

Latin America: On Target for COP 24?

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Cover photo: COP 24 will take place from December 3 to 14 of 2018 in Katowice, Poland. (Photo credit: Umkatowice/Creative Commons)

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EXECUTIVE SUMMARY

In recent years, Latin America as a region has demonstrated remarkable leadership on issues of energy modernization and climate change management. As signatories to the Paris climate agreement prepare to meet in Katowice, Poland, in December 2018, Latin America appears to hold the pole position. Impressive growth and deployment of renewable energy is evident throughout the region, where reducing power sector emissions is important to many countries' nationally determined contribution (NDC) goals within the Paris Agreement. More than any other region, it has combined ambitious emissions targets with policy actions and frameworks that make the countries' various NDC targets achievable.

Within Latin America, Brazil, Mexico, Chile, Uruguay, and Argentina have been particularly successful in incentivizing procurement of renewable generation, accelerating diesel to natural gas substitution, and reducing barriers to investment. A creative mix of policy tools—from net metering and clean energy auctions to modernized power purchase agreements, targeting of subsidies, and carbon pricing—have put these nations far along on the path to modernized and sustainable energy systems.

Despite these laudable outcomes, however, progress within Latin America remains uneven and serious challenges remain. Efforts to modernize regulatory and legal frameworks, procure investment, and support sustainable energy development have been top heavy, with national governments leading on all fronts. The next phase of energy modernization for some of these countries will require expanded private investment in addition to strong public sector efforts. All would be aided by more robust international engagement in energy system design.

Many countries in the Southern Cone, notably Argentina, Brazil, Chile, and Uruguay, are well situated with diversified economies, plentiful conventional and unconventional resources, high political consensus and motivation to achieve clean energy goals, and increasingly attractive foreign investment climates. These nations must now improve efforts to balance growing shares of renewable power on high-demand grid networks by using natural gas as a backup and leveraging advanced grid and battery technologies to manage variability. US national laboratories and companies offer the most advanced smart grid and accessory technologies available worldwide, positioning the United States to partner with these countries on technological innovation and knowledge sharing.

Central America faces challenges similar to the Southern Cone economies, but as a region is considerably further behind. Progress on energy development and modernization in the region has been stalled by heavy electricity subsidies combined with a reliance on petroleum fuels for power and poor governance surrounding energy regulation and utilities management.

The Caribbean countries face deep and intractable challenges in meeting their stated climate policy and energy development goals given problems endemic to the region's energy frameworks. The barriers to creating modern energy systems in the Caribbean are small economies, lack of scalability, limited economic growth prospects, dependency on conventional fossil fuels (particularly in power generation), and high power costs. The Caribbean requires a combination of natural gas, advanced energy storage options, and renewably sourced power to address its energy security challenges, but the region struggles under low to no creditworthiness to secure investment support.

These challenges can be overcome by wise policy and robust external support. The United States can help by showing how US regional markets balance cost and reliability while managing increasingly diverse fuel mixes. US regulators can engage in knowledge sharing and capacity building in South America, potentially opening more doors for US products and services in these spaces. In Central America and the Caribbean, US diplomacy should expand upon proven successes, such as the Caribbean Energy Security Initiative, in fostering regional cooperation on energy system integration. Bilateral ties, such as those between the United States and Mexico on electricity and conventional fuels trade, should be leveraged to support overarching energy and infrastructure goals in Central America and the Caribbean. Among these goals, the United States should consider how it can support sustainable distributed and microgrid technologies, especially in the Caribbean, as a component of a post-Hurricane Maria model of durability.

The report also recommends expanding regional energy integration and trade. The regional energy integration that the United States has with Mexico (and Canada) should be preserved and protected. While North American Free Trade Agreement (NAFTA) negotiations remain highly fraught, piped natural gas trade with Mexico is indispensable to the US gas industry, and also the key to decarbonization in Mexico and potentially

Central America. Rather than restricting it, the United States should move toward expanding free trade status to Central America and the Caribbean to support energy exports. In the event NAFTA is not modernized, a regional energy free trade agreement, or elimination of the distinction between free trade and non-free trade status in the Natural Gas Act, should be considered.

Multilateral development banks (MDBs) and regional development organizations, where appropriate and needed,

can help finance the modeling required to help national regulators design tariffs that incentivize private investment for gas importation infrastructure. With support from the United States, MDBs can provide credit support to countries that have low or no credit to help finance liquefied natural gas import and other infrastructure. A measure of credit support for private investors would accelerate the conversion from coal and oil to gas and address intermittency issues for countries enjoying higher levels of renewables integration.

INTRODUCTION

As signatories to the Paris Agreement race towards the twenty-fourth meeting of the Conference of the Parties to the United Nations Framework Convention on Climate Change (UNFCCC) meeting in Katowice, Poland, in December 2018 (known as COP 24), Latin America as a region appears to hold the pole position.¹ More than any other region,² Latin America has combined ambitious emissions targets with policy actions and frameworks that make their various nationally determined contribution (NDC) targets within the Paris Agreement achievable. Most of this progress rests on the strategies of the major emitters, which have thus far largely succeeded in balancing their energy security, sustainability, and affordability needs. While they are on track to meeting their NDC targets, the major emitters face challenges completing the next, more difficult phase

of measures to comply with their Paris targets. Some of Latin America's distinct regions are only just beyond the starting gate in their journeys, with unique barriers to progress towards their national climate targets.

This report focuses on the lessons learned from the region's major emitters, and the policy steps they and other countries can consider as they update their NDCs at the Katowice check-in in December. Closing the gap between their current progress and their targets will require addressing challenges of market and policy design, political willpower, financing, and investment. This report reviews the creative policy approaches taken in the region and the heterogeneous challenges faced by the subregions, and offers recommendations based on their unique contexts as well as some overarching recommendations to support Latin America on this path.

1 For the purposes of this report, Latin America is defined as including all countries in the regions of South America, Central America, the Caribbean, and Mexico.

2 While other major developing regions, such as Southeast Asia, are making progress towards their Paris Agreement targets, the most current available analyses suggest that these regions (taken together as wholes) are behind Latin America despite its own uneven progress (discussed more fully in the following pages). Bloomberg New Energy Finance (BNEF) analyses cited below consider numerous factors, among which we find the conditionality of emissions targets (based on anticipated international green investment) and the type and intensity of emissions reduction targets (business as usual (BAU) vs. absolute vs. intensity) most compelling. We note, for example, that "intensity" targets, which measure a country's emissions per unit of gross domestic product and thus allow for considerable emissions growth, predominate among Asian NDCs whereas BAU targets predominate in Latin America (with an absolute target in Brazil, arguably the region's largest developing economy). In Latin America, most pledges are either unconditional or a mix of both, with the unconditional target usually forming around half of the total commitment. For example, Mexico's target includes an unconditional 25 percent reduction commitment but up to a 40 percent conditional reduction commitment. See also: "INDC," Climate Policy Observer, <http://climateobserver.org/open-and-shut/indc/>, for side-by-side comparisons of the 2015 NDCs and BNEF's November 2017 *Clean Energy and the Paris Promises* report: <http://global-climatescope.org/en/insights/climate-policy/>.

THE ROAD FROM PARIS

The 2015 Paris Agreement was an unprecedented ground-up, global accord that committed 160 initial signatories to specific NDC targets in line with an overarching goal of meeting a two-degree-or-below temperature increase scenario in this century. The agreement spanned a range of issues including climate resilience and adaptation, emissions management and reductions, energy efficiency, investment frameworks, and land use and deforestation.³ Since entering into force on November 4, 2016, at COP 22, 175 countries have ratified the Paris Agreement out of the total 197 parties to the UNFCCC. Its unique approach employs self-monitoring and self-reporting mechanisms, supported by historic public and private global financing commitments, to help developing countries transition away from carbon-intensive economies.⁴ NDCs are therefore more indicative of national energy strategies than predictive. Implementation is contingent on political will, fiscal frameworks, external financing, commodity pricing, and technological change.

The agreement requires that parties submit an initial NDC and strengthen it at periodic intervals. Consequently, the COP cycles are designed around intervals of review and resubmission dating from when the agreement was signed and entered into force. The COP 24 check-in will be a key milestone, the first serious reality check on the first drafts of NDCs submitted over 2015 and 2016.

