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Current Status and Challenges of Renewable Energies in Latin America and the Caribbean

Congreso Transición Energética y Cambio Climátio en el Caribe
May 21th - 22th, 2019, Dominican Republic

Andres Schuschny, Ph.D.
Director of Studies, Projects and Information

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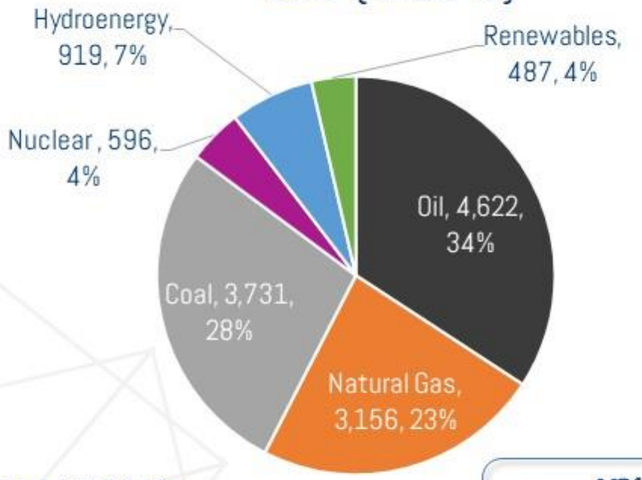
World and Latin American and Caribbean Energy Matrix

World Primary Energy Supply 2017 (Mtoe, %)

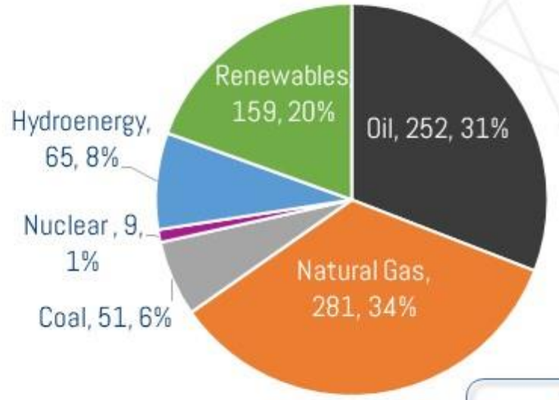


Total: 13,511 Mtoe

11% renewable

Source: BP p.l.c. - BP Statistical Review of World Energy June 2018

LAC Primary Energy Supply 2017 (Mtoe, %)



Total: 816 Mtoe

28% renewable

Source: sieLAC, http://sielac.olade.org/, 2018, OLADE.

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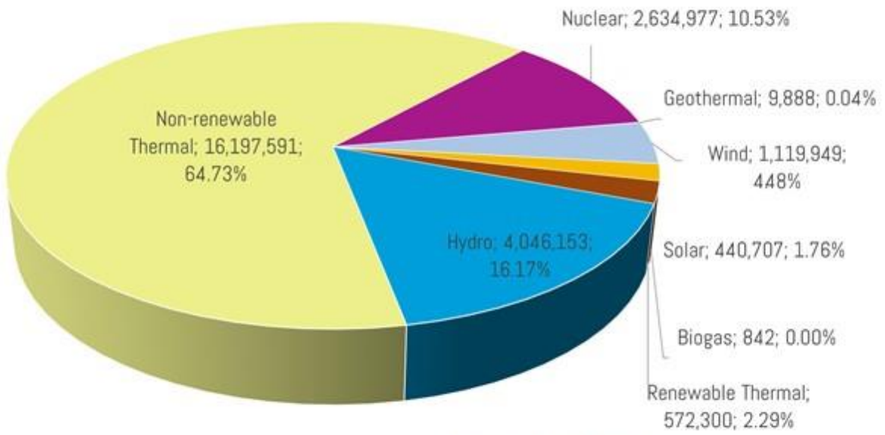
Power generation: World and LAC

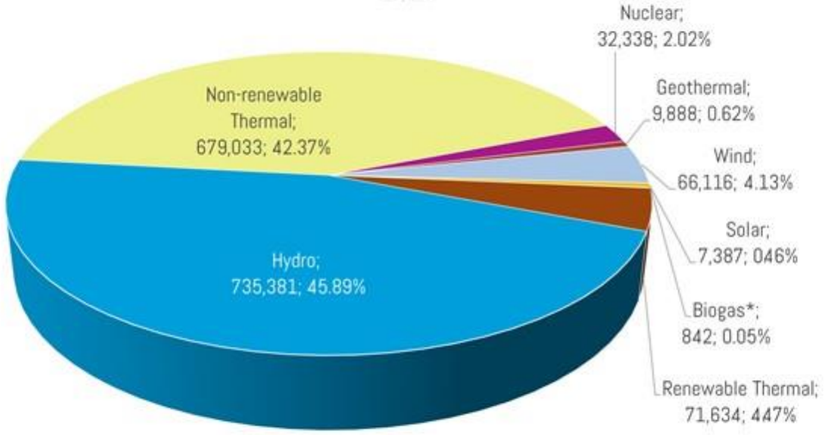
Electricity Generation World by Source [GWh; %]
2017



Total: 25,022 TWh

25% renewable

Electricity Generation LAC by Source [GWh; %]
2017



(*): Information reported by Mexico.

Total: 1,603 TWh

56% renewable

Source: sieLAC, http://sielac.olade.org/, 2018, OLADE.

