FINANCING CLIMATE ACTIONS FOR TRANSPORTATION

Binyam Reja

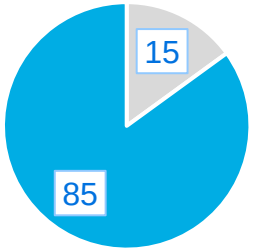
World Bank

ADB Transport Forum

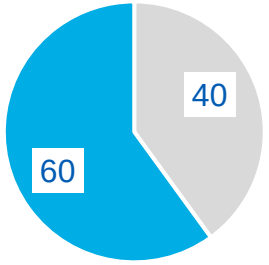
Developing countries bear the brunt of negative externalities associated with motorization

Direct damage to transport infrastructure from natural disasters already costs about $15 billion annually

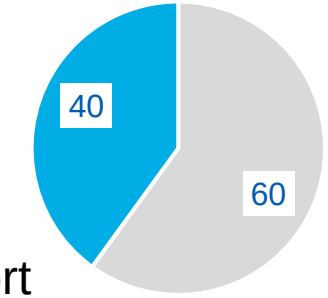
Population



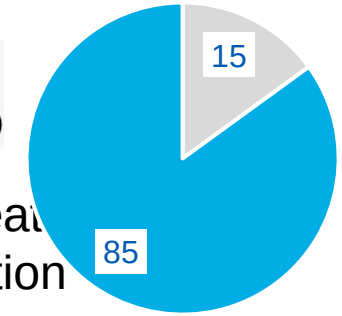
Vehicles



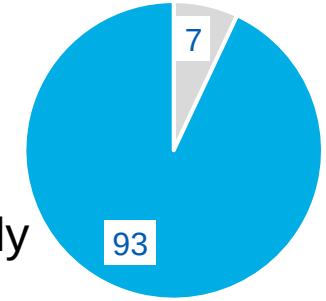
Transport GHG emissions



Premature deaths from air pollution

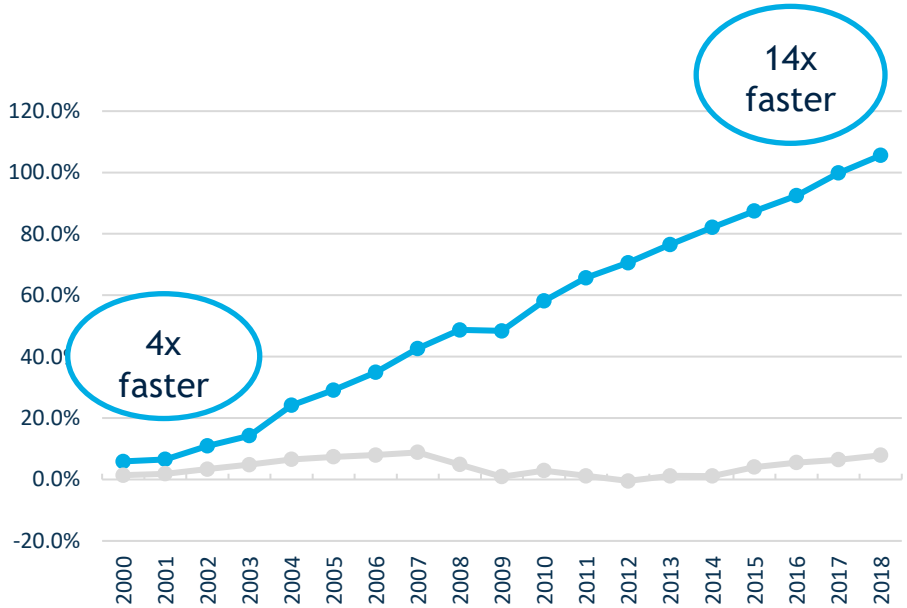


Road traffic deaths globally



Developing countries

Developed countries



WORLD BANK GROUP Transport

How to decarbonize Transport?

Transport decarbonization is one of the pillars of the proposed **Energy - Global Challenge Program.**
The objective is to give access to sustainable transport solutions to **100 million people.**
Progress will be measured through the **corporate scorecard.**

Avoid

Avoid the need for motorized transport, shorten trips, and reduce frequency of travel where possible.

Densifying cities to bring people closer to jobs

Shift

Shift to greener modes of transport.

Public transportation (BRTs, metros, urban rail)
Rail, river-based transport

Improve

Improve the efficiency of transport systems through more energy-efficient and zero-emission technologies.

E-mobility
Alternative fuels

Resilience

Make transport systems more resilient to the effects of climate change.

Climate-smart transport and logistics

CLIMATE FINANCE FRAMEWORK

Complex climate finance infrastructure, with multiple actors and players and multiple sources of finance

Activity-based finance

Outcome-based finance

International Public Climate Finance

Deployed through international system: multilateral, bilateral and MDBs

A. Dedicated Climate Finance

- UNFCCC Financial Mechanisms

gef · GREEN CLIMATE FUND · ADAPTATION FUND

- Other dedicated CF funds

CIF

B. Development Finance

- Financing from MDBs

ADB · AIIB · CEB · European Bank for Reconstruction and Development · European Investment Bank · IDB · New Development Bank · IsDB Islamic Development Bank · WORLD BANK GROUP

- Bilateral Development Finance

Public & Private Sector Climate Finance

Deployed directly by private and public sector entities

C. Private Finance

Investments in climate projects seeking commercial returns

- Financial Markets (Capital Markets, Commercial Financial Institutions)
- Asset managers and asset owners
- Corporations

D. Public Finance

Domestic government spending and resource mobilization (DRM) on climate-related activities

- Public budgeting
- State-owned enterprises
- State-owned Financial Institutions
- National DFIs

E. Results-based climate finance

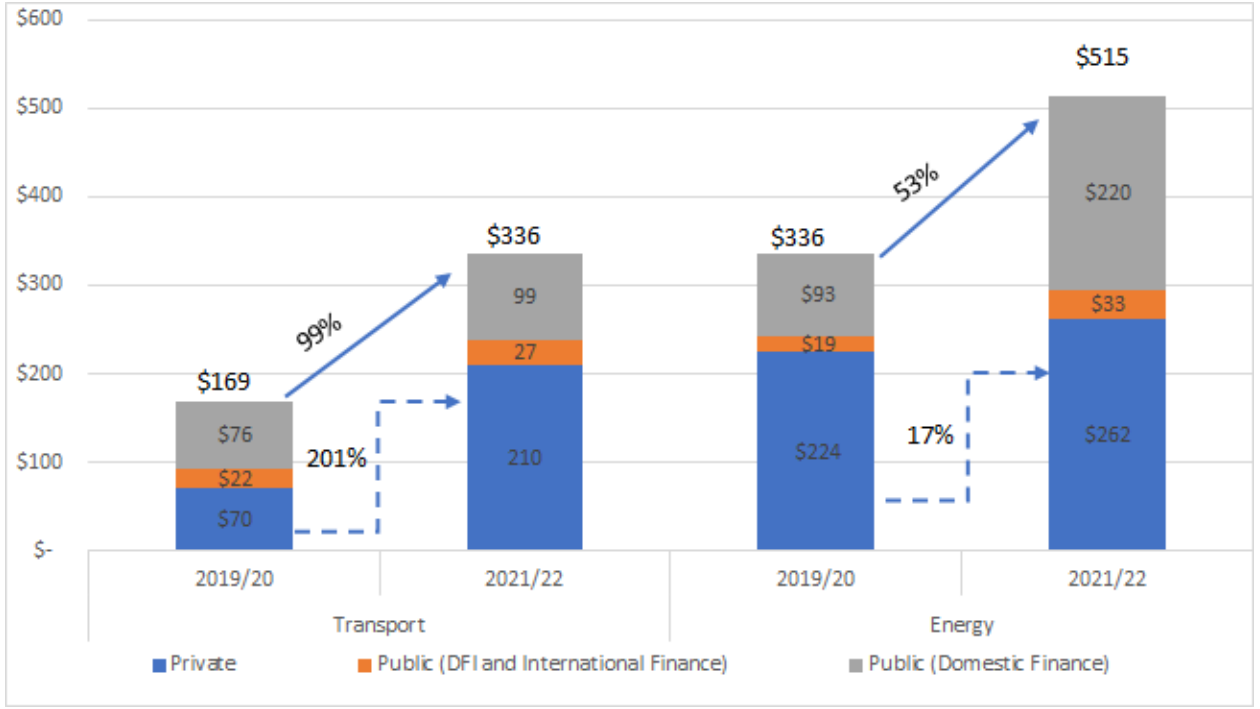
F. Voluntary Carbon Markets

G. Compliance Carbon Markets

MOST RECENT AVAILABLE FIGURES SHOW AN INCREASE OF CLIMATE FINANCE FOR TRANSPORT

- According to the Climate Policy Initiative, the increase in climate finance for transport is led by the private sector
- The sector is recovering from the impact of the 2020-2021 COVID-19 pandemic
- Still, decarbonizing energy is leading the trends among the infrastructure sectors
- DFI/IFI contribute (directly) with a small share

