

Electrification trends in Latin America

Ricardo Perez*
Luiz Barroso**

ricardo@psr-inc.com*
luiz@psr-inc.com**

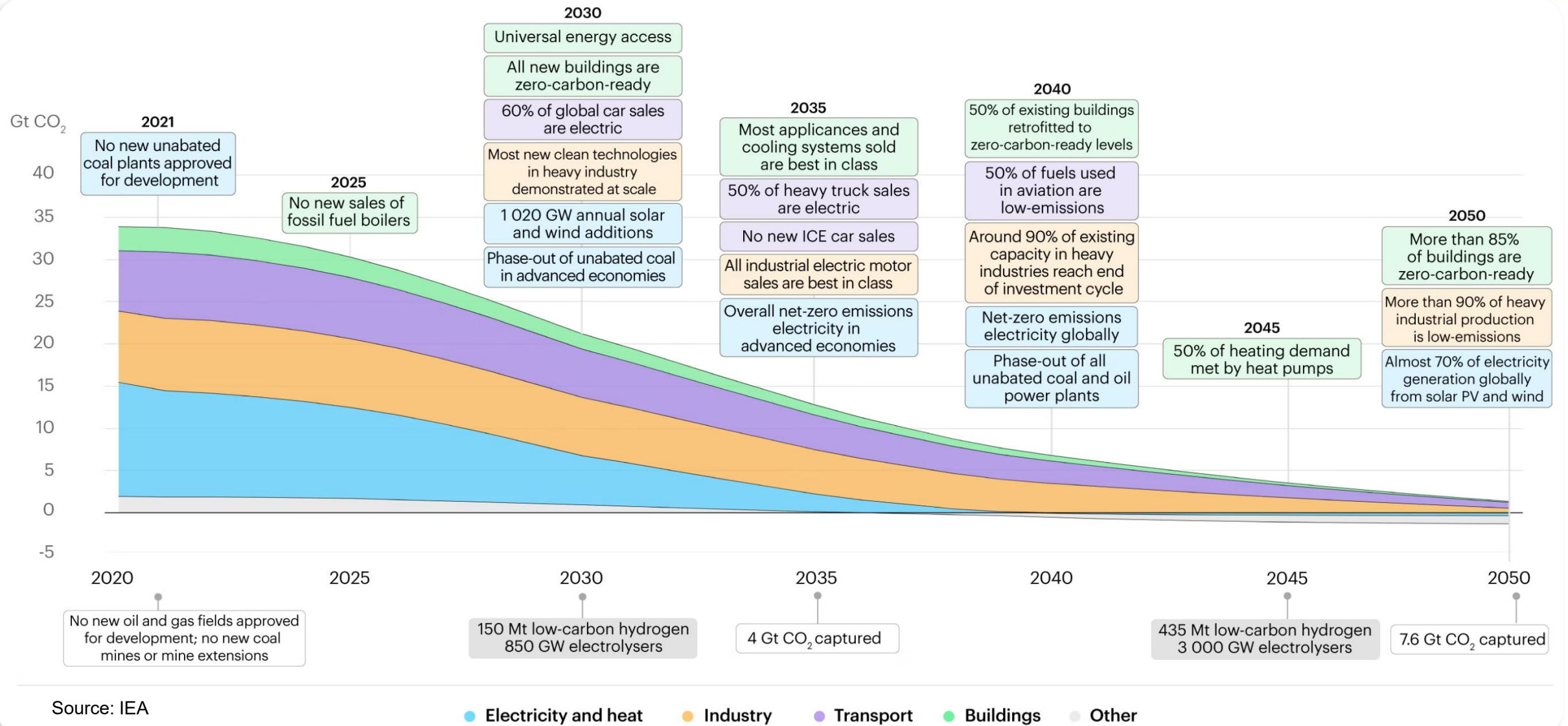


July 31th, 2025



Introduction

Roadmap for the reduction of CO₂ emissions





General Comments

Light vehicle market is already established



Market penetration

In 2024, electric vehicles accounted for more than **20% of all automobiles** sold globally



China

Almost **1/2 of the cars sold in the country in 2024 were electric**, representing about 2/3 of global EV sales



Europe and USA

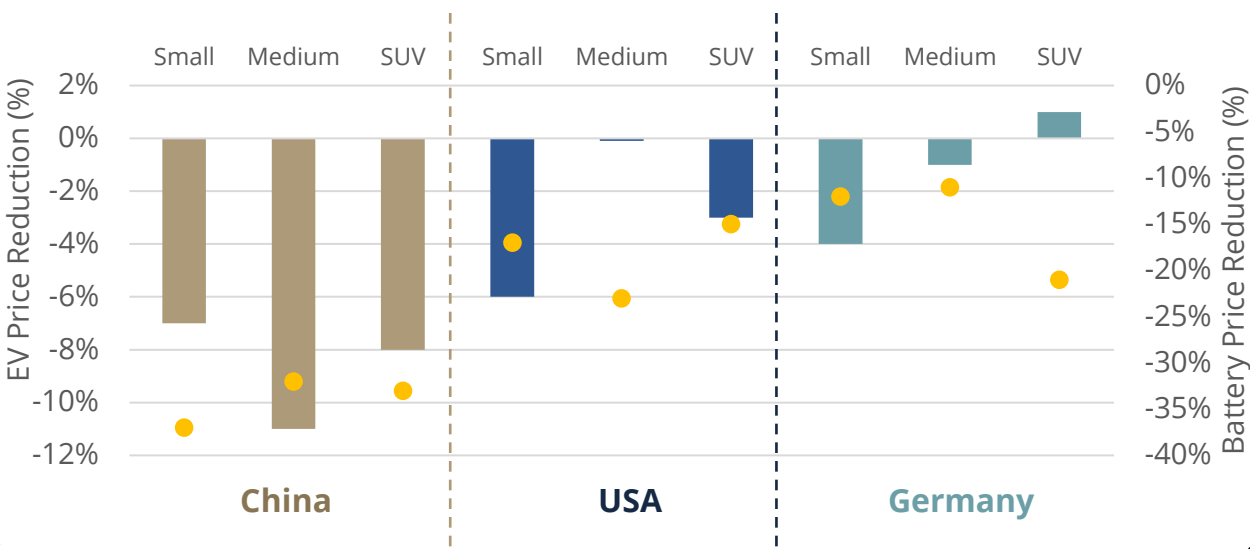
They recorded **a slowdown in EV sales in 2024** due to subsidy cuts, in addition to limitations on vehicle cost and autonomy



