax Incentives

Some regions of the country have tax incentives to encourage investment and development, such as the Manaus Free Trade Zone. To benefit from one of these, a company is required to have at least two-thirds of its staff be nationals who are earning two-thirds of the total payroll. There is an exemption for foreign specialists so that their payroll is not counted in the total payroll and therefore payroll ratio.

F. Private Ownership

Foreigners and nationals can establish, own, sell and close business enterprises.

VII. U.S. AND BRAZILIAN ENERGY

The United States started using corn-based ethanol as an additive in the 1970s because of the mandate by the Environmental Protection Agency (“EPA”) to replace all lead additives in sold gasoline.²²⁰ Like Brazil, the United States was also affected by the 1970s oil price hikes as well as lobbying interest in hedging against low crop prices in commodity markets.²²¹ The drop in oil supplies because of the 1973 oil embargo by OPEC²²² as well as the political instability in Iran²²³ made the United States reconsider its reliance on foreign energy sources.

219. John Knapp, *The New Brazilian Bankruptcy Law—Nova Lei de Falências e Recuperação de Empresas, Law No. 11101*, ABI COMM. NEWS (Int’l Committee, Am. Bankr. Inst.), Jan. 2008, available at <http://www.abiworld.org/committees/newsletters/international/Vol5num1/Brazil.html>.

220. See Control of Lead Additives in Gasoline, 38 Fed. Reg. 33,734 (Dec. 6, 1973) (codified at 40 C.F.R. pt. 80).

221. See Theresa Braine, *Subsidizing the Surplus*, NATION, Aug. 4–11, 1984, at 78.

222. See DANIEL YERGIN, *THE PRIZE: THE EPIC QUEST FOR OIL, MONEY, AND POWER* 633–34 (1991). OPEC is a cartel of oil suppliers that determines production levels as well as international oil prices.

223. *Id.* at 684–90.

The United States implemented the Energy Security Act of 1980 to offer loans to small ethanol manufacturers so that there would at least be a ratio of 1:10 of ethanol to gasoline supplies by 1990.²²⁴ The loan program was extended in 2008 under the Food, Conservation, and Energy Act, which also offered loans to manufacturers developing bio-fuels.²²⁵ Since 1978, the United States has also encouraged ethanol manufacturers by exempting producers from the federal motor fuels tax.²²⁶ In conjunction with those Acts, the United States also enacted protectionist tariffs against foreign imports of ethanol.²²⁷ It was not until 2012 that the United States removed those tariffs in response to Brazil's own lift in 2010.²²⁸ In 2000, the U.S. Department of Agriculture created the Commodity Credit Corporation Bio-energy Program, which offered cash payments to ethanol producers as a solution to crop surpluses.²²⁹ To further encourage ethanol supplies, the Energy Policy Act of 2005 required 7.5 billion gallons of ethanol production in 2012.²³⁰ Because of the lack of infrastructure for ethanol-only fuels,²³¹ ethanol has usually only been used as a non-toxic five to ten percent additive to gasoline in the United States.²³²

A. U.S.-Brazil Cooperation

Both countries have explored ethanol production in order to reduce their dependence on fluctuating oil imports, stimulate their agricultural economies, and improve air quality. In 2007, both countries signed a Memorandum of Understanding (MOU) to

224. Energy Security Act of 1980, Pub. L. No. 96-294, 94 Stat. 611 (1980) (codified in scattered sections of 2, 5, 7, 10, 12, 15, 16, 30, 42, and 50 App. U.S.C. (2012)).

225. The Food, Conservation, and Energy Act of 2008, Pub. L. No. 110-246, 122 Stat. 1651 (2008) (codified as amended in scattered section of U.S.C.).

226. James A. Duffield et al., *Ethanol Policy: Past, Present, and Future*, 53 S.D. L. REV. 425, 428 (2008).

227. *Id.*

228. John Mathews, *The End of the U.S. Ethanol Tariff*, GLOBALIST (Jan. 6, 2012), <http://www.theglobalist.com/the-end-of-the-u-s-ethanol-tariff>.

229. See *Fact Sheet: Bioenergy Program*, U.S. DEP'T OF AGRIC., FARM SERVS. AGENCY 1 (2004), http://www.fsa.usda.gov/Internet/FSA_File/bioenergy05.pdf.

230. Energy Policy Act of 2005, Pub. L. No. 109-58, 119 Stat. 594, § 932 (2005) (codified at 42 U.S.C. § 16232 (2012)).

231. See *Ethanol Benefits and Considerations*, U.S. DEP'T OF ENERGY, http://www.afdc.energy.gov/fuels/ethanol_benefits.html (last updated Oct. 24, 2013).