Sources of Climate Finance for Low-Carbon Transport ($ billion)

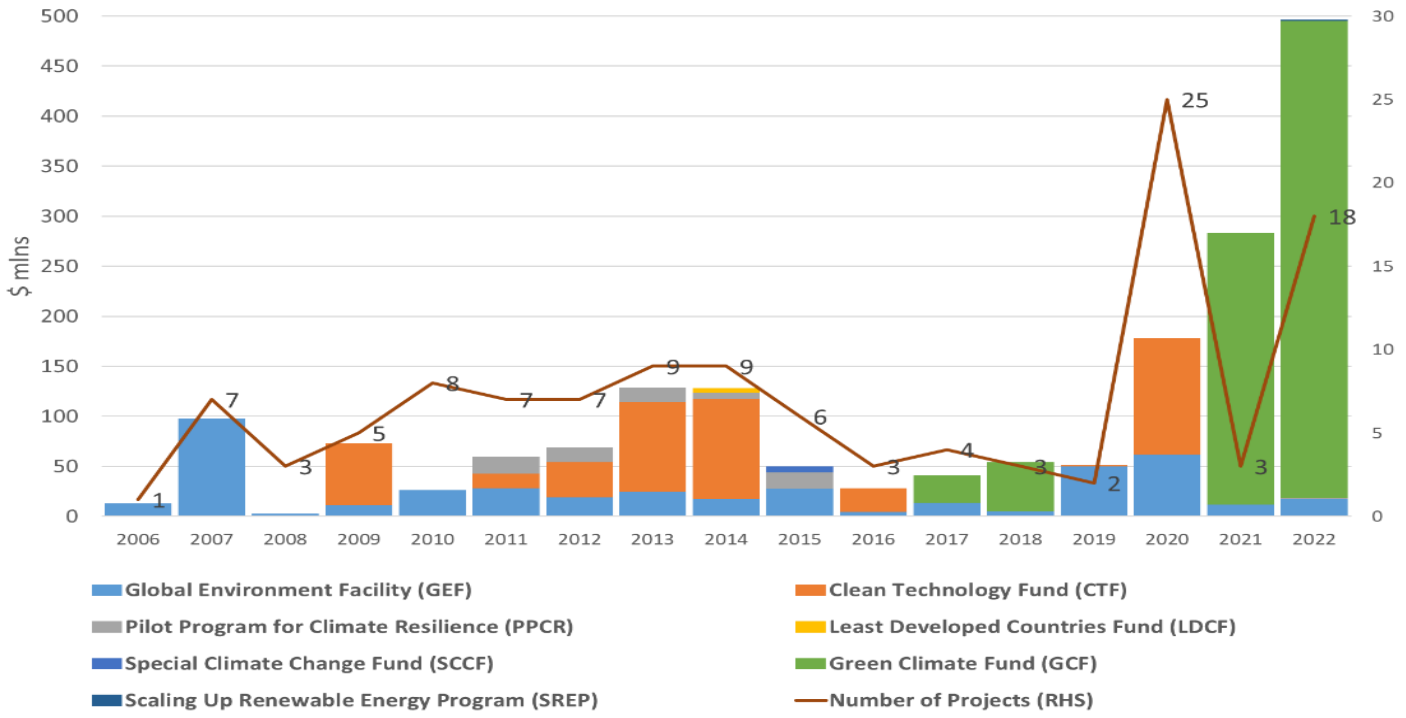


Source: CPI 2022. Data derived from "Global Landscape of Climate Finance"

ARE CLIMATE FUNDS BACK IN TRANSPORT?

- The Green Climate Fund is leading the return of climate funds to transport
  - Multi countries operations in LAC with three MDBs plus another by ADB. Another operation in India (private sector window) with Macquarie (EVs)
  - Some questions remains in the execution of these funds
- But is the transport sector ready to deploy climate friendly projects that bring Value for Money on the limited available climate finance?

Amount of Funding Approved by Climate Funds in LMICs for Transport by Year



Source: Authors' derivation from Climate Funds Update Data Dashboard

GREEN FINANCING
ESG bonds and Carbon finance

- Maximize the use of carbon market (e.g., VCM, Compliance Market)
- Thematic ESG bond markets for greening the transport sector.
- In EM sovereigns, most of the issuances financed railway, metro, and associated infrastructure (stations, grid connectivity, rolling stock, railway tracks etc.) within the sustainable transport category

Sample of green bonds issued by EM Sovereigns (World Bank Treasury)

Country	Use of proceed (transport)
Chile	Rail and metro: 12 projects
	Electrification of buses: 4 projects
Colombia	Metros
	Mass transport and integration
Indonesia	Rail and metro: 29 projects
	Bus (Rapid Transit): 2 projects
	Vessel modernization: 1 project
Egypt	Metro (monorail)
Malaysia	Electrification of rail infrastructure
Mexico	Rail infrastructure (freight and passengers)
Poland	Electrification of rail infrastructure
Serbia	Rail infrastructure
Thailand	Metro infrastructure
Uzbekistan	Metro infrastructure

WHO IS FINANCING CLIMATE ACTIONS IN TRANSPORT?

No single nor "official" definition of climate finance, which leads to differences in reported numbers across sources:

- **World Bank**: "Climate finance is financing provided by public or private entities for activities that, in whole or in part, mitigate carbon emissions or support adaptation and resilience to climate change"*
- **UNFCCC Standing Committee on Finance:** "Climate finance aims at reducing emissions and enhancing sinks of greenhouse gases and aims at reducing the vulnerability of, and maintaining and increasing the resilience of, human and ecological systems to negative climate change impacts."
- **Climate Policy Initiative:** "Global primary investment by public and private actors in activities that reduce emissions and improve adaptation and resilience to climate change"

*Source: WBG Development Committee Paper (October 2022), Achieving Climate and Development Goals - The Financing Question

Breakdown of Types of Financing Sources for Transport (US$m)

	2017	2018	2019	2020	2021	2022
Private	33,882	48,970	63,085	76,419	162,318	256,967
Commercial FI	4,840	3,337	16,913	23,450	45,667	70,430
Corporation	2,969	1,838	20,028	26,004	7,305	11,071
Funds	586		3,355			
Households/Individuals	19,299	41,509	22,753	26,946	109,339	175,432
Institutional investors	4,468	2,286	22	19	7	34
Unknown	1,721		14			
Public (Domestic Finance)	107,762	47,014	92,335	60,344	77,327	121,272
Government	12,973	14,897	10,182	10,995	22,223	32,747
National DFI	92,150	31,085	82,128	49,139	55,065	88,525
Public Fund	21	67	26	211		
State-owned FI	585				39	
SOE	2,032	966				
Public (DFI and International Finance)	15,081	19,513	19,684	25,295	22,977	31,604
Multilateral DFI	12,382	10,810	15,657	15,705	17,561	20,171
Bilateral DFI	2,151	7,993	3,823	9,567	4,485	10,288
Export Credit Agency	548	710	203	23	649	649
Multilateral Climate Funds	44	49	34	141	283	496
Total	156,725	115,497	175,104	162,059	262,622	409,843

Source: CPI 2022. Data derived from "Global Landscape of Climate Finance".