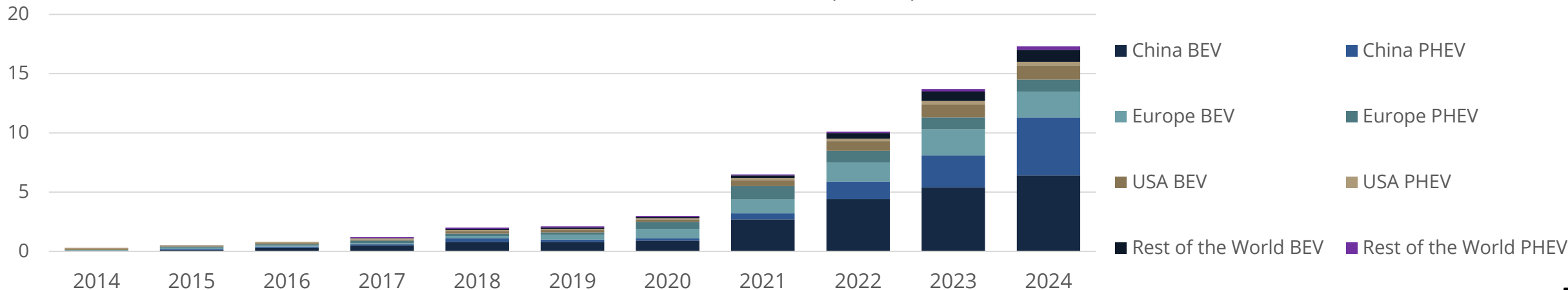
For 2025

Electric car sales are expected to increase by 25% globally, similar to the 2024 growth

Price reduction of Electric Cars and Battery Systems (%)



Global electric car sales (Millions)



Market Outlook: Electric Buses & Trucks

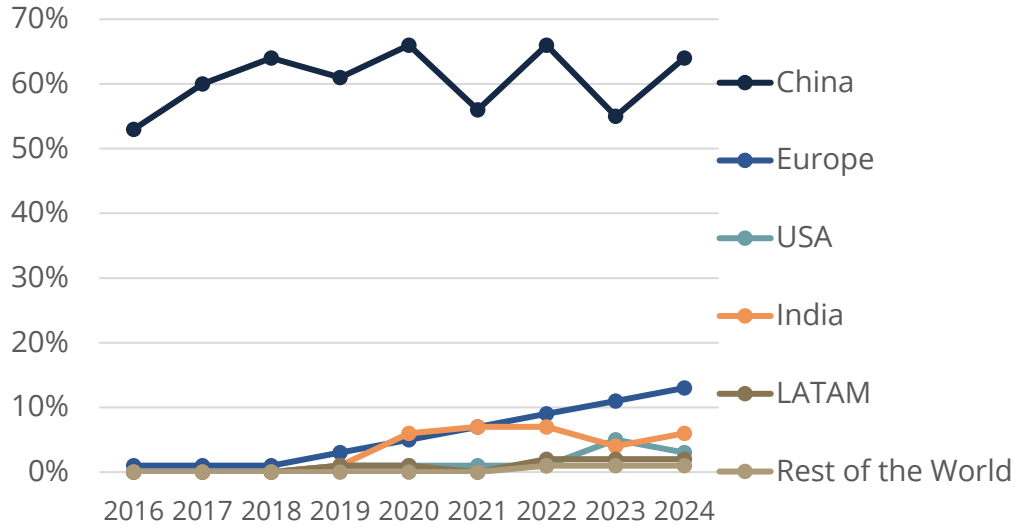


Global Electric Bus Market



- Global sales grew by more than 30% in 2024, reaching 70,000 vehicles, but still represent only 6% of bus sales
- China maintains the largest share of the market, but its share has fallen from 99% in 2017 to less than 70% in 2024.

Share of electric buses in sales by country (%)



Sources: [IEA](#), [EPE](#), [C40 Knowledge](#), [Reset](#)

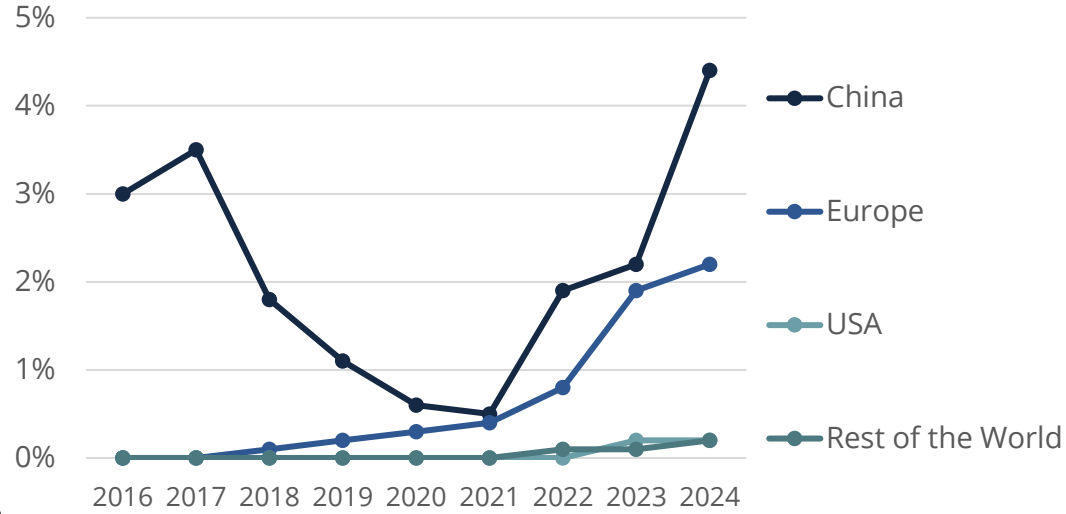


Global Electric Truck Market










- Global sales grew more than 80% in 2024 (reaching 90,000 trucks), but maintain low share percentages
- More than 80% of electric trucks sold in 2024 were in China

Share of electric trucks in sales by country (%)



Sources: [1EPE](#), [2IEA](#), [BCG](#)

The Current Panorama of Electromobility

Category	 Current Market	 Techno-Economic Feasibility	 Challenges	 Horizon
 Light Vehicles	Established market with high projections	<ul style="list-style-type: none"> Competitive cost in some cases Charging infrastructure developing 	<ul style="list-style-type: none"> Lack of sufficient charging stations Low autonomy and high investment costs 	<ul style="list-style-type: none"> Short Term
 Electric Buses	<u>Urban buses</u> : on the rise. <u>Intercity Buses</u> : incipient (needs technological improvements)	<u>Urban buses</u> <ul style="list-style-type: none"> Economically viable Available subsidies 	<ul style="list-style-type: none"> High CAPEX Recharging infrastructure Impact on the distribution network 	<ul style="list-style-type: none"> Medium Term
 Electric Trucks	<u>Light</u> : Relevant growth prospects <u>Heavy</u> : Incipient (needs technological improvements)	<u>Light</u> : Viable on urban routes <u>Heavy</u> : Low techno-economic viability	<ul style="list-style-type: none"> Autonomy (Heavy) Recharging infrastructure 	<u>Light</u> : Medium Term <u>Heavy</u> : Long Term

H2 Market

The H₂ already has a reasonable international market, but its production still has a high emission intensity

H₂ Market (2023)

97 Mton



Industry

~54 Mton (56%)

- 60% for ammonia, 30% methanol & 10% DRI (steel/iron)

