



**BUYING
THE SUN**

OPPORTUNITIES FOR THIRD-PARTY POWER-
PURCHASE AGREEMENTS AS CORPORATE
INVESTMENTS IN RENEWABLE ENERGY:
A REVIEW OF LATIN AMERICAN MARKETS

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Executive Summary

Latin America has quickly become a rising star in clean energy development, and corporations and developers are taking notice, putting Latin Americaⁱ above the rest in terms of new investments in clean energy.ⁱⁱ Despite a global drop in clean energy investments from 2011 to 2012, investments during the same time frame in Latin America rose dramatically, with several countries experiencing triple-digit growth.ⁱⁱⁱ

Parallel to this growth is the rise of third-party financing of energy systems, specifically third-party power purchase agreements (third-party PPAs). Through a third-party PPA, end-users such as homeowners, non-profit entities, and corporations may purchase power directly from a renewable energy project, without owning the project itself. Often, the corporation also serves as host to the project, meaning the energy technology is installed on the corporation's property, but a separate entity owns and finances the project, from whom the corporation purchases the generated power.^{iv} As companies increase their renewable energy investments, third-party PPAs are an important tool to simply financing and procurement of renewable energy.

To explore what markets would be most attractive for corporations to make renewable energy investments using third-party PPAs, this paper assesses policy and market conditions in a subset of the Latin American market, six Central America countries: Costa Rica, El Salvador, Guatemala, Honduras Nicaragua, and Panama.^v Using data from a variety of sources including World Bank and Bloomberg New Energy Finance, we assess the presence of policies which support the development of third-party PPAs, and review

the overall status of each market. Finally, we summarize our findings to provide guidance to corporations seeking to increase their clean energy investments in Central America.

Our analysis reveals that Guatemala and Panama lead the pack among Central American countries in administering policies to support renewable energy development through third-party PPAs. We reviewed the following elements:

1. Deregulated markets with a high rate of electrification.
2. Markets that allow third-party producers.
3. Markets that allow third-party purchasers.
4. Markets that have supporting policies to improve financial viability, such as interconnection, net-metering, and renewable energy certificates/credits (RECs).

However, to date, Panama's and Guatemala's exemplary policy and regulatory schemes have not resulted in high investment totals, a trend seen in other Central American countries as well. This trend indicates that these countries have the policy structures to support higher levels of investment, yet investments have not yet reached their full potential. Efforts to harmonize regulations and policies will further streamline and encourage renewable energy investment. While Central American markets continue to mature, the region provides substantial opportunity for the development of renewable energy through third-party PPAs.

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I. Introduction

Central America is quickly emerging as the top growing market for renewable energy development, despite the slowdown in global renewable energy investments. Between 2011 and 2012, total new investments in clean energy in non-Brazil Latin America rose 127% to a high of \$4.6 billion. Several countries in Latin America experienced triple-digit growth, including Mexico, Peru, and Uruguay.^{vi}

Additionally, corporations are increasingly involved in the direction of their energy use and development, and many are leading the way in renewable energy development and investment. Nearly two-thirds of Global 100 companies, and 59% of Fortune 100 companies, have set GHG emissions reduction commitments, renewable energy commitments, or both.^{vii}

To meet their energy and sustainability goals, corporations are turning to innovative financing and acquisition strategies, including renewable energy credits (RECs), third-party power purchase agreements (third-party PPAs), and on-site direct investment. Companies are moving towards more direct involvement in their energy production, rather than solely investing in RECs, green tariffs, and carbon offsets.^{viii} Through long-term PPAs companies can avoid investing capital in non-core (outside the corporation's business/product line) assets, while still providing control and access to the development of the corporation's energy.^{ix} Thus, on-site development of power and the use of PPAs are on the rise, which allow companies very direct involvement in the development of the energy they use.

The use of third-party PPAs is expanding rapidly in the United States, and projected to grow in other markets as well. For example, in Colorado, the percent of new solar installations financed as third-party owned systems grew from less than 10% in 2009, to over 80% in 2012; this exponential growth is mirrored in other western U.S. states including California, Arizona, and Massachusetts.^x Sungevity, considered a leader in providing third-party financing tools in the U.S., is also expanding to Europe and Australia, leading the way for the development of third-party PPAs in new markets.^{xi}

The movement has already begun. In 2012, developer Marena Renovables entered a 20-year power-purchase agreement contract for their 396MW wind farm in Mexico, the largest wind project in Latin America to date. The wind farm will serve the local utility, and several corporations including Heineken, FEMSA, the largest bottler for Coke, and OXXO, a fast-growing chain of convenience stores.^{xii} In April 2013, Honda announced plans to build a wind farm with enough capacity to support automobile production, and is set to become the first automaker to invest in windpower in Brazil.^{xiii}

Due to market growth plus increased availability of novel financing strategies, Central American markets provide a prime opportunity for corporations and developers alike to invest in renewable energy on an unprecedented scale.

II. Policy Considerations to Develop Third-Party Power Purchase Agreements in Central America

Many companies have adopted a PPA strategy to acquire renewable energy, and

thus must consider the legality of creating PPAs in each location. Generally, local utility regulations and policies supporting renewable energy control the details of creating a PPA.