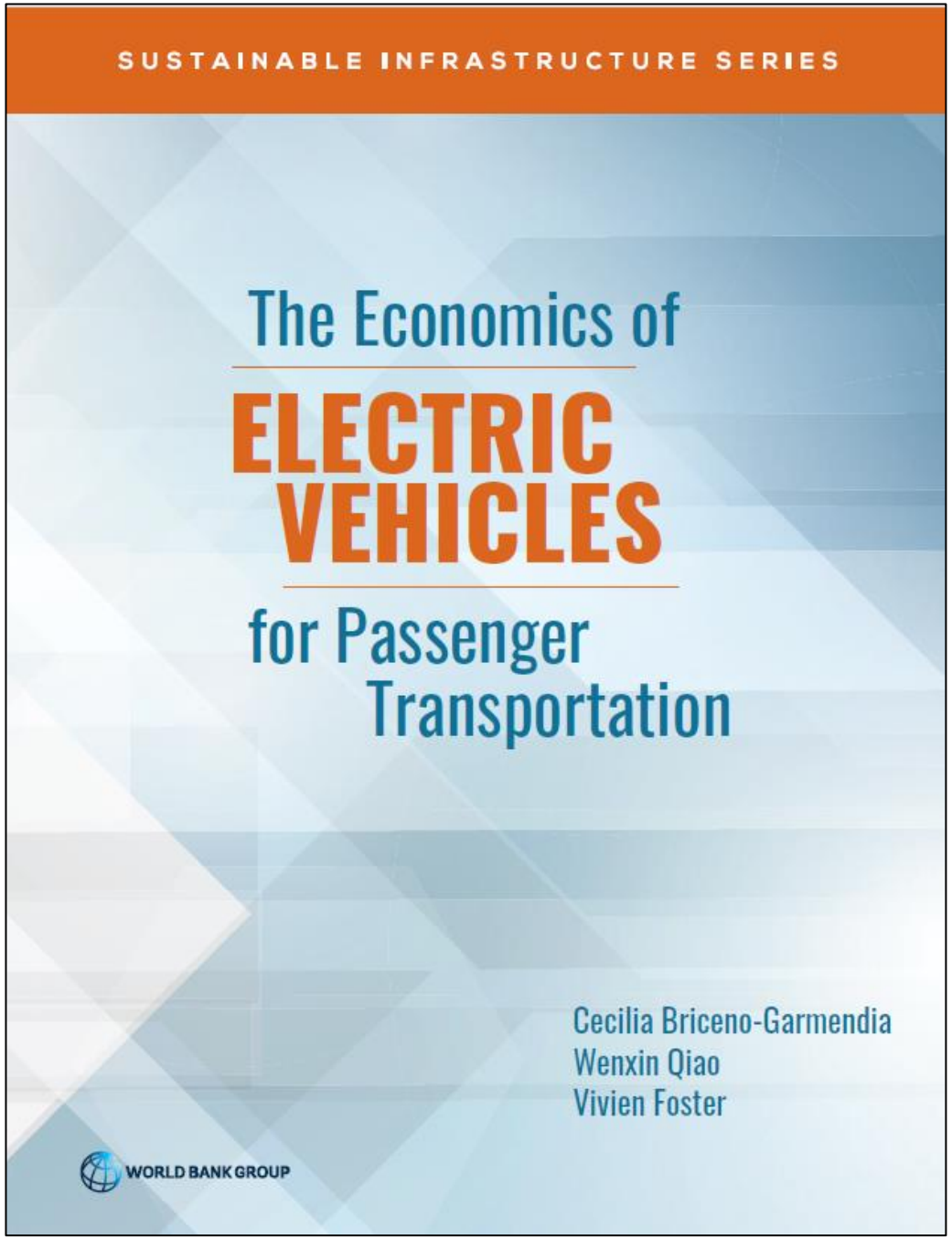
ZOOMING ON THE USE OF PROCEEDS IN TRANSPORT

- Road transport (probably EV household finance) is leading the investment
- It includes battery production and chargers)

Breakdown of sub-sectors in Transport 2019-2022 in $ billions

Sector	2019	2020	2021	2022
Rail & Public Transport	17.0	10.0	68.0	88.0
Transport-oriented Urban Development and Infrastructure	1.0	1.0	-	0.0
Waterway	-	-	2.0	6.0
Aviation	-	-	0.2	0.1
Other/Unspecified	92.0	60.0	6.0	17.0
Policy & National Budget Support & Capacity building	2.0	-	2.0	3.0
Road Transport (EVs battery & chargers)	59.0	106.0	184.0	295.0
Total Transport	171.0	177.0	262.2	409.1

Source: CPI 2022. Data derived from "Global Landscape of Climate Finance".



Can E-mobility be a Relevant Development Solution?

- **Why** is electric mobility for passenger transportation relevant to the developing world?
- **When/Where** does it make sense for developing countries to proactively pursue the transition?
- **How** can policymakers accelerate adoption of electric passenger vehicles?

https://openknowledge.worldbank.org/handle/10986/38265

Economics of Accelerating E-Mobility Adoption in Developing Countries

Global Report: "The Economics of Electric Vehicles for Passenger Transportation"

Why is electric mobility for passenger transportation relevant to the developing world?

- Health benefits (reduced air pollution)
- Inclusive mobility (affordable last mile)
- Energy security (reduced dependency on imported fuel)
- Industrial policy (Economic benefits and jobs/global value chain)
- As part of an integrated sustainable transport strategy

When/Where does it make sense for developing countries to proactively pursue the transition?

- **A Scoping Tool** is developed to answer key questions, based on analysis of 20 countries.
- Brazil, Cambodia, Egypt, Ethiopia, Ghana, India, Jamaica, Jordan, Kazakhstan, Maldives, Nepal, Nigeria, Poland, Rwanda, Tajikistan, Turkey, Ukraine, Uruguay, Vanuatu, Vietnam

How can policymakers accelerate adoption of electric passenger vehicles?

- Recommendations are provided in the sectors of:

✓Transport

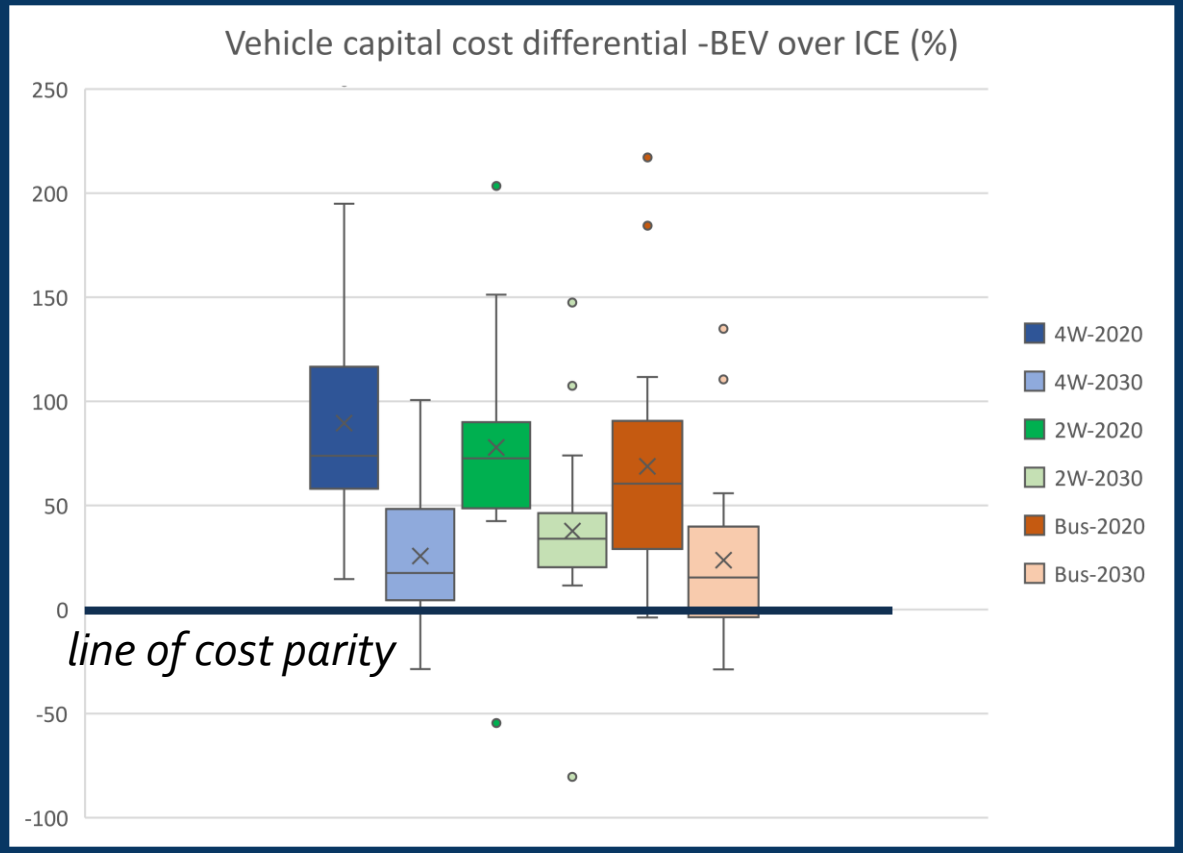
✓Energy

✓Finance

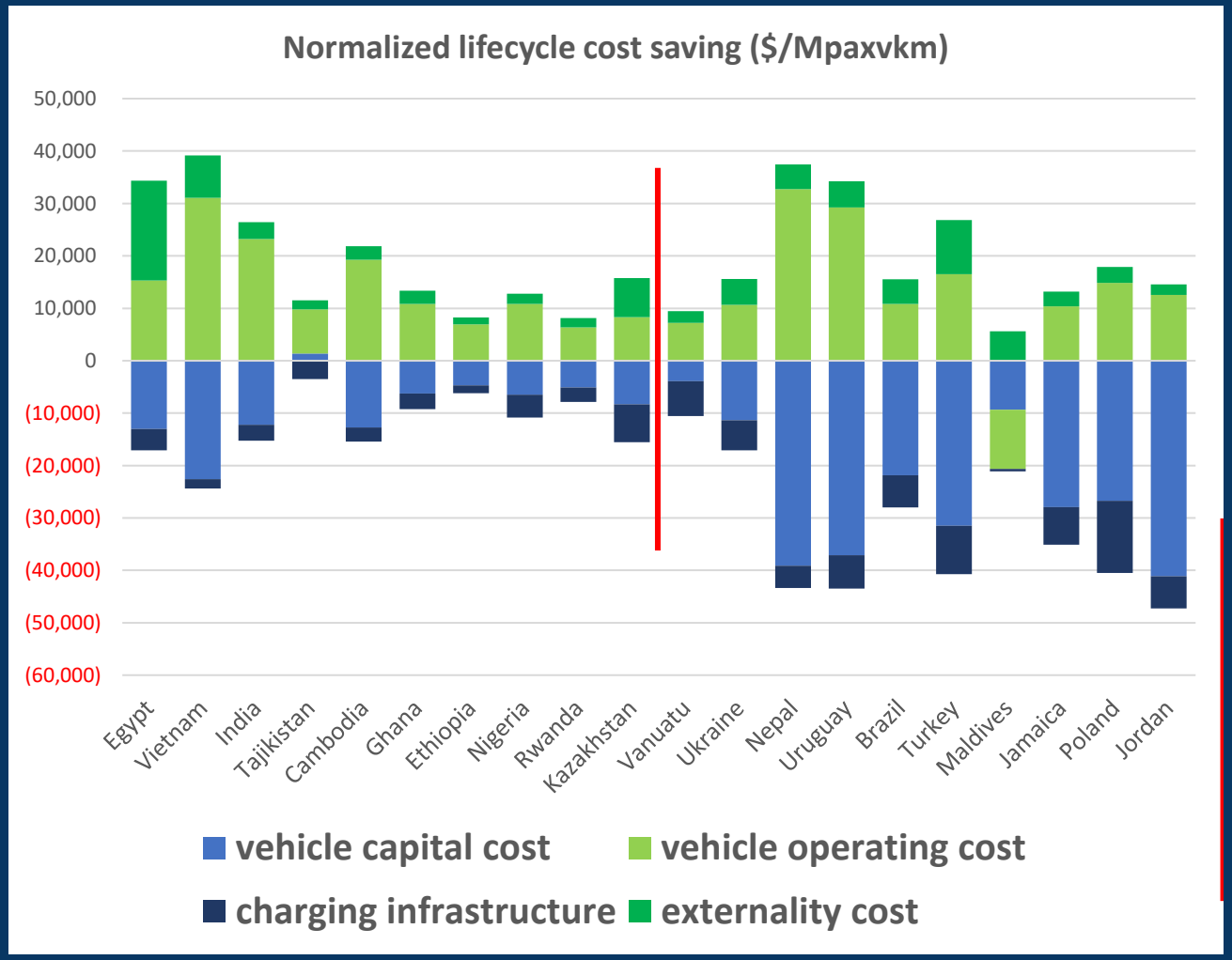
The economic case for e-mobility is becoming stronger for developing countries

Vehicle capital cost premiums are high now at about 80%, but coming down to 20-40% by 2030.

Higher capital cost of EV can be compensated by lower lifecycle costs

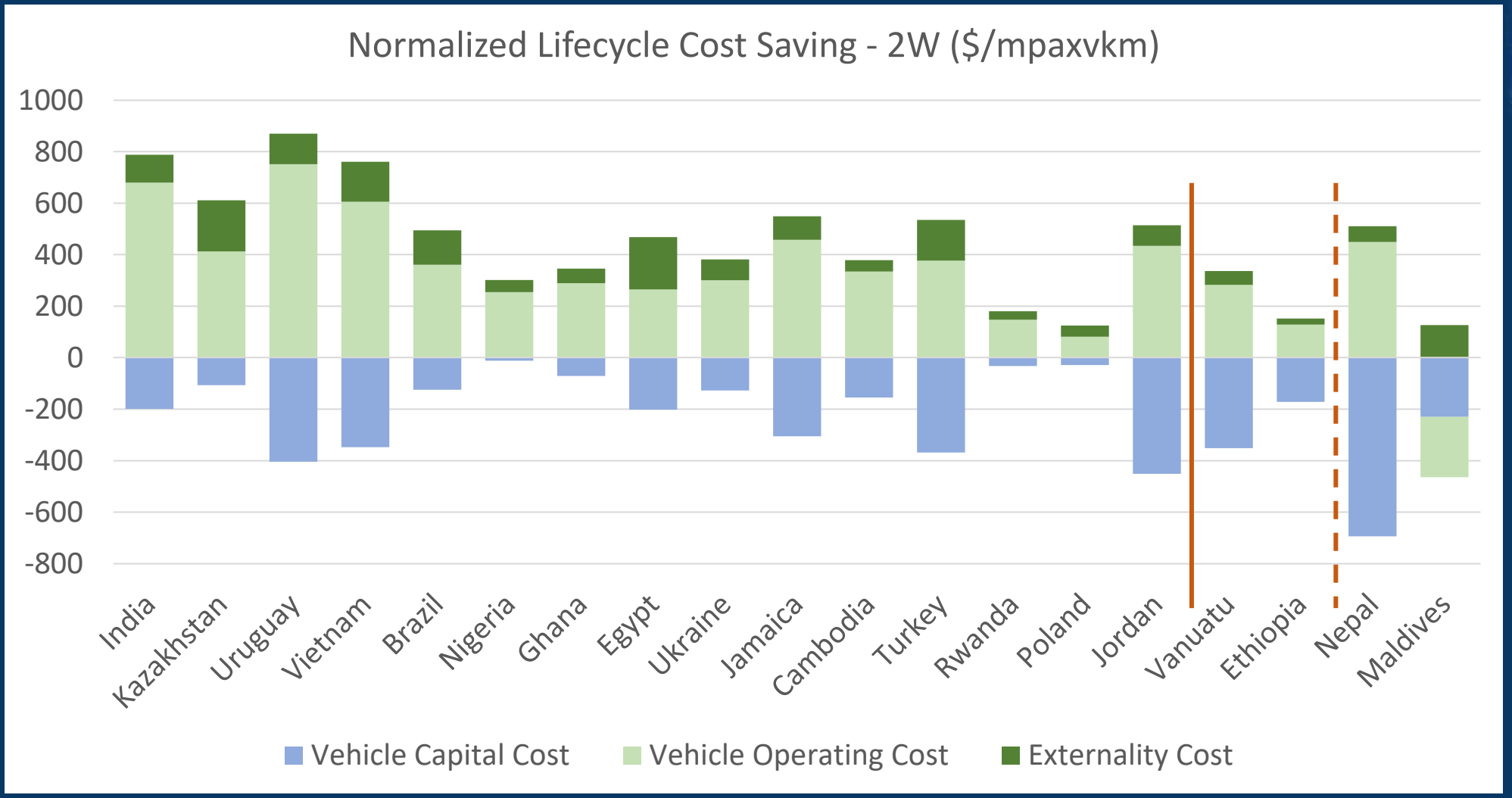


There is economic case for EV adoption in half of the LIMCs studied



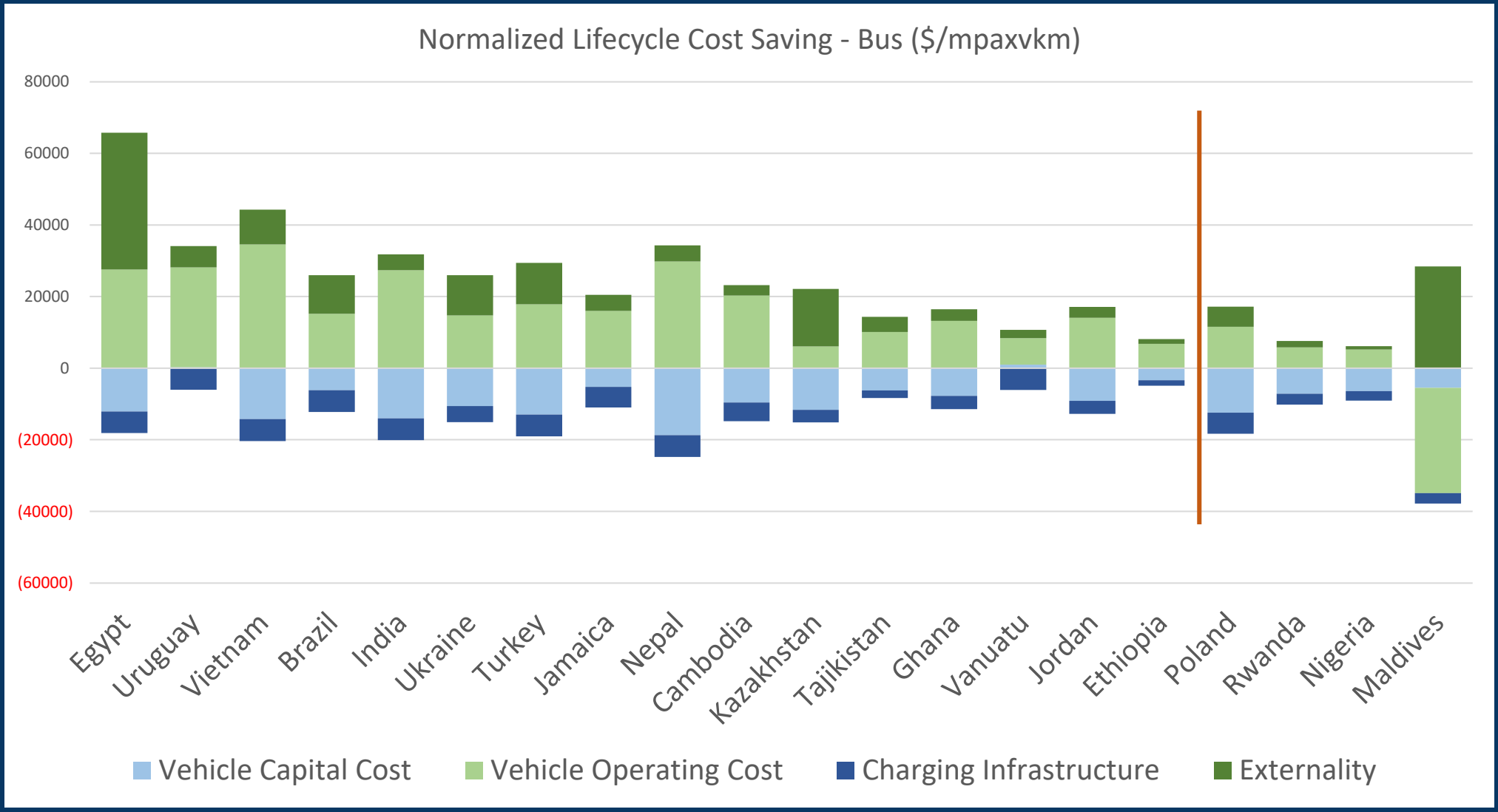
2W Results:
Economic case for EV adoption in ~90% of the LIMCs studied



