

# **New Paradigms of Policies for Electric Vehicles (EVs) and EV Infrastructure Expansion for Developing Countries**

*June 14<sup>th</sup>, 2023*

# Webinar & Speaker Introductions

Moderated by Jal Desai, National Renewable Energy Laboratory (NREL)

June 14<sup>th</sup>, 2023

# Agenda

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- Overview of the Clean Energy Solutions Center (CESC)
- Overview of the Electric Vehicle (EV) Initiative
- Overview of the United Nations Climate Technology Centre and Network (CTCN)
- Global EV Outlook 2023
- Global Electric Mobility Programme
- Q&A

# Webinar Speakers



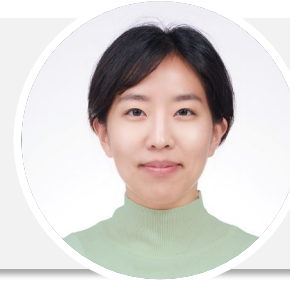
**Jal Desai**

Researcher,  
**NREL**



**Sarbojit Pal**

Partnerships Manager,  
**Clean Energy Ministerial  
(CEM)**



**Daye Eom**

Capacity Building and  
Network Specialist,  
**CTCN**



**Elizabeth Connelly**

Energy Technology and  
Transport Analyst,  
**International Energy Agency  
(IEA)**



**Alexander Körner**

Programme Officer,  
Sustainable Mobility Unit,  
**United Nations  
Environment Programme  
(UNEP)**

# Overview of the Clean Energy Solutions Center

Presented by Jal Desai, NREL

June 14<sup>th</sup>, 2023

# The Clean Energy Solutions Center

## OBJECTIVE

To accelerate the transition of clean energy markets and technologies.

## RATIONALE

Many developing governments lack capacity to design and adopt policies and programs that support the deployment of clean energy technologies.

## AMBITION/TARGET

Support governments in developing nations of the world in strengthening clean energy policies and finance measures

## ACTORS

### Leads:



### Operating Agent:



### Partners:

More than 40 partners, including UN-Energy, IRENA, IEA, IPEEC, REEEP, REN21, SE4All, IADB, ADB, AfDB, and other workstreams etc.

## ACTIONS

- **Deliver** dynamic services that enable *expert assistance, learning, and peer-to-peer sharing of experiences. Services are offered at no-cost to users.*
- **Foster** dialogue on emerging policy issues and innovation across the globe.
- **Serve** as a first-stop clearinghouse of clean energy policy resources, including policy best practices, data, and analysis tools.

## UPDATES

### Website:

[www.cleanenergyministerial.org/initiatives-campaigns/clean-energy-solutions-center](http://www.cleanenergyministerial.org/initiatives-campaigns/clean-energy-solutions-center)

### Factsheet:

[www.nrel.gov/docs/fy22osti/83658.pdf](http://www.nrel.gov/docs/fy22osti/83658.pdf)

**Requests:** Now accepting Ask an Expert requests!

# The Clean Energy Solutions Center



## **Ask an Expert Service**

- Ask an Expert is designed to help policymakers in developing countries and emerging economies identify and implement **clean energy policy** and finance solutions.
- The Ask an Expert service features a network of more than **50** experts from over **15** countries.
- Responded to **300+** requests submitted by **90+** governments and regional organizations from developing nations since inception



## **Training and Capacity Building**

- Delivered over **300** webinars training more than **20,000** public & private sector stakeholders.



## **Resource Library**

- Over **1,500** curated reports, policy briefs, journal articles, etc.



For additional information and questions, reach out to Jal Desai, NREL, [jal.desai@nrel.gov](mailto:jal.desai@nrel.gov)



# Electric Vehicle Initiative

Clean Energy Ministerial's flagship transport initiative

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Sarbojit Pal, Manager of Partnerships | 14<sup>th</sup> June, 2023





(Co-lead)



(Co-lead)



(Co-lead)



(Coordinator)



- Established in 2010 as one of the first global initiatives on electric mobility
- Members account for over 85% of the global sales
- Brings together a combination of government leadership, analysis and action
- Pushing the goals through aspirational targets and collective actions