Latin America in the Lead

Bloomberg New Energy Finance (BNEF) noted in its 2016 Climatescope report (which reviews each developing country's legal, financial, and emissions control framework) that Latin America "is the only Climatescope region which would achieve absolute expected emissions cuts if its collective conditional target is met."⁵ The impressive growth and deployment of renewable energy evident throughout the region, where power sector emissions

are important to many countries' NDC goals, has been a factor. Although the Southern Cone already enjoyed high shares of hydropower, the International Renewable Energy Agency (IRENA) has estimated that between 2006 and 2015 Latin America experienced "impressive growth in non-hydropower renewables, whose installed capacity has more than tripled between 2006 and 2015, from 10 gigawatts (GW) to 36 GW."⁶ More recently, in 2017, BNEF's Climatescope analysis ranked four Latin American countries in its global top ten leaders among seventy-one developing countries.⁷

These outcomes were not accidental, but rather the result of combining ambitious sustainable energy development targets with creative policy solutions and thoughtful implementation strategies. These strategies can be fine-tuned for the major emitters and emulated by others in and outside the region. Notable policy tools in the region include the rapid adoption of net metering (currently in eleven countries), the introduction of auctions and tenders for clean power generation (thirteen countries), the introduction or expanded use of power purchase agreements or PPAs (especially in the region's biggest economies), uptake of distributed generation solutions (especially in Central America), and the introduction of carbon pricing (in three countries, so far).

Recent developments in two of the region's fastest growing economies are illustrative.

Mexico became the first developing country to pass comprehensive climate change legislation in 2012, and its Paris Agreement target includes reducing greenhouse gas (GHG) emissions by 22 percent and black soot emissions by 51 percent by 2030, relative to business-as-usual (BAU) levels, and peaking emissions no later than 2026.⁸ Mexico's target is notably ambitious and binding. Mexico has been attractive for renewable investment for

3 "The Paris Agreement," The United Nations Framework Convention on Climate Change, http://unfccc.int/paris_agreement/items/9485.php.

4 For additional information on the self-reporting and monitoring mechanisms in the Paris Agreement, see also Jake Schmidt, "Paris Climate Agreement Explained: How Will We Track Country Progress?" Natural Resources Defense Council, December 16, 2015, <https://www.nrdc.org/experts/jake-schmidt/paris-climate-agreement-explained-how-will-we-track-country-progress>.

5 Bloomberg New Energy Finance, *Clean Energy and the Paris Promises*, Climatescope 2017, <http://global-climatescope.org/en/insights/climate-policy/>.

6 IRENA, "South America Plans for Its Renewable Energy Future," August 29, 2017, <http://www.irena.org/newsroom/pressreleases/2017/Aug/South-America-Plans-for-its-Renewable-Energy-Future>.

7 These include Brazil (2), Mexico (4), Chile (7), and Uruguay (9). The full rankings may be viewed here: "Results for All Regions," Bloomberg New Energy Finance, Climatescope 2017, <http://global-climatescope.org/en/results/>.

8 Mexico's full NDC is available here: Government of Mexico, Intended Nationally Determined Contribution, via United Nations Framework Convention on Climate Change, <http://www4.unfccc.int/submissions/INDC/Published%20Documents/Mexico/1/MEXICO%20INDC%2003.30.2015.pdf>.

Latin American Energy and Climate Policies (by country)	
Argentina	<ul style="list-style-type: none"> ■ Reduced energy subsidies and liberalized production/development environment for conventional and renewable energy ■ Federal renewable energy consumption target ■ Value-added tax (VAT) exemptions and accelerated depreciation investment incentives ■ RenovAr reverse auction rounds for power contracts ■ Unconditional, absolute emissions-reduction target
Mexico	<ul style="list-style-type: none"> ■ Carbon pricing (\$3.50/tonne) ■ Power generation market liberalization beginning with 2013 energy reforms and private sector opening ■ Reform of state-owned utility Comisión Federal de Electricidad (CFE) ■ Creation of an independent system operator, Centro Nacional de Control de Energía ■ Net metering policies ■ Renewable power mandate (35% by 2024) ■ Implementation of clean energy certification program ■ Unconditional, relative to 2005, BAU emissions-reduction target
Brazil	<ul style="list-style-type: none"> ■ Reverse auctions for power generation ■ Net metering ■ Banco Nacional de Desenvolvimento Economico e Social (BNDES) as a top renewable financier (dispersed \$29 billion for renewable energy thus far) ■ BNDES content requirements encouraging local growth ■ Energy efficiency policies through national energy savings obligation, requiring 0.5% of operators' profits to go towards efficiency end uses ■ Smart metering support required of all operators as of 2018 ■ Aggressive use of power purchase agreements favoring renewables
Chile	<ul style="list-style-type: none"> ■ Carbon pricing (\$5/tonne) ■ Unbundled power sector and redesigned, more competitive power market developed ■ Removal of virtually all distortive energy sector subsidies ■ Creation of time sub-block system for power auctions in 2014, supporting variable renewable power ■ Technology, fuel-blind power auctions with conventionals and renewables competing together ■ Net metering as of 2014 ■ Clean energy mandate requiring 20% of power generation from renewable sources by 2025
Uruguay	<ul style="list-style-type: none"> ■ Long-term 20-year PPAs available to generators, allowing independent operators to coordinate or compete with national utility UTE ■ Investment-supportive VAT exemptions ■ Income tax reduction for clean energy and energy efficiency projects ■ Reverse auctions favoring renewables, especially wind ■ Measures to incentivize local content of 40% for new power capacity projects ■ Net metering program established; customers can receive credits for clean power added to grid
Honduras	<ul style="list-style-type: none"> ■ Modernized legal framework for power in July 2014 and feed-in tariff (\$180/mega-watt hour) for plants commissioned by July 31, 2015, supported record solar installations ■ Creation of independent regulatory agency Comisión Reguladora de Energía ■ Decree 70, implemented in 2007, created a 10% price premium for clean energy projects in the first 15 years of operation as well as grants import, income, and sales tax exemptions to renewable energy generators

Latin American Energy and Climate Policies (by country)

Nicaragua

- Ambitious 91% total renewable electricity consumption target by 2027
- Plan for Electric Generation Expansion 2016-30 updated in January 2017 with a nonbinding 73% renewable energy generation target by 2030
- Range of investment incentives: import duty, VAT, and income tax exemptions
- Power generation can be contracted between generators and distributors and large consumers
- Law 532 requires set-asides for renewable energy in tenders
- In 2015, the federal government began establishing reference prices for renewable energy technologies

Barbados

- Net metering in place since 2010
- Comprehensive tax incentive policy supportive of renewable energy expansion, particularly self-generation and efficiency since 2013
- Non-legally binding target to generate 29% of electricity from renewable sources and reduce consumption by 22% below BAU by 2029

Jamaica

- First Caribbean country to hold a clean energy-specific auction
- National Energy Plan goal of 20% of generation from renewables by 2030
- National Energy Policy includes voluntary goals for renewable energy, biofuels, energy efficiency, waste-to-energy, and carbon credits trading
- Net metering pilot program underway
- Committed to unconditional 7.8% emissions reduction below BAU target without financing support, 10% with financing support

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Bloomberg New Energy Finance, “Results for Latin America,” Climatescope 2017, (by country).

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“The Macri Government’s Reform Program: A Scorecard,” Center for Strategic and International Studies, accessed March 29, 2018, argentinareforms.csis.org.

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Juan-Carlos Altamirano and Julia Martínez, “Mexico’s 3 Big Steps Towards Comprehensive Carbon Pricing,” World Resources Institute, April 14, 2017, <http://www.wri.org/blog/2017/04/mexicos-3-big-steps-towards-comprehensive-carbon-pricing>.

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International Energy Agency, “Electric Power Auctions – Wind,” last modified August 19, 2015, <https://www.iea.org/policiesandmeasures/pams/brazil/name-24700-en.php>.

Chile:

The World Bank, “Carbon Pricing Dashboard,” accessed March 29, 2018, http://carbonpricingdashboard.worldbank.org/map_data.

