



# Latin America and the Caribbean Access to Energy Brief

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## Introduction

Over the past two decades the energy landscape of Latin America and the Caribbean has changed dramatically. The region has developed rapidly from rural, unelectrified communities to huge metropolises connected to power grids and centralized generation. However, some major access to energy challenges remain unmet. First, 34 million people across the region still do not have access to reliable electricity, and their communities are often too isolated for connection to the major grids. Second, although Latin America and the Caribbean have some of the highest quality and most plentiful renewable energy resources on the planet, governments still do not see them as a viable alternative to fossil fuels. Finally, the continent faces challenges of policy implementation – in particular, the question of how to incentivize energy efficiency and conservation in unregulated and illegal markets. This research brief will address each of these challenges.

## Current Energy Profile

Between 1991 and 2011, the region more than doubled electricity production from 609 terawatt-hours to 1,379 TWh – an average annual growth rate of 4.4 per cent per year.<sup>1</sup> Economists predict continued growth in the region: of the population by 0.85 per cent annually, and of economies by three per cent annually over the next 20 years.<sup>2</sup> All of this growth will require another doubling of electricity production to 2,500 TWh by 2030 (to put this number in context, the United States currently produces over 4,000 TWh of electricity annually). Part of this growth will be tied to access to energy, as impoverished or isolated communities are either connected to the cen-

<sup>1</sup> Majano, Ana María. "Study on the Development of the Renewable Energy Market in Latin America and the Caribbean." Inter-American Development Bank, 2014. <http://publications.iadb.org/handle/11319/6711>.

<sup>2</sup> Majano, 2014.



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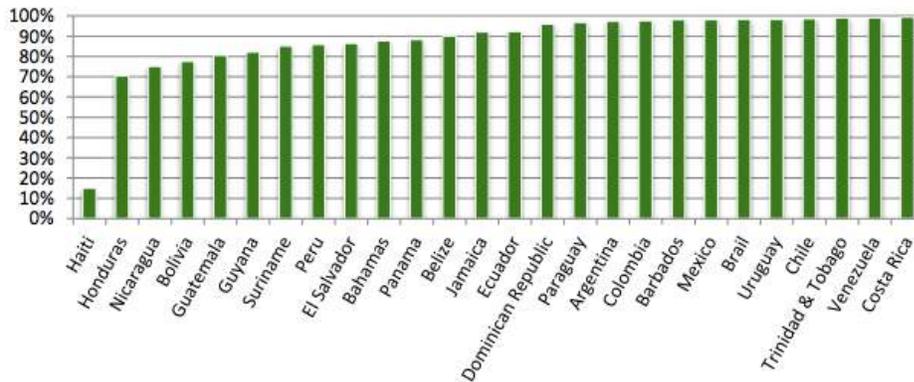


Figure 1: Electricity access in InterAmerican Development Bank Member Countries, 2012. Source: Majano, 2014.

tral power system or equipped with stand-alone microgrids. In 1970, only half of the population of Latin America and the Caribbean had access to electricity. By 2013, although the region's population had more than doubled, 88 per cent of people had access to electricity. However, this average obscures regional nuances: Brazil boasts 99.5 per cent access, and Bolivia 90.5 per cent, while Haiti has only 37.9 per cent access to electricity.<sup>3</sup> Figure 1 demonstrates these variations across the region. Today, approximately 34 million people lack access to electricity – eight million of whom live in Haiti.<sup>4</sup>

## Renewable Potential

Latin America could meet all of their expanded energy needs with renewable sources, claims a recent Scientific American article.<sup>5</sup> Indeed, the region already enjoys the greenest energy mix in the world, in terms of carbon intensity, on account of the region's huge hydroelectric projects. Today, two of the four largest hydroelectric facilities (in terms of installed ca-

3 World Bank. "Access to Electricity (% of Population)," 2015. <http://data.worldbank.org/indicator/EG.ELC.ACCS.ZS>.

4 Majano, 2014.

5 Friedman, Lisa. "Latin America Enjoys Abundant Renewable Energy but Lacks Policies for Use." *Scientific American*, June 18, 2013. <http://www.scientificamerican.com/article/latin-america-enjoys-abundant-renewable-energy-but-lacks-policies-for-use/>.