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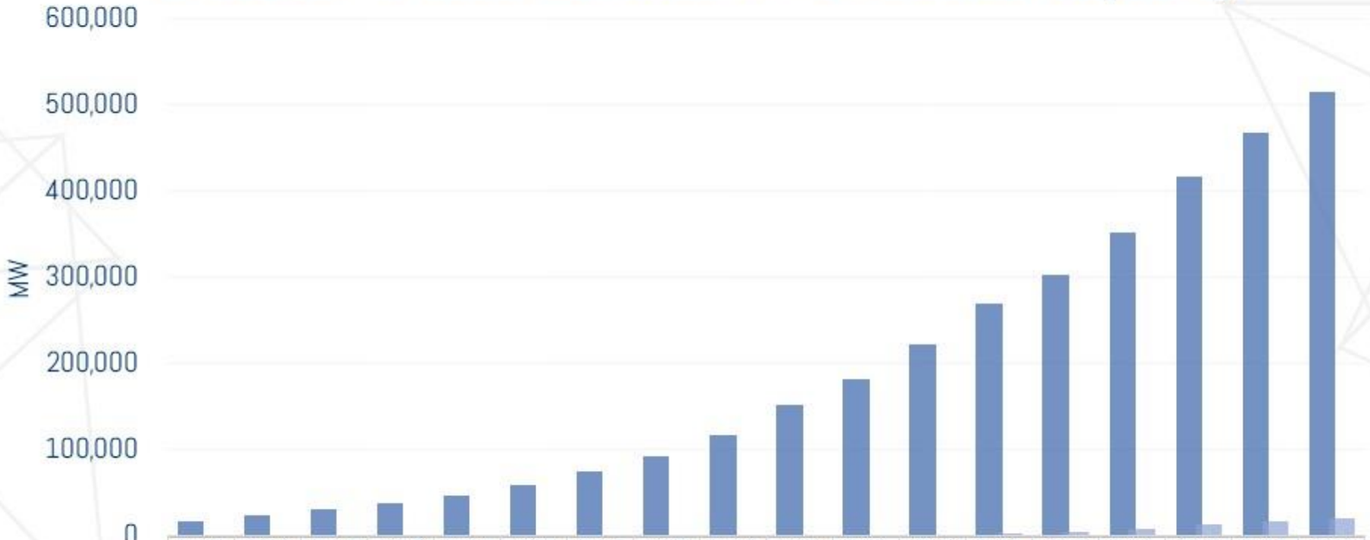
Installed capacity: Wind

Evolution of accumulated wind installed capacity



	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
World	17,72	24,52	31,53	39,08	47,40	58,96	74,41	91,89	116,5	151,6	182,9	222,5	269,8	303,1	351,6	417,1	467,6	514,7
LAC	36	71	73	122	172	162	378	493	666	1,017	1,499	2,227	3,473	5,008	9,326	13,80	17,93	21,28

IN 2017, BRAZIL RANKED SIX IN WIND INSTALLED CAPACITY WORLDWIDE

Source: sieLAC, http://sielac.olade.org/, 2018, OLADE and BP.

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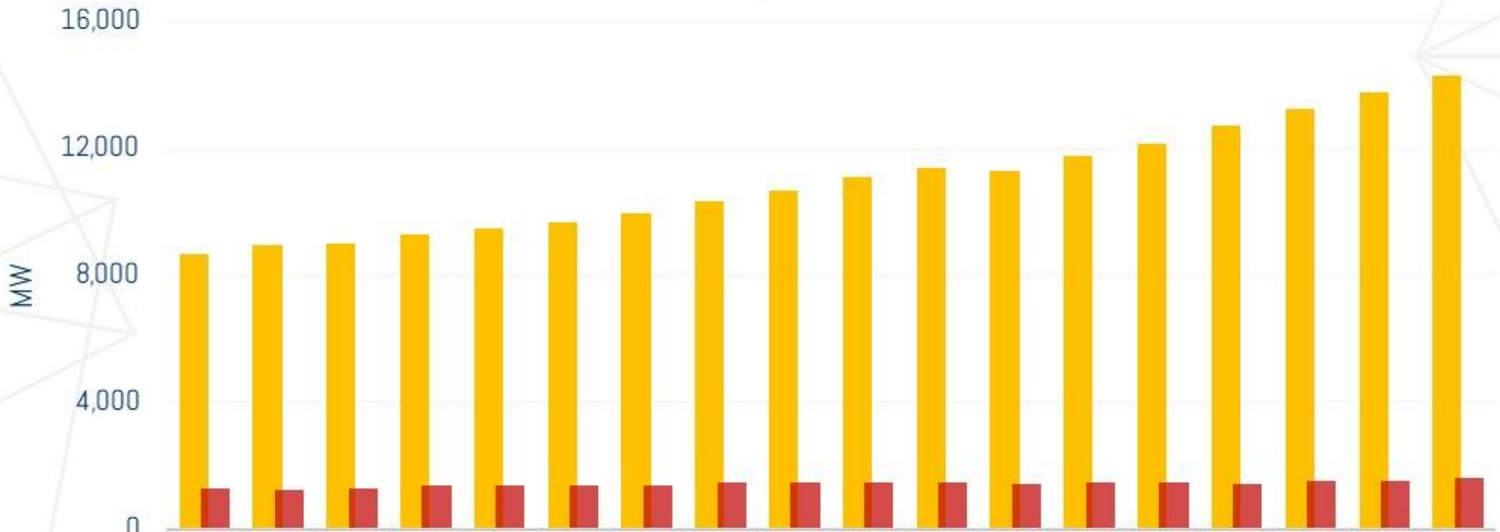
Installed capacity: Geothermal

Evolution of accumulated geothermal installed capacity



	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
World	8,645	8,938	9,011	9,267	9,453	9,686	9,968	10,34	10,67	11,10	11,39	11,30	11,78	12,13	12,72	13,25	13,75	14,30
LAC	1,261	1,243	1,256	1,391	1,384	1,394	1,394	1,462	1,467	1,471	1,471	1,438	1,447	1,449	1,439	1,509	1,524	1,603

Source: sieLAC, http://sielac.olade.org/, 2018, OLADE and BP.

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Installed capacity: Solar

Evolution of accumulated solar installed capacity

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
World	639	871	1,252	1,746	2,809	4,245	5,714	8,230	14,85	22,93	39,45	71,25	100,6	137,2	178,0	226,9	302,7	399,6
LAC	3	3	3	3	3	5	6	7	8	9	14	16	116	194	510	1,485	2,336	4,732

Source: sieLAC, http://sielac.olade.org/, 2018, OLADE.

