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Renewables trends in LACs

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Goal 7 on renewables

- The second energy goal, **Goal 7.2**, addresses renewables: it states to increase substantially the share of renewable energy in the global energy mix by 2030
- Around 20 indicators are considered in BIEE organised in 4 categories:
 - **Share of renewables in final consumption***
 - Share of renewables in TPES (i.e. oferta total)
 - Share of renewables in power (6 indicators)
 - Share of renewables by end-use sector (13)*
- The **share of renewables in final energy consumption** is the privileged one (UN monitoring, EU target): it combines the share of renewables in thermal uses**, electricity consumption and transport.
- This indicator is more relevant than the share in primary supply as it is independent on the way geothermal or hydropower is converted from kWh to energy units (toe, or J) and excludes all losses in transformation (e.g. for thermal generation).

*See list in Annex

** Heating, water heating and cooking

Indicators for power : normalization

- As power production of renewables is fluctuating quite a lot with hydrological conditions and climate, these indicators have more stable trends if they are **normalized** in BIEE to normal conditions (officially done for EU monitoring, not done in UN monitoring).
- For instance 3 indicators are **normalised*** in BIEE for the share of renewables in the power sector:

Share of renewables in power generation (i.e. in power mix):

- Total (actual)
- Total (**normalized**)
- Without large hydro (actual)
- Without large hydro (**normalized**)

Share of renewables in electricity consumption:

- Actual
- **Normalized**

Share of renewables in electricity capacity

- Total
- Without hydro

Normalisation based on average historical number of hours of utilisation of the capacity (15 years for hydro, 4 years for wind).

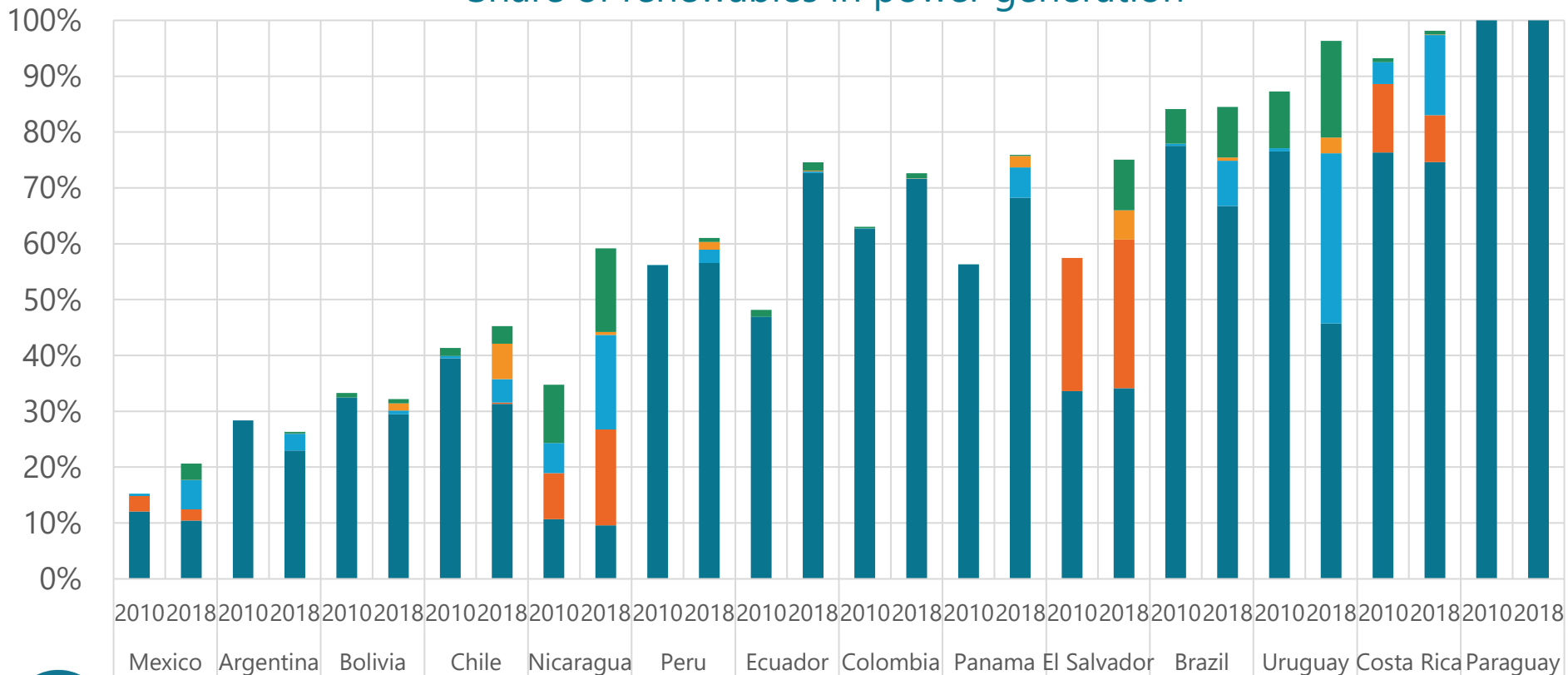
- For some countries the **variation** in the share of renewables in the power mix between 2010 and 2018 is quite **different** with the normalized value (e.g. much higher in El Salvador, Nicaragua and Uruguay), with even a reverse trend between normalized and actual values for Brazil and Mexico;
- The **normalized** value is more **stable** and the most **relevant indicator** to monitor the variation over a period.