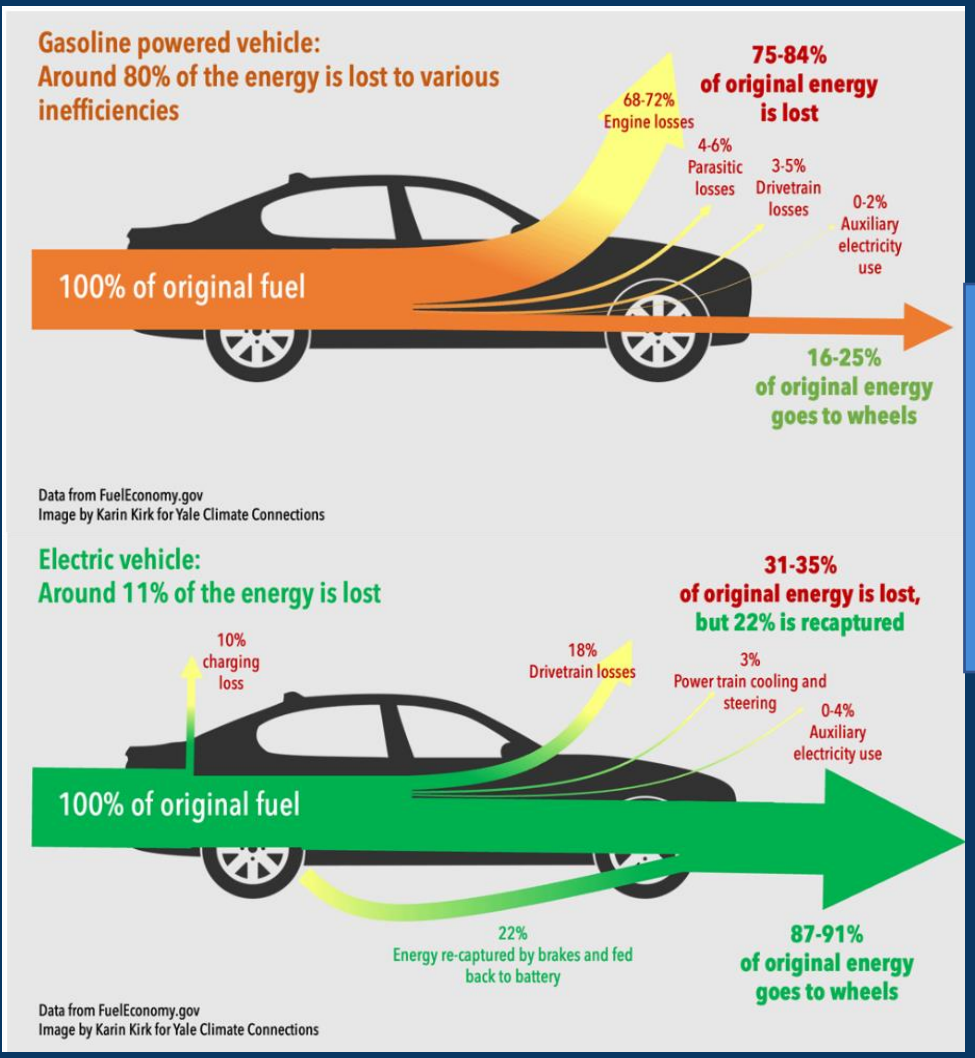


Buses Results:
Economic case for EV adoption in ~80% of the LIMCs studied





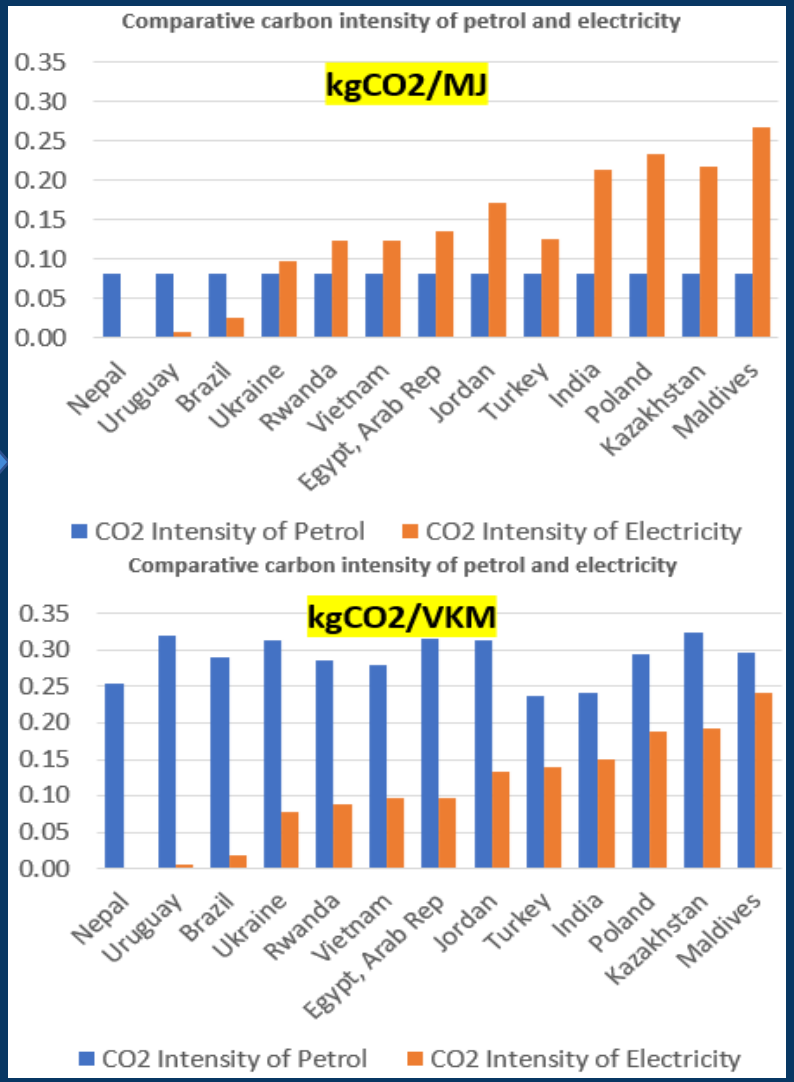
GHG emission savings are significant even when electricity comes from fossil fuels