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capacity) are located in South America: the Itaipu Dam between Brazil and Paraguay and the Guri Dam in Venezuela. The Belo Monte Dam is a massive, and controversial, hydroelectric complex currently under construction in Brazil's Amazonian region that will have the third largest generating capacity in the world when completed, and the potential to supply 18 million people's daily energy needs. However, Latin America is fortunate enough to have extensive reserves of all renewable resources. Central America currently exploits only one twentieth of its estimated geothermal resources, and countries in the region receive two to three times the solar radiation of Northern countries, such as Germany, that already rely heavily on solar energy. As one of the most energy-wealthy regions of the world, Latin America is well positioned to become a global leader, and potential energy exporter, as the world transitions toward more renewable energy sources.

To a certain extent, governments seem to have recognized this potential, as almost every country has now legislated renewable energy targets, and renewable capacity (excluding hydro) more than doubled from 11.3 gigawatts in 2006 to 26.6 GW in 2012 to provide nine per cent of total installed capacity.<sup>67</sup> Aside from the obvious local and global environmental benefits, renewables also provide the advantages of job creation and energy security. As populations and economies grow, energy security is particularly important in ensuring that communities who have already been connected remain so. A major access to energy challenge in Latin America is avoiding the shocks of fossil fuel price fluctuations and unstable hydrological cycles by diversifying energy portfolios to include other renewables.<sup>8</sup>

6 IRENA. "Renewable Energy in Latin America 2015: An Overview of Policies." International Renewable Energy Agency, 2015.

7 Majano, 2014

8 Vergara, Walter, Claudio Alatorre, and Leandro Alves. "Rethinking Our Energy Future." Inter-American Development Bank, June 2013. <https://www.imf.org/external/np/seminars/eng/2013/caribbean/pdf/rethinking.pdf>.



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## Rural Communities

Of course, as in the rest of the developing world, the primary access to energy challenge is rural communities. Despite decades of growth in Latin America, developmental benefits have not been evenly distributed. Unfair political, economic, and social institutional frameworks have entrenched Latin America as the most unequal region in the world today.<sup>9</sup> In Central America alone, an estimated seven million people have inadequate access to electricity, and the vast majority of them live in isolated, remote rural areas. It is often logistically and economically infeasible to connect these communities to national grids.<sup>10</sup> Therefore, in most cases, the best option for electrification in these rural communities is some form of autonomous microgrid, powered by renewable resources and perhaps anchored by a diesel generator.<sup>11</sup> Providing access to energy in these isolated communities can play a role in confronting the systemic inequalities that denied them access in the first place. For example, studies have shown that, when used effectively, ICT technologies enabled by electrification can dramatically improve educational outcomes by connecting teachers to global knowledge through the internet, and allowing students to work later into the evening with lighting.<sup>12</sup>

The expense of providing access to energy in these remote communities does not have to fall exclusively on cash-strapped Latin American governments. A report produced by the Multilateral Investment Fund and the GSMA association of mobile operators identifies a number of strategies to use mobile technology and infrastructure to help deliver off-grid

<sup>9</sup> Díaz, Javier González. "Energy and ICT for Educational Inclusion in Latin America." In *Smart Villages: New Thinking for off-Grid Communities Worldwide*, edited by Brian Heap. Centre of Development Studies, University of Cambridge, 2015.

<sup>10</sup> Dolezal, Adam, Ana Maria Majano, Alexander Ochs, and Ramon Palencia. "The Way Forward for Renewable Energy in Central America." Worldwatch Institute, June 2013. [http://www.worldwatch.org/system/files/The%20Way%20Forward%20for%20Renewable%20Energy%20in%20Central%20America\\_low-res2.pdf](http://www.worldwatch.org/system/files/The%20Way%20Forward%20for%20Renewable%20Energy%20in%20Central%20America_low-res2.pdf).

<sup>11</sup> Díaz, 2015.

<sup>12</sup> Ibid.



