



Bright Perspectives for Renewable Developments in Latin America

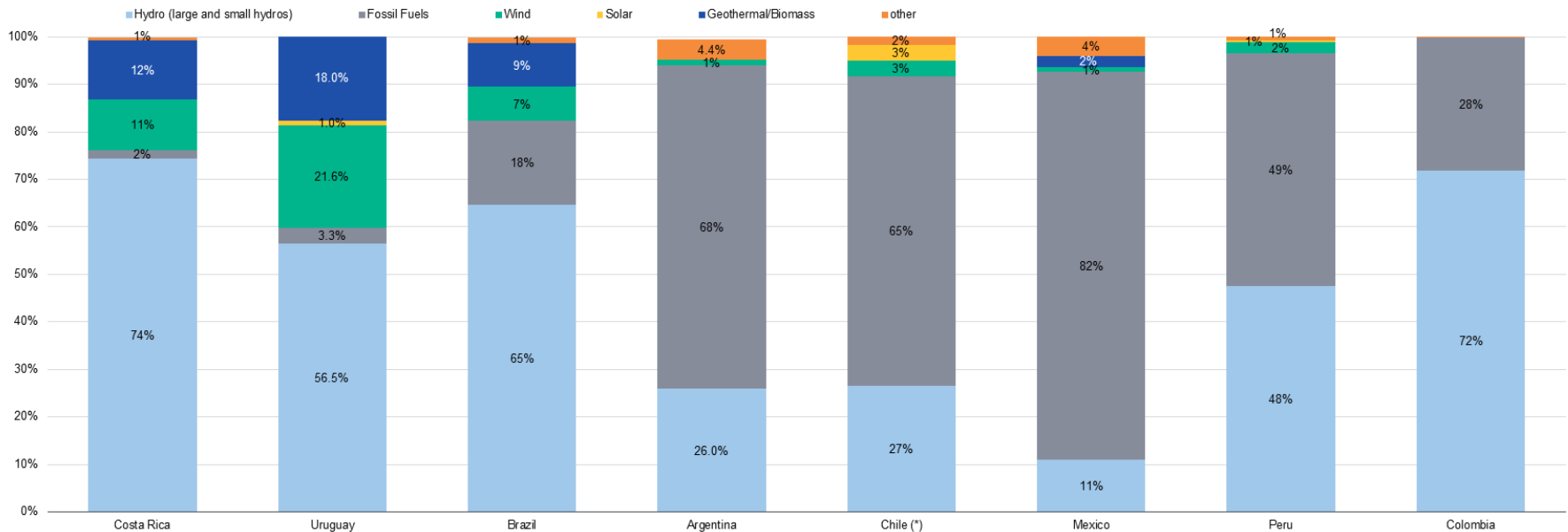
Agenda

- 1. Growing contribution of nonconventional renewables to energy-mix**
- 2. Overall favorable factors will continue to drive renewables**
- 3. New renewables pose challenges for incumbent generators**
- 4. Development of renewables in Latin America also face challenges**

Growing contribution of nonconventional renewables to energy-mix

Countries fall under three categories:

1. Renewables already account for >95% of the power supply in Costa Rica and Uruguay
2. Fast growth of non-conventional renewables – Argentina, Brazil, Chile
3. Slower growth of non-conventional renewables – Peru, Mexico and Colombia