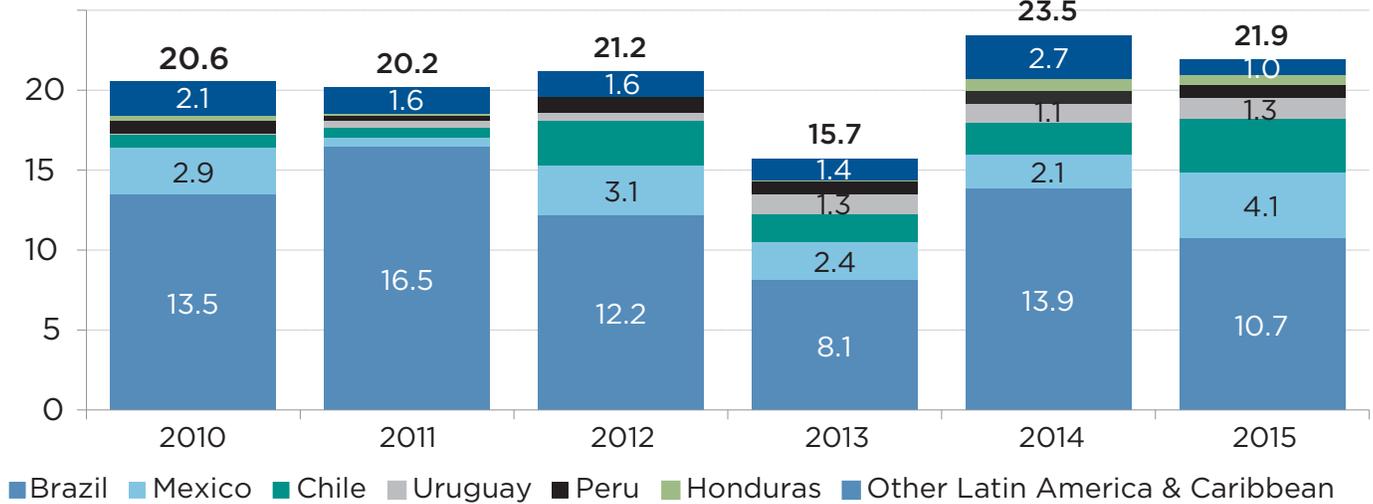
Nicaragua:

International Renewable Energy Agency, Renewables Readiness Assessment: Nicaragua, January 2015, https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2015/IRENA_RRA_Nicaragua_ES_2015_EN.pdf.

Jamaica:

The Government of Jamaica, Jamaica’s National Energy Policy 2009–2030, Ministry of Energy and Mining, October 2009, http://mset.gov.jm/sites/default/files/National%20Energy%20Policy_0.pdf.

Clean energy investment by country (\$bn), 2010 – 2015



Note: These figures include new investment, acquisition transactions, public market investment and refinancing.

Source: Bloomberg New Energy Finance/Climatescope 2016

years; the International Trade Administration has estimated that the country attracted \$13.5 billion in foreign direct renewable energy investment between 2010 and 2015 in more than forty projects.⁹

Since 2015, Mexico has implemented its new clean energy power auction rules and became the second-largest renewables investment destination in the region, securing an all-time annual high of \$6.2 billion in investment in 2017—more than tripling its total renewables investment of \$1.8 billion in 2015.¹⁰ Mexico has effectively leveraged a system of clean energy certificates and highly successful power auctions with historically cheap renewables bids, and a carbon price to bring industrial electricity costs down while increasing renewables to 9 percent of installed generation capacity.¹¹ The Mexican government has likewise reduced residential power subsidies and liberalized all other power

prices in an effort to make the power sector more competitive over the long term and to support broader renewable power generation goals.¹²

To the south, Argentina under the Mauricio Macri government has implemented difficult policy changes. It has liberalized energy and power markets and cut inefficient electricity subsidies. These have been courageous (and unpopular) steps but the government has weathered the storm. At the same time, the government held reverse auctions to lay the groundwork for the addition of renewable power generation to the grid.¹³ Since the launch of the renewable energy auction program of Argentina (RenovAr) in 2016, Argentina has conducted multiple successful renewables auctions with estimates from the latest round (Ronda 2) in October 2017 of around \$11 billion in domestic and foreign investment in wind, solar, small-scale hydroelectric, and bioenergy projects.¹⁴

9 “Mexico - Renewable Energy,” International Trade Administration, last updated September 16, 2017, <https://www.export.gov/article?id=Mexico-Renewable-Energy>.

10 Abraham Louw, “Clean Energy Investment Trends, 2017,” Bloomberg New Energy Finance, January 16, 2018, <https://data.bloomberglp.com/bnef/sites/14/2018/01/BNEF-Clean-Energy-Investment-Trends-2017.pdf?elqTrackId=2e6e6b2aa1f946bca67cd74d9e20babb&elq=72c115874de449be8347657fca8c0e9f&elqaid=10316&elqat=1&elqCampaignId=>

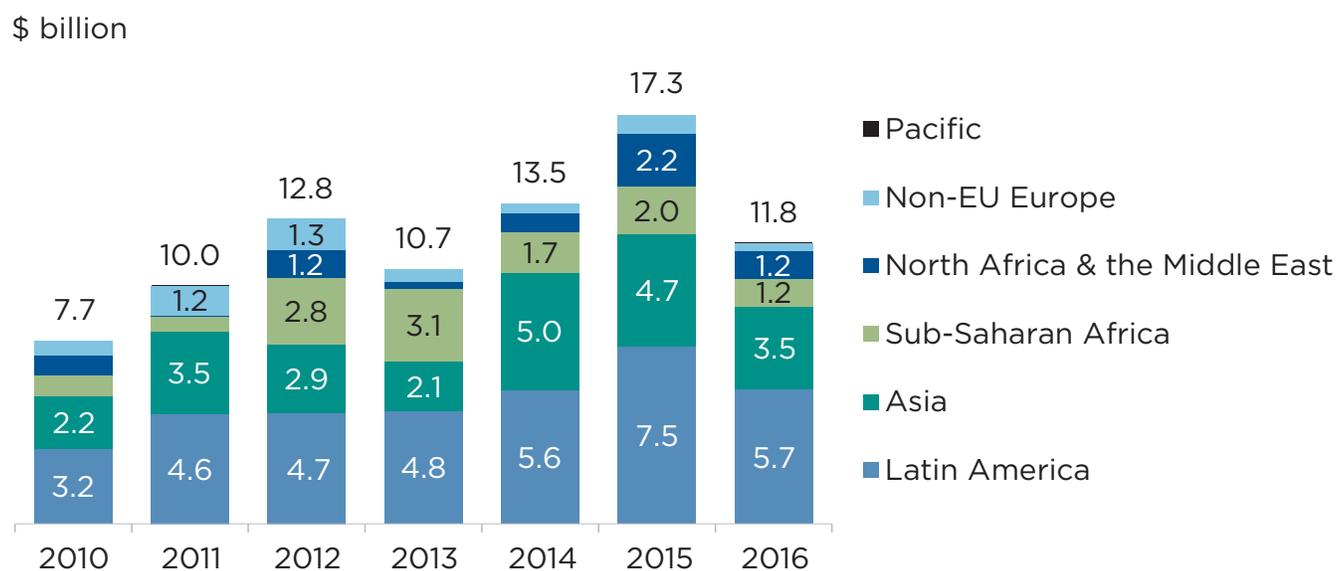
11 “Mexico,” Bloomberg New Energy Finance, Climatescope 2017, <http://global-climatescope.org/en/country/mexico/#/enabling-framework>.

12 “Mexico Electricity Market Reforms Attempt to Reduce Costs and Develop New Capacity,” Energy Information Administration, July 5, 2016, <https://www.eia.gov/todayinenergy/detail.php?id=26932>.

13 “Argentina,” Bloomberg New Energy Finance, Climatescope 2017, <http://global-climatescope.org/en/country/argentina/#/enabling-framework>.

14 Adam Critchley, “Argentina’s RenovAr 2 Renewable Energy Auction Draws 9.4GW of Offers,” October 20, 2017, Business News America, <https://subscriber.bnamericas.com/Subscriber/en/news/electricpower/argentinas-renovar-2-renewable-energy-auction-draws-94gw-of-offers/>.