# Defining the global Zero-Emissions Transport landscape

## Leaders and partners

## Driving actions

## Results



**Global EV Outlook 2021**  
Accelerating ambitions beyond the paradigm



**Global EV Data Explorer**

Explore and download the full data behind the Global EV Outlook

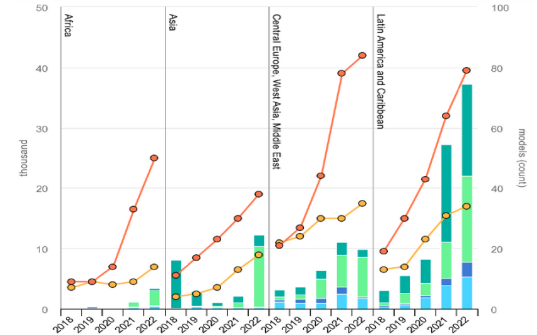
Article - 29 April 2023



**GLOBAL MEMORANDUM OF UNDERSTANDING ON ZERO-EMISSION MEDIUM- AND HEAVY-DUTY VEHICLES**



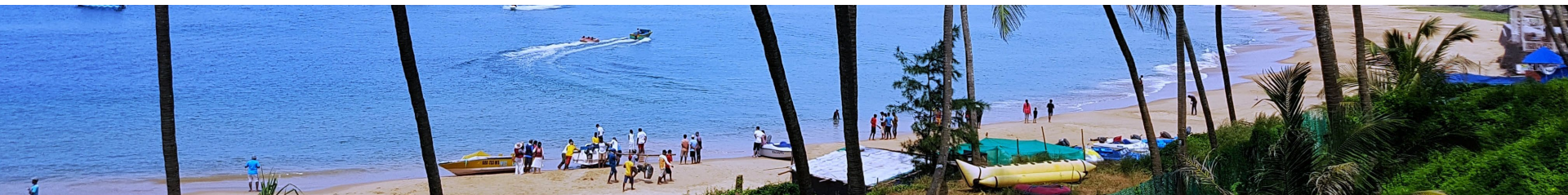
- Government fleet declaration
- EV Pilot City Programme and Forum
- EVI Call to Action on Closing the Gap
- COP26 Global MoU on Zero Emission Trucks
- Support the GEF7 Global E-Mobility Programme
- Global EV sales are taking off





**Welcome you all to the 14<sup>th</sup> Clean Energy Ministerial & 8<sup>th</sup> Mission Innovation Meeting**

19-22 July, 2023 | Goa, India 





# CEM14/MI-8 – key elements in the programme

- **Date:** 19-22 July 2023
- **Venue:** Goa India
- **Host:** Government of India
- **Side events:** Over 80+ side-events and high-level roundtables and dialogues planned



Back-to-back with G20  
ETWG and Energy  
Ministerial meetings

Joint CEM-MI Plenary for  
Ministers

Thematic roundtables  
for Ministers and CEOs +  
high-level dialogues

Comprehensive side  
event programme to  
showcase workstream  
activities

Strong focus on  
showcasing impact and  
achievements to  
Ministers, including a  
CEM Impact Report

Technology showcase  
ZEVs, Innovation,  
Demonstration

Insight/community  
sessions (e.g. BNEF  
Factbook, B2B dialogue)

Networking, bilaterals  
and cultural events

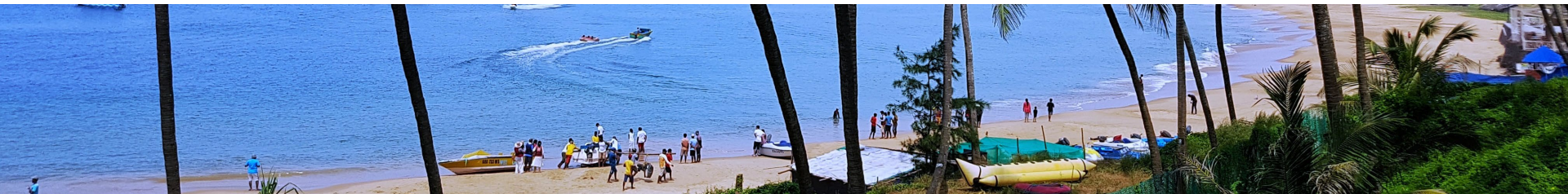




**Registration Open**

<https://cem-mi-india.org/registration>

19-22 July, 2023 | Goa, India







# Introduction to the CTCN

## Connecting Countries to Climate Solutions

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Daye Eom,  
Network Specialist  
[Daye.eom@un.org](mailto:Daye.eom@un.org)

# UN Climate Technology Centre and Network

## An integral mechanism of the UNFCCC convention

Mandated to support the development, transfer, deployment and dissemination of climate technologies



Conference of Parties

UNFCCC  
Technology  
Mechanism

UNFCCC  
Financial  
Mechanism

Implementation arm



Policy arm

TEC



GREEN  
CLIMATE  
FUND



ADAPTATION FUND



World Bank, MDBs, etc.



Host  
agency

800+  
Network  
Members

164 country  
focal points  
(NDEs)



# Our strategic plan for 2023-2027



INTRODUCING THE 2023-2027

# Programme of Work

This programme aims to enhance transformational impact and scale across its core service areas through two proven technology enablers and five system transformations.