As a baseline assessment, consider the following questions:

1. Is the market regulated or de-regulated? What is the rate of electrification?
2. Are Independent Power Producers (IPPs, or non-utility generators) allowed?
3. Are third-party (non-utility purchasers) purchases from IPPs allowed?
4. Do policies exist to support renewable energy development – interconnection, net-metering, Renewable Energy Credits (RECs), etc.?

1. Regulated or Deregulated Utility Market; Rate of Electrification

A primary consideration, though not entirely indicative of the legalities of a PPA, is the status of the utility market – regulated or deregulated. As a general rule, PPAs are allowed in deregulated markets, and banned in regulated markets. But the specific rules in each market determine whether a PPA is legal, rather than the market type itself.

Most Central American countries^{xiv} adopted electricity deregulation in the 1990's, far in advance of most developed nations. The failure of the public model, in which a vertically-integrated State monopoly controlled all aspects of electricity supply, spurred the deregulation movement.^{xv} The reforms were intended to attract private investment, establish independent regulators, and create competitive markets, thus improving the efficiency and quality of electricity generation. El Salvador,

Nicaragua, and Panama rejected the vertically-integrated monopoly system, thus, opening generation, transmission, and distribution to competition. While Honduras and Costa Rica maintained a monopoly system, these countries nevertheless opened generation to competition for Independent Power Producers (IPP).^{xvi} Each nation remains in a unique position on the spectrum between public and private markets, creating hurdles for interconnection between markets.^{xvii}

In 1987, efforts began to overcome barriers to interconnection with the creation of a regional transmission system – The Central American Electrical Interconnection System (Sistema de Interconexion Electrica de los Paises de America Central – SIEPAC). The purpose of the project was both to literally and figuratively connect the countries of Central America, through physical infrastructure and the creation of a single regulatory environment to facilitate interconnected electricity production.^{xviii} To enhance cooperation of construction of SIEPAC, the Regional Electricity Market (Mercado Electrico Regional – MER) was also developed. The MER exists as a “seventh market” overarching the six national markets, and is governed by a single set of market rules, a separate regional regulatory agency, and a regional market operating entity.^{xix}

Additionally, the rate of electrification is important to determine market openness and ease of access to the grid. Central America has a relatively high rate of electrification, with Costa Rica leading at 99.2%, followed by El Salvador, Guatemala, and Panama (96.8%, 84.4%, and 83.3%, respectively).^{xx} These numbers are especially impressive given that in 1985, the majority of Central

American countries had not achieved even 50% electrification.^{xxi}

2. Non-Utility Generators/Independent Power Producers

Independent Power Producers (IPPs) are defined as:

“An entity that owns facilities to generate electric power for sale to utilities and end users and that has no affiliation to a transmission or distribution company.”^{xxii}

Introducing IPPs is generally one of the first steps to create a deregulated market, by introducing competition to the generation market.^{xxiii} To purchase power from an IPP a Power-Purchase Agreement (PPA) is developed. A PPA must be distinguished from a third-party PPA, which separate ownership of the energy system and the power. A Power-Purchase Agreement is defined as:

“A legally binding contractual agreement by which an entity, such as a single buyer or distribution company, undertakes to purchase the power generated by an independent or affiliated power producer under specified terms for a multiyear period.”^{xxiv}

Thus, a PPA is a contractual agreement between two parties, purely for the purchase of power; contrasted with a third-party PPA, which includes three parties – host/customer, owner, and utility – and separates ownership of the energy system and the power. The regulatory framework allowing for PPAs also provides the building blocks to support third-party PPAs.

All members of SIEPAC have allowed private generators/IPPs to some extent. Among SIEPAC countries, Panama has allowed for the highest percentage of private participation in its generation sector at over 80%, followed by El Salvador, Nicaragua, and Guatemala at over 60%. Interestingly, Costa Rica has a very low percentage of private involvement at just over 10%, while Honduras has over 60%, but both countries have limited private involvement to only vertically-integrated State-owned enterprises.^{xxv}

Many countries began employing IPPs and PPAs in the initial stages of deregulation in order to attract private capital. The terms of the PPA and the attendant financing protects IPPs from risks such as market risks, fuel price volatility, inflation, credit risks, and political risks. Though initially successful, difficulties occurred in transferring the contracts to the wholesale market during full deregulation. Two solutions arose: 1) renegotiate the PPA and transfer it to the wholesale market; or 2) the State represents the IPP in the market, assumes the cost of the PPA, and sells the energy at market prices. These solutions have been met with varying levels of success.^{xxvi}

3. Third-Party Purchasers

Once the building blocks provided by regulations allowing IPPs and PPAs have been set, the ideal regulations must also allow third-party purchasers to purchase the power from an IPP. Through market deregulation, large purchasers are generally allowed to purchase power directly from generators, either state-owned or private.^{xxvii} The policy mechanisms allowing direct purchases from IPPs provide further support for third-party PPAs.