ICEVs consume **4 to 5** times as much energy per vehicle-kilometer as EVs

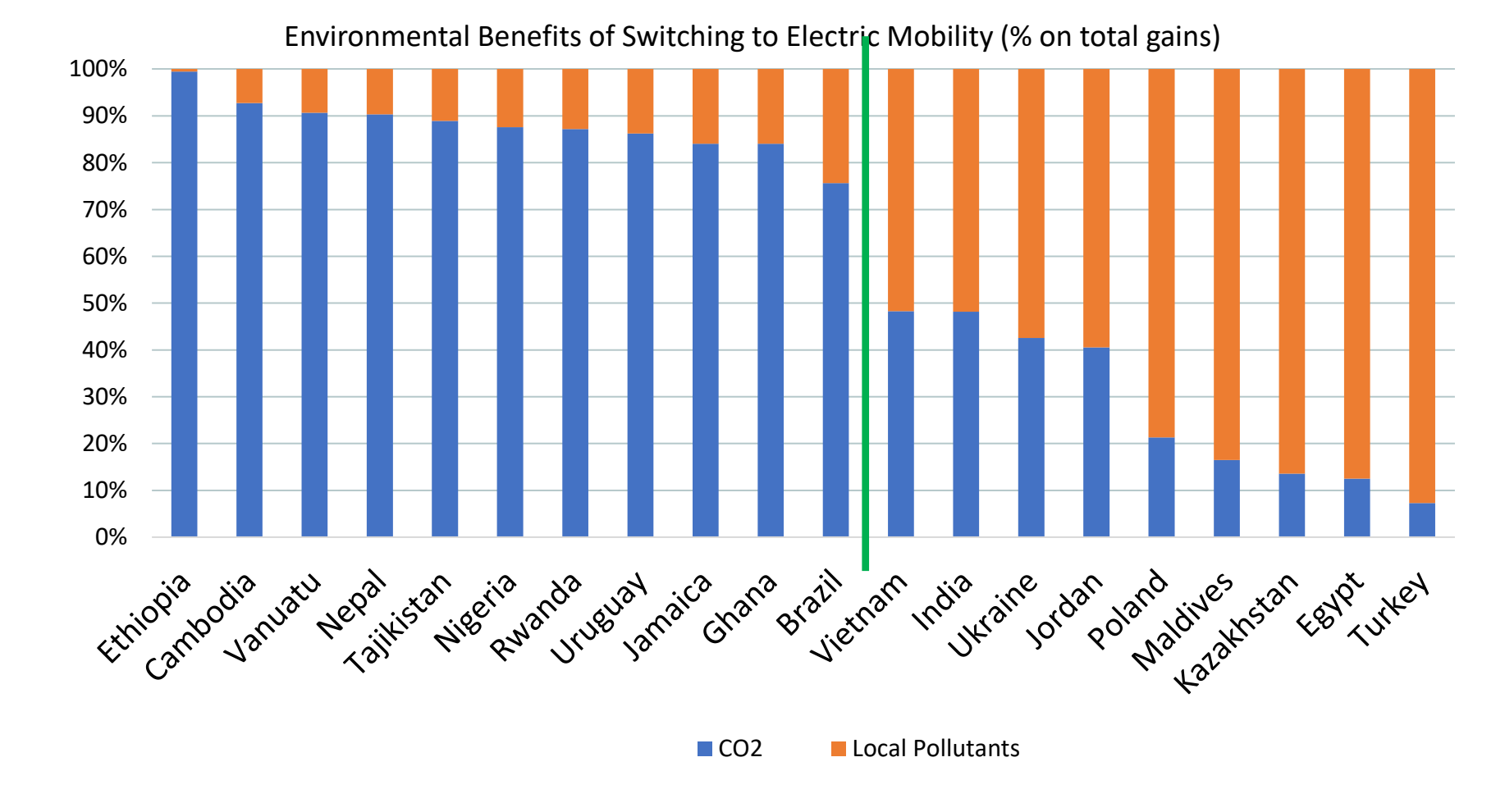
EVs offer a major energy advantage due to the efficiency of their engines

Electricity may be more carbon intensive than petrol per unit of energy but NOT per vehicle-kilometer



Local environmental benefits V.S. Global GHG emission benefits

For many developing countries, the environmental benefits associated with reducing local air pollution are even more significant than those associated with mitigating GHG emission.



INNOVATIVE EXAMPLES TO MOBILIZE FINANCING
Focusing on public transport

- **Supporting Blended Finance and Risk Mitigation structures: strategic deployment of limited concessional climate and MDB/DFI funds to maximize mobilization of private capital**
  - Dakar e-BRT
  - India e-bus and e-2/3W programs
  - Proposed regional financing facility for SSA
- **Innovative business and funding models for long-term E-Buses contracts.**
  - **PPP 'Bus as a Service' business model example –** Colombia E-Buses PPP between Transdev Group and TransMileno for 15 years O&M of E-buses, where TransMileno covers fleet provision and funding through a Stability Trust Fund to reduce risk and guarantee income

USING CONCESSIONAL FINANCE TO MOBILIZE PRIVATE FINANCE

First SSA e-BRT project

Senegal Dakar Bus Rapid Transit Pilot

$300M committed + 92M AF = $426.30M

- The **development of a 20km fully segregated, fully-electric BRT** to enhance urban mobility and accessibility in the Greater Dakar Area.
- Transit time between downtown Dakar and the north suburb of the city (Guediawaye) with the BRT is estimated to be **reduced to about 45 mins against the current situation of up to 3 hours and improves road safety**.
- IDA resources have been used to blend private finance. The project benefit from a MIGA – type of guarantee.
- The support of the World Bank Group contributed to US$144 million of Private Capital Mobilization



EXPLORING INNOVATIVE FINANCING APPROACHES AT SCALE

India's e-bus program

2017-19: FAME I and City level procurement

- **425 e-buses** sanctioned across 10 cities through FAME I
- Included outright purchase and Gross Cost Contracts (GCC)
- Different vehicle specifications and contractual templates specified by each cities

2019-21: FAME II Phase I ▶ **Introduction of Gross Cost Contract (GCC)**

- **3,600 buses** sanctioned subsidy across 32 cities –each city procuring for itself
- Gross Cost Contract (GCC) model & standard Model Concession Agreement (MCA) mandated
- Resulted in ~40% variation in costs for similar specifications-based on volumes, technical specs and city's bankability

2021-22: FAME II Phase II- Grand Challenge ▶ **Aggregated Procurement**

- Grand Challenge aggregated procurement of **5,450 buses** under FAME II across 5 cities (out of 9 eligible ones)
- Gross Cost Contract (GCC) model-- Harmonised procurement specifications across cities

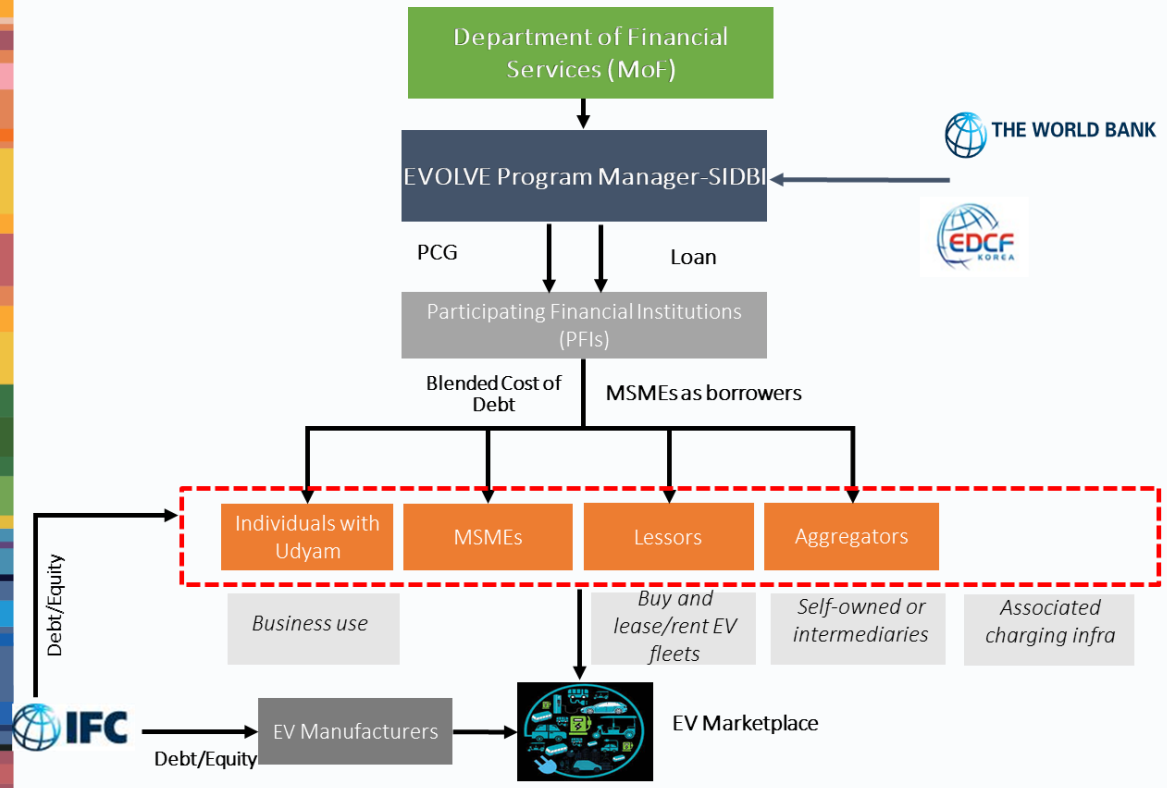
2022: National Electric Bus Program (NEBP-I) ▶ **Need for the Payment Security Mechanism (PSM)**

- **6,465 buses** procured by CESL through aggregation, without subsidy- Low participation