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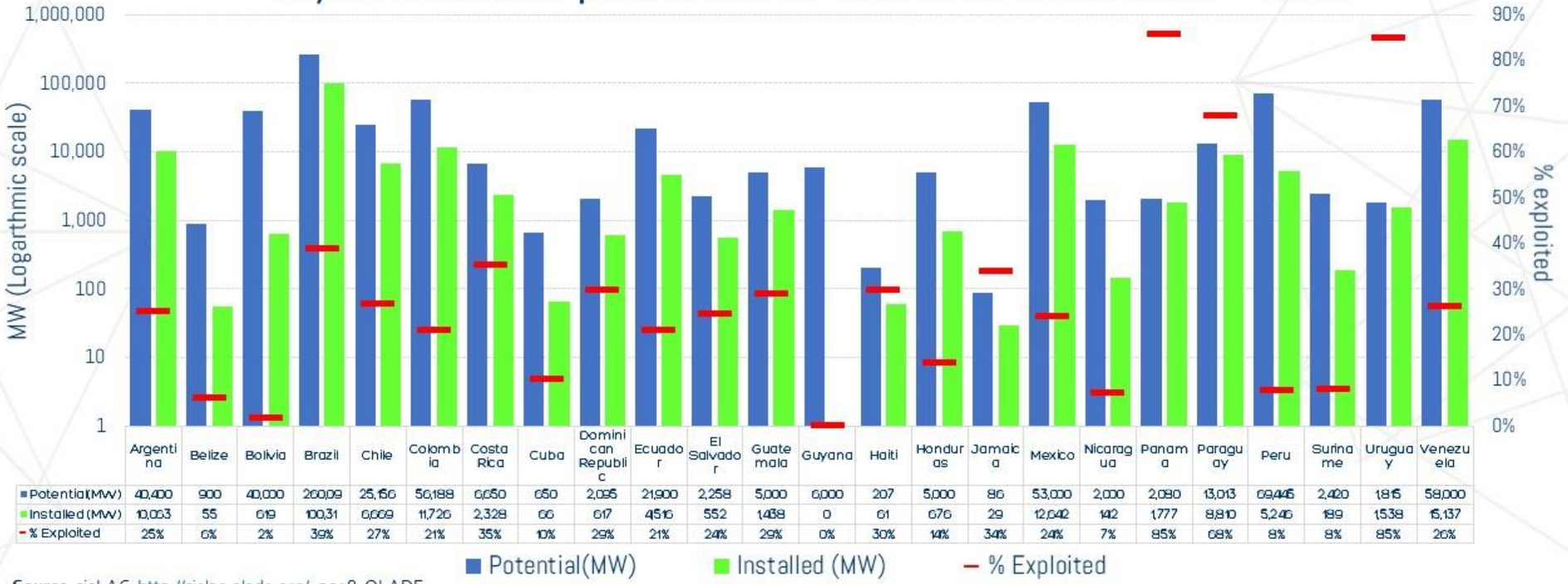
Hydropower potential

Hydroelectric potential of the LAC countries - 2017



	Argentina	Belize	Bolivia	Brazil	Chile	Colombia	Costa Rica	Cuba	Dominican Republic	Ecuador	El Salvador	Guatemala	Guyana	Haiti	Honduras	Jamaica	Mexico	Nicaragua	Panama	Paraguay	Peru	Suriname	Uruguay	Venezuela
Potential(MW)	40,400	900	40,000	260,09	25,156	56,188	6,650	650	2,095	21,900	2,258	5,000	6,000	207	5,000	86	53,000	2,000	2,080	13,013	69,445	2,420	1,815	58,000
Installed (MW)	10,053	55	619	100,31	6,669	11,726	2,328	66	617	4516	552	1,438	0	61	676	29	12,042	142	1,777	8,810	5,245	199	1,538	15,137
% Exploited	25%	6%	2%	39%	27%	21%	35%	10%	29%	21%	24%	29%	0%	30%	14%	34%	24%	7%	85%	68%	8%	8%	85%	26%

Source: sieLAC, http://sielac.olade.org/, 2018, OLADE.

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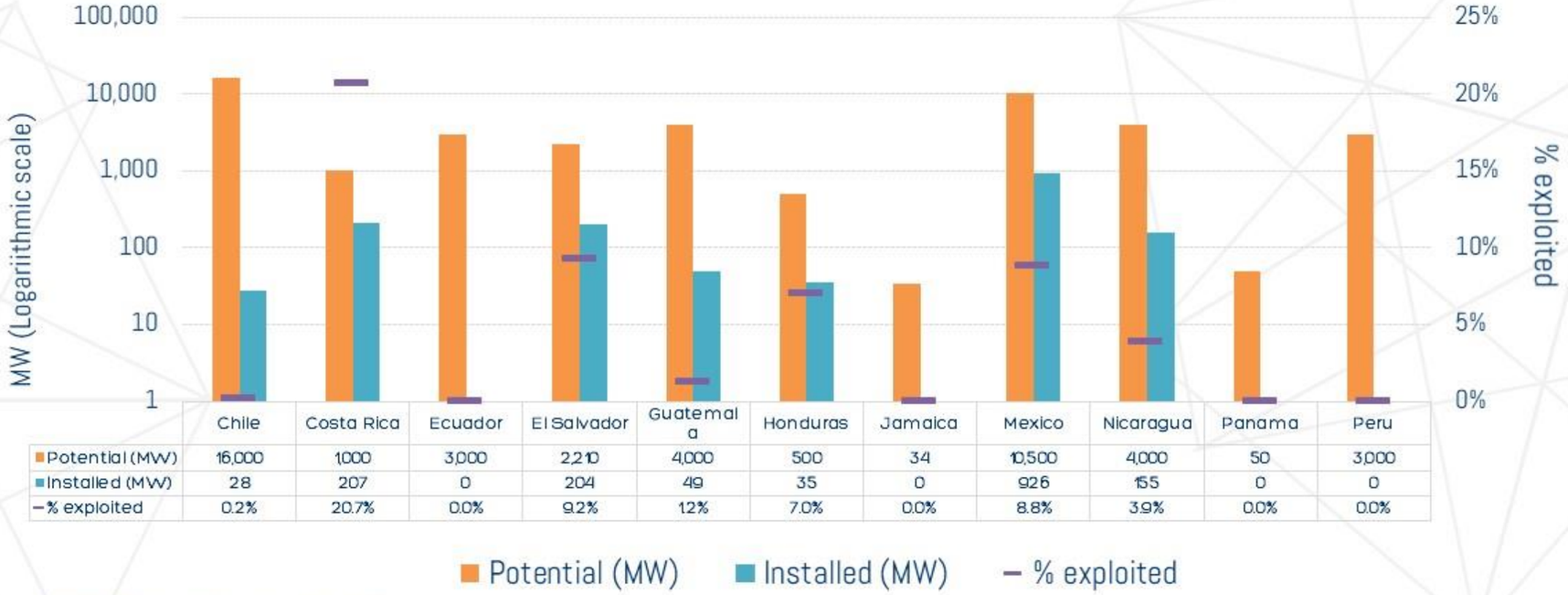
Geothermal potential

