



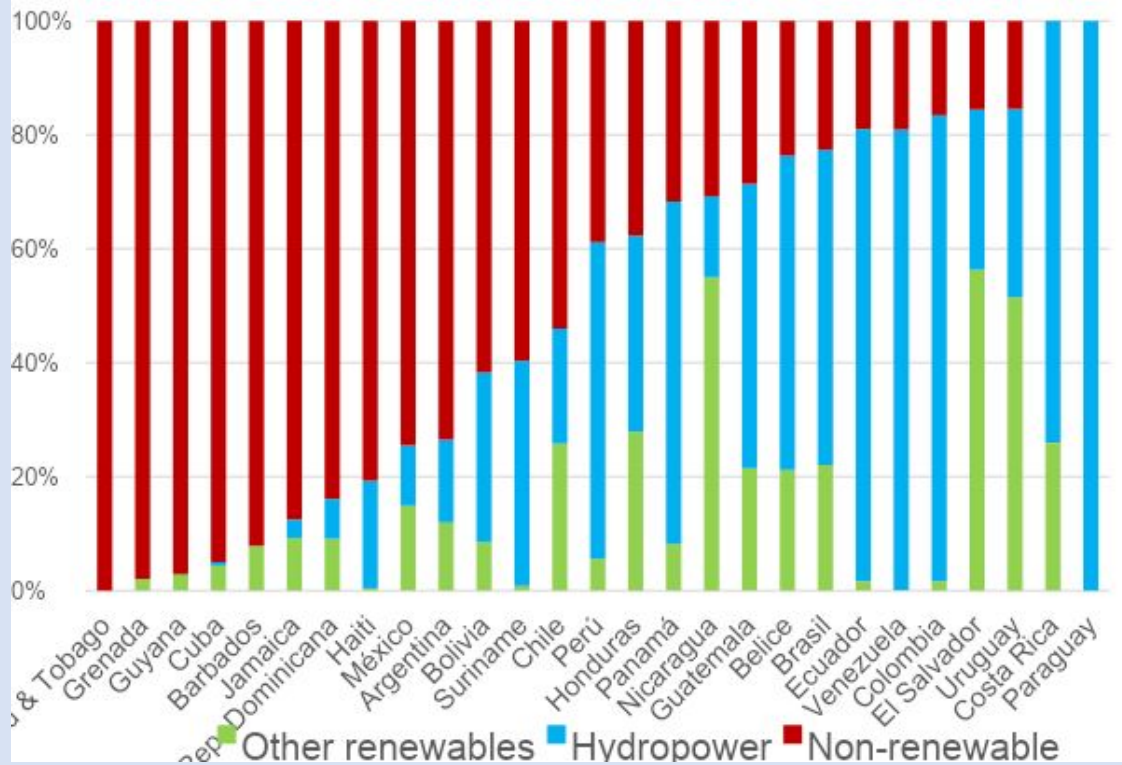
# Latin America and the Caribbean Energy & Water Management Transitions

**Side event: Advancing Climate Change Mitigation and Adaptation through  
Integrated Innovative Sustainable Water and Energy Solutions- COP 28**

**Carlos de Miguel, ECLAC Natural Resources Division  
December 4th, 2023**

# The region has the most renewable electricity generation matrix of the world, 73% generated from hydropower, while water related disasters have doubled in past years