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electricity.<sup>13</sup> For example, while over 30 million people in Latin America do not have reliable access to electricity, approximately 11 million people living off-grid have cellular subscriptions. This is because, as cellular networks have grown to the limits of the electricity grid, providers have become adept at generating their own off-grid electricity to power the network. However, this data also shows that many Latin Americans have a phone before they have a place to charge it.<sup>14</sup> Therefore, the report concludes, there is a strong business case to be made for mobile operators to partner with governments in bringing off-grid electricity solutions to remote communities. Infrastructure, such as mobile towers, and technologies such as mobile payment can help facilitate the spread of energy access in Latin America's rural communities.<sup>15</sup>

## Energy Efficiency Incentives

Energy efficiency also plays a crucial role in ensuring universal access to Latin Americans. With rapidly growing populations and economies, increasing energy efficiency is the fastest and most economical method to stop demand from outstripping supply.<sup>16</sup> However, in many countries consumers do not pay the full price of power generation, and thus have little incentive to decrease consumption or purchase more energy efficient products. In Brazil, for example, six per cent of the population, or 11.25 million people, live in favelas or shantytowns. Although Brazil's favelas have almost universal energy access, residents traditionally do not pay for their electricity. Instead, they improvise connections to public lines or the closest neighbourhood where electricity is available. This practice, colloquially known as part of the "jeitinho brasile-

<sup>13</sup> MIF and GSMA. "Beyond Coverage: The Opportunity for Mobile Operators to Improve Access to Energy in Latin America." The Multilateral Investment Fund, 2013. [http://www.gsma.com/mobilefordevelopment/wp-content/uploads/2013/12/FOMIN-GSMA-Movistar\\_Nicaragua-Case-Study-English.pdf](http://www.gsma.com/mobilefordevelopment/wp-content/uploads/2013/12/FOMIN-GSMA-Movistar_Nicaragua-Case-Study-English.pdf).

<sup>14</sup> MIF and GSMA, 2013.

<sup>15</sup> Ibid.

<sup>16</sup> Driver, Alice. "Universal Energy Access In Latin America." Revolve Media. Accessed October 22, 2015. <http://revolve.media/achieving-universal-energy-access/>.



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iro,” is a legacy from when the favelas were informal settlements lacking all basic infrastructure. Today, despite massive urbanizing initiatives by local governments, stealing power is still a common practice. The National Electric Energy Agency estimates that 13 per cent of all energy generated in Brazil is stolen, with the state of Amazonas – where 30 per cent of all electricity disappears – occupying first place.<sup>17</sup> Under this system, it is impossible for governments to provide energy efficiency incentives, and residents have no cause to curb their power usage. In Rio Janeiro, famous for its sprawling hillside favelas, the situation became so bad that levels of non-technical losses and default for the local utility reached 64.1 per cent and 90.4 per cent, respectively.<sup>18</sup> Furthermore, the favelas had become so deadly because of the infiltration of the drug trade, that the utility refused to send its employees into them because the state could not guarantee their safety. All of this began to change shortly before the World Cup in 2014, when the state government began an aggressive strategy of occupying the favelas with permanent Units of Pacifying Policy (UPPs), that essentially made drug trafficking impossible and reasserted the authority of the state. As violence in Rio’s favelas fell, the government enacted legislation requiring the utility to invest 0.5 per cent of its annual operating budget into energy efficiency programs such as replacing old appliances, and education programs that would convince people of the need to adjust consumption patterns to generate affordable bills.<sup>19</sup> As favela residents begin to associate paying for electricity with high quality and uninterrupted service, the social contract is slowly repaired. Paying a regular energy bill also provides favela residents with other benefits, such as the ability to

<sup>17</sup> Novais, Andréa. “Stealing Infrastructure Access in Brazil.” *The Brazil Business*, April 30, 2012. <http://thebrazilbusiness.com/article/stealing-infrastructure-access-in-brazil>.

<sup>18</sup> Lins, Clarissa. “Providing Electricity to Rio de Janeiro’s Favelas.” *The Guardian*, March 18, 2014, sec. *Guardian Sustainable Business*. <http://www.theguardian.com/sustainable-business/providing-electricity-rio-de-janeiro-favelas>.

<sup>19</sup> Lins, 2014.



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open a bank account, access microfinance loans, and attend entrepreneurship training. Today in Rio, the utility's level of non-technical losses and default among the favelas that benefit from UPPs has dropped dramatically to 11.1 per cent and 1.5 per cent, respectively.<sup>20</sup> Meanwhile, the government's ability to now incentivise energy efficiency helps ensure both the stability of the power system and that the favelas will remain with 100 per cent access to energy.

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<sup>20</sup> Ibid.