Estimated geothermal potential for some LAC countries – 2017



	Chile	Costa Rica	Ecuador	El Salvador	Guatemala	Honduras	Jamaica	Mexico	Nicaragua	Panama	Peru
Potential (MW)	16,000	1,000	3,000	2,210	4,000	500	34	10,500	4,000	50	3,000
Installed (MW)	28	207	0	204	49	35	0	926	155	0	0
– % exploited	0.2%	20.7%	0.0%	9.2%	1.2%	7.0%	0.0%	8.8%	3.9%	0.0%	0.0%

Source: sieLAC, http://sielac.olade.org/, 2018, OLADE.

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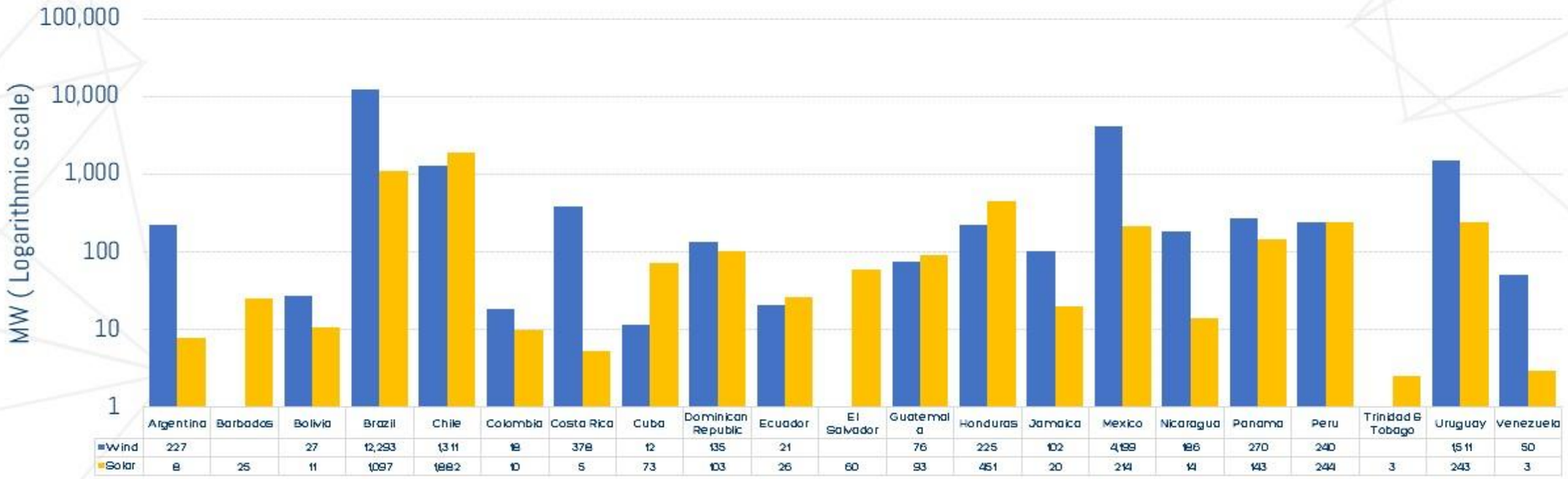
Installed capacity: Wind and solar

Installed capacity wind and solar in LAC - 2017



	Argentina	Barbados	Bolivia	Brazil	Chile	Colombia	Costa Rica	Cuba	Dominican Republic	Ecuador	El Salvador	Guatemala	Honduras	Jamaica	Mexico	Nicaragua	Panama	Peru	Trinidad & Tobago	Uruguay	Venezuela
Wind	227		27	12,293	1,311	18	378	12	135	21		76	225	102	4,199	196	270	240		1,511	50
Solar	8	25	11	1,097	1,882	10	5	73	103	26	60	93	451	20	241	14	143	244	3	243	3

Source: sieLAC, http://sielac.olade.org/, 2018, OLADE.