Many countries have reduced the threshold allowing purchases on the wholesale market, thus encouraging large customers to enter the market and directly purchase power, thereby increasing competition. Countries such as El Salvador, Guatemala, and Panama all exhibit high competition rates as a result of deregulated markets and low purchasing thresholds, resulting in a high level of private sector participation.^{xxviii}

4. Interconnection, Net-Metering, and Renewable Energy Credits

While not critical to the legality of a PPA structure, interconnection and net-metering are crucial regulations to ensure the financial viability of a project. Interconnection is defined as:

“Two or more electric systems having a common transmission line that permits a flow of energy between them. The physical connection of the electric power transmission facilities allows for the sale or exchange of energy.”^{xxix}

Net-metering programs go a step further, and allow customers to use their own generation

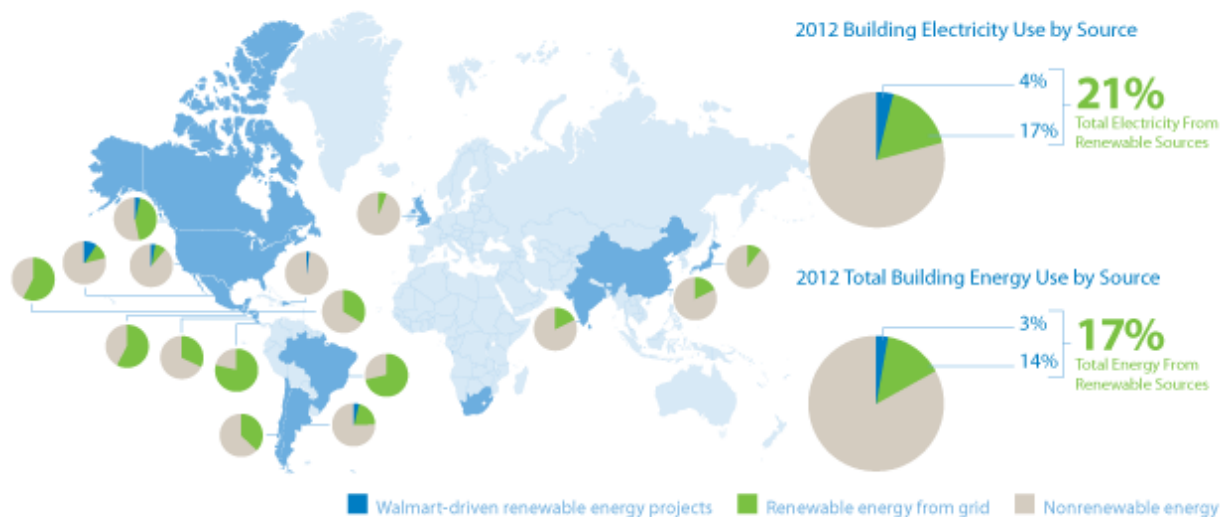
from on-site renewable energy systems to offset their own energy consumption.^{xxx}

A major goal of the SIEPAC initiative is to develop the infrastructure to allow for electric interconnection, which would streamline the process of integrating renewable energy sources. As of 2012, interconnection using existing regional infrastructure has begun, but planning of new infrastructure is not complete.^{xxxi} However, development of regional supporting institutions and policy structures is underway, and additional regional integrations are being explored to further streamline interconnection and renewable energy integration.^{xxxii}

Interconnection is critical to ensure the transfer of electricity, while net-metering provides stability regarding the purchase of power. Further, Renewable Energy Credits (RECs) add an additional layer of financial stability to a project. Net-metering and REC policies have recently been introduced at a local or national level in several countries, but none in Central America to date.^{xxxiii} These policies serve to further incentivize renewable energy deployment, especially distributed-generation projects.

Walmart Case Study

In 2005, Walmart publicly declared a goal to be 100% supplied by renewable energy.^{xxxiv} As the largest retailer in Central America, their strategy in Central America is key to meeting this goal.^{xxxv} Walmart has utilized grid-purchased renewable energy in nearly all Central American countries, and has initiated renewable energy development in several other countries.^{xxxvi} Walmart employs multiple methods to obtain renewable energy – distributed-generation projects, utility-scale offsite generation, and grid-connected purchases – and tailors the approach depending on the market. For example, Walmart has used more distributed generation in the U.S to take advantage of net-metering and interconnection policies, while in other markets Walmart has instead developed offsite generation or purchased green energy.^{xxxvii}



Source: Walmart 2012 Global Responsibility Report, <http://corporate.walmart.com/microsites/global-responsibility-report-2013/renewableEnergy.aspx>

In 2010, Walmart signed a 15-year PPA with EDF Energies Nouvelles, to purchase power from a 67.5MW windfarm in Oaxaca, in southern Mexico. The project was completed despite regulations banning private investment in power generation for general supply to the grid, by utilizing the PPA mechanism in conjunction with self-supply regulations, which allow the purchaser to take as much electricity from the grid as they put back in.^{xxxviii} This project serves as an example of both the efficacy of the PPA structure, as well as the challenges of developing such a project within complex regulatory schemes. The policy frameworks exist to replicate this model in other countries, such as Guatemala and El Salvador. Thus, this project may serve as a template for Walmart and other companies seeking to expand renewable energy development in Central America.