Foreign clean energy project capital deployed, by destination



Source: Bloomberg New Energy Finance/Climatescope 2017

Note: includes only asset (project) financings

Both Argentina and Mexico have reinvigorated and modernized their conventional fossil fuel exploration, production, and utilization while incentivizing renewables capacity in their power sectors. They have adopted foreign investment incentives for domestic fossil fuel production to reduce trade imbalances and improve domestic energy security. Both are laying the (literal) groundwork to maintain and expand the role of cleaner-burning natural gas in their respective power grids by building out gas distribution networks. In Mexico, converting power plants from diesel to natural gas has resulted in near-term emissions reductions. Argentina is focused on producing domestic natural gas (and importing liquefied natural gas, or LNG) both for baseload power and as a lower carbon backup to hydropower and renewable energy.

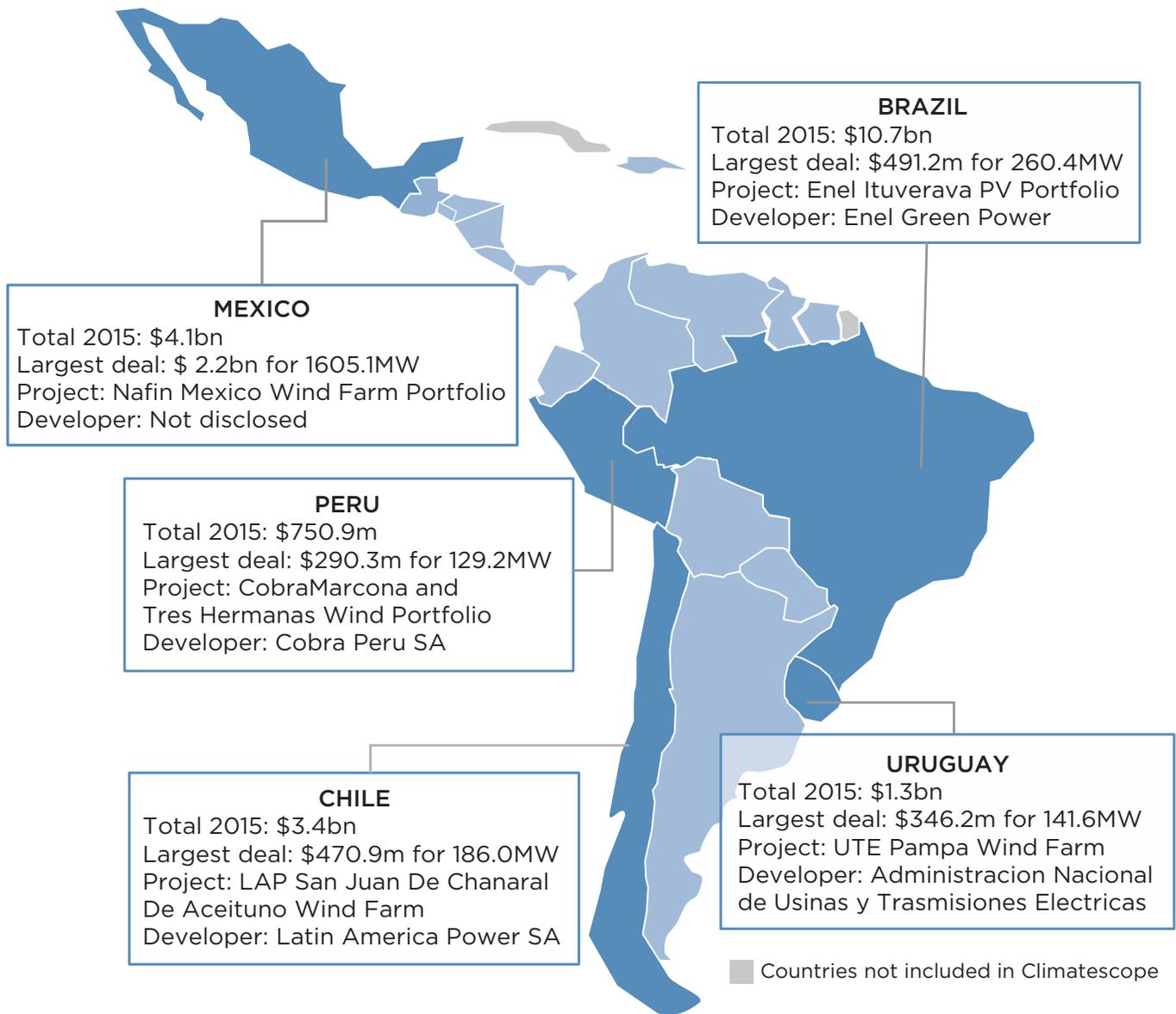
The Challenge Ahead

Despite laudable developments thus far, progress in the region is uneven, and serious challenges remain. Efforts to modernize regulatory and legal frameworks,

procure investment, and support sustainable energy development have been top heavy, with national governments leading investment on all fronts. The broad challenges for energy modernization in Latin America include moving from government-led investment to private investment in energy, reducing price distortions from subsidies, and managing the politics of energy transformation. The next wave of investment for emissions reductions will take place after the low-hanging fruit strategies—improved efficiency, switching from coal and diesel to gas, and hydroelectric optimization—have been maximized. Likewise, there is growing unease among utilities and power regulators in the region, as well as among external observers, over possibly too-good-to-be-true power auction pricing for renewables. The worry is that low bids for wind-and-solar-based generation may not reach final investment decision, and auctions will need to be studied to ensure auction designs do not undervalue assets or inadvertently encourage underbidding.¹⁵ The regulatory environment in these markets should be designed to avoid a race to the bottom, lest providers

¹⁵ A 2013 IRENA study of renewable power auctions in developing countries notes that “Under an auction scheme, an incentive is created for bidders to bid as low as possible...A serious risk is, however, that developers will bid too low to actually be able to realise the project, that is, underbidding. Returns on investment would then be too low to secure financing for the project.” Renewables auctions are often bid on the basis of assumed future technological cost cuts, and are thus based on projections and not necessarily hard data. This places both governments and consumers in precarious situations. See Hugo Lucas, Rabia Ferroukhi, and Diala Hawila, *Renewable Energy Auctions in Developing Countries*, IRENA, 2013, https://www.irena.org/documentdownloads/publications/irena_renewable_energy_auctions_in_developing_countries.pdf.

Top five clean energy projects financed in Latin America & Caribbean, 2015



Source: Bloomberg New Energy Finance/Climatescope 2016

Note: each country can only figure once.

offer unsustainably low prices that may result in projects going unfinished.¹⁶

In light of these problems, updating NDCs for the next phase of emissions reductions in Latin America is likely to be challenging. A concerted effort leveraging both smart policies and rapid technological advancements in energy development will be necessary for the Latin American countries, and the region as a whole, to meet

their NDC goals in an affordable and sustainable manner. A look at these efforts through the lens of sub-regional cohorts is instructive.

The Southern Cone: Integrating Renewables

Many countries in the Southern Cone are well situated with diversified economies, plentiful conventional and unconventional resources, high political consensus and

¹⁶ In Mexico, for example, each recent power auction (all dominated by renewable power generation) has seen bid prices decline (notably, by 30 percent between its second such auction in March 2016 and third in November 2017).



Sugarloaf mountain, Rio de Janeiro, Brazil. *Photo credit:* Unsplash/Julianna Kaiser

motivation to achieve clean energy goals, and increasingly attractive investment climates. Among this group are the region's largest economies and biggest emitters. Recent estimates suggest that Brazil alone contributes 2.3 percent of total global emissions despite exceptional progress in generating 76 percent of its power from renewable resources (hydro and non-hydro) as of 2016.¹⁷

The countries of this region, including Argentina, Brazil, Paraguay, Uruguay, and Chile, historically relied on a mix of oil, natural gas, and hydroelectric power (the latter two especially for power generation) in their energy supplies, with non-hydro renewables effectively nonexistent on some of these grid networks until the mid-2010s. Brazil is both a regional and global exemplar, having made notable strides in initiating investment for non-hydro renewables and developing small-scale LNG infrastructure. BNEF notes in its 2017 report that Brazil's "size, plentiful resources and conducive policies have made [it]

the region's main renewable energy market and one of the top 10 in the world."¹⁸ Brazil has been successful in leveraging reverse auctions—enabling renewables and conventional fuels to compete head-to-head—to diversify its fuel mix in a competitive fashion. Moreover, its Banco Nacional de Desenvolvimento Economico e Social (BNDES) is ranked among the top clean-energy lenders in the world, and between 2006 and 2016 dispersed \$29 billion for renewable energy projects.¹⁹

Argentina is likewise notable for its diversification efforts. In 2012, Argentina's power mix was comprised of 54 percent natural gas (mostly imported after production drops began in 2006), 22 percent hydroelectricity, and 15 percent oil.²⁰ This pattern has changed rapidly. In 2016, the RenovAr auction Rounds 1 and 1.5 resulted in 2.4 GW of renewable power awarded (nearly all of which was non-hydro), which recent estimates suggest will bring total non-hydro renewable power generation

17 Johannes Friedrich, Mengpin Ge, and Andrew Pickens, "This Interactive Chart Explains World's Top 10 Emitters, and How They've Changed," World Resources Institute, April 11, 2017, <http://www.wri.org/blog/2017/04/interactive-chart-explains-worlds-top-10-emitters-and-how-theyve-changed>; "Brazil - Renewable Energy," International Trade Administrator, US Department of Commerce, August 10, 21017, <https://www.export.gov/article?id=Brazil-Renewable-Energy>.