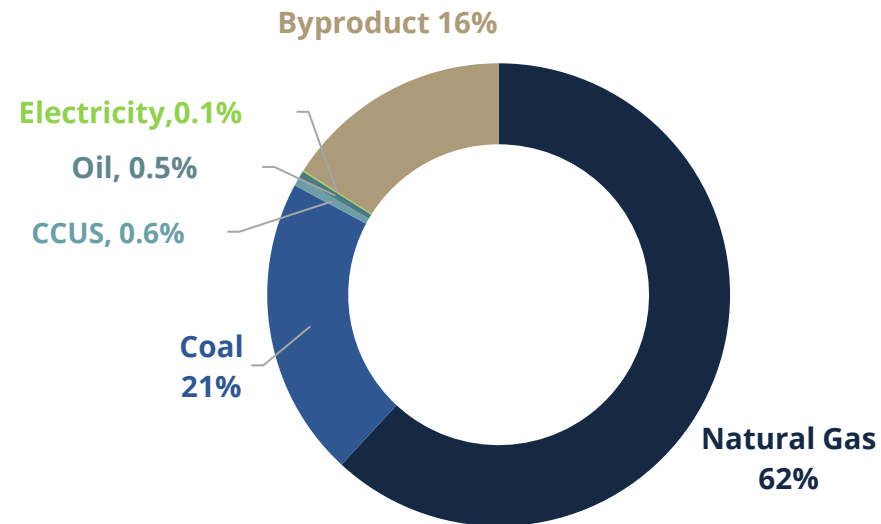


Refineries

~43 Mton (44%)

- Hydrocracking and hydrotreating

Production



H₂

Natural Gas

Steam methane reforming

- Gray hydrogen
- Emissions: 10-12 tCO₂ / tH₂

H₂

Coal

Gasification

- Emissions: 22-26 tCO₂ / tH₂

920

Mton of CO₂ produced / year (2023)

=



~2.5%

of global CO₂ emissions from the energy sector

Low-carbon H₂ Production Methods

H₂ Renewable Hydrogen

- **Green hydrogen:** Water electrolysis with renewable energy
- Biomethane reform
- **Ethanol reform**
- Biomass gasification

H₂ Blue Hydrogen

Fossil fuels + CCUS

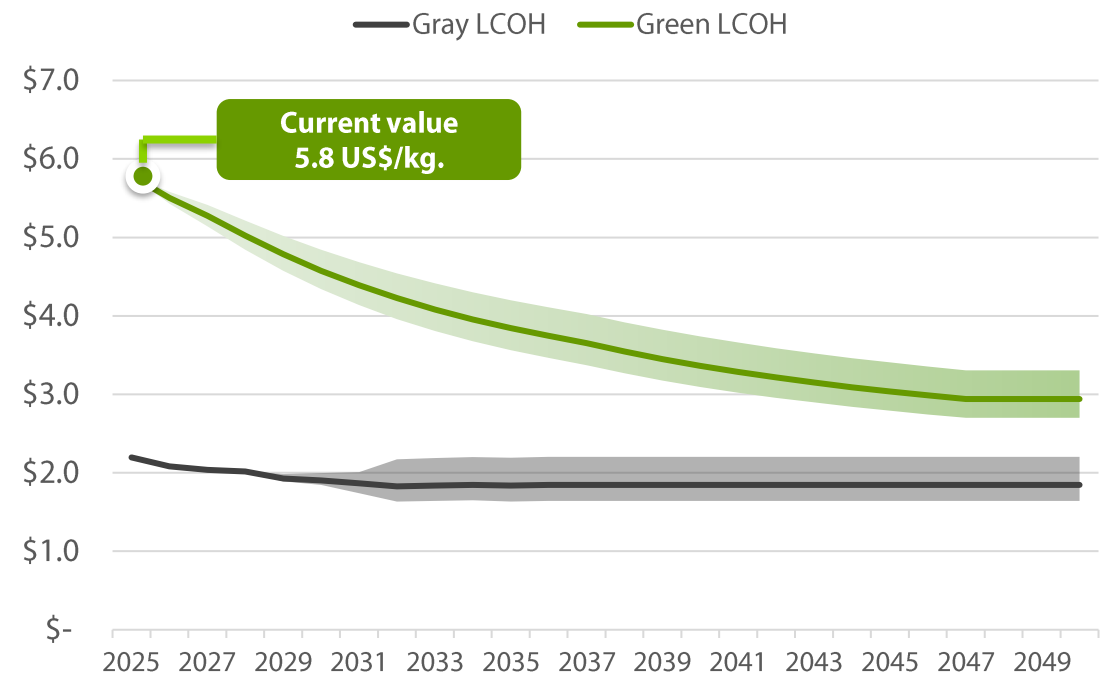
H₂ Natural Hydrogen

Found naturally and mined, as is done for natural gas

Currently the costs of producing renewable H₂ are much higher, but a reduction is expected in the future

Levelized Cost Projection of H₂ - LCOH (US\$ / kg H₂V)

* No taxes

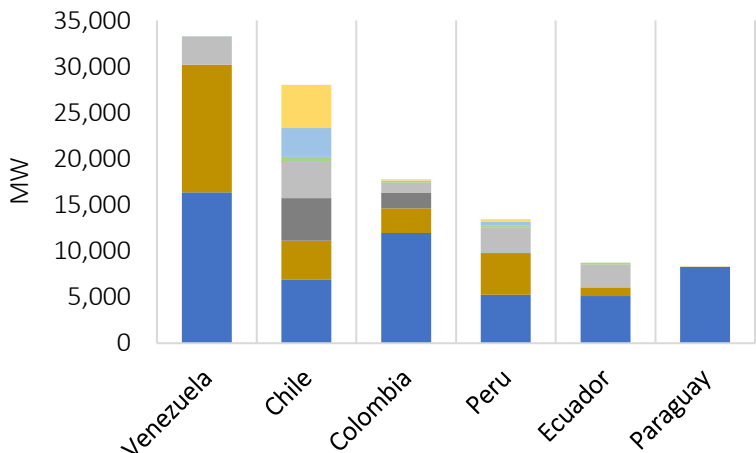
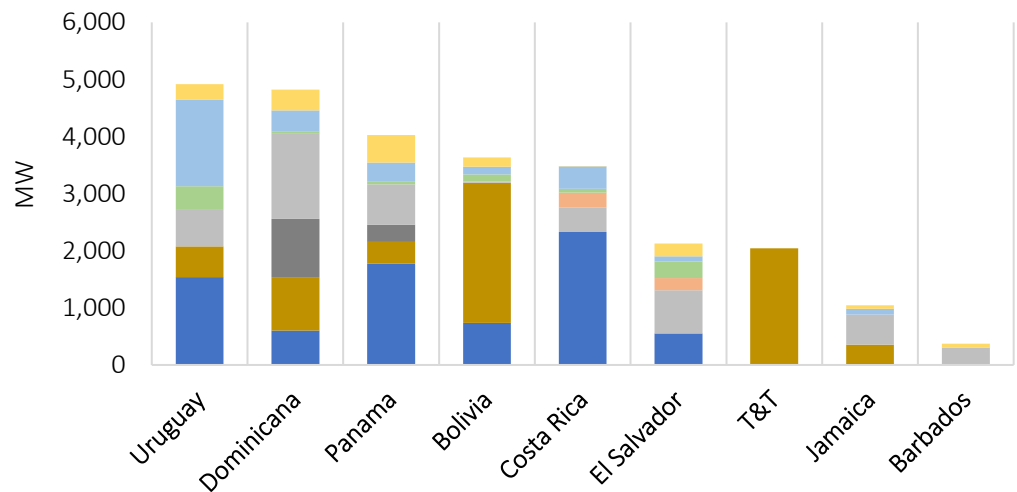
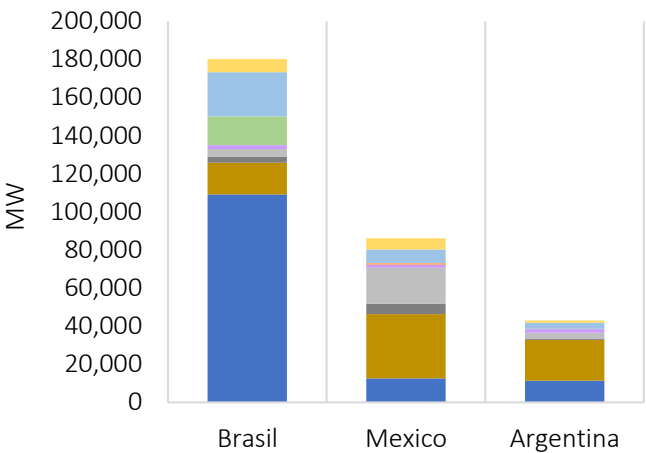