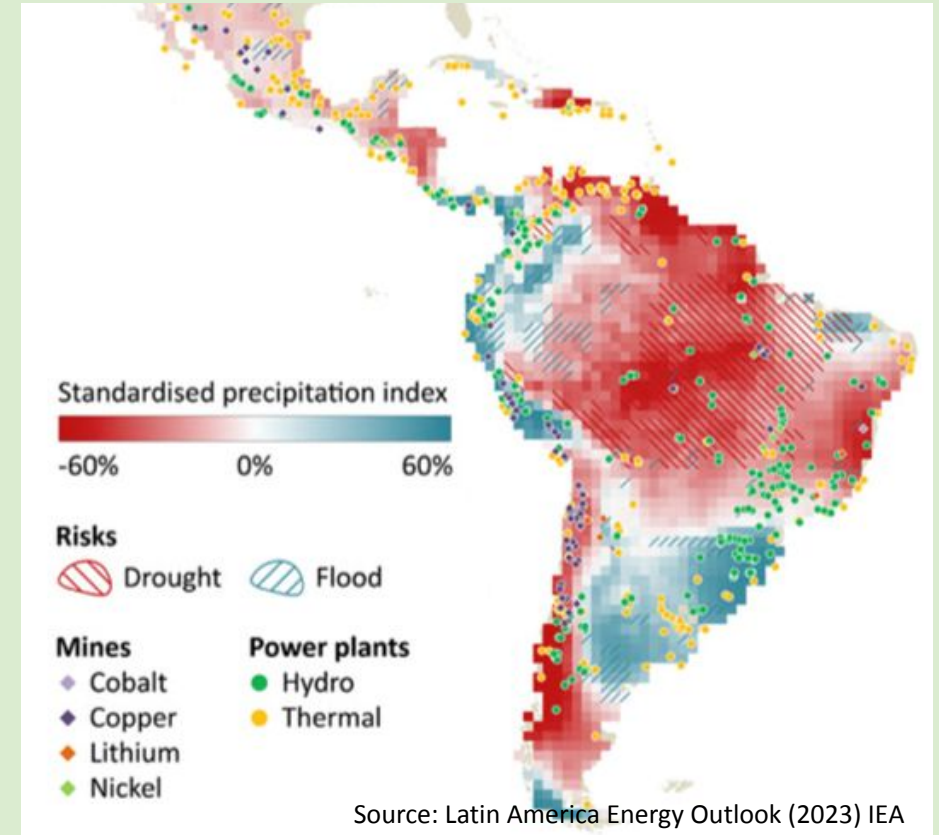
Electric generation renewability in selected economies (%)



Source: SiELAC-OLADE (2021)

Precipitation changes and power plants

SSP2-4.5 scenario, 2040-2060



Source: Latin America Energy Outlook (2023) IEA

## 1980-2020 Disasters

Decade	Droughts	Floods	Total
1980-1990	48	275	323
2000-2020	89	559	648

Source: UNSTAT (2022)

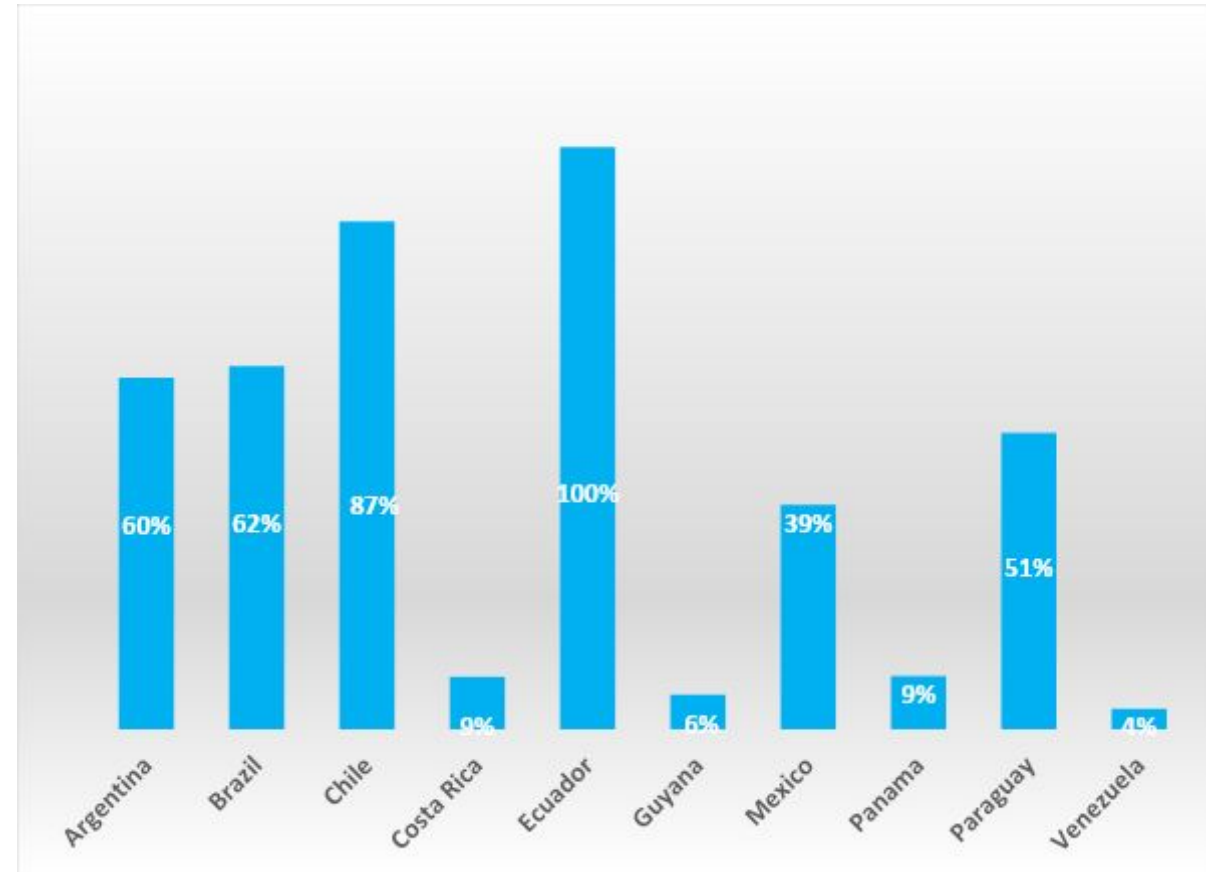
- Over **70% of existing hydropower plants**, lithium and copper mines and 65% of fossil fuel power plants need to be prepared to cope with **drier climates**.
- And conflicts: the region holds over **364 environmental conflicts** associated to multipurpose water dams.