Variation in the share of renewables in power production: actual vs normalized values (2010-2018)



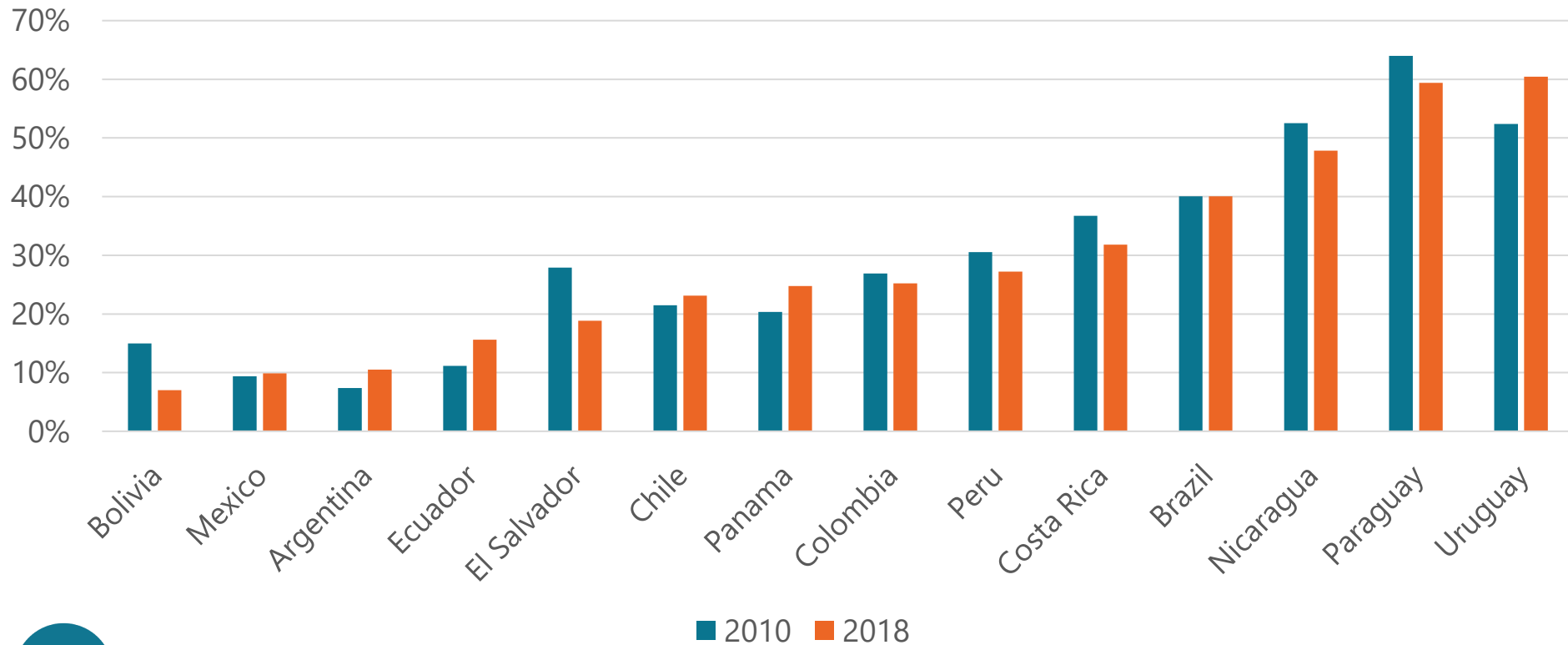
- The share of renewables in the power mix ranges from 15% in Mexico to a share above 95% in Uruguay, Paraguay, Costa Rica.
- This share has increased by 20 points or more in 3 countries since 2010 : Ecuador (+ 26 points for hydro), Nicaragua (+12 pts for wind, +7 pts for geothermal), Panama (+12 pts for hydro,+ 5 wind, +2 solar).
- It also progressed well in El Salvador (+ 9 biomass,+ 3 geothermal), Uruguay (+ 29 wind, + 7 biomass) and Costa Rica (+10 pts wind).