Energy Transition in LATAM

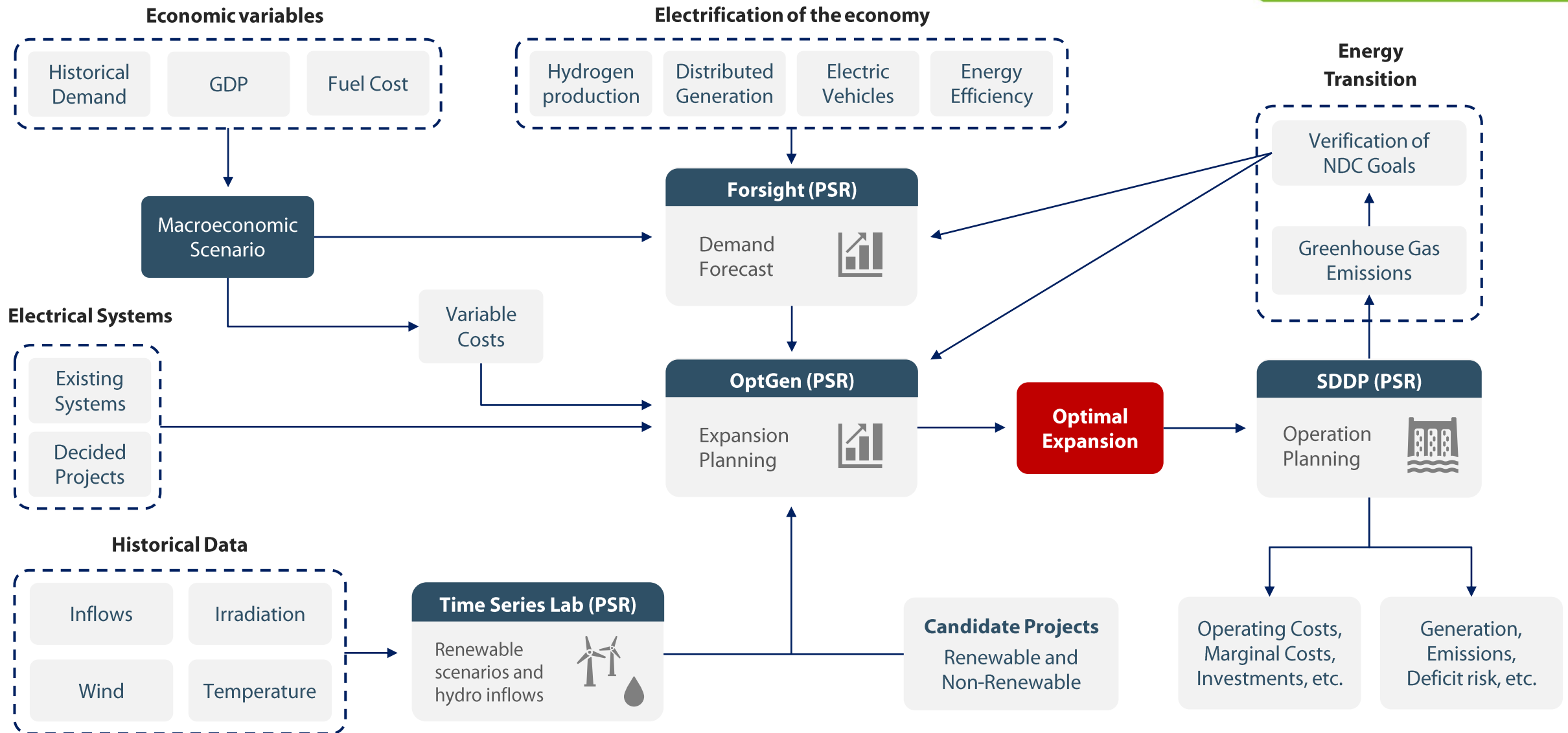
18 Countries Evaluated

- In this study, 18 Latin American countries were modeled, from large countries such as Mexico and Brazil to small countries and islands such as Barbados and Jamaica.
- 590 million people (30% > Europe)
- Total GDP of 5 trillion USD (20% > US GDP)



■ Hydro ■ Natural gas ■ Carbon ■ Liquid fuels ■ Nuclear ■ Geothermal ■ Biogas/biomass ■ Wind ■ Solar

Methodology



H2 + DG + EV + EE Modeling

- A model frequently used to carry out forecasting is the **Bass Diffusion Model**, which is focused on estimating the innovation adoption curve
- The Theory of Diffusion of Innovations indicates that the insertion of a technology can be represented by an “S curve”, divided into the phases of early adopters (innovators), majority adoption (imitators) and final adopters (late adopters)
- The model consists of four stages: (i) definition of the potential market; (ii) estimation of the final potential market; (iii) determination of market diffusion; and (iv) calibration of the model according to historical data

Definition of the potential market

Final Potential Market = fmm × initial potential market

$$fmm = e^{-SPB \times TPM}$$

Where:

fmm: maximum market fraction

SPB: payback sensitivity

TPM: payback time in years

Definition of market diffusion

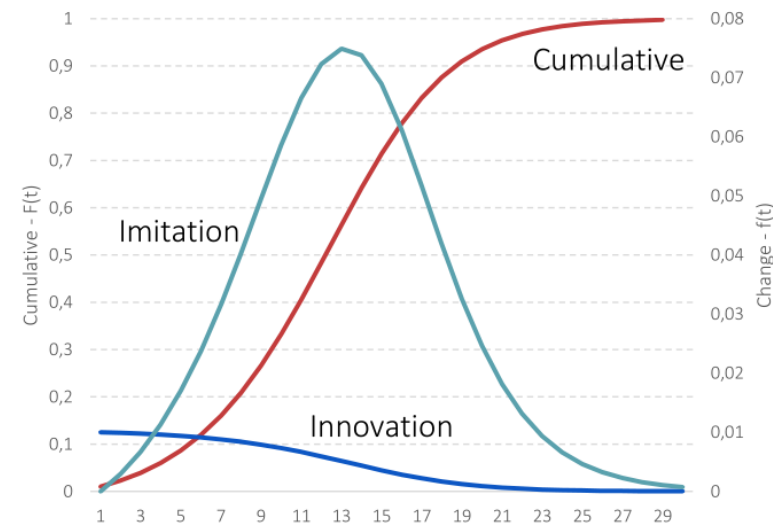
$$F(t) = \frac{1 - e^{-(p+q) \times t}}{1 + \frac{q}{p} \times e^{-(p+q) \times t}}$$