Water-Energy-Food Nexus



Sustainable Mobility



Energy Systems



Buildings and resilient infrastructure

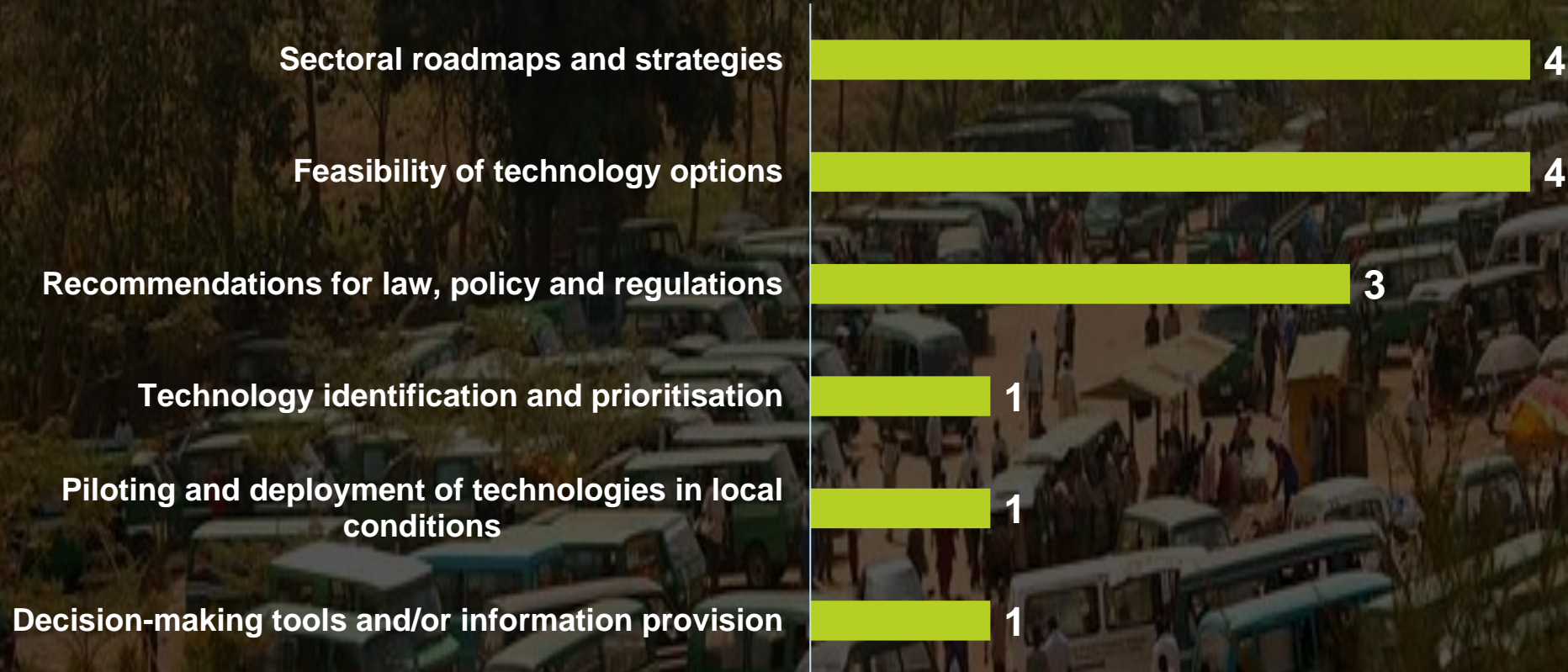


Business and Industry



# Type of services the CTCN offers

## Type of services



# Join us to support developing countries!

As a **Network member**, if you are an organization with technical and financial expertise

- You can design or implement EV solutions with us

As a **Knowledge partner**, if you are an organization with knowledge, resources and tools in EV

- You can showcase your technologies and products among our Network
- You can work with us to co-design capacity building workshops and webinars for country focal points (NDEs,NDAs)

Please contact [daye.eom@un.org](mailto:daye.eom@un.org) for a potential partnership.  
More information available on [www.ctc-n.org](http://www.ctc-n.org).