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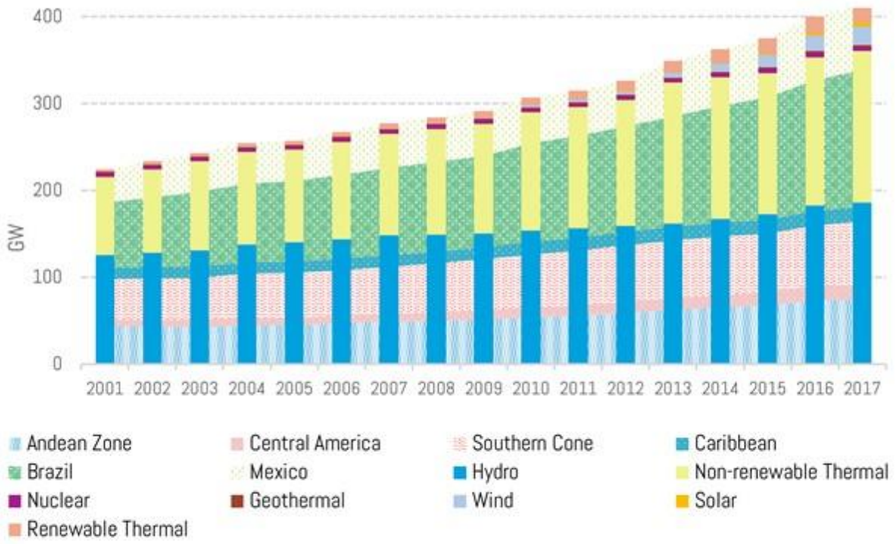
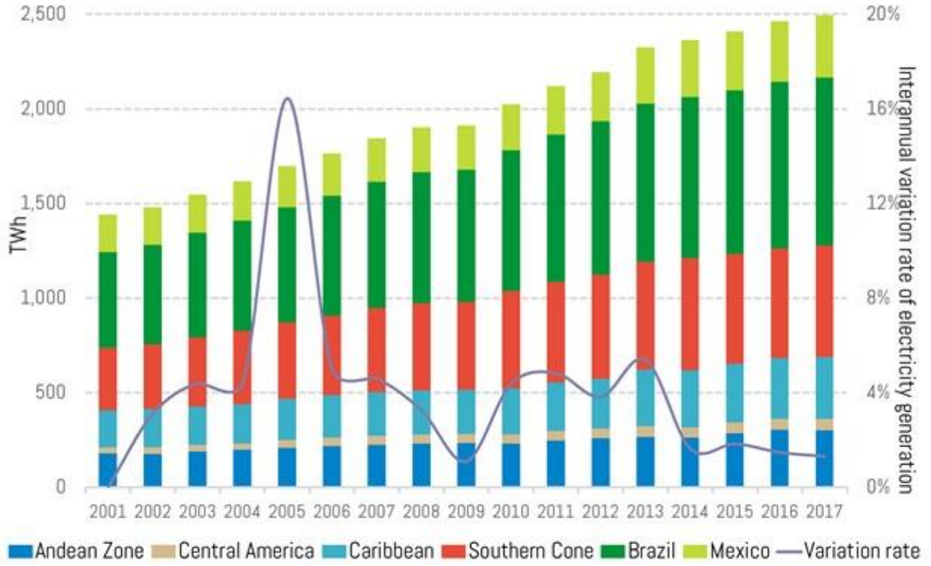
Evolution: Installed capacity and electric generation

Installed capacity for electricity generation by subregions and technology



Electricity generation by subregions



Source: sieLAC, http://sielac.olade.org/, 2018, OLADE.

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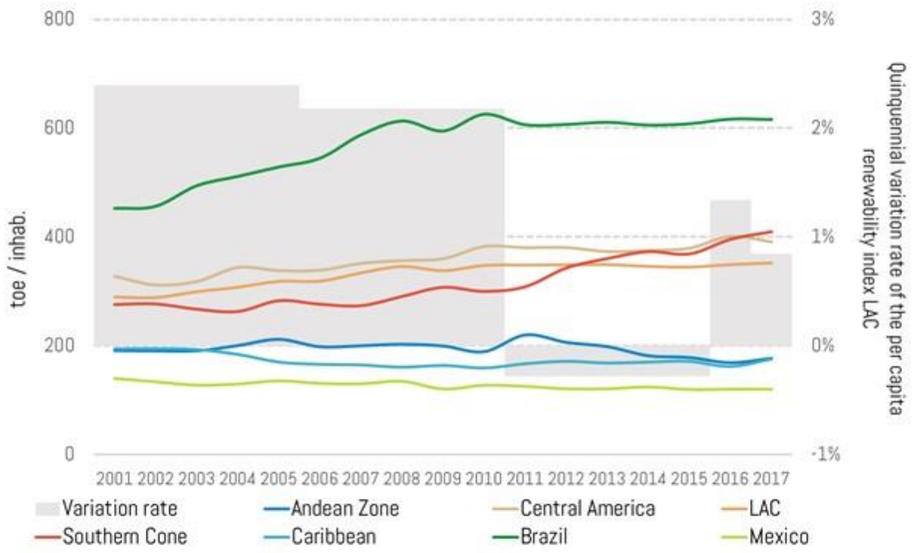
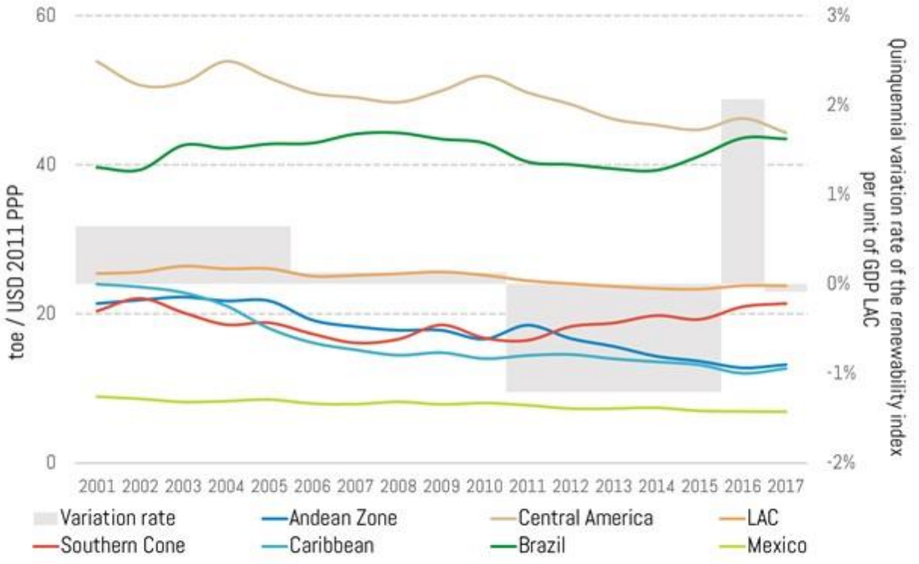
Evolution: Renewable supply per capita and per GDP

Renewable sources supply per capita



Renewable sources supply per unit of GDP



Source: sieLAC, http://sielac.olade.org/, 2018, OLADE.