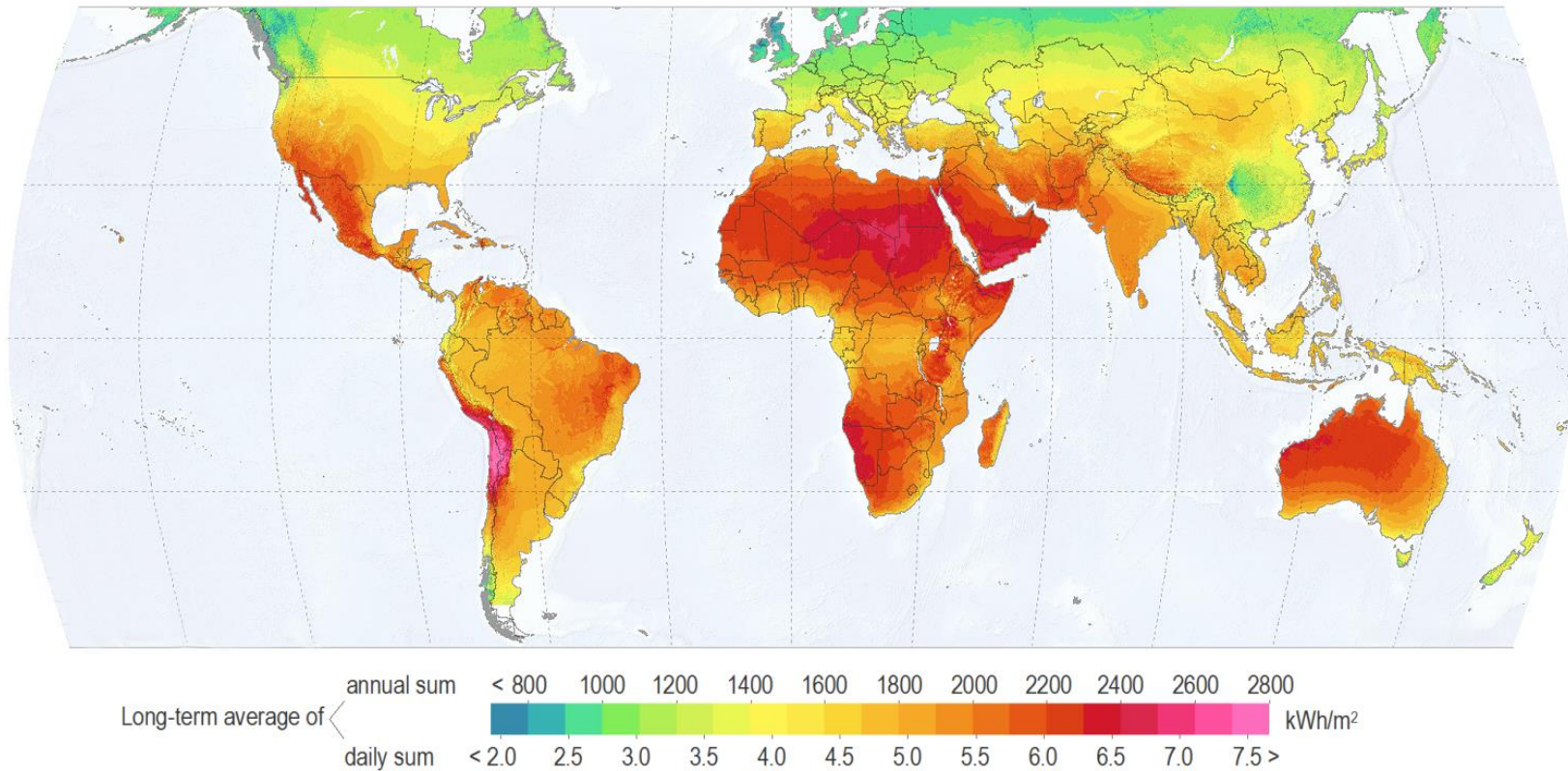
(*) In countries such as Chile output from large hydro-plants do not qualify as renewable resources; only the output from small plants (<20MW)

(**) Aggregated output of the two main systems (interconnection expected: early 2018)