Share of renewables in power generation



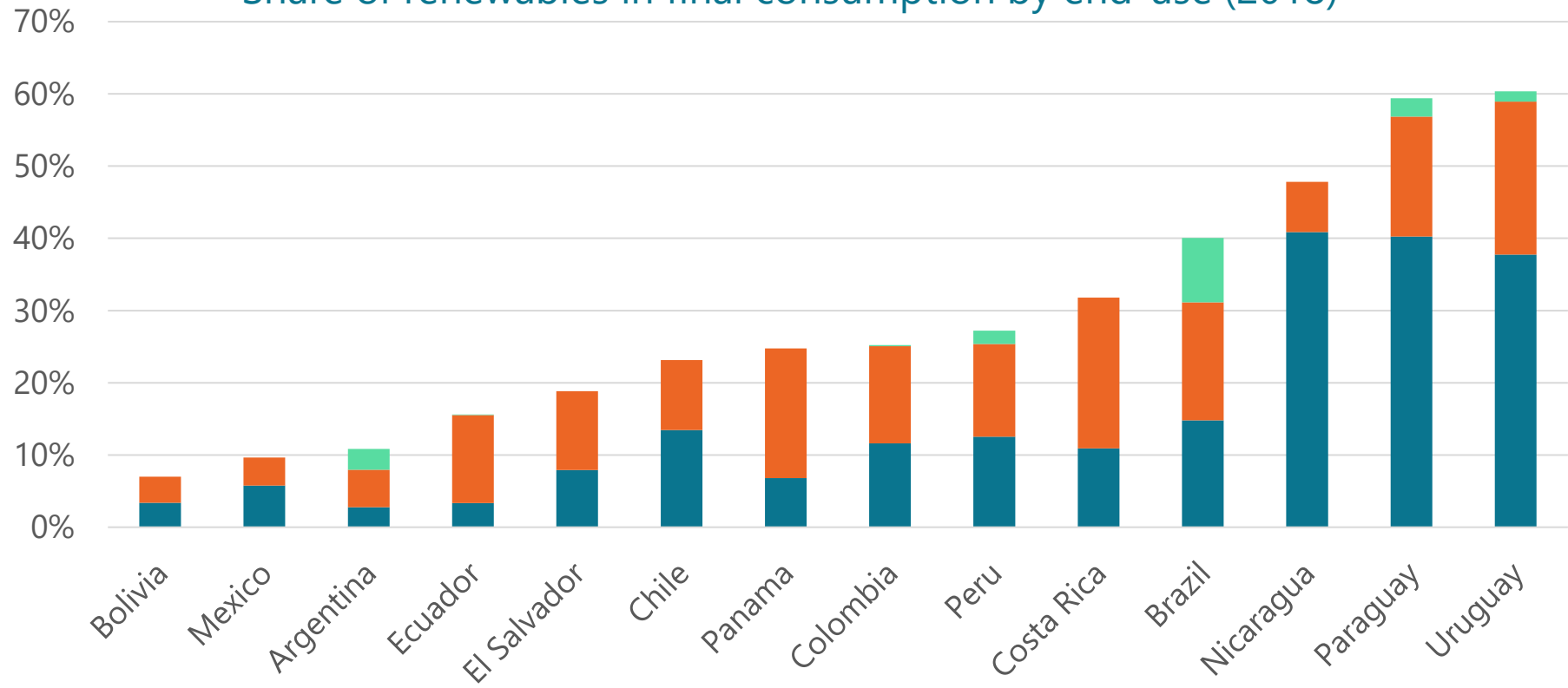
- The highest progression of the share of renewables in final energy consumption is seen in Uruguay (+ 8 points), followed by Panama and Ecuador (+5 points).
- There is a decreasing share in several countries, especially in Bolivia, Paraguay and El Salvador (~-10 points), and to a lower extent in Costa Rica and Nicaragua (~-5 pts), because of a reduced use of biomass for cooking.
- The share of renewables is close to 60% of final consumption in 2018 in Uruguay and Paraguay.