Ongoing: PM e-Bus Sewa ▶ **Implementation of PSM (in process)**

EXPLORING INNOVATIVE FINANCING APPROACHES AT SCALE

India e-2/3W Program

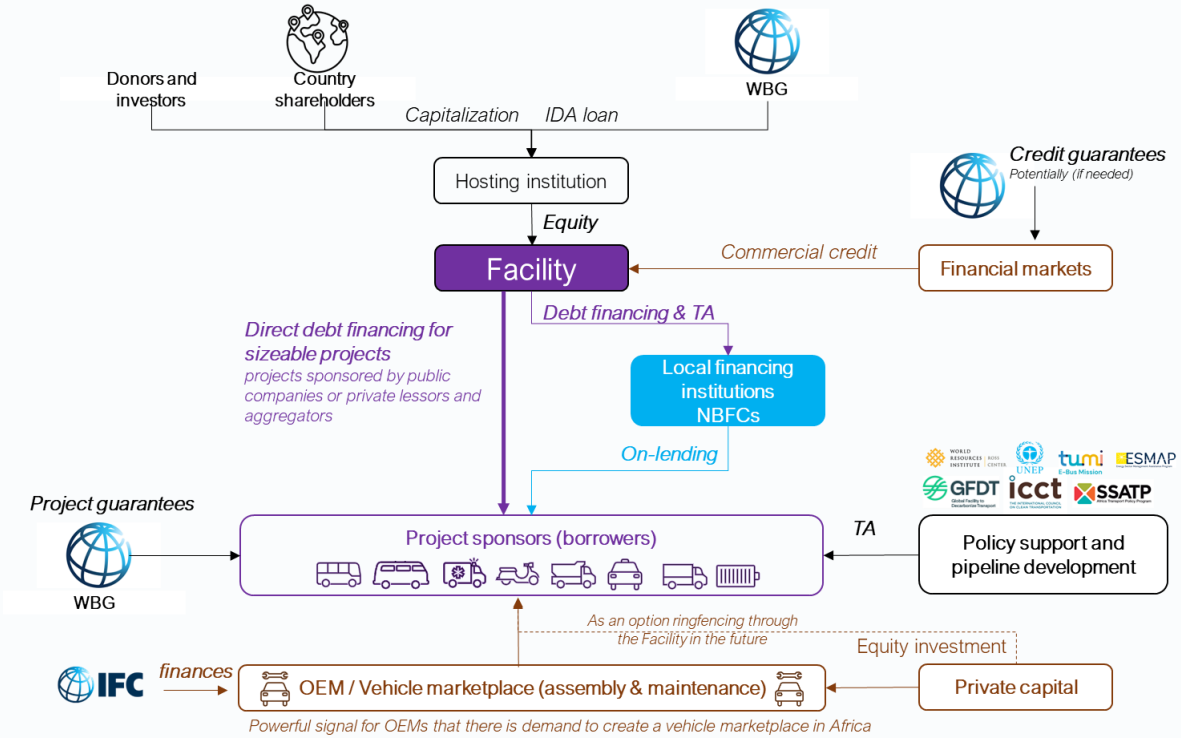


- Program aimed to accelerate the transition from fossil fuel to e-wheelers
- Proposed structure could mobilize US$1,500 million
- Diverse financing instruments to provide liquidity, blended finance and guarantees are envisaged
  - First and second loss schemes among other derisking instruments

CREATING SCALE AND MOBILIZING RESOURCES

Through a regional financing facility for fleet renewal in Africa

- **A regional financing solution can:**
  - bring scale, diversify risks, reduce transaction costs, establish track record and address financing needs flexibly at country/ asset level
  - Offer blended financing, credit enhancements and technical assistance to manage the challenges and risks to decarbonize transport, which span across financing, affordability and creditworthiness issues
- **Mobilizing commercial finance is necessary:**
  - Globally, development finance is in the magnitude of billions, while investment needs is in the trillions
  - Private finance can reduce the gap, but new institutions could be necessary to diversify some risks



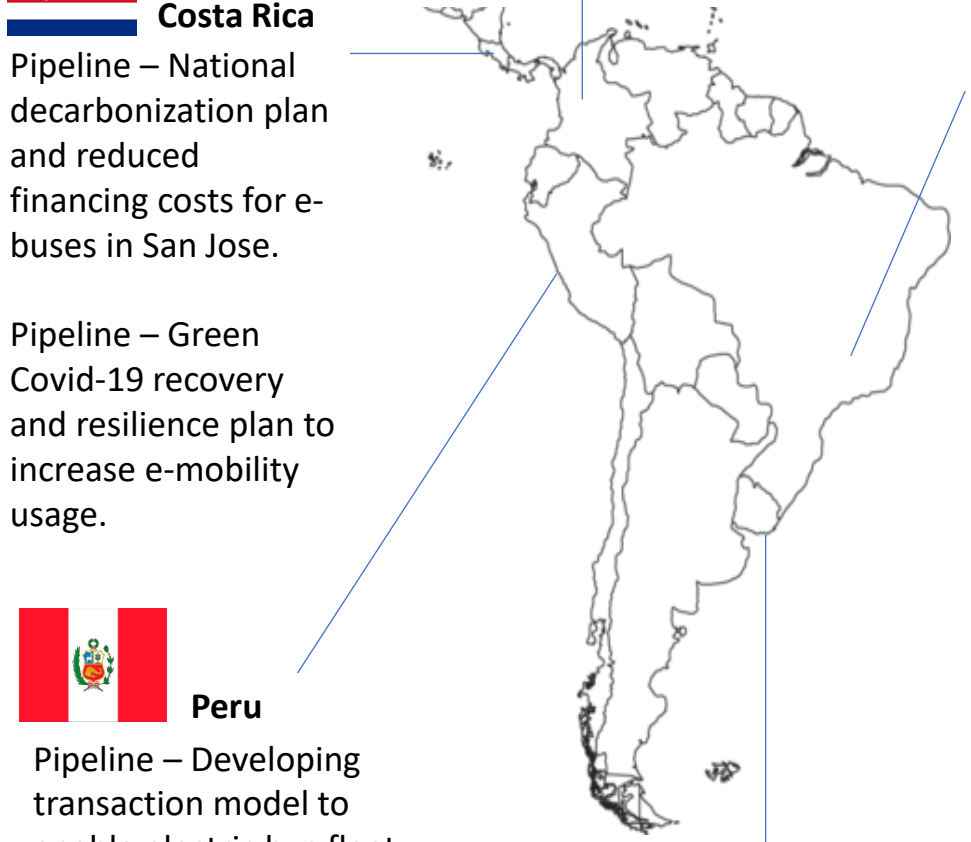
Financial structure for illustration purpose

IFC Financial scheme for Santiago's e-Bus Fleet

- Procurement of 992 E-buses for the Santiago metropolitan area, operated under 14-year bus supply leasing contracts
- Replacing existing diesel buses with e-buses will lead to GHG emissions reductions of 47,092 tons of CO2 equivalent per year
- Total project cost estimated: US$392 million.
  - IFC is the lead arranger for the entire financing package, granting a US$120 million loan, mobilizing a US$120 million parallel loan from the IDB Invest and US$60 million from other financial institutions.
  - Sponsors will contribute up to US$68 million in shareholders' equity and US$24 million in shareholders' subordinated loans.
- The proposed transaction:
  - Supports the world's largest e-mobility urban public transport fleet outside China
  - Marks IFC's first E-buses project globally. It plays an important role in establishing IFC's presence in this new but potentially large and strategic sector and would open significant opportunities for IFC to deliver its development mandate and climate commitments.



Latin & Central America E-Mobility Opportunities



Colombia

Active – Developing business and financial modelling for e-mobility in 3 cities

Costa Rica

Pipeline – National decarbonization plan and reduced financing costs for e-buses in San Jose.

Pipeline – Green Covid-19 recovery and resilience plan to increase e-mobility usage.

Peru

Pipeline – Developing transaction model to enable electric bus fleet in Lima

Brazil

Active – scaling up e-bus adoption through electrification feasibility study.

Active - TA to support technical, financial and institutional readiness to transition to bus electrification.

Active – Developing roadmap for e-bus deployment.