III. Markets for Renewable Energy in Central America

1. Costa Rica

Costa Rica maintains a vertically-integrated electricity sector that is mainly controlled by state-owned Instituto Costarricense de Electricidad (ICE), its subsidiary Compañía Nacional de Fuerza y Luz (CNFL), and a few small utilities and cooperatives. National energy planning and policy are the responsibility of the Ministry of Environment, Energy, and Telecommunications (MINAET), which serves as the Technical Secretariat to the Energy Board. The Public Utilities Regulatory Authority (Autoridad Reguladora de los Servicios Públicos – ARESEP) regulates the industry.^{xxxix}

Two laws, the latest of which was approved in 1995, opened the generation market to competition and allows for up to 30% participation by IPPs with capacity below 50 MW. Thus, “utilities” can be defined as a power producer which sells electricity either back to the market, or to a large consumer. These laws were intended to provide favorable conditions for renewable energy PPAs; however, other legal hurdles have prevented major development, such as the lack of clarity of in setting electricity prices in PPAs.^{xl}

Despite Costa Rica’s restrictive market structure, in which the state-owned ICE controls generation, transmission, and distribution as well as serving as the country’s sole purchaser, the country remains the largest market by capacity in Central America^{xli}, and serves as the leading producer of clean energy in the region. Due to the government’s role as the sole purchaser,

combined with a high electrification rate, the Costa Rican market has traditionally been relatively closed to private investment.^{xlii} However, the national government recently initiated the National Strategy for Decarbonization of the Economy, designed to promote the utilization of renewable energy sources and diversify the market, while reducing dependency on fossil fuels in transportation, industry, and general power consumption. Hydropower dams provide the majority of the nation’s electric power (78%), and there are significant resources remaining including hydro, geothermal, solar, and wind.^{xliii}

2. El Salvador

Until the passage of the General Law of Electricity in 1996, the government-owned Comision Hidroelectrica del Rio Lempa (CEL) controlled the power sector, and provided generation, transmission, and distribution. Sector reforms privatized the CEL, and within ten years, there were 11 generation companies, and 18 of 22 generation plants were privately held. In contrast, 97% of hydro-electric capacity remains in public ownership. A single government entity, Empresa Transmisora de El Salvador (ETESAL), controls transmission, and distribution is divided among five privately-owned companies.^{xliv}

El Salvador’s standout industry is geothermal, which provides 204 MW installed power, and the option for increased development sustained by vast untapped resources and a supportive local supply-chain.^{xlv} Additionally, large hydro projects provide a large portion of the country’s power.^{xlvi} In 2007, the government made efforts to diversify the energy mix through the National Energy Strategy, which supports

additional renewable energy sources such as solar, wind, biomass, and small hydro, with the goal of an additional 50MW from renewable energy sources within 10 years of the law. There are several programs to financially support renewable energy projects, including a 10-year tax exemption for projects below 10MW of generation capacity, and a fund to provide loans, guarantees, and assistance in the development of new projects.^{xlvii}

3. Guatemala

The 1996 passage of the General Electricity Law privatized the energy sector, dividing the Guatemala Electric Company (Empresa Electrica de Guatemala – EEGSA) and the National Institute of Electrification (Instituto Nacional de Electrificación – INDE) into separate commercialization, distribution, transmission, and generation companies.^{xlviii} However, INDE still owns a majority of the hydro-plants, and also owns and operates approximately 85% of the transmission network. Distribution is largely privatized, with three major distribution companies. Additionally, generation is open to private developers, which have created significant thermal power generation.^{xlix}

Guatemala has a robust renewable energy industry, with plenty of room to grow due to an open market structure, significant remaining renewable capacity, and relatively well-developed renewable energy supply-chains.¹ Biomass and small hydro lead the renewable energy industry in the country, comprising approximately 16% and 10 % of total installed capacity, respectively.ⁱⁱ

Approved in November 2003, the Renewable Energy Project Incentives program is intended to increase deployment of other

renewable sources.^{lii} Government support and an open market structure, combined with Guatemala’s relatively low 80% electrification rate, creates an attractive market for further clean energy development, in the form of both distributed-generation and utility-scale projects.^{liii}

4. Honduras

In 1994, Honduras passed The Electricity Law, which defined a new institutional structure, created a new regulatory agency to govern energy, and mandated the unbundling of the National Electricity Company’s (Empresa Nacional de Energia Electrica – ENEE) distribution networks. However, many of these reforms never took place, including, and most critically, the unbundling of the state-owned electricity company. Thus, the ENEE remains the state-owned company in charge of generation, transmission, distribution, and commercialization of electricity in Honduras. The law does allow power generation by state agencies, or by private and mixed-ownership companies, which can be sold to ENEE or large consumers. However, since the state remains the sole distribution network, competition is limited, and market reform remains incomplete.^{liv}

The state-owned vertically-integrated utility creates a limited market structure, which has hampered the Honduran clean energy market, and will continue to restrict growth by blocking private investment. Despite this major hurdle, Honduras is poised for changes to its energy market due to government-sponsored reverse auctions, and increased efforts to procure renewable energy.^{lv}

Small hydro and biomass comprise the majority of renewable energy production in Honduras; however, many new government-initiated projects promise to integrate more renewable sources into the mix. Additionally, the relatively low electrification level provides opportunity for distributed generation projects to utilize renewable energy sources.^{lvi}

5. Nicaragua

In 1994, the Nicaraguan government created the Nicaraguan Electricity Company (Empresa Nicaraguense de Electricidad - ENEL), a state-owned electricity company which controlled generation and supply, as well as policy development and pricing. However, the 1998 Power Sector Law separated the ENEL, through separation of transmission, system operations, and market administration. The reforms created a cost-based wholesale electricity market with participation by generators, distributors, and large consumers.^{lvii}