Where:

F(t): accumulated distribution function

p: innovation coefficient

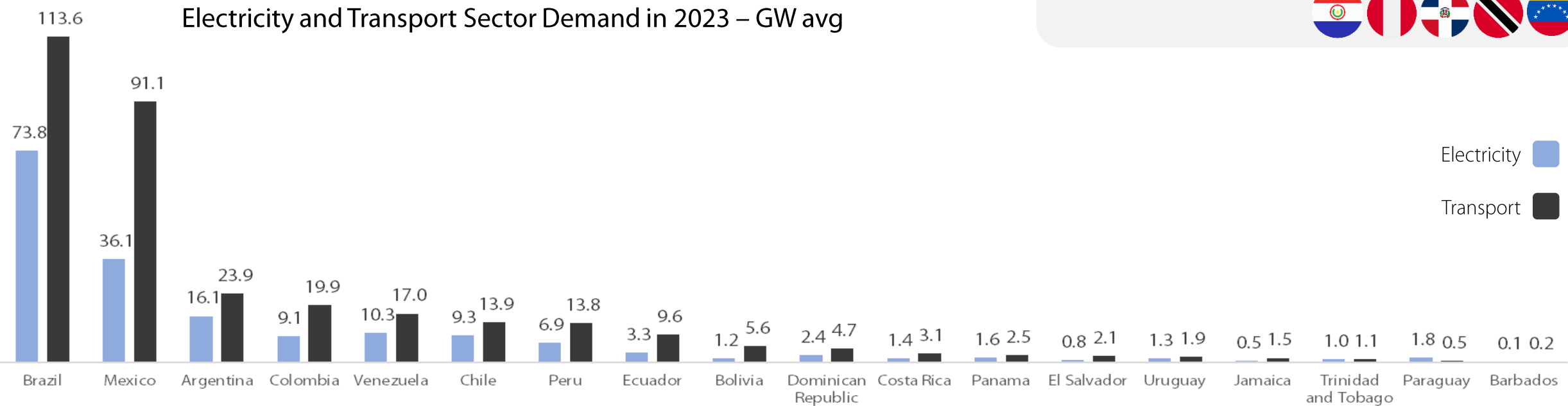
q: imitation coefficient




Energy Demand in the Transport Sector

Full electrification of the transport sector poses a **major challenge** for the future, as this sector requires at least **twice as much energy** as what is **currently consumed by national electric power sectors**







Electrifying a significant share of this sector, as projected in IRENA's 1.5°C scenario (52% by 2050), **appears to have a low likelihood of materializing**. This is because, in addition to meeting the increased electricity demand – which is expected to double in most countries by 2050 – it would also be necessary to develop the entire infrastructure required to support fleet electrification, given the still very incipient stage observed in the region












Meets targets



5-year delay

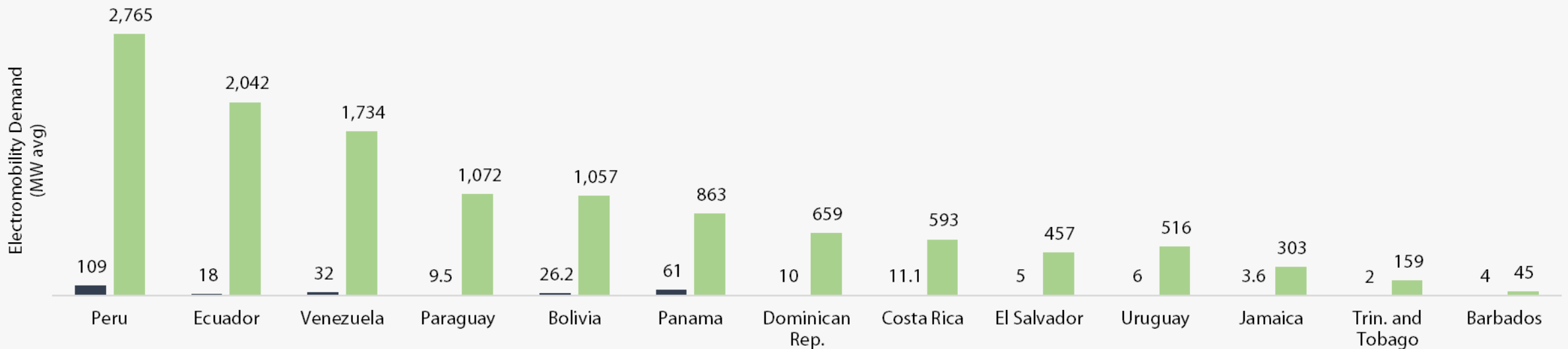
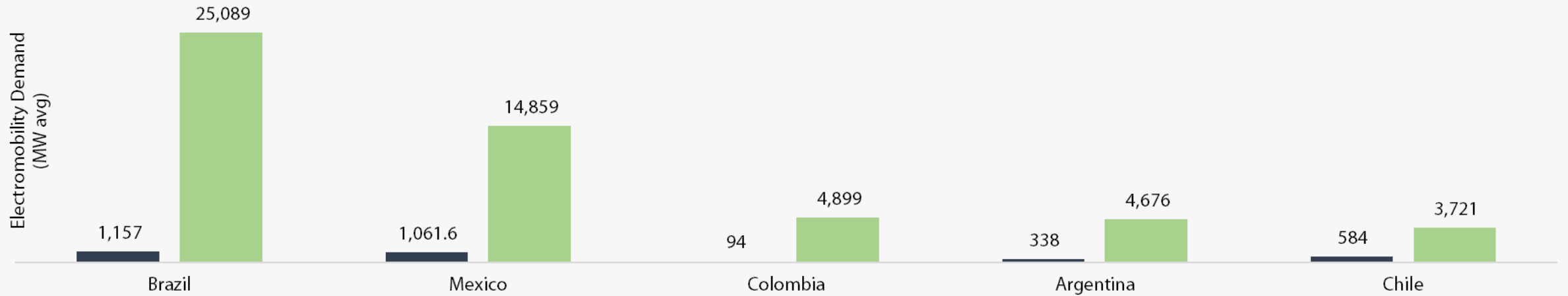