Variation in the share of renewables in final energy consumption



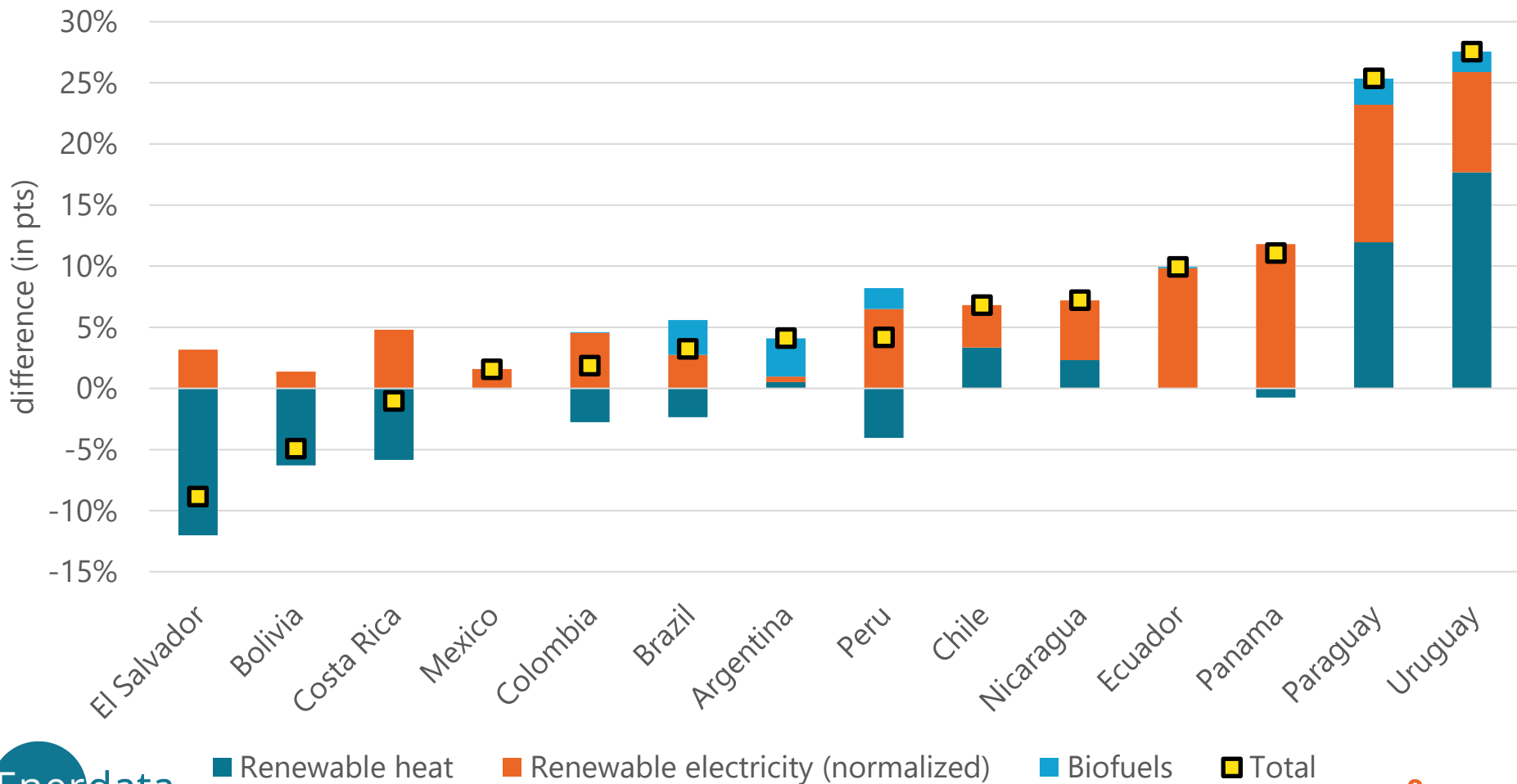
- Renewable heat is the largest component in these two countries and Nicaragua (~40%).
- Renewable electricity is above 20% in Costa Rica and Uruguay ; it is the dominant component in Ecuador, Panama, and Costa Rica (over 2/3).
- Biofuel is mainly significant in Brazil .