Currently, the production of energy is mixed between private and public ownership. In 2006, there were 10 generation companies, 8 of which were privately owned. However, the state-owned Empresa Nacional de Transmision Electrica (ENATREL) controls all transmission, and the state-owned Disur-Disnorte controls nearly all distribution. Additionally, Hidrogesa, also a state-owned company, generates all hydro-electric capacity.^{lviii}

Nicaragua's wholesale energy market framework allows private sector involvement in generation and distribution, attracting significant private investment. High electricity prices along with a relatively low electrification rate provide an opportunity for

increased renewable energy deployment, especially development of distributed generation projects.^{lix} Substantial renewable resources combined with the most developed green micro-finance sector among Central American nations, creates a prime opportunity for growth and investment.^{lx}

Significant renewable resources remain available for development, especially geothermal resources. The majority of Nicaragua's investment has been devoted to expanding geothermal projects^{lxi}, and the *Geothermal Law* of 2002 regulates the exploration and development of geothermal resources.^{lxii}

6. Panama

The 1998 privatization of the vertically-integrated electricity utility Instituto de Recursos Hidraulicos y Electrificación (IRHE) was part of a broad reform initiative that also included establishment of a new regulatory framework, development of a wholesale electricity market, and new tariff regulations. The IRHE was divided into four private generation companies, three private distribution companies, and one transmission company which remains in public ownership. The state also retains large holdings in generation and transmission, including the state-owned company Empresa de Transmision Electrica, S.A. (ETESA), which is responsible for transmission services, and provides other distribution services.^{lxiii}

Panama's open wholesale power market and high electrification rate has attracted significant investment and spurred growth in renewable energy development. However, the lack of clean energy financing opportunities has been an obstacle, only

somewhat offset by the open market structure.^{lxiv}

The government sought to increase investment through the National Energy Plan of 2009, which requires additional renewable energy development from hydropower, thermal power, and wind power.^{lxv}

Additionally, the government has established support for distributed generation projects, employing solar, small hydro, and small wind, to improve Panama's electrification rate.^{lxvi}

IV. Conclusion

As indicated in Table 1, this paper compares countries on the baseline elements needed to make third-party PPA's successful. Those elements are:

1. Is the market regulated or de-regulated? What is the rate of electrification?
2. Are Independent Power Producers (IPPs, or non-utility generators) allowed?
3. Are third-party (non-utility purchasers) purchases from IPPs allowed?

4. Do policies exist to support renewable energy development – interconnection, net-metering, Renewable Energy Credits (RECs), etc.?

Thus, Panama and Guatemala rank above other Central America countries, largely due to the open status of their markets and a high rate of electrification, which provide ample support for renewable energy development and a third-party PPA regulatory structure. Surprisingly, Costa Rica, a country generally ranked very highly for sustainability and energy initiatives, ranks poorly due to a very restrictive market that leaves little room for private actors. Nicaragua and El Salvador boast markets that are relatively open and supportive of private actors, but lack government incentives to encourage renewable energy development. Lastly, Honduras boasts a fully-integrated market, but lacks other elements to support third-party PPAs.

Table 1: Summary of Availability of Third-Party PPAs in Central America

	Guatemala	Panama	El Salvador	Costa Rica	Nicaragua	Honduras
Rank & Score	Rank = 1 Score = 5	Rank = 2 Score = 1	Rank = 3 Score = -1	Rank 3 Score = -1	Rank = 5 Score = -3	Rank = 6 Score = -4
State of Market Deregulation	Wholesale competition	Wholesale competition	Retail competition	Fully integrated	Wholesale competition	Fully integrated
Rate of Electrification	84.4%	83.3%	96.8%	99.2%	64.8%	79.3%
Private Participation in Generation (IPPs) (% of generation)	68%	89%	64%	12%	69%	65%
Large Consumers (% of demand)	32%	2%	10%	0%	8%	2%
Threshold of Large Consumers	100kw	100kw	No threshold	N/A	2Mw	1Mw
National Renewable Energy Status	63%	59%	65%	94%	35%	65%
National Renewable Energy Goal	70% by 2020	No stated goal	No stated goal	100% by 2021	38% by 2011	No stated goal
Net Metering	Yes	Yes	No	Yes	No	No
Renewable Energy Credits	No	No	No	No	No	No

Methodology:

Countries were judged in only in comparison with SIEPAC countries, not in comparison with countries outside the scope of our study. For each criterion, the range of data was evenly divided into three categories. The top third of the data range received a green score, a yellow score for the middle third of the data range, and a red score for the bottom third of the data range. The red, yellow, and green scores were tallied as follows: red = -1, yellow = 0, and green = +1.

Sources: Data from the following sources:

Bloomberg New Energy Finance and Multilateral Investment Fund, Climate Scope 2012: Assessing the Climate for Climate Investing in Latin America and the Caribbean (2012).

David Reinstein, Almudena Mateos, et al., Regional Power Integration: Structural and Regulatory Challenges (Report No. 58934 LAC) (Energy Sector Management Assistance Program, The World Bank) (2011).

Renewable Energy Policy Network for the 21st Century (REN 21), Clean Energy Info Portal, <http://www.reegle.info/> (last visited June 4, 2013).