10-year delay



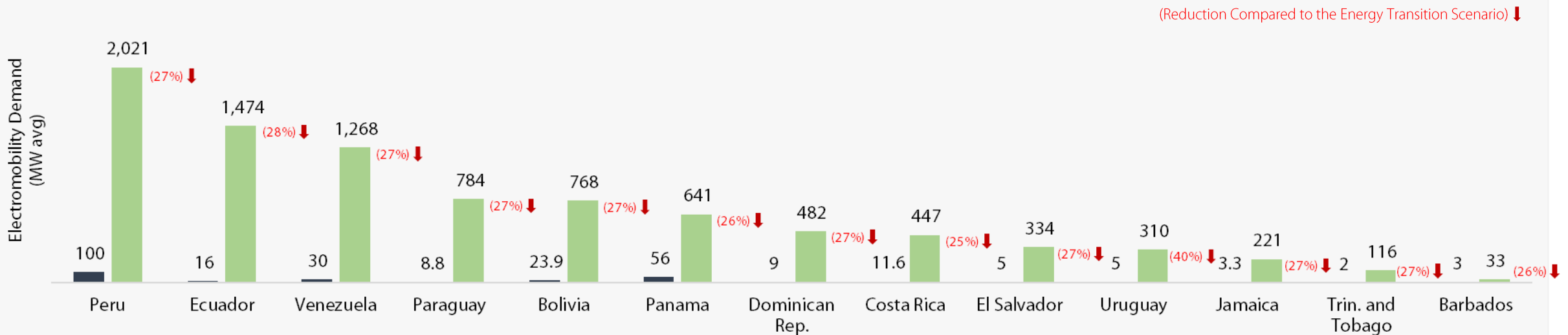
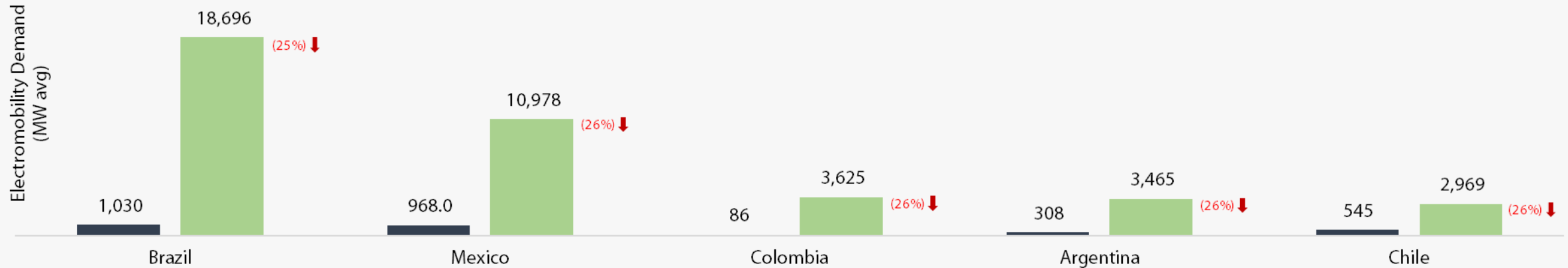
Electromobility Projection by Country

Energy Transition Scenario

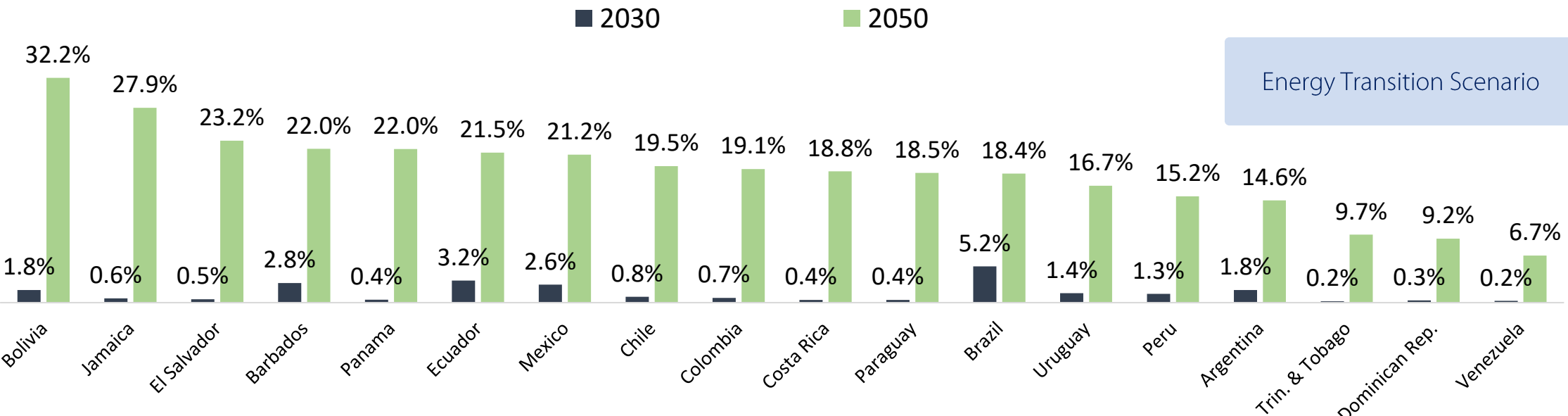
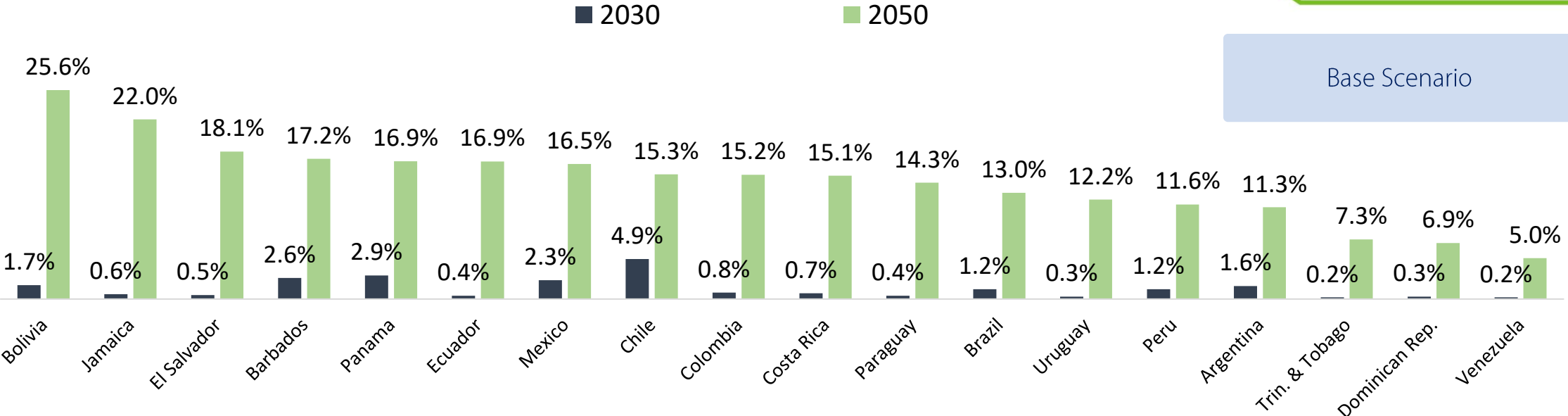