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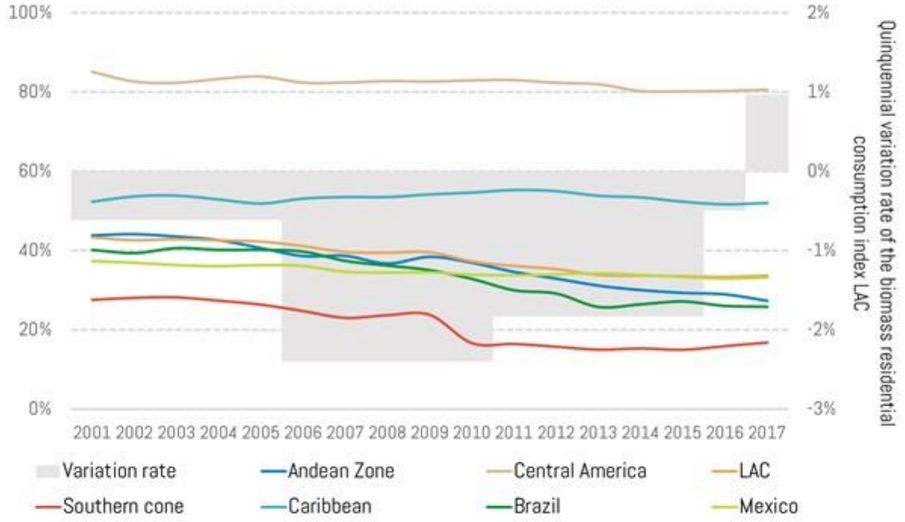
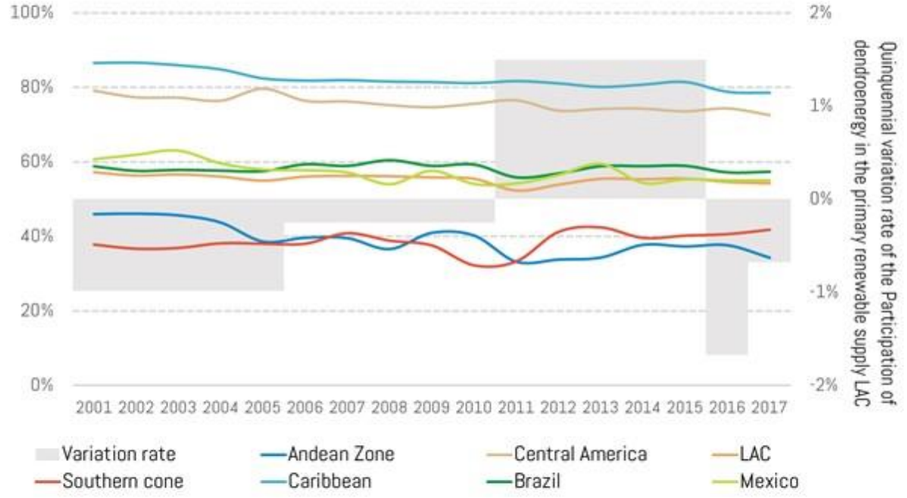
Residential biomass and participation of wood energy

Residential biomass consumption index



Defined as the consumption of firewood and charcoal from the residential sector divided by the consumption of kerosene, diesel, liquefied gas, natural gas and electricity of the residential sector

Participation of dendroenergy in the renewable primary supply



Defined as: Supply of firewood and charcoal divided by the primary supply of renewable energies.

Source: sieLAC, http://sielac.olade.org/, 2018, OLADE.

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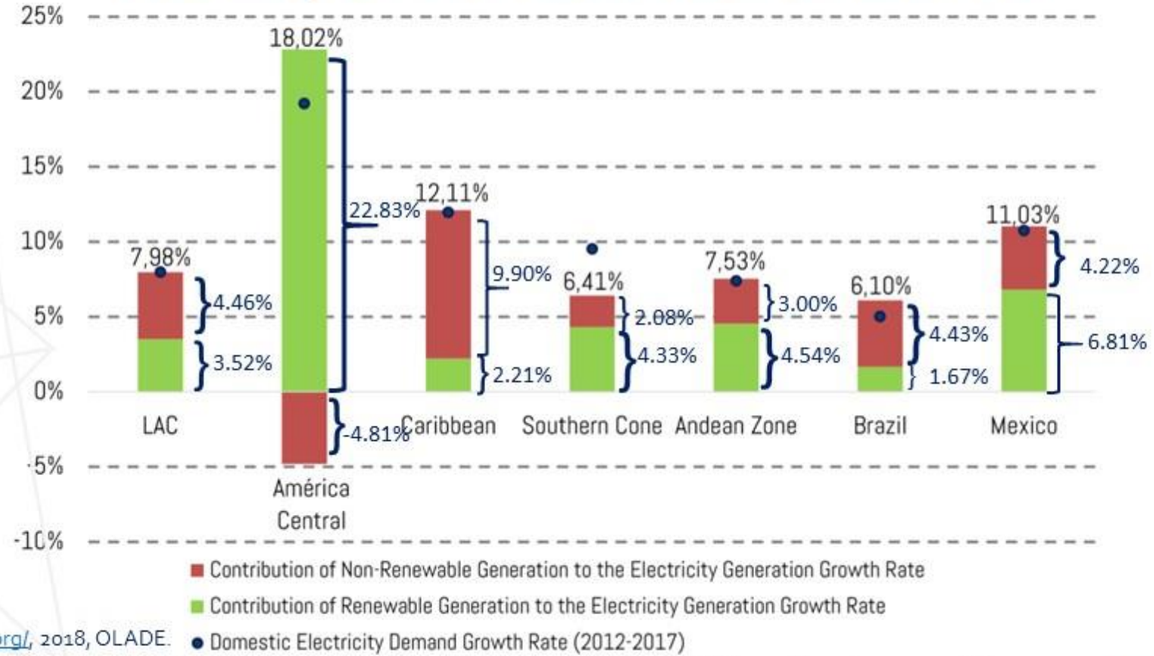
Contribution in Power Generation of Renewables to the recent growth has been poor

Electricity Generation (renewable and non-renewable) and Domestic Electricity Demand Growth Rate (2012 to 2017)



The percentages represent the electricity generation growth rate (renewable and non-renewable).

Source: sieLAC, http://sielac.olade.org/, 2018, OLADE.