Renewable Energy Policy Network for the 21st Century (REN21), Renewables Interactive Map <http://www.map.ren21.net/> (last visited June 4, 2013).

Trevor Byer, Enrique Crousillat, et al., Latin America and the Caribbean Region Energy Sector – Retrospective Review and Challenges (ESMAP Technical Paper 123/09) (Energy Sector Management Assistance Program, The World Bank) (2009).

Janet L. Sawin, et al., Renewables 2013 Global Status Report (REN21) (2013).

The World Bank’s business rankings support these conclusions, and rank Guatemala and Panama highest among Central America countries.^{lxvii} The World Bank ratings analyze ease of doing business for small to medium-size firms, including the clean technology sector, and include pertinent factors such as protecting investors, enforcing contracts, and dealing with construction permits.^{lxviii}

However, strong policy structures do not always translate into high levels of investment. In terms of clean energy investment, Costa Rica and Nicaragua rank highest in the region, both with \$0.2b invested in 2012.^{lxix} In contrast, the countries which ranked highest in our policy rankings, Guatemala and Panama, rank fourth and second, respectively, in terms of investment.^{lxx} Thus, analysis of policy and regulatory structures seem to be a better indicator of market readiness, more relevant than investment totals, indicating that Panama and Guatemala are largely untapped markets for private development and investment.

Table 2: Comparison of Policy Rankings against Other Factors

Country (in order of Policy Ranking)	Clean Energy Investment Totals & Rank		World Bank Ease of Doing Business Score & Rank	
	Guatemala	\$401m (2006- 11)	4	97/183
Panama	0.1b (2012)	2	61/183	1
Nicaragua	\$0.2b (2012)	1	118/183	4
El Salvador	\$0.1b (2012)	2	112/183	3
Costa Rica	\$0.2b (2012)	1	121/183	5
Honduras	\$596.5m (2006- 11)	3	128/183	6

Sources: Data from the following sources:

Janet L. Sawin, et al., Renewables 2013 Global Status Report (REN21) (2013).

Multilateral Investment Fund, Climate Scope 2012: Assessing the Climate for Climate Investing in Latin America and the Caribbean (2012).

Bloomberg New Energy Finance & Frankfurt School UNEP Collaborating Center for Climate & Sustainable Energy Finance, Global Trends in Renewable Energy Investment 2013 - Datapack (2013).
Doing Business: Economy Rankings, The World Bank, <http://www.doingbusiness.org/rankings> (last visited July 16, 2013).

Among Central American countries, Panama leads in the administration of policies in support of PPAs, according to a review of World Bank rankings and investments along with our own policy rankings. In 2011, 127 MW of renewable energy projects with private participation reached financial closure in the Panama, with total project costs of \$461 million.^{lxxi} These projects were mostly large hydro developments, however, emerging markets such as Panama are

attracting investment for other technologies, such as solar power.^{lxxii}

Due to individual policies and regulatory regimes, varying states of development of the clean energy supply chain, and differing levels of market deregulation, it remains critical to review country-specific policies when investing. However, it is notable that many countries provide substantial support for the development of renewable energy, and seek to create a market open to development.

The Central American market appears ripe for renewable energy development through the use of third-party PPAs, and provides an attractive opportunity for companies seeking to expand their renewable energy use. However, until overarching policies are approved to improve market stability, including the completed development of the SIEPAC system, development of renewable energy will require a case-by-case analysis. Overall, the Central American market provides a promising opportunity for large corporations seeking to expand their renewable energy investments.

End Notes

ⁱ Refers to Non-Brazil Latin America only.

ⁱⁱ Clean Energy Investments in Latin America Total \$9.7 billion in 2012, <http://finance.yahoo.com/news/clean-energy-investments-latin-america-153700978.html> (last visited July 16, 2013).

ⁱⁱⁱ *Id.*

^{iv} United States Environmental Protection Agency, Solar Power Purchase Agreements, <http://www.epa.gov/greenpower/buygp/solarpower.htm> (last visited May 20, 2013).

^v For purposes of this report, “Central America” includes only SIEPAC countries – Costa Rica, El Salvador, Guatemala, Honduras Nicaragua, and Panama.

^{vi} Clean Energy Investments in Latin America Total \$9.7 billion in 2012, <http://finance.yahoo.com/news/clean-energy-investments-latin-america-153700978.html> (last visited July 16, 2013).

^{vii} David Gardiner & Associates, Power Forward: Why the World’s Largest Companies are Investing in Renewable Energy 2 (January 2013)

^{viii} Ernst & Young, *Large corporations – a new driving force behind renewable energy*, Issue 36, Renewable Energy Country Attractiveness Indices, Ernst & Young, 10, 10 (February 2013).

^{ix} *Id.* at 11.

^x U.S. Department of Energy: On-site Renewable Energy: Third-Party Solar Financing, http://apps3.eere.energy.gov/greenpower/onsite/solar_financing.shtml (last visited September 13, 2013).

^{xi} Sungevity Scores \$15M for Solar Sales and Third-Party Financing, <http://www.greentechmedia.com/articles/read/Sungevity-Scores-15M-for-Solar-Sales-and-Third-Party-Financing> (last visited September 13, 2013).

^{xii} Latin America’s Largest Wind Find Project to Power Mexico Coca-Cola, Heineken, OXXO, <http://cleantechnica.com/2012/03/12/latin-americas-largest-wind-project-to-power-mexico-coca-cola-heineken-oxxo/> (last visited July 16, 2013).