Electromobility Projection by Country

Base Scenario

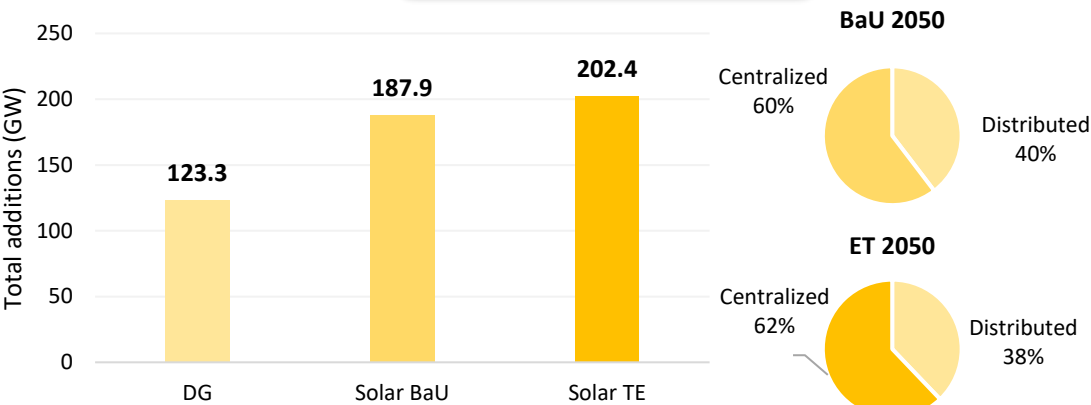


Electromobility forecast

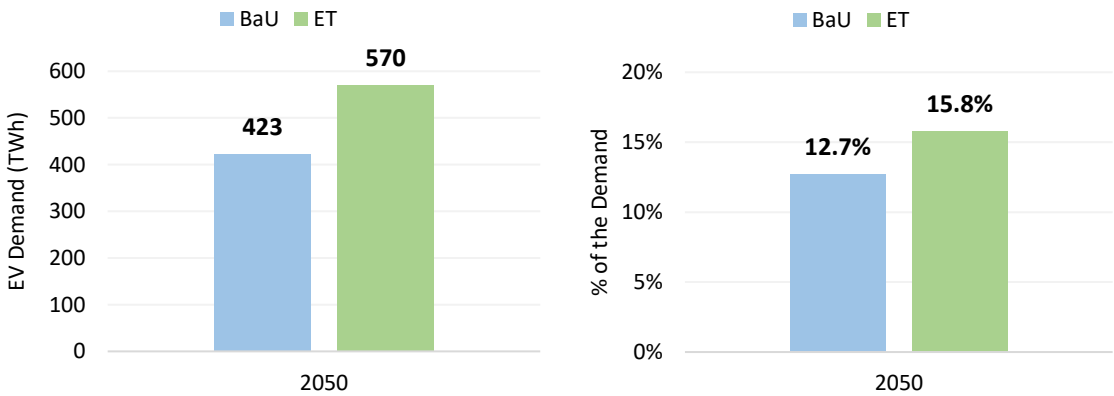


Winning technologies on the “Demand Side”

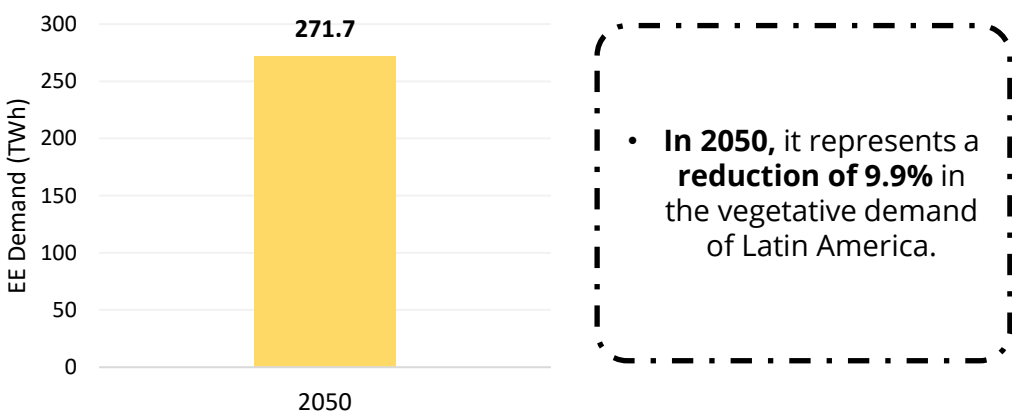
Distributed generation



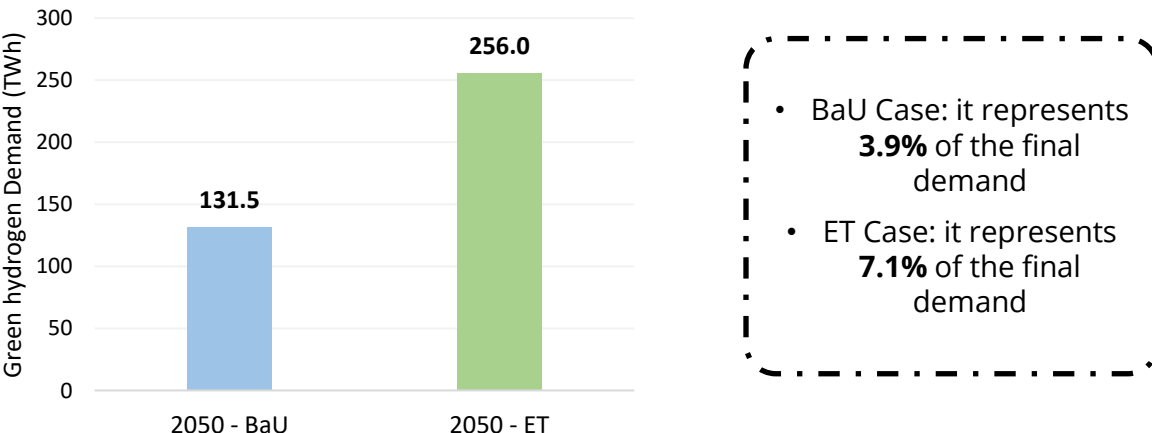
Electric Vehicles



Energetic Efficiency

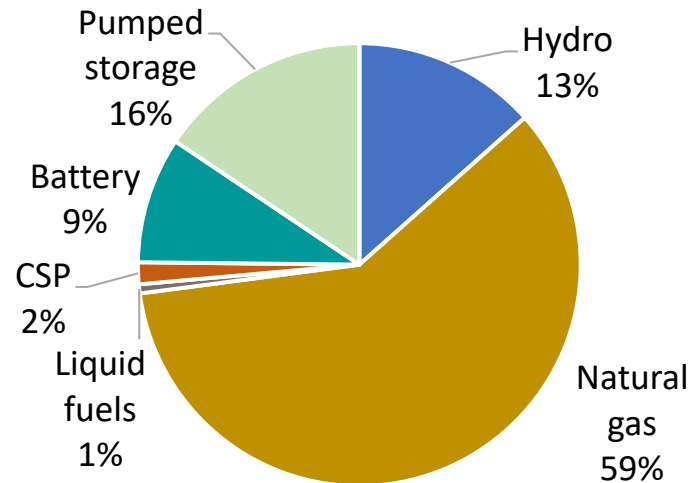


Green Hydrogen



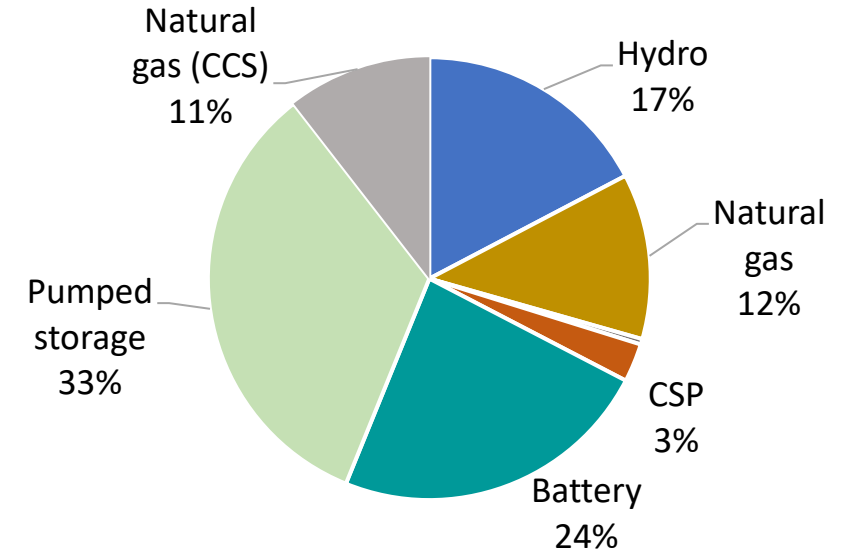
Additions of flexibility aggregators between 2024 and 2050