# Electric interconnections and transboundary water cooperation are key for climate change adaptation

- In the Southern cone, interconnections are mainly based on **hydroelectric** power plants.
- Some bilateral electric agreements have been successful:
  - Itaipú, between Paraguay and Brazil,
  - Argentina, Brazil, and Chile, for emergency exchanges during droughts.
- **76% (19 GW)** of the installed capacity for electricity exchange comes from **binational hydroelectric plants**.
- **Electricity exchanges account for less than 3%** of total electricity generation in Latin America (15% would be an optimal rate for integration).
- 71% of surface water belongs to transboundary systems, while **only 24% of them** have a water operational arrangement in place.



Proportion of transboundary basins with operational agreement for water cooperation (%)



Source: UNSTAT (2022)

# Methane recovery for electricity generation from wastewater treatment can serve as mitigation strategy

**Methane emissions from wastewater account for 10% of total methane emissions**

- The second largest greenhouse gas, methane emissions in LAC **have grown by almost 40%** since 1990.
- Emissions are projected to **increase by 19%** between 2010 and 2030.
- According to IPCC, they **need to be reduced by a third**.

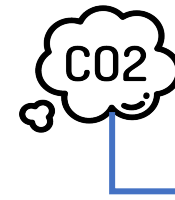
While wastewater treatment plants on mega-cities already adopt **circular economy principles**, focus is now on **mid-sized cities and municipalities**.

Study was done considering **75 mid-size WWTPs** from 5 countries: Mexico, Colombia, Costa Rica, Peru and Bolivia.

- An **investment of USD 251 million** is required to adopt circular economy principles.
- Annual revenues from **electricity cost savings** of USD 46.6 million would be generated.



## Benefits derived from methane use IN 75 WWTPs:



### Environmental benefits

1.3 million tonnes/year of CO2 reduction,  
**18% of Nicaragua's annual emissions.**



### Economic benefits

In 10 years, a present net income of  
**USD \$260.4 million** would be obtained



### Socioeconomic benefits

In 20 years, the investment has a  
**benefit/ cost ratio of 1.36.**

# Towards a water & energy transition in Latin American and Caribbean countries



## Water



**Investments:** 1.3% of the annual GDP of the region in 10 years, can close the gap can create 36 million Jobs.



**Equity and affordability:** Quintile 1 has **25% less** access to safely managed water, while paying double for it.



Reverse **negative externalities:** +30% pollution, +200% conflicts over water, in past 4 decades.



Promote the **circular economy** through the water value chain

## Energy



**Universalize access** to electricity: Quintile 1 has 9 times less access and pays 5 times more.



Investments: 1.3% of the annual GDP in 10 years increases **renewable electricity** generation up to 80%, **reducing CO2 emissions** by 32% and 7 million jobs.



Improve **energy efficiency** in all economic sectors: Energy intensity in GDP of the region has decreased by 18% over the last three decades.



Strengthen **energy integration**.



Enhance energy security and regional resilience to **external impacts**.

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