Share of renewables in final consumption by end-use (2018)



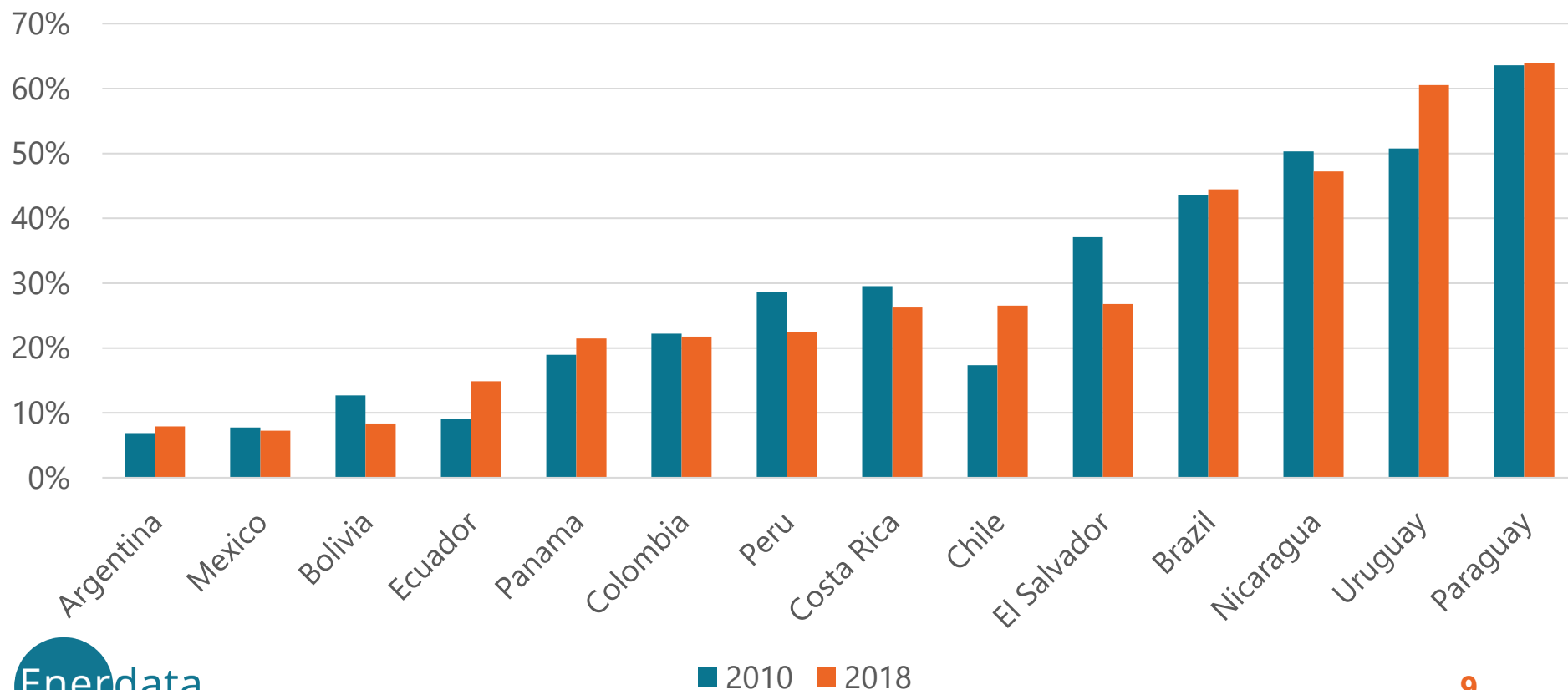
- The share of renewables “heat” (mainly cooking) has decreased in most countries.
- It is not balanced by the penetration of renewable electricity in Salvador and Bolivia, which explain a much lower share of renewables in 2018, as well as in Costa Rica.