BAU



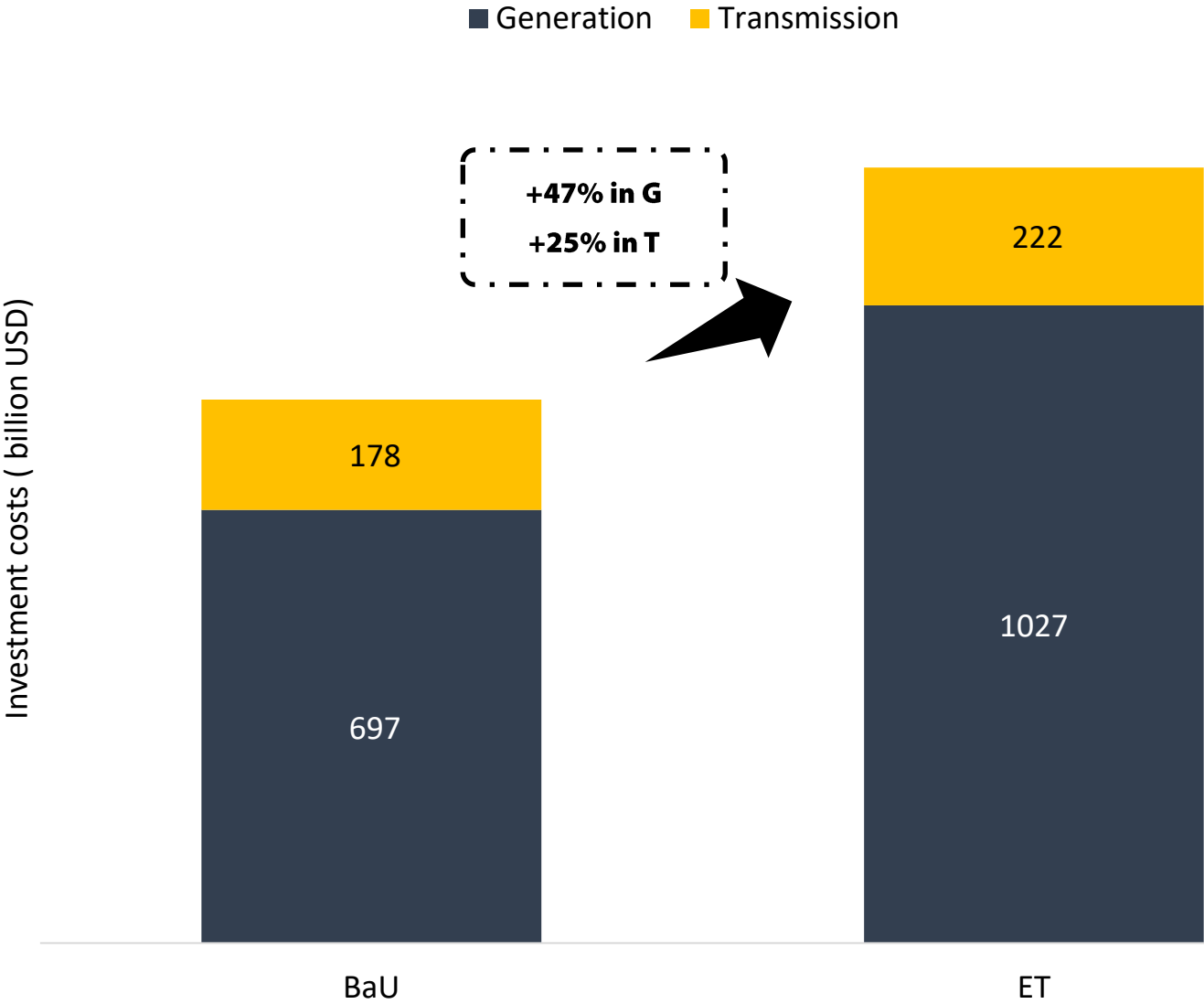
- In the **BAU case**, **natural gas** is the most attractive option from both a technical and economic perspective for providing flexibility in most countries
- In countries with the capacity to invest in **hydropower**, this option has also proven to be attractive
- Additionally, some countries have focused their investments on **battery storage systems**

ET



- In the **ET case**, the most prevalent option for incorporating flexibility has been the implementation of **battery and pumped storage systems**
- **Natural gas power plants with carbon capture** were installed in Brazil and Peru only
- Natural gas is still an option in some countries without comprising the clean energy targets

The ET process will require significant investments



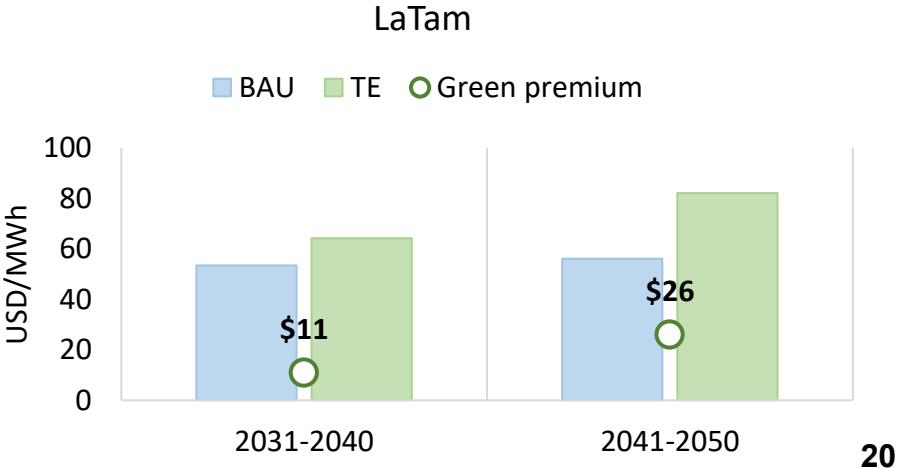
Total investments

Business as Usual Case (BAU)

875 billion USD of investments in G&T

Energy Transition Case (ET)

1248 billion USD of investments in G&T



Conclusions

Key Takeaways



Effective “net zero” portfolio: decarbonize other sectors (as industry and transport), demanding transmission and flexibility investments to meet renewable / DC load needs



Technologies able to aggregate flexibility and compensate renewable / DC load variability will play a key role in the costs associated with the energy transition process



Electricity x gas will complement each other to define consumption drivers and growth factors: data centers, hydrogen, electromobility



Latin America strong track record on electricity regulation allows the construction of sound design practices, as electricity forward contracts, auctions, etc.

THANK YOU!

Any questions?

Ricardo Perez*
Luiz Barroso**

ricardo@psr-inc.com*
luiz@psr-inc.com**



PSR