^{xiii} Honda to Become First Automaker in Brazil to Undertake Wind Power Generation, <http://world.honda.com/news/2013/c130425Brazil-Undertake-Wind-Power-Generation/index.html> (last visited July 16, 2013).

^{xiv} For purposes of this report, “Central America” includes only SIEPAC countries - El Salvador, Nicaragua, Panama, Costa Rica, Honduras, and Guatemala.

^{xv} Trevor Byer, Enrique Crousillat, et al., Latin America and the Caribbean Region Energy Sector – Retrospective Review and Challenges (ESMAP Technical Paper 123/09) xxvi (Energy Sector Management Assistance Program, The World Bank) (2009).

^{xvi} United States Agency for International Development, Promoting Sustainable Energy Integration in Central America xiii (2010).

^{xvii} Amanda Johnson, Achieving 100% Reliance on Renewable Energy for Electricity Generation in Central America 13 (Peter Meisen ed., Global Energy Network Institute) (2012).

^{xviii} United States Agency for International Development, Promoting Sustainable Energy Integration in Central America 15 (2010).

^{xix} Amanda Johnson, Achieving 100% Reliance on Renewable Energy for Electricity Generation in Central America 19 (Peter Meisen ed., Global Energy Network Institute) (2012).

^{xx} Janet L. Sawin, et al., Renewables 2013 Global Status Report 122 (REN21) (2013).

^{xxi} United States Agency for International Development, Promoting Sustainable Energy Integration in Central America 71 (2010).

^{xxii} John E. Besant-Jones, Reforming Power Markets in Developing Countries: What Have We Learned? 130 (Energy and Mining Sector Board, The World Bank) (2006).

^{xxiii} *Id.* at 66.

^{xxiv} *Id.* at 131.

^{xxv} Trevor Byer, Enrique Crousillat, et al., Latin America and the Caribbean Region Energy Sector – Retrospective Review and Challenges (ESMAP Technical Paper 123/09) 20 (Energy Sector Management Assistance Program, The World Bank) (2009).

^{xxvi} *Id.* at 32.

^{xxvii} David Reinstein, Almudena Mateos, et al., Regional Power Integration: Structural and Regulatory Challenges (Report No. 58934 LAC) 34 (Energy Sector Management Assistance Program, The World Bank) (2011).

^{xxviii} Trevor Byer, Enrique Crousillat, et al., Latin America and the Caribbean Region Energy Sector – Retrospective Review and Challenges (ESMAP

Technical Paper 123/09) 8 (Energy Sector Management Assistance Program, The World Bank) (2009).

^{xxxix} U.S. Energy Information Administration: Glossary, <http://www.eia.gov/tools/glossary/index.cfm> (last visited September 13, 2013).

^{xxx} U.S. Department of Energy: Green Power Markets: Net-Metering, <http://apps3.eere.energy.gov/greenpower/markets/netmetering.shtml> (last visited September 13, 2013).

^{xxxix} Jeremy M. Martin & Juan Carlos Posadas, Central America's Electric Sector: the Path to Interconnection and a Regional Market (Journal of Energy Security) (July 2012)

http://www.ensec.org/index.php?option=com_content&view=article&id=375:central-americas-electric-sector-the-path-to-interconnection-and-a-regional-market&catid=128:issue-content&Itemid=402 (last visited August 12, 2013).

^{xxxii} South American Energy Companies to Explore Interconnection (Electric Light & Power) (March 19, 2013) <http://www.elp.com/articles/2013/03/south-american-energy-companies-to-explore-interconnection.html> (last visited August 12, 2013).

^{xxxiii} Renewable Energy Policy Network for the 21st Century (REN21), Renewables Interactive Map <http://www.map.ren21.net/> (last visited June 4, 2013).

^{xxxiv} Leon Kaye, Waste Diversion, Renewable Energy Among Highlights of Walmart's 2011 Sustainability Report, Triple Pundit, <http://www.triplepundit.com/2011/04/waste-diversion-renewable-energy-among-highlights-walmarts-2011-sustainability-report/> (last visited August 25, 2013).

^{xxxv} Walmart: Our Locations, <http://corporate.walmart.com/our-story/locations#/costa-rica> (last visited August 25, 2013).

^{xxxvi} Walmart 2013 Global Responsibility Report, Renewable Energy, <http://corporate.walmart.com/microsites/global-responsibility-report-2013/renewableEnergy.aspx> (last visited August 25, 2013).

^{xxxvii} Walmart's Renewable Energy Approach, <http://www.walmartstores.com/sites/responsibility-report/2012/renewableEnergyApproach.aspx> (last visited August 30, 2013).

^{xxxviii} EDF signs PPA with Walmart for new Mexican wind farm, <http://www.windpowermonthly.com/article/993484>

[/edf-signs-ppa-walmart-new-mexican-wind-farm](#) (last visited August 25, 2013).

^{xxxix} David Reinstein, Almudena Mateos, et al., Regional Power Integration: Structural and Regulatory Challenges (Report No. 58934 LAC) 36 (Energy Sector Management Assistance Program, The World Bank) (2011).