Components of variation of the renewable share in final consumption (2010-2018)



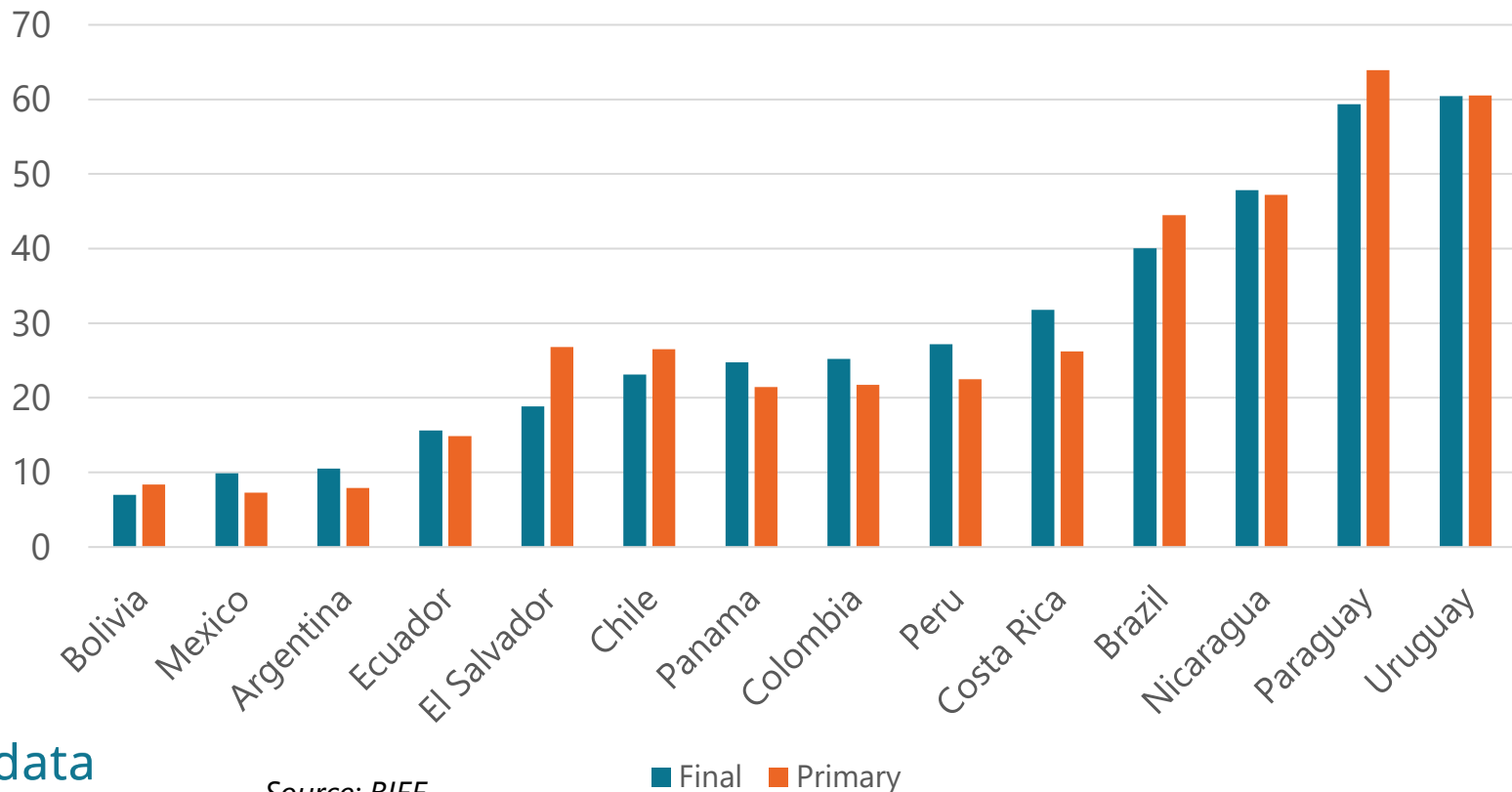
- Another indicator often used is the share of renewables in the primary consumption (i.e. TPES).
- Large increase in Uruguay, Chile (+10 points) and Ecuador (+6), linked to the rapid penetration of renewable in the power mix.
- Countries with decreasing trends have reduced their use of traditional biomass (e.g. -10 points in El Salvador).