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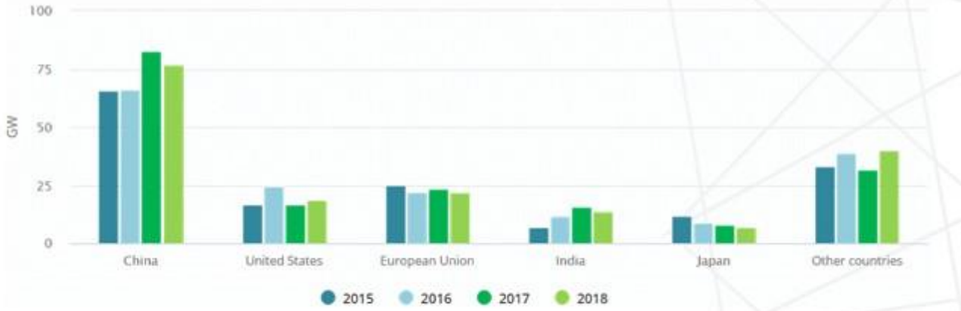
The previous results are in line with the recent global renewable capacity additions

Capacity additions by technology (2015 - 2018)

Renewable capacity additions by country and region (2015 - 2018)



Source: International Energy Agency (IEA), Renewable capacity growth worldwide stalled in 2018 after two decades of strong expansion
https://www.iea.org/newsroom/news/2019/may/renewable-capacity-growth-worldwide-stalled-in-2018-after-two-decades-of-strong-e.html

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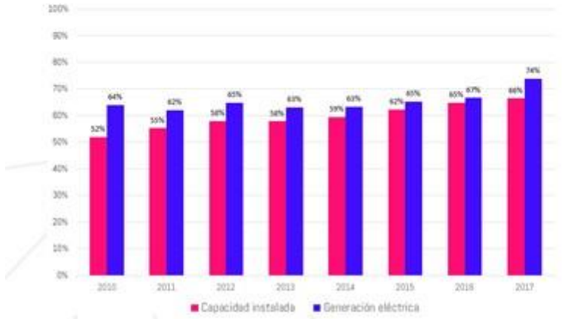
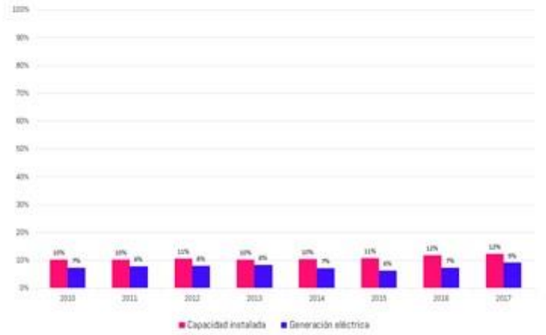
Participation in Installed Capacity and Power Generation of Renewables in recent years by subregions

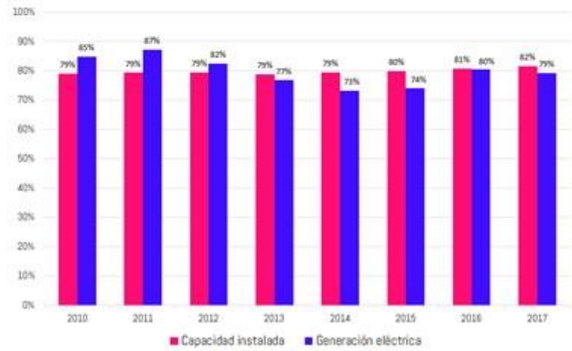
América Central



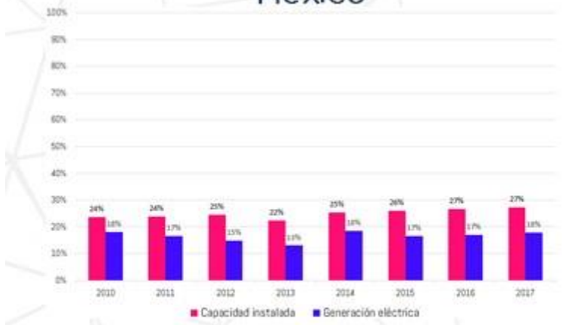
El Caribe



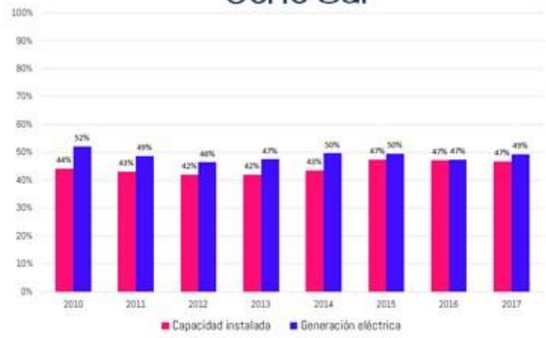
Brasil



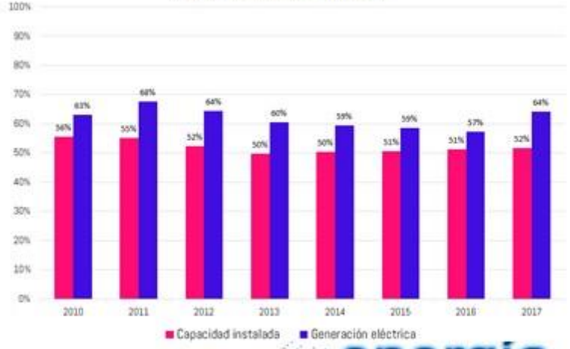
México



Cono Sur



Zona Andina



Source: sieLAC, http://sielac.olade.org/, 2018, OLADE.