Source: Local market operators and regulatory authorities; Moody's

Access to strongest comparative solar resources

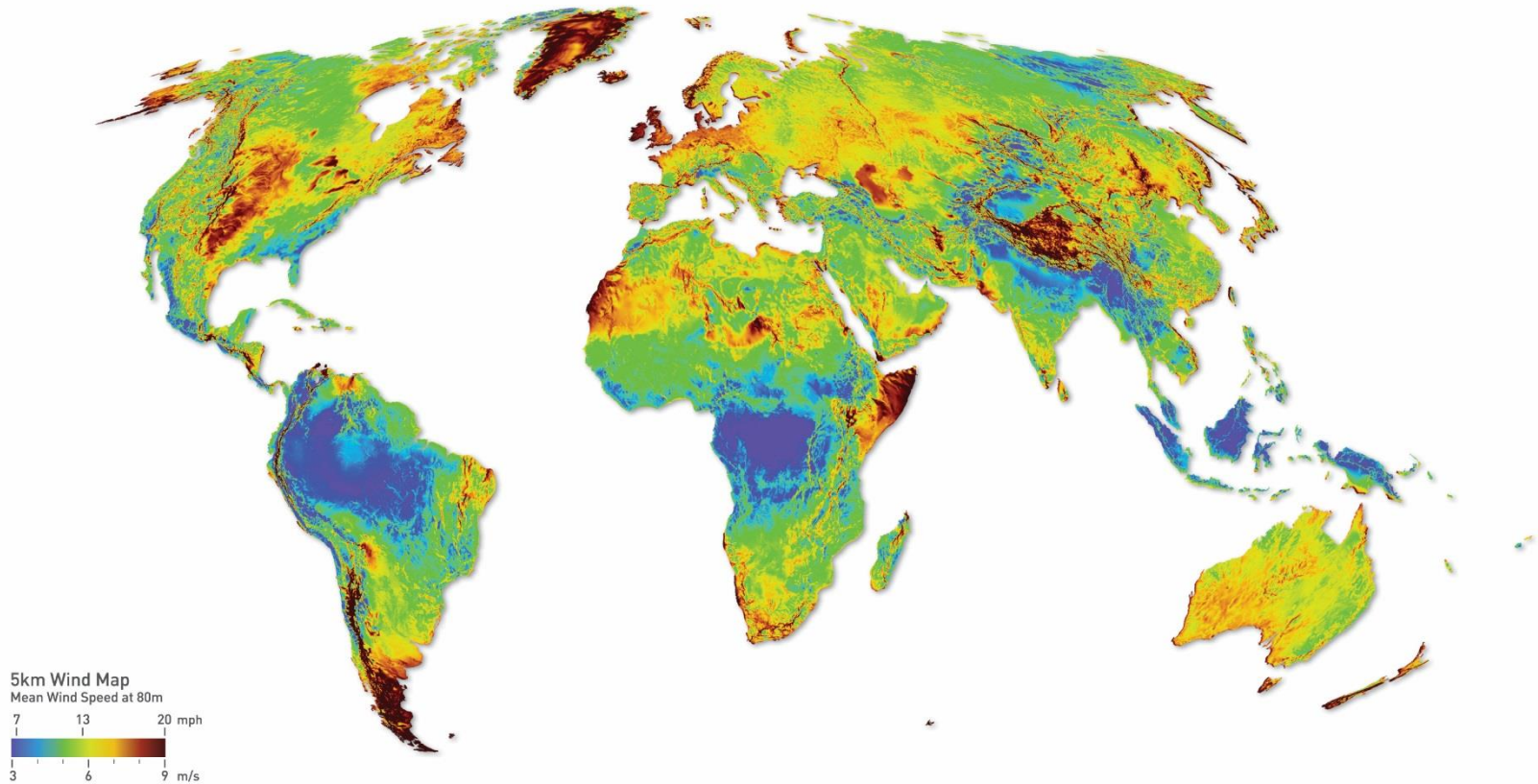
Global Horizontal Irradiation



Source: Solargis

High availability of wind resources

Global Mean Wind Speed at 80m



Source: Map Developed by 3TIER

Overall favorable factors will continue to drive renewables

Positive factors

1. Developments of new large hydro-electric capacity face challenges

- Less economic efficient locations are available only
- Material environmental and social opposition; HydroAysen (Chile), São Luiz do Tapajós, Belo Monte (Brazil)
- In Peru and Colombia: material untapped hydro potential; new plants coming on-line (2017/2020)

2. Availability of renewable resources drive competitive pricing

- Strong wind resources: Brazil, Uruguay, Argentina (capacity factors > 38%);
- Top solar radiation levels: Mexico/Central America, dessert area Northern Chile/Southern Peru;
- Biomass (Uruguay), geothermal (Costa Rica)

3. Environmental policies and targets

- All countries have some form of policies and mechanisms to foster renewable energy
- However, policies vary per country - more aggressive targets in Chile, less aggressive: Peru and Colombia

Negative factors

1. Availability of low cost natural gas

- Mexico and Peru benefit from low NG-prices (~US\$1.6/MMTU) amid high reserve margins (>55%%)

Comparison of renewable energy-related policies

Auctions of utility load are key in the development

	National Renewables Policies	Specific renewable Energy Targets	Fiscal incentives ¹	Feed-in tariffs	Public auctions to allocate utility load
Argentina	Yes	20% (2025)	AD, IT, VAT	No	Yes
Brazil	Yes	86.1% (2023) (*)	Other	No	Yes
Chile	Yes	20% (2025)	CT, Other	No	Yes
		70% (2050)			
Colombia	Yes	No	AD, IT, VAT	No	No
Costa Rica	Yes	97% (2018) (*)	IT, Other	No	Yes
Mexico	Yes	50% (2050)	AD, CT	No	Yes
Peru	Yes	6% (2018) (**)	AD, VAT	Yes	Yes
Uruguay	Yes	90% (2015)	IT, VAT, Other	No	Yes

¹ Accelerated depreciation (AD), Carbon tax (CT), Income tax exception/reduction (IT), VAT exception (VAT), Import/Export benefits
 (*) In Costa Rica and Brazil the renewable targets include the output of large hydroelectric plants

(**) In Peru the renewable targets exclude the output of hydroelectric plants

Source: International Renewable Energy Agency, National legislation

New renewables pose challenges for incumbent generators

- 1. Utilities contracts for future supply through auctions - prices have fallen dramatically in the last few years**
- 2. As older PPAs expire, incumbent generators face declining EBITDA**
- 3. Incumbent generators in New England face similar risks**
 - Growth of renewables, Imports from Canada
- 4. Renewables will lower both energy and capacity prices in New England over time**
- 5. DYN, CPN, NRG, EXE all have exposure to New England**

Development of renewables in Latin America also face challenges

1. Intermittent nature of renewable resources requires back-up resources

- In Chile, regulation for the remuneration of ancillary services under development; mining sector needs 24/7 power supply
- In Costa Rica, hydro-electric plants' reservoirs help offset the intermittency of growing wind output

2. Transmission bottlenecks delay the projects' interconnection to the grid

3. Financing and Commission challenges

- Tenor of the PPAs: in Colombia (<10 year), in Chile corporate PPAs becoming shorter
- Aggressive bid prices (utility load auctions) based on expected additional reductions in the technology costs - collateral levels; In Peru, postponed 2017 renewables auction
- Fiscal challenges in Brazil may cause a shift in the projects financing sources from BNDES (wind: 70%; solar: 80%) to capital markets

4. Social opposition

- Renewable projects also face challenges although to a lesser extent compared to hydro-plants and renewable developments; Example: Eólica del Sur (former Mareña Renovables)



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