18 "Brazil," Bloomberg New Energy Finance, Climatescope 2017, <http://global-climatescope.org/en/country/brazil/#/enabling-framework>.

19 Ibid.

20 IRENA, *Renewable Energy Policy Brief: Argentina*, June 2015, http://www.irena.org/DocumentDownloads/Publications/IRENA_RE_Latin_America_Policies_2015_Country_Argentina.pdf.

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from approximately 2 percent today to 7 percent by 2020.²¹

Uruguay, which began from a higher hydroelectric generation starting point, has been ahead of the global curve in addressing GHG emissions even prior to the Paris Agreement. It adopted an aggressive renewables investment program of \$5.68 billion from 2011 to 2015 to diversify its grid and reduce expensive and carbon-intensive oil imports. By 2015, nearly 95 percent of the country's power was renewably sourced, largely between hydropower (56 percent) and wind (22 percent), with oil and diesel consumption reduced to 3 percent of the power supply.²² Uruguay's NDC commits it to maintain these intensity reductions in the power sector, reduce agricultural (beef) emissions intensity by 33 percent from 1990 levels, and become a net carbon dioxide remover by 2030 using aggressive land use, land-use change, and forestry efforts.²³

Chile²⁴ offers a similar example, adding wind power to existing hydropower generation, while Paraguay's surplus of hydroelectricity has made it a long-standing net regional power exporter while adding \$2 billion to the country's gross domestic product.²⁵

Periodic drought and increasing shares of non-hydro renewables penetration in this region have introduced questions about how to back up and balance growing levels of intermittent renewable power. National governments must assure reliability while reducing emissions. Natural gas offers solutions on all fronts, but leveraging it successfully will require careful design of these countries' emerging gas markets. The Southern Cone countries increasingly rely on imported gas to play a balancing role while ramping up renewables. Brazil has again led on this front by leveraging gas to back up its newer resources. Brazil is home to three Floating Storage Regasification Units (FSRUs), with a fourth planned near Aracaju.²⁶ Flexible gas-fired power,

dominated by LNG imports, was critical to supporting the grid during the historic drought seasons between 2012 and 2016.²⁷ In 2016, Brazil, Argentina, and Chile together constituted 4 percent of global LNG imports, at 5.2, 4.2, and 3 million tons per annum, respectively.²⁸

“Natural gas offers solutions on all fronts, but leveraging it successfully will require careful design of these countries' emerging gas markets.”

Ongoing developments in the global LNG market favor South America's emerging importers; affordable supplies, increasing liquidity, flexible contracts, disappearing destination clauses, and (most importantly) the rapid growth of the global spot market all support increased imports if the domestic markets are properly managed. Financing new terminals and adding to the region's five existing FSRUs located in Argentina and Brazil, as well as distribution infrastructure, is challenging given the high variability of the region's gas demand based on hydro output for power and seasonal gas heating needs.

Reliability auctions, held by the utilities, are one solution. Reliability auctions typically involve a mechanism by which reliability in extreme or atypical circumstances is factored into power providers' bid frameworks. In the United States, for example, PJM Interconnection's annual capacity auction for 2018-19 included new capacity performance rules in response to power outages during the 2014 polar vortex.²⁹ A recent Brattle Group analysis of international reliability and security products notes “energy (and ancillary services) prices drive investment.

21 Daniel Artana, Oscar Natale, and Cynthia Moskovits, *Argentina*, Fundacion de Investigaciones Economicas Latinoamericans (provided for the OECD), May 2017, <https://www.oecd.org/environment/cc/g20-climate/collapsecontents/Fiel-argentina-growth-and-low-carbon-transition.pdf>.

22 “Uruguay,” Bloomberg New Energy Finance, Climatescope 2017, <http://global-climatescope.org/en/country/uruguay/#/enabling-framework>.

23 Uruguay's full NDC is available here: Government of Uruguay, *Uruguay: Intended Nationally Determined Contribution*, via United Nations Framework Convention on Climate Change, [http://www4.unfccc.int/submissions/INDC/Published%20Documents/Uruguay/1/INDC%20Uruguay%20\(English-unofficial%20translation\).pdf](http://www4.unfccc.int/submissions/INDC/Published%20Documents/Uruguay/1/INDC%20Uruguay%20(English-unofficial%20translation).pdf).

24 Henry Kasper, “How Chile Is Embracing Renewable Energy,” World Economic Forum, April 14, 2016, <https://www.weforum.org/agenda/2016/04/how-chile-is-embracing-renewable-energy>.

25 “Paraguay,” The Observatory of Economic Complexity, Massachusetts Institute of Technology Media Lab, Macro Connections Group, accessed February 9, 2017, <https://atlas.media.mit.edu/en/profile/country/pry/>.

26 “Golar Power Secures 25-Year FSRU Charter Deal,” *World Maritime News*, October 18, 2016, <https://worldmaritimeneews.com/archives/204249/golar-power-secures-25-year-fsru-charter-deal/>.

27 Anouk Honore, *South American Gas Markets and the Role of LNG*, Oxford Institute for Energy Studies, October 2016, <https://www.oxfordenergy.org/wpcms/wp-content/uploads/2016/10/South-American-Gas-Markets-and-the-Role-of-LNG-NG-114.pdf>.

28 The International Gas Union, *IGU World Gas LNG Report - 2016*.

29 Jeffrey Tomich, “PJM Auction Sees Power Prices Soar under New Reliability Rules,” *EnergyWire*, August 24, 2015, <https://www.eenews.net/stories/1060023802>.



Electricity pylons at sunset; unidentified location. *Photo credit:* Unsplash/Matthew Henry

In some jurisdictions, additional measures have been implemented to provide greater certainty that reliability goals will be met.³⁰ Pricing and regulatory mechanisms that address reliability concerns will support renewables deployment (and reduce price volatility) while enabling private financing of backup generation.

Additionally, these countries can pursue digitalized smart grid solutions to manage variable resource inputs, minimize transmission losses, and support distributed generation and microgrids for rural populations. Grid modernization is a particularly ripe area for international cooperation in the areas of technology trade and technical assistance. A new report from the International Energy Agency Digitalization and Energy Working Group estimates digitalization of power grids could result in \$80 billion in annual savings globally, or “about 5 percent of total annual power generation costs,” to say

nothing of industrial, building, and energy industry applications.³¹ Digitalization enables “smart demand responses,” potentially adding 185 GW of system flexibility to the global grid network, as well as coordinating demand-storage responses, and facilitating the storage, sharing, and consumption of excess energy supply.

Another component of a grid-based solution to the balancing question could be battery storage technology, which continues to show dramatic improvements in both efficiency and cost year to year. Advanced storage technology could provide invaluable support to the increasingly renewable-heavy and dispersed grid networks of the Southern Cone.

The Southern Cone countries are working to integrate digital technologies into their power infrastructures but have struggled under the combined burdens of

³⁰ The Brattle Group, *Near-Term Reliability Auctions in the NEM: Lessons from International Jurisdictions*, Prepared for the Australian Energy Market Operator, August 23, 2017, https://www.aemo.com.au/-/media/Files/Media_Centre/2017/2017-08-23-Brattle-Reliability-Auction---Case-Studies.pdf.