232. SEELKE & YACOBUCCI, *supra* note 111, at 6.

Advance Cooperation on Biofuels.²³³ The aim of the MOU was to have each country share technology to advance the development of bio-fuels.²³⁴ Since March 2011, the two countries have engaged in U.S.-Brazil Strategic Energy Dialogues²³⁵ in order to improve each country's energy security and clean energy resources. The EIA noted in 2011 that Brazil imported 396 million gallons of corn ethanol from the United States, while the United States imported 101 million gallons of sugar ethanol from Brazil.²³⁶

Because of the Energy Policy Act of 2005 and the Energy Independence and Security Act of 2007, the EPA must annually set renewable fuel standards to ensure that every year, the amount of bio-fuel in gasoline increases.²³⁷ Moreover, U.S. state programs, like California's Low Carbon Fuel Standard Program, as well as Brazil's agricultural constraints in growing sugarcane in certain regions have driven up the demand for ethanol in both countries.²³⁸ The different production schedules of each country's crops complement one another, so that when supplies are low domestically, more ethanol can be imported from the other country.²³⁹ Figure IV.C.1.d-1²⁴⁰ shows the historical ethanol import levels from Brazil. In 2010, the amount imported from Brazil was negligible.

233. *Id.* at 1.

234. *Id.*

235. *Fact Sheet: The U.S.-Brazil Strategic Energy Dialogue*, WHITE HOUSE (Apr. 9, 2012), <http://www.whitehouse.gov/the-press-office/2012/04/09/fact-sheet-us-brazil-strategic-energy-dialogue>.

236. Regulation of Fuels and Fuel Additives: 2013 Renewable Fuel Standards, 78 Fed. Reg. 9282, 9299 (proposed Feb. 7, 2013) (to be codified at 40 C.F.R. pt. 80).

237. Sandra Snyder, *EPA Issues Final 2013 Renewable Fuels Standard*, BRACEWELL & GIULIANI ENERGY LEGAL BLOG (Aug. 7, 2013, 4:39 PM), <http://www.energylegalblog.com/archives/2013/08/07/4735>.

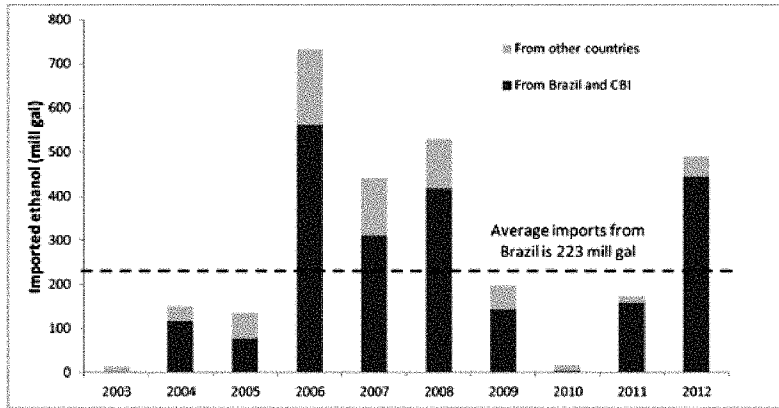
238. Regulation of Fuels and Fuel Additives: 2013 Renewable Fuel Standards, 78 Fed. Reg. 49,794, 49,819 (Aug. 15, 2013) (codified at 40 C.F.R. pt. 80).

239. *Id.*

240. Regulation of Fuels and Fuel Additives: 2014 Renewable Fuel Standards, 78 Fed. Reg. 71,732, 71,771 (proposed Nov. 29, 2013) (to be codified at 40 C.F.R. pt. 80).

Figure IV.C.1.d-1

Historical Imports of Ethanol into the U.S.



Source: EIA, "U.S. Imports by Country of Origin."

Both the Brazilian Ministry of Mines and Energy (MME) and the country's sugarcane association, UNICA, have guaranteed the United States at least 666 million gallons of sugar ethanol for 2013.²⁴¹

The United States has also been experimenting with other plants like switch-grass and tree crops to create ethanol under the Cellulosic Biomass Program.²⁴² In 2012, the United States exported 20,000 gallons of cellulosic bio-fuel to Brazil for marketing purposes before it unveiled the new fuel to the world.²⁴³ The United States became the lowest global cost producer of ethanol in 2009 due to increasing economies of scale.²⁴⁴ In 2011, the United States exported 1.2 billion gallons of corn ethanol; more than a third of that amount was shipped to Brazil.²⁴⁵ Like Brazil, the United States has also faced drought conditions, which has lessened its annual production.²⁴⁶