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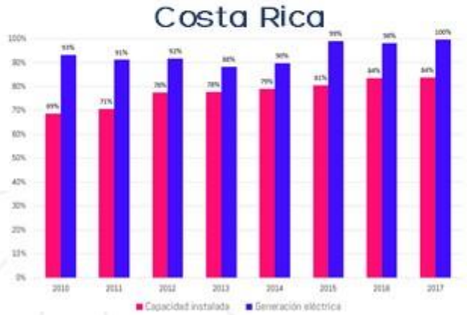
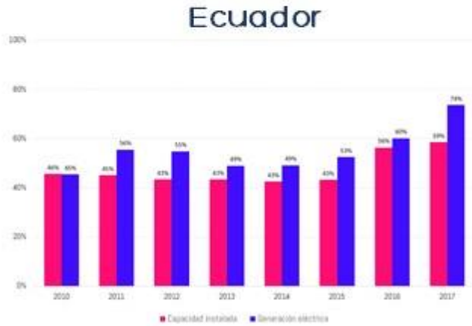
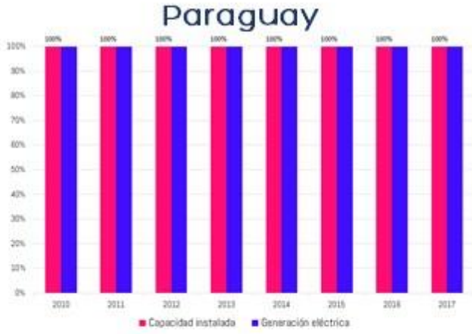
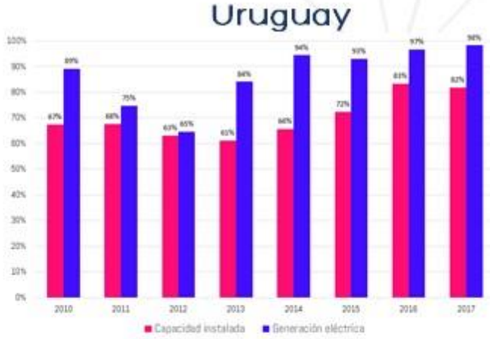
Participation in Installed Capacity and Electricity Generation of Renewables in recent years, remarkable countries









Source: sieLAC, http://sielac.olade.org/, 2018, OLADE.

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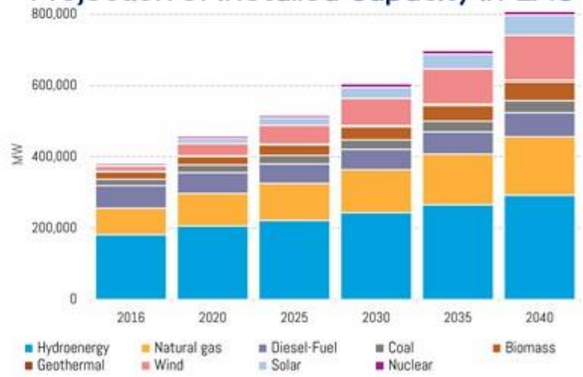
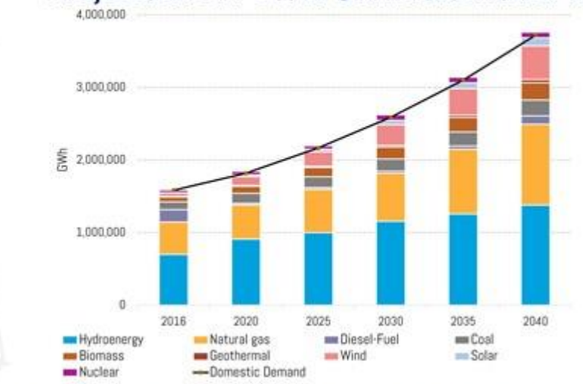
Future prospects : *Gas Natural*, and *Renewables* will be the drivers of power generation thanks to the remarkable potencials of hydro, wind, biomass and solar energy

Projection of Installed Capacity in LAC

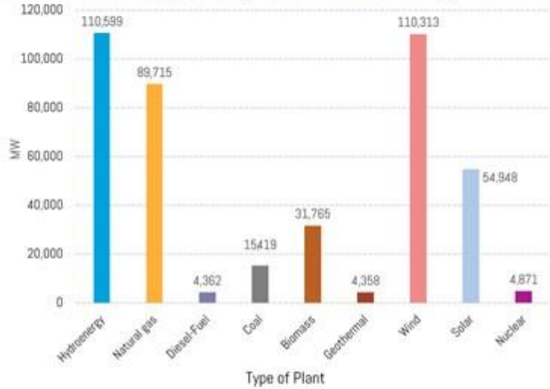


Projection of Power Generation in LAC

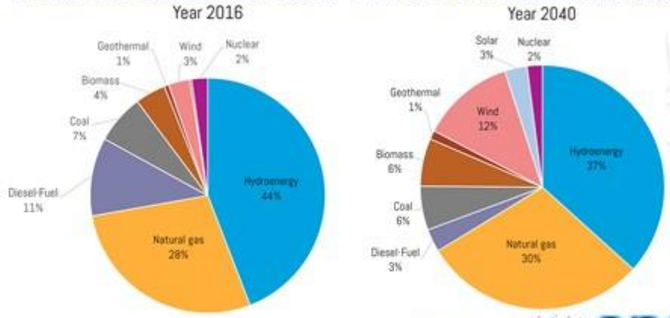


UNDER THE CURRENT POLICIES SCENARIO

Additional Installed Capacity in LAC during the forecast period



Future evolution of the Power Generation Matrix



Source: Energy Outlook of LAC, 2019, OLADE. http://bit.ly/Outlook2k18

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Main "drivers" of sustainable energies in LAC

- Commitments of the countries with the Paris Agreement (NDCs), SE4ALL, SDG7, International Cooperation
- National objectives of RE penetration
- Great potential of renewable sources (hydroenergy, solar, wind, geothermal, etc.) and improvement of EE in the energy chains
- Levelized costs of NCRE are increasingly competitive especially in the case of wind (↓ 33% since 2009) and solar PV (↓80% since 2009)
- Increase in the supply of NCRE technologies, even from regional and local manufacturers
- Credit lines, financing mechanisms and public incentives for NCRE
- Most LAC countries are energy importers, mainly fossil fuels; RE and EE are an opportunity to improve their energy self-sufficiency

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Investment barriers

- *Macroeconomic risks*: macroeconomic instability / inflation / exchange rates / legal security
- Scarcity of instruments that mitigate financial risks / low diversification / low availability of capital / institutional investors - The role of Mesofinance
- *Energy Sector Risks*: Fuel Subsidies / Controlled Prices / Non-internalized Externalities / Immature Markets / Uncertainty and Volatility about Future Energy Demand / Higher levels of non technical losses and Poor Transmission Infrastructure / Climate Vulnerability
- *Technical barriers*: lack of technical training and in the financial system / absence of quality standards and infrastructure

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and the Caribbean
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Thank you

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