³¹ The Digitalization and Energy Working Group, *Digitalization and Energy*, International Energy Agency, September 27, 2017, <https://www.iea.org/publications/freepublications/publication/DigitalizationandEnergy3.pdf>.

accelerating demand and insufficient investment. For example, Argentina's earliest smart grid programs were through a 2010 memorandum of understanding with the US Department of Energy. Bilateral coordination has continued through the United States-Argentina Binational Energy Working Group and the State Department's Power Sector Program, yielding the San Martin and Armstrong smart grid pilot projects.³² However, the government's inability to manage the country's electricity subsidies until 2016 left the power sector unable to secure financing for the large-scale improvements necessary to simultaneously meet demand and modernize.³³ Although the Argentine situation is likely to improve as recent power auction investments bear fruit, it illustrates the importance of regulatory mechanisms complementing technological ambitions.³⁴

“Despite heavy subsidization, soaring electricity costs are a pervasive problem in Central America.”

Central America: Coordination and Integration

Central America faces challenges similar to the Southern Cone economies, but as a region is considerably further behind. Progress on energy development and modernization in the region have been stalled by heavy electricity subsidies combined with a reliance on petroleum fuels for power and poor governance surrounding energy regulation and utilities management.³⁵ Costa Rica is an exemplar in the region for maximizing natural

resources with constructive policies. The country has made strides in its power sector thanks to concerted efforts to explore and harness native geothermal resources since the mid-1990s, today used to support large amounts of hydroelectric power with growing amounts of wind and solar. The Costa Rican Institute of Electricity has estimated the country's total geothermal reserves at 875 MW, over three times the country's installed geothermal capacity today (195 MW).³⁶

These resources, in conjunction with policies including net metering, tax exemptions for renewables, and clean energy tenders, have enabled Costa Rica to shift electricity production almost exclusively to renewable sources—including a three-hundred-day renewable-power-only streak in 2017. It is a remarkable achievement. Costa Rica's next challenge is in transportation, where it is focused on developing and scaling efficient public transport options and green vehicle fleets to reduce transportation emissions (two-thirds of the country's energy-use emissions) as car ownership surges.³⁷ Despite its success, the Costa Rican model cannot necessarily be replicated elsewhere given its heavy dependence on the country's natural resources.

Despite heavy subsidization, soaring electricity costs are a pervasive problem in Central America. The International Finance Corporation (IFC) has noted that a dependency on imported oil for 40 percent of power in Central America has inadvertently caused these countries to pay twice the electricity costs of their South American neighbors—an issue for cost and competitiveness, and for emissions.³⁸ Many, such as Guatemala, highly depend on traditional biomass in rural areas not reached by the grid. The IFC notes that these small economies, which need reliable and widely accessible distributed generation, are

32 Oscar Medina (presenter), “Smart Grids: The Development of Smart Grid Pilot Projects in Argentina,” August 5, 2015, <http://ccap.org/assets/Oscar-Medina-Argentina-Smart-Grid-Pilots.pdf>.

33 A series of power auctions were conducted in 2016 and 2017 to promote investment for both generation and transmissions additions, which could result in more than \$13 billion in investments.

34 Argentina's efforts to reduce energy subsidies in recent years are laudable given the pervasiveness of such subsidies in the entire continent. Argentina is among over a dozen examples of Latin American countries that subsidize either fuel, power, or (in many cases) both. A recent International Monetary Fund report notes that these subsidies “were an important driver of fiscal deficits in many LAC [Latin America and the Caribbean] countries in 2011-13 [and] are a drag on countries' long-term growth and competitiveness, both by diverting resources away from other spending priorities and by discouraging efficiency-enhancing investment in the energy sector.” See Gabriel Di Bella, Lawrence Norton, Joseph Ntamatungiro, Sumiko Ogawa, Issouf Samake, and Marika Santoro, *Energy Subsidies in Latin America and the Caribbean: Stocktaking and Policy Challenges*, International Monetary Fund, February 12, 2015, <https://www.imf.org/en/Publications/WP/Issues/2016/12/31/Energy-Subsidies-in-Latin-America-and-the-Caribbean-Stocktaking-and-Policy-Challenges-42708>.

35 Ibid.

36 Wendy Anders, “Geothermal Exploration in Costa Rica's National Parks under Consideration,” *Costa Rica Star*, June 5, 2017, <https://news.co.cr/geothermal-exploration-costa-ricas-national-parks-consideration/61807/>.

37 Sebastian Rodriguez, “Costa Rica Drives for a New Green Goal: Electric Transport,” *Reuters*, November 30, 2017, <https://www.reuters.com/article/us-costa-rica-climatechange-transportati/costa-rica-drives-for-a-new-green-goal-electric-transport-idUSKBN1DU1RE>.

38 “Changing the Energy Landscape in Central America,” International Finance Corporation, August 2016, http://www.ifc.org/wps/wcm/connect/news_ext_content/ifc_external_corporate_site/news+and+events/news/changing-the-energy-landscape-in-central-america.



Solar panels with wind turbines and electricity pylons in the background; unidentified location. *Photo credit: Pixabay/Kenuone*

also excellent candidates for combinations of renewable and gas-fired power.

Yet progress towards a sustainable mix is uneven even within Central American countries. El Salvador, for example, has made strides in capitalizing on its ample geothermal power resources, but (like many of its neighbors) its power mix is still dominated by diesel, with 43 percent of its generation petroleum-based in 2016.³⁹ The stated aspirations of these governments and qualified progress so far reveals the “will” to keeping moving forward, but the “way” will require additional outside support—especially in gas infrastructure and integration to balance growing renewables.

Fortunately, coordinated international efforts have borne some encouraging results in bringing much needed ex-

ternal investment in energy modernization to the region. In July 2016, the IFC completed a \$150 million financing package to develop the 380 MW AES Colón power plant in Panama, which will become the region’s first integrated plant that generates power from LNG.⁴⁰ Although a positive development, a project of this scale would have been impossible without the support of a major development bank.

Individually, these economies are often unable to develop gas infrastructure at the scale needed to alleviate oil demand for power or to balance growing levels of renewables integration on the grids in line with these countries’ stated NDC targets. The originally planned AES Fonseca coal-fired power plant in El Salvador is now scheduled to come online in 2018, with 338 MW of capacity, as the country’s first gas-fired power plant.⁴¹

39 “El Salvador,” Bloomberg New Energy Finance, Climatescope 2017, <http://global-climatescope.org/en/country/el-salvador/#/enabling-framework>.

40 International Finance Corporation, World Bank Group, “IFC Provides \$150 Million for Central America’s First Integrated Liquefied Natural Gas Facility,” August 2, 2016, <https://ifcextapps.ifc.org/IFCExt/Pressroom/IFCPressRoom.nsf/0/06C6411636BC96CF85258003004CA296>.

41 Rosie Mitzmaurice, “Wärtsilä Backs First Gas-Fired Plant in El Salvador,” IJ Global, November 29, 2013, <https://ijglobal.com/articles/90166/w-rtsil-backs-first-gas-fired-plant-in-el-salvador>.



SIEPAC electrical interconnection through Costa Rica and 5 neighboring countries. *Photo credit: Wikimedia Commons/Chepanet*

Although redeveloped as a gas project from an initial coal project in 2010, the new power plant has endured delays due to challenges in financing the necessary \$900 million required to build it. Thus, even when the will to build modern, cleaner energy systems exists, the way is fraught with difficult financial realities for small, developing markets.

Regional integration—which creates larger and more attractive markets—is therefore critical. The 1,800 kilometer/300 MW Central American Electrical Interconnection System, known by its Spanish acronym, SIEPAC, and the Regional Electricity Market, known as MER, have been major steps forward for the region, establishing true power interconnections between the six Central American countries and thirty-seven million people while usage tripled between 2013 and 2015.⁴² Despite

these successes, SIEPAC and MER have not reached their full potential. At its current size, SIEPAC can support only about 5 percent of the region's total electricity demand.⁴³ Energy demand growth is expected to accelerate to as much as 6 percent annually, potentially requiring a twofold expansion from the region's 2010 installed power capacity by 2030.⁴⁴

The US-Caribbean-Central American Energy Security Task Force detailed some of the challenges facing these systems at the 2016 US-Caribbean-Central American Energy Summit. Issues included technical constraints for increasing energy trade among the Central American countries, developing regulatory and policy frameworks to support a competitive power sector, and determining how to integrate non-Central American countries (notably Colombia and Mexico)

42 Rebecca O'Connor and Lisa Viscidi, "Guatemalan Leadership & the Regional Electricity Market," August 2015, Inter-American Dialogue, <https://www.thedialogue.org/blogs/2015/08/guatemalan-leadership-the-regional-electricity-market/>.