241. Regulation of Fuels and Fuel Additives: 2013 Renewable Fuel Standards, 78 Fed. Reg. at 9300–01.

242. Energy Policy Act of 2005, Pub. L. No. 109-58, 119 Stat. 594, § 932 (2005) (codified at 42 U.S.C. § 16232 (2012)).

243. Regulation of Fuels and Fuel Additives: 2014 Renewable Fuel Standards, 78 Fed. Reg. at 71,740.

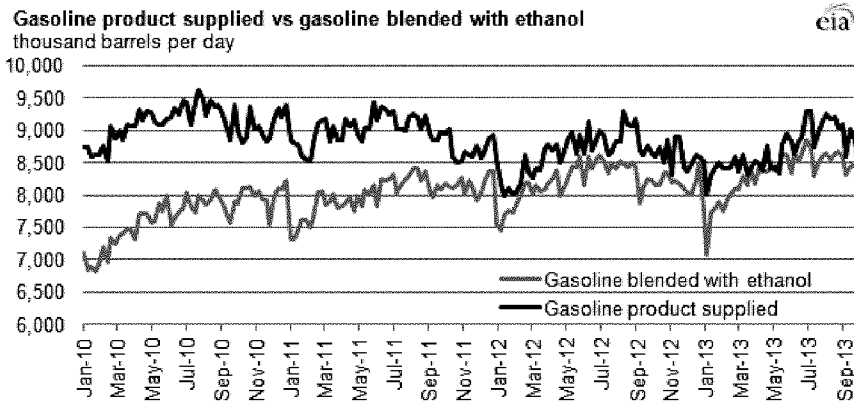
244. Bob Dinneen, *End All Trade Barriers*, ETHANOL PRODUCER MAG. (Jan. 16, 2013), <http://www.ethanolproducer.com/articles/9452/end-all-trade-barriers>.

245. *Id.*

246. *Id.*

B. U.S. Oil Demand

The United States is the largest energy consumer worldwide requiring forty percent of oil to be imported from abroad.²⁴⁷ Due to security concerns,²⁴⁸ the United States has limited its imports from the Persian Gulf states to twenty-nine percent of all oil imports.²⁴⁹ Seventy-one percent of the oil imported is used to power U.S. vehicles.²⁵⁰ Although the United States has tried to decrease its consumption of petroleum through the development of ethanol, the lack of infrastructure for ethanol-only vehicles has had a limited effect.²⁵¹ Instead, the United States tends to add ethanol to gasoline at a ratio of 1:10,²⁵² which may actually increase the amount of gasoline consumed. The EIA graph below shows how gasoline and ethanol-blended gasoline has converged over time.²⁵³



247. *How Dependent Are We on Foreign Oil?*, U.S. ENERGY INFO. ADMIN., http://www.eia.gov/energy_in_brief/article/foreign_oil_dependence.cfm (last updated May 10, 2013).

248. See generally MICHAEL T. KLARE, *BLOOD & OIL: THE DANGERS & CONSEQUENCES OF AMERICA'S GROWING PETROLEUM DEPENDENCY* (2004).

249. *How Dependent Are We on Foreign Oil?*, *supra* note 247.

250. *What Are the Major Sources & Users of Energy in the United States?*, U.S. ENERGY INFO. ADMIN., http://www.eia.gov/energy_in_brief/article/major_energy_sources_and_users.cfm (last updated Aug 1, 2013).

251. *Ethanol Benefits and Considerations*, *supra* note 231.

252. Alex Wood, *Ethanol Blending Provides Another Proxy for Gasoline Demand*, U.S. ENERGY INFO. ADMIN. (Oct. 7, 2013), <http://www.eia.gov/todayinenergy/detail.cfm?id=13271>.

253. *Id.*

Regardless, it is unlikely that the United States will lower its petroleum consumption levels in the imminent future. With continuing security concerns, the United States may also want to consider not relying any further on Persian Gulf states for oil, even if the amount imported is only between fourteen to twenty percent.²⁵⁴

Unfortunately, no U.S. oil companies partook in the May 2013 bidding on Brazil's sedimentary basins due to accusations of the United States spying on Petrobras.²⁵⁵

VIII. CONCLUSION

By implementing new energy business regulation and policy, Brazil has achieved its objective of becoming independent of oil imports. The New Petroleum Law encourages foreign oil companies to explore for oil and especially natural gas in Brazil. This presents an excellent opportunity for an oil company to add reserves to its books, which is critical, and lead in developing a new frontier. There appear to be many excellent prospects in Brazil, especially offshore for oil and onshore for natural gas. With the opportunity for an oil firm to take control of a field through the new liberal laws (it is critical for publicly traded oil companies to be able to post reserves), many foreign companies are participating and are being joined by several local start-ups in the search for energy sources. This advancement is reminiscent of the early American experience in developing oil fields and becoming an oil exporter.