Share of renewables in primary consumption



- The shares of renewables in primary and final consumption is quite different for some countries.
- The share is higher when related to final consumption in Costa Rica, Peru Colombia, Panama (> 3 pts) , but higher with primary consumption in Salvador (8 pts), Brazil, Paraguay (~4.5 pts) , Chile 3,5 pts).
- It depends on the importance of the consumption of renewables in the energy sector (high share of biomass for power in Salvador) and of losses in energy sector

Share of renewables in primary and final consumption (%)



Conclusions: energy efficiency and renewables

(1/2)

- How the development of renewables impact energy efficiency?
- This depends on the **sector**, the type of **renewables** and the **accounting** of renewables in energy balance.
- **Power sector:**
 - Hydro, wind and solar PV contribute **to raise** energy efficiency: an increased penetration decreases the primary consumption;
 - Biomass as all thermal generation has a low efficiency (similar to coal): biomass replacing natural gas imply an increased primary consumption;
 - Geothermal: this depends on the conversion of kWh in energy units; most Central American countries account geothermal power like wind and solar (i.e. with 100% efficiency) but IEA considers geothermal as a thermal power generation and use a rather low efficiency (10%), i.e. 10 times less → an increasing share of geothermal power will increase the primary consumption according to IEA but decreases it if 100% efficiency is assumed .
 - Solar CSP is considered as thermal generation and has a low efficiency (37.4%) → a penetration of solar CSP decrease energy efficiency

Conclusions: energy efficiency and renewables

(2/2)

- **Household sector:**
 - Biomass: Increasing the use of biomass implies a deterioration of energy efficiency ; the magnitude depends on the technology (traditional/efficient cooking stove, pellets vs wood stove for heating...
 - Solar: if solar is accounted for in the energy consumption there are limited savings when shifting from electricity or fuels (LPG, gas , oil) to solar water heating (savings depending on the efficiency of the conventional water heater) → should be removed to see the full EE gains or energy savings
- **Transport sector**
 - Biofuels : biofuels usually increase the specific consumption of vehicles and reduce their energy efficiency.

Annex: List of BIEE indicators by end-use

Indicators on renewables in BIEE: households

Share of renewables in household final consumption

Share of renewables in household final consumption (including renewable electricity)

Share of biomass in household sector

Area of solar water heaters:

- Total area
- Area per capita

Proposed indicators for renewables: services and industry

Share of renewables in services final consumption

Share of renewables in services final consumption (including renewable electricity)

Share of renewables in industry final consumption

Share of renewables in industry final consumption (including renewable electricity)

Proposed indicators for renewables: transport

Share of biofuels in transport sector

Share of renewables in transport sector (including renewable electricity)

Share of biofuels in road transport

Share of biofuels in consumption of gasoline and diesel in road transport (i.e. average blending rate)