43 Ibid.

44 Paul Shortell, Kathryn Baragwanath, and Carlos Sucre, *Natural Gas in Central America*, Inter-American Dialogue, March 2014, https://www.thedialogue.org/wp-content/uploads/2014/03/NatGAs_1.pdf.

into the regional network.⁴⁵ Mexico should be fully integrated into the transmission line network to the north, which will depend on developments in, and cooperation with, Guatemala. Achieving a fully functioning regional transmission network will likewise bolster the economic and financial case for gas-fired power and expanded LNG imports to the region. Sufficient gas markets of scale will be necessary to attract the large investments needed to support LNG infrastructure, enabling a transition away from oil generation.⁴⁶

Another challenge for these economies is properly managing and phasing out existing oil and coal-fired power assets, as an estimated 47 percent of installed power plant capacity in Central America is less than two decades old.⁴⁷ Since traditional power plants can operate for decades, these are relatively recent investments for low-income governments, and could be threatened in the rush to integrate high levels of renewables and gas-fired power onto the grids. Appropriate, cost-effective electricity tariffs will be important to supporting a balanced transition to de-risk older but still valuable assets—especially while cheaper, flexible renewables come online at competitive or likely lower prices than these traditional generation sources. As these traditional assets are gradually phased out, the electricity tariffs can be modified accordingly and consumer power costs decreased over time.

The Caribbean: Help Needed

Within Latin America, the Caribbean region faces the deepest and most intractable challenges in meeting its stated NDC and climate policy goals given problems endemic to the region's energy frameworks. The barriers to creating modern energy systems in the Caribbean mirror those in Central American states—small economies, lack of scalability, limited economic growth prospects, dependency on conventional fossil fuels, particularly in power generation, and high power costs. The Caribbean also requires a combination of natural gas, energy storage, and renewably sourced power to address its energy security challenges, but

the region struggles under low to no creditworthiness to secure investment support.

Historically, these challenges all but precluded LNG infrastructure investment, which will be critical to supporting high levels of solar and wind power on these countries' grids. An Institute of the Americas report notes, "When the costs of the LNG business are taken into account and the requirements for strict take or pay terms in contracts are considered, the ability of most off takers (utilities, mostly) in the Caribbean to post the requisite guarantees is practically non-existent."⁴⁸ The problems are exacerbated by geography, as these island countries face supply and infrastructure access problems. These issues were thrown into sharp relief by the devastation of Hurricane Maria in September 2017. The region also does not typically produce exportable natural gas, with the exception of Trinidad and Tobago.

“Securing investment and developing investable frameworks for energy is a clear starting point where the international community is well-suited to contribute.”

Securing investment and developing investable frameworks for energy is a clear starting point where the international community is well-suited to contribute. In 2015, the World Bank Group began working with the Caribbean governments to modernize their power sectors with investments and regulatory updates meant to reduce inefficiencies and attract private investment.⁴⁹ The United States has also shown strong international leadership on this front, supporting the establishment of the Caribbean Energy Investment Network as a key outcome of the Caribbean Energy Security Initiative (CESI) in January 2015.

45 The White House Office of the Vice President, "FACT SHEET: U.S.-Caribbean and Central American Energy Summit," May 4, 2016, <https://obamawhitehouse.archives.gov/the-press-office/2016/05/04/fact-sheet-us-caribbean-and-central-american-energy-summit>. Mexico is currently selling electricity to Guatemala and Belize through bilateral connections.

46 David L. Goldwyn and Cory R. Gill, *The Waning of Petrocaribe? Central America and Caribbean Energy in Transition*, Atlantic Council, May 2016, <http://www.atlanticcouncil.org/images/publications/Petrocaribe.pdf>.

47 Nestor Sanchez, *Establishing a Transitional Framework for Generation Development in Central America*, Aggreko, based on data from the National Renewable Energy Laboratory, a national laboratory of the US Department of Energy, Office of Energy Efficiency and Renewable Energy, March 2015, <https://www.platts.com/IM.Platts.Content/ProductsServices/ConferenceandEvents/americas/central-american-energy/presentations2017/Nestor-Sanchez.pdf>.

48 Institute of the Americas, *Natural Gas in the Caribbean: Matching Opportunity and Reality*, February 2014, https://www.iamericas.org/documents/Natural_Gas_Caribbean_Matching_Opportunity_Reality.pdf.

49 Jose Familiar, "Unlocking the Caribbean's Energy Potential," World Bank Group, January 31, 2015, <http://www.worldbank.org/en/news/opinion/2015/01/31/unlocking-the-caribbeans-energy-potential>.



A view of the first re-gasification of Liquefied Natural Gas (LNG) terminal storage in Quintero city, about 96 miles (155km) northwest of Santiago, Chile. October 22, 2009. *Photo credit:* REUTERS/Eliseo Fernandez.

In its Caribbean Vision 2020 strategy, the US Department of State committed to providing technical assistance for energy sector and utility reforms, supporting regulatory reforms to improve the business climate and strengthen regional planning, and coordinating mechanisms on energy.⁵⁰ The Caribbean strategy recognizes the desirability of both US natural gas exports to the Caribbean states as well as renewable technology exports. In November 2017, the State Department announced an additional \$4.3 million in funding support for energy diversification as part of the ongoing CESI operations.⁵¹ As the Donald Trump administration pursues its “energy dominance” theme for US energy diplomacy, the Caribbean can become a major energy importer and advance US interests in humanitarian security, particularly if a healthier energy

sector and economy stabilize the region and potentially reduce migration flows.

Continued regional engagement and coordination is also critical. CARICOM (Caribbean Community) has been a strong regional leader on energy modernization, prioritizing it in line with the Paris Agreement goals. The CARICOM Energy Programme has mandated an ambitious renewable energy target, aiming to increase the total share of renewable energy in the region’s energy mix from less than 10 percent in 2017 to 47 percent by 2027, and offers the Caribbean Sustainable Energy Roadmap and Strategy (C-SERMS) as a shared tool for regional policy makers to identify and address gaps in achieving their sustainable energy goals. C-SERMS has been a key coordinating mechanism for donor

50 The US Department of State, “U.S. Strategy for Engagement in the Caribbean,” <https://www.state.gov/p/wha/rt/caribbeanstrategy/index.htm>.

51 The US Department of State, “U.S. Department of State Supports Energy Diversification in the Caribbean,” November 16, 2017, <https://www.state.gov/r/pa/prs/ps/2017/11/275720.htm>.

“The Caribbean states can ... draw lessons from one another and their Latin American neighbors.”

and investor engagement to accelerate and assist with lending activities in the energy space, and interfaces with other multilateral organizations including the Organization of American States.⁵²

The Caribbean states can likewise draw lessons from one another and their Latin American neighbors. Many of the policy, regulatory, and fiscal framework tools applied throughout the region could be transplanted to the Caribbean context, including importing experienced independent regulators to advise power market reforms, seeking out trade and cooperation agreements that include third-party dispute resolution mechanisms, utilizing purchase power agreements to incentivize renewable power generation (e.g., Argentina) and reassure investors, using power auction reforms such as reverse auctioning, examining net metering proposals (e.g., Mexico, Brazil), and using local content requirements for energy infrastructure to bolster local economies (e.g., Brazil). If the investment problems can be ameliorated by international and regional engagement, the Caribbean countries need not reinvent the wheel on feasible policy prescriptions.