^{xi} *Id.*

^{xli} Bloomberg New Energy Finance and Multilateral Investment Fund, Climate Scope 2012: Assessing the Climate for Climate Investing in Latin America and the Caribbean 55 (2012).

^{xlii} *Id.* at 54.

^{xliii} Renewable Energy Policy Network for the 21st Century (REN 21), Clean Energy Info Portal, Costa Rica <http://www.reegle.info/> (last visited June 4, 2013).

^{xliiv} Renewable Energy Policy Network for the 21st Century (REN 21), Clean Energy Info Portal, El Salvador <http://www.reegle.info/> (last visited June 4, 2013).

^{xliiv} Bloomberg New Energy Finance and Multilateral Investment Fund, Climate Scope 2012: Assessing the Climate for Climate Investing in Latin America and the Caribbean 64 (2012).

^{xliiv} *Id.* at 65.

^{xliiv} Renewable Energy Policy Network for the 21st Century (REN 21), Clean Energy Info Portal, El Salvador <http://www.reegle.info/> (last visited June 4, 2013).

^{xliiv} Renewable Energy Policy Network for the 21st Century (REN 21), Clean Energy Info Portal, Guatemala <http://www.reegle.info/> (last visited June 4, 2013).

^{xlix} David Reinstein, Almudena Mateos, et al., Regional Power Integration: Structural and Regulatory Challenges (Report No. 58934 LAC) 40 (Energy Sector Management Assistance Program, The World Bank) (2011).

ⁱ Bloomberg New Energy Finance and Multilateral Investment Fund, Climate Scope 2012: Assessing the Climate for Climate Investing in Latin America and the Caribbean 69 (2012).

ⁱⁱ *Id.* at 68.

ⁱⁱⁱ Renewable Energy Policy Network for the 21st Century (REN 21), Clean Energy Info Portal, Guatemala <http://www.reegle.info/> (last visited June 4, 2013).

^{liii} Bloomberg New Energy Finance and Multilateral Investment Fund, Climate Scope 2012: Assessing the

Climate for Climate Investing in Latin America and the Caribbean 69 (2012).

^{liv} David Reinstein, Almudena Mateos, et al., Regional Power Integration: Structural and Regulatory Challenges (Report No. 58934 LAC) 37-38 (Energy Sector Management Assistance Program, The World Bank) (2011).

^{lv} Bloomberg New Energy Finance and Multilateral Investment Fund, Climate Scope 2012: Assessing the Climate for Climate Investing in Latin America and the Caribbean 76 (2012).

^{lvi} *Id.* at 77.

^{lvii} David Reinstein, Almudena Mateos, et al., Regional Power Integration: Structural and Regulatory Challenges (Report No. 58934 LAC) 38 (Energy Sector Management Assistance Program, The World Bank) (2011).

^{lviii} Renewable Energy Policy Network for the 21st Century (REN 21), Clean Energy Info Portal, Nicaragua <http://www.reegle.info/> (last visited June 4, 2013).

^{lix} Bloomberg New Energy Finance and Multilateral Investment Fund, Climate Scope 2012: Assessing the Climate for Climate Investing in Latin America and the Caribbean 87 (2012).

^{lx} *Id.* at 86.

^{lxi} *Id.* at 86.

^{lxii} Renewable Energy Policy Network for the 21st Century (REN 21), Clean Energy Info Portal, Nicaragua <http://www.reegle.info/> (last visited June 4, 2013).

^{lxiii} Renewable Energy Policy Network for the 21st Century (REN 21), Clean Energy Info Portal, Panama <http://www.reegle.info/> (last visited June 4, 2013).

^{lxiv} Bloomberg New Energy Finance and Multilateral Investment Fund, Climate Scope 2012: Assessing the Climate for Climate Investing in Latin America and the Caribbean 90 (2012).

^{lxv} Renewable Energy Policy Network for the 21st Century (REN 21), Clean Energy Info Portal, Panama <http://www.reegle.info/> (last visited June 4, 2013).

^{lxvi} Bloomberg New Energy Finance and Multilateral Investment Fund, Climate Scope 2012: Assessing the Climate for Climate Investing in Latin America and the Caribbean 91 (2012).

^{lxvii} Doing Business: Economy Rankings, The World Bank, <http://www.doingbusiness.org/rankings> (last visited July 16, 2013).

^{lxviii} Doing Business: Economy Rankings, The World Bank, <http://www.doingbusiness.org/rankings> (last visited July 16, 2013).

^{lxix} Bloomberg New Energy Finance & Frankfurt School UNEP Collaborating Center for Climate & Sustainable Energy Finance, Global Trends in Renewable Energy Investment 2013 – Datapack 23 (2013).

^{lxx} *Id.*

^{lxxi} Private Participation in Renewable Energy Database, The World Bank, Panama, <http://ppi-re.worldbank.org/Snapshots/Country/panama> (last visited on July 16, 2013).

^{lxxii} Latin America Report: Emerging Markets Are Hot Spots for Solar Development, <http://www.renewableenergyworld.com/rea/news/article/2012/09/latin-america-report-emerging-markets-are-hot-spots-for-solar-development> (last visited July 16, 2013); New Winds for Central America: Renewables get Boost in Panama, <http://blogs.worldwatch.org/revolt/new-winds-for-central-america-renewables-get-a-boost-in-panama/> (last visited July 16, 2013).

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