Although taxes are cumbersome, the opportunity is more than worthwhile given the openness of the process and the end of the Petrobras monopoly. Many opportunities are now present given the excellent selection of properties that are available through the concession process. By carefully evaluating the concessions, it will be possible to determine an appropriate bid or even joint venture with Petrobras or other companies looking to explore and add reserves in Brazil. With the prospect that Brazil will continue to grow its oil

254. *U.S. Imports by Country of Origin 2007–2012*, U.S. ENERGY INFO. ADMIN., http://www.eia.gov/dnav/pet/pet_move_impcus_a2_nus_ep00_im0_mbb1_a.htm (last updated Sept. 7, 2013).

255. Gabrielle Coppola, *Snowden Documents Show U.S. Spied on Petrobras*, *Globo TV Reports*, BLOOMBERG (Sept. 8, 2013, 10:21 PM), <http://www.bloomberg.com/news/2013-09-08/u-s-government-spied-on-brazil-s-petrobras-globo-tv-reports.html>.

production and become an energy exporter, the opportunities to export oil are high. The liberalization of the currency regime allowing for export of hard currency is a further incentive to explore and gain a return on investment.

Brazil was willing to take a risk by developing the PROÁLCOOL program. With current world oil prices²⁵⁶ combined with the fact that worldwide production of crude oil may have peaked or plateaued,²⁵⁷ it seems Brazil made an excellent decision. In the process Brazil pushed the auto industry to develop ethanol cars, developed a bio-friendly fuel, and showed the world that a viable alternative fuel industry could be built on a large scale.²⁵⁸ As a result of Brazil's success, the United States introduced ethanol into its gasoline products to reduce emissions and oxygenate the fuel, and Japan is moving in the same direction with plans to import substantial quantities of alcohol from Brazil. Because Brazil produces alcohol from sugar cane, it is much more efficient at producing ethanol and costs much less than ethanol from corn.

Brazil's policy of diversifying energy sources by pursuing domestic oil, importing natural gas from its neighbors, adding hydroelectric capacity, and pursuing bio-energy sources has valuable lessons for other countries including the United States. The best form of energy security is to rely on several sources rather than one, and then to open those sources to the marketplace. Although natural gas supplies from Argentina and Bolivia may now be in question, Brazil has the time to find other suppliers and alternative sources of production, including its own domestic supplies, because it opened its territory for exploration and freed prices to encourage producers and other suppliers to enter the market.

The next step for Brazil should be to simplify its tax code. This seems to be the biggest issue facing the country in terms of foreign firms entering and competitively bidding to find and produce the natural resources. By simplifying the tax code, further liberalizing the

256. *Energy & Oil Prices*, BLOOMBERG, <http://www.bloomberg.com/energy> (last visited May 8, 2014). Oil prices hover around \$100 per barrel.

257. Kurt Cobb, *Has Crude Oil Production Already Peaked?*, CHRISTIAN SCI. MONITOR (Apr. 16, 2014), <http://www.csmonitor.com/Environment/Energy-Voices/2014/0416/Has-crude-oil-production-already-peaked>. World oil production peaked in 2005, and as of 2013/2014 it seems to have recovered to the peak. Natural gas liquids are not crude oil.

258. Stecker & ClimateWire, *supra* note 80.

marketplace, and encouraging alternative energy sources through tax incentives and subsidies, Brazil can truly develop a secure energy system for its economy while promoting advances in technologies that will be eco-friendly.

For other countries, including the United States, it is important to understand the concept of energy security and what Brazil has done to promote regulation that enhances its energy security. From opening up territories for exploration, providing incentives to create alternative energy industries, and liberating the energy markets, Brazil has shown that it can lead in developing a coherent plan to promote energy security. Russia, China, India, Argentina, and even the United States can learn lessons from this while promoting the development of energy in an environmentally safe manner. This can be done by relying on bio-energy, and creating and enforcing strict environmental laws for offshore as well as onshore drilling. Brazil is bringing these rules and regulations into its own legal code, and as a result, Brazil's energy future looks bright.²⁵⁹

259. See BRASIL-ROUNDS, http://www.brasil-rounds.gov.br/index_e.asp (last visited Apr. 11, 2014) (where Brazil announces all of its bidding rounds and has maps available as to which areas are available for bidding).