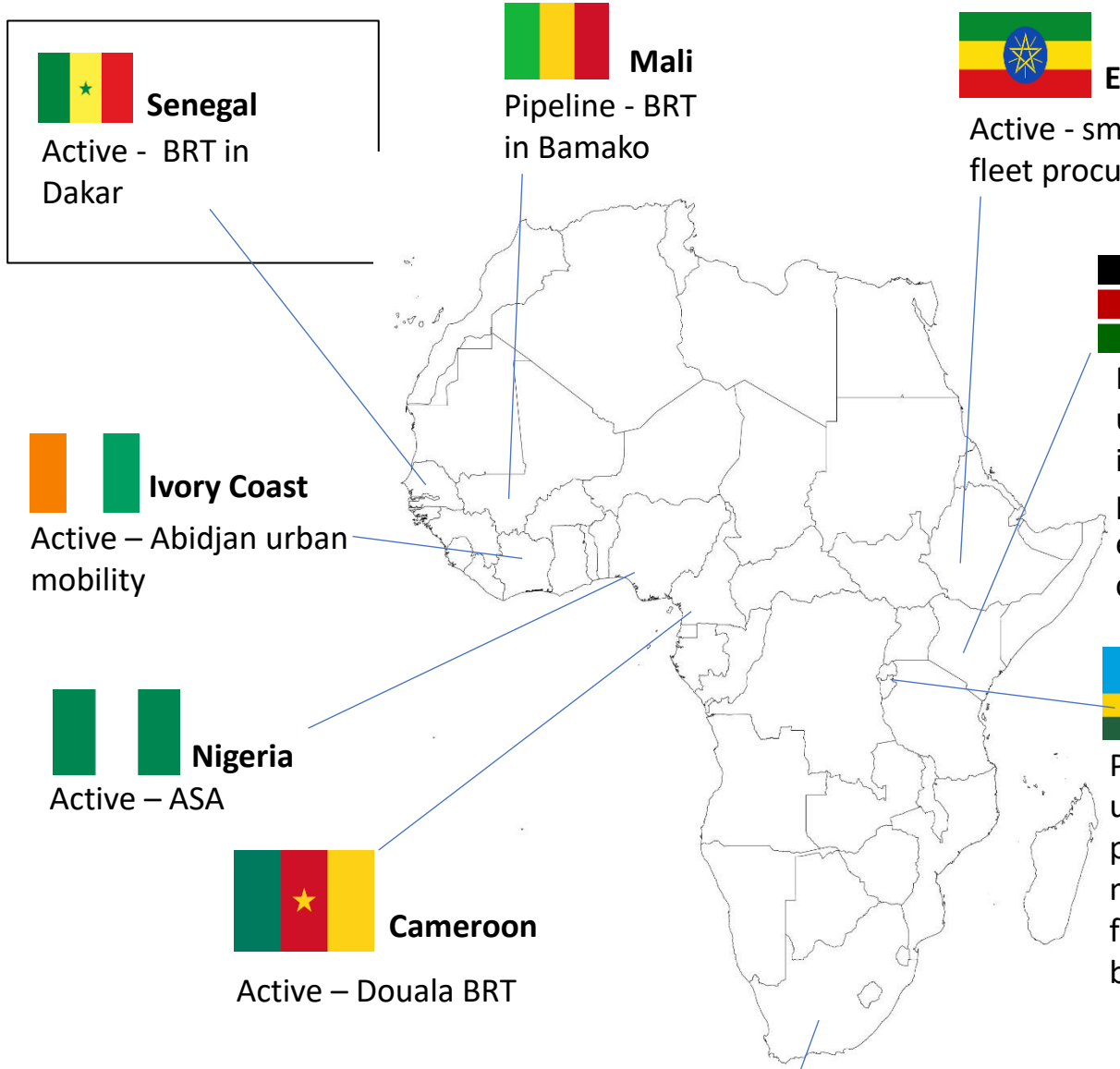
Pipeline - Regulatory and institutional assessment for e-buses in the city of Salvador.

Pipeline - eBRT concession and tunnel construction in Southern Municipalities (US$ 90M).

Uruguay

Completed – Developed business model to accelerate e-bus introduction in Montevideo

Africa E-Mobility Opportunities



Senegal
Active - BRT in Dakar

Mali
Pipeline - BRT in Bamako

Ethiopia
Active - small private fleet procurement

Kenya
Pipeline – Kenya urban mobility improvement project focus on electrification of commuter rail.

Ivory Coast
Active – Abidjan urban mobility

Rwanda
Pipeline – Rwanda urban mobility program with multi-modal charging facilities for pilot e-bus fleet.

Nigeria
Active – ASA

Cameroon
Active – Douala BRT

South Africa
Active – E-mobility in taxi and minibus sector

ECA E-Mobility Opportunities



Serbia

Active – E-mobility pathway for urban buses in Belgrade

Ukraine

Active – Business case for private operator to deploy batteries for electric buses

Turkey

Pipeline – two pilot project designs for electric bus deployment

Pipeline – Maritime electrification in Istanbul

Georgia

Active – Electric bike sharing scheme in Tbilisi

WB support for greening public transport fleet –China

CNG Bus
2010-2015
4 projects

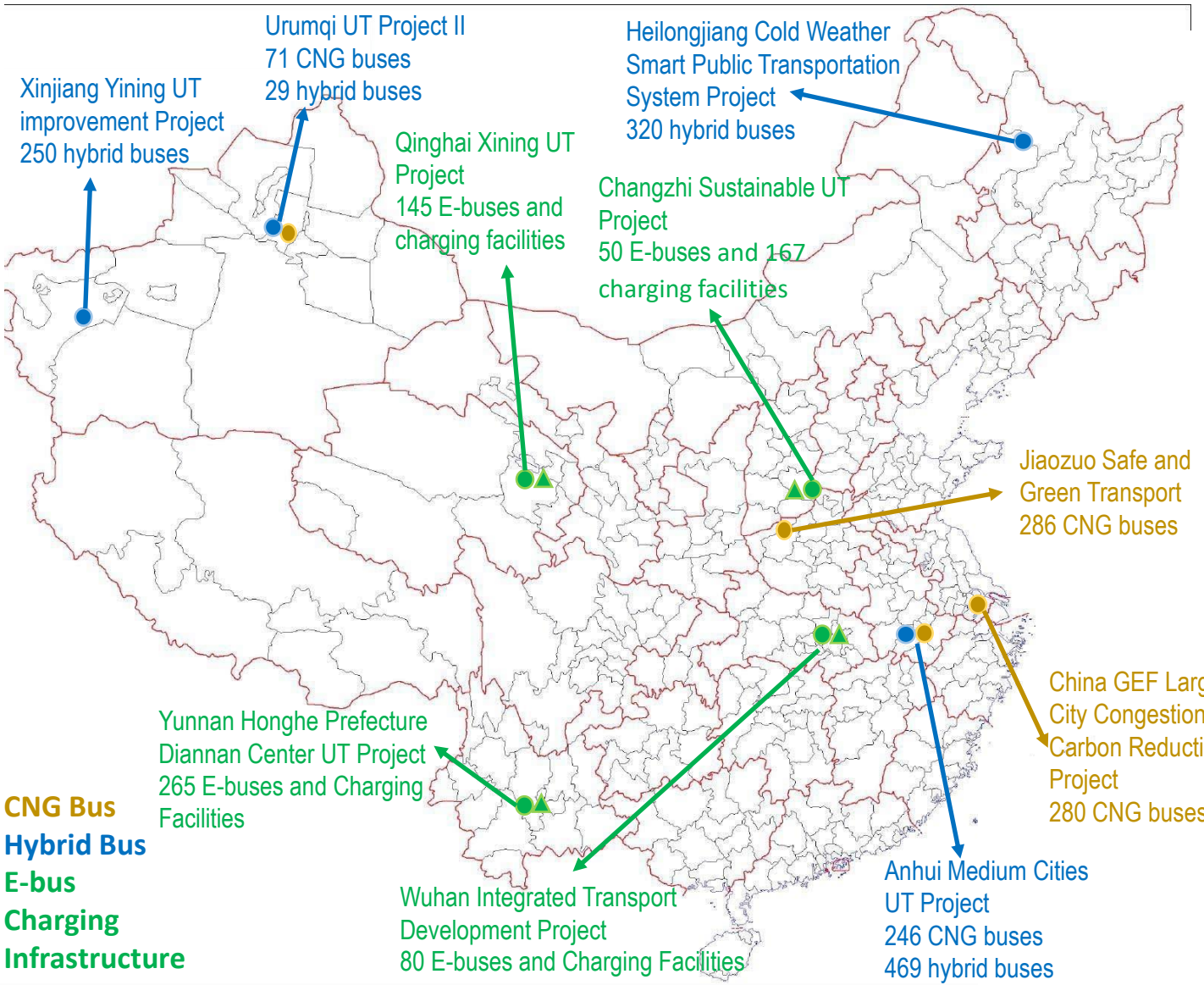


Hybrid Bus
2010-2018
4 projects



E-Bus
2012-2021
4 projects





RECOMMENDATIONS ON MOVING TOWARD CLIMATE ACTION PATHWAYS FOR TRANSPORT

1. Set transport climate action goals
2. Incorporate climate action scenarios to build resilient strategy, policies, and investment plans
3. Establish green and resilient transport-specific regulatory and institutional frameworks
4. Optimize funding mechanisms to incentivize climate action
5. Ensure efficiency of public spending and prioritization
6. Focus on R&D by leveraging private sector's ability to innovate
7. Finance the transition toward green and resilient transportation

A FEW EXAMPLES OF WB'S PUBLICATION TO DECARBONIZE TRANSPORT