In Jamaica, some of these ideas have already borne fruit in just a few years. Like its Caribbean neighbors, Jamaica has historically relied upon petroleum-based fuel for most of its energy supply, especially in power generation, and largely from Venezuela via the Petrocaribe agreement. In 2015, imported fossil fuels (mainly diesel) accounted for 90 percent of Jamaica’s electricity production while its power plants averaged an estimated 29 percent efficiency.⁵³ Jamaica’s 2015 NDC target included a 10 percent conditional emissions reduction target from 2005 levels from the BAU scenario by 2030.⁵⁴ Jamaica’s

official National Energy Policy targets an ambitious 20 percent renewables share of the country’s primary energy mix by 2030.⁵⁵

Jamaica has also made strides towards conversion from fuel oil to natural gas in power generation. Since 2015, multiple gas-fired facilities have been built or are under construction; American company New Fortress Energy is developing a 190 MW gas-fired plant for the Jamaica Public Service Company (due to be finished in December 2018) as well as a \$160 million Jamalco 94 MW project.⁵⁶ Jamaica hosted its inaugural Jamaica Gas Conference in October 2017 as a signal of intent to move forward on gas infrastructure and LNG in the future.

On the renewables side, Jamaica’s minister of economic growth and job creation announced in April 2017 that the government is seeking \$300 million in investments to advance new renewable power projects, mostly in solar.⁵⁷ With the support of the US Agency for International Development and the US National Renewable Energy Laboratory, the Jamaican government conducted a study of a Net Billing Pilot Programme for solar electricity in 2015 and applied these recommendations to the Electricity Act of 2015, which established a new legal framework for net metering.⁵⁸ It is anticipated that these regulatory improvements will accelerate solar power uptake throughout the country. Jamaica is an exemplar of how focused and thoughtful policies—underpinned by serious engagement with outside partners—can support a clear vision for a small country’s energy development and future security.

The Path Forward

National governments, international and regional organizations, and the US government can all play a role in helping Latin American governments continue to build on the progress made already as COP 24 draws closer, and retain Latin America’s position as a region in the lead in pursuing major systemic changes. Latin America’s complex path thus far, and the path forward, could be invaluable to the global community as dozens

52 “Caribbean Sustainable Energy Roadmap and Strategy (C-SERMS) Platform,” The Energy and Climate Partnership of the Americas, <http://www.ecpamericas.org/initiatives/?id=92>.

53 “An Overview of Jamaica’s Electricity Sector,” Jamaica Ministry of Science, Energy, and Technology, <http://mset.gov.jm/overview-jamaicas-electricity-sector>.

54 Government of Jamaica, *Intended Nationally Determined Contribution of Jamaica*, via the United Nations Framework Convention on Climate Change, 2015, http://www4.unfccc.int/ndcregistry/PublishedDocuments/Jamaica%20First/Jamaica%27s%20INDC_2015-11-25.pdf.

55 “Jamaica’s National Energy Policy 2009 – 2030,” Ministry of Energy and Mining, <http://mstem.gov.jm/sites/default/files/National%20Energy%20Policy.pdf>.

56 Denise Dennis, “JAMALCO Switches to Natural Gas,” Jamaica Information Service, June 2, 2016, <http://jis.gov.jm/jamalco-shifts-natural-gas/>.

57 Emiliano Bellini, “Jamaica Targets \$300 Million Renewable Energy Investments,” *PV Magazine*, April 28, 2017, <https://www.pv-magazine.com/2017/04/28/jamaica-targets-300-million-renewable-energy-investments/>.

58 Ibid.

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of countries worldwide grapple with responding to the threat of climate change.

In the Southern Cone, the key is to maintain and improve efforts to balance growing shares of renewable power on high-demand grid networks using gas as backup and leveraging advanced grid and battery technologies to manage variability. The United States can help by facilitating workshops that show how US regional markets, like ERCOT (Electric Reliability Council of Texas), MISO (Midcontinent Independent System Operator), and PJM (Pennsylvania-New Jersey-Maryland) Interconnection balance cost and reliability using similar toolkits. Opportunities for experienced US regulators to engage in knowledge sharing and capacity building in South America can be mutually beneficial endeavors, potentially opening more doors for US products and services in these spaces.

“In Central America, US diplomacy has proven indispensable in fostering regional cooperation on energy system integration.”

Multilateral development banks (MDBs) and regional development organizations, where needed, can help finance the modeling necessary to help national regulators design tariffs that incentivize private investment for gas importation infrastructure. In Brazil, gas infrastructure has already served as an essential backup to renewables-heavy grid networks. While the question of appropriate backup supply will vary country to country, it is increasingly salient given record wind- and solar-based renewable power coming online in the Southern Cone where they are relatively recent additions to these grids.

In Central America, US diplomacy has proven indispensable in fostering regional cooperation on energy system integration. Existing programs such as CESI should be maintained and expanded, while bilateral diplomatic ties with the region’s governments should be leveraged to support overarching energy and

infrastructure goals. As the Trump administration has now developed a close relationship with Guatemala, it could use its influence to encourage that country’s cooperation on a second SIEPAC line.

In the Caribbean, a new post-Hurricane Maria model of sustainability may be emerging, using renewables-based minigrids backed by propane, liquefied petroleum gas, and possibly advanced batteries to provide distributed generation to key demand centers and to encourage more self-generation.⁵⁹ The United States, in tandem with MDBs, might marry its desire to export US technology with the need to support the competitiveness and sustainability of its neighbors by creating a regional electrification initiative. MDB credit support and US export financing could create a goal of full electrification for the Caribbean by 2025, while doing the same for Puerto Rico on a much more rapid timetable. These and the lessons learned from its regional neighbors could dramatically change the trajectory for sustainability in the Caribbean.

Two broader efforts would support US energy and technology exports and domestic job creation while promoting competitiveness and sustainability on the hemisphere.

First, the United States should use its influence in the World Bank and the Inter-American Development Bank to provide credit support to finance LNG import infrastructure. With the advent of FSRUs, the cost of entry and time to market for countries to access LNG have dropped dramatically. A measure of credit support for private investors would accelerate the conversion from coal and oil to gas and address intermittency issues for countries enjoying higher levels of renewables integration. This kind of program would not require new US appropriations, merely a refocus of existing bank priorities. Such an initiative is likewise in line with “energy dominance,” creating growing gas demand centers to the immediate south ideal for US exports from the Gulf of Mexico.

On the technology side, US national laboratories and private companies offer the most advanced smart grid technology available worldwide. Smart grids in the United States have dramatically reduced transmission and distribution losses while providing increasingly accurate data on demand response that has supported uptake in renewable power generation. Still nascent in Latin America, smart grids are particularly well suited

⁵⁹ Minigrids, thanks in part to their success in other continents (notably Africa), have attracted tremendous interest in the Caribbean as external and native organizations discuss the merits of particular systems over others. The Department of Energy, for example, is leading a deep-dive study on minigrids in Puerto Rico. An ongoing question is that of fossil-based backup versus advanced battery backup. Tesla has vigorously promoted the latter in post-Hurricane Maria Puerto Rico, where it is building a minigrid to power a local hospital using a battery as backup. See David Ferris and Peter Behr, “Microgrids Could Save Puerto Rico. But First, a Fight,” *E&E News*, December 8, 2017, <https://www.eenews.net/stories/1060068479>.



Participants from Latin American countries attending the Latin American natural gas roundtable, held at the Atlantic Council April 16, 2018 in cooperation with the US Department of State.

to the region's unique energy framework, specifically the need to balance variable renewables with baseload determined by weather conditions and the large distributed power demand in rural and semirural regions.

Second, the regional energy integration that the United States has with Mexico should be preserved and protected. While North American Free Trade Agreement (NAFTA) negotiations remain highly fraught, the piped natural gas trade with Mexico is indispensable to the US gas industry, and also the key to decarbonization in Mexico and potentially Central America. Rather than restricting it, the United States should move toward expanding free trade status to Central America and the Caribbean to support energy exports. In the event NAFTA is not modernized, a regional energy free trade agreement, or elimination of the distinction between free trade and non-free trade status in the Natural Gas Act, should be considered.

With the 2018 COP 24 in Katowice, Poland, fast approaching, Latin America faces a critical moment for its future energy development. It is increasingly important to advance policies and integrate new energy technologies that can modernize these systems as efficiently as possible. Much has been achieved in this region, but the strong pace of progress in some areas (such as the Southern Cone) is not evenly represented throughout Latin America. The active engagement and support of the international community will continue to be imperative, particularly for the region's smaller economies, as these governments seek assistance to close the gap and place themselves firmly on the path towards achieving their Paris Agreement targets. The United States can—and should—increase engagement with its southern neighbors on these issues and seek constructive and mutually beneficial opportunities to achieve shared energy goals. Latin America has come remarkably far, but considerable work lies ahead.

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