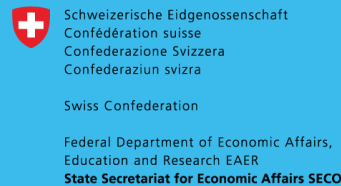


CTCN Secretariat  
 UN City, Marmorvej 51  
 DK-2100 Copenhagen, Denmark  
[www.ctc-n.org](http://www.ctc-n.org)  
[ctcn@un.org](mailto:ctcn@un.org)

# Thank you for listening.



Supported by





# Connecting Countries to Innovative Climate Solutions



**106**

developing countries served



**320**

climate technology transfers implemented



**12.9 million**

expected tonnes of CO<sub>2</sub>eq reductions per year



**100 million**

anticipated beneficiaries



**1,24 billion USD**

anticipated funding leveraged for developing countries



Experts from **700** technology companies and institutions around the world



## Connecting through the CTCN

To help developing countries meet their climate change goals and deliver on all 17 SDGs, especially:





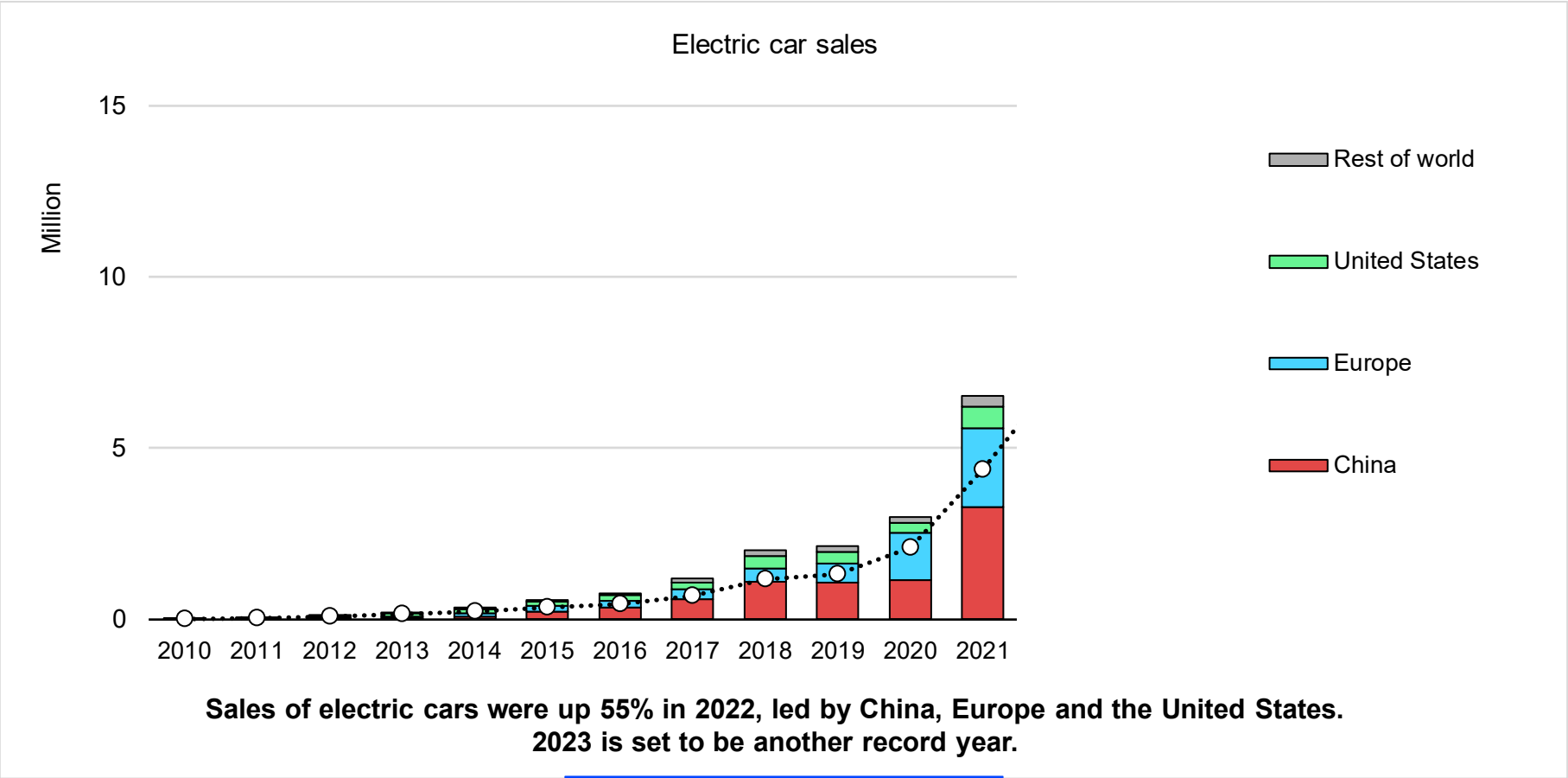
# Global EV Outlook 2023

New Paradigms of Policies for Electric Vehicles (EVs) and EV Infrastructure Expansion for Developing Countries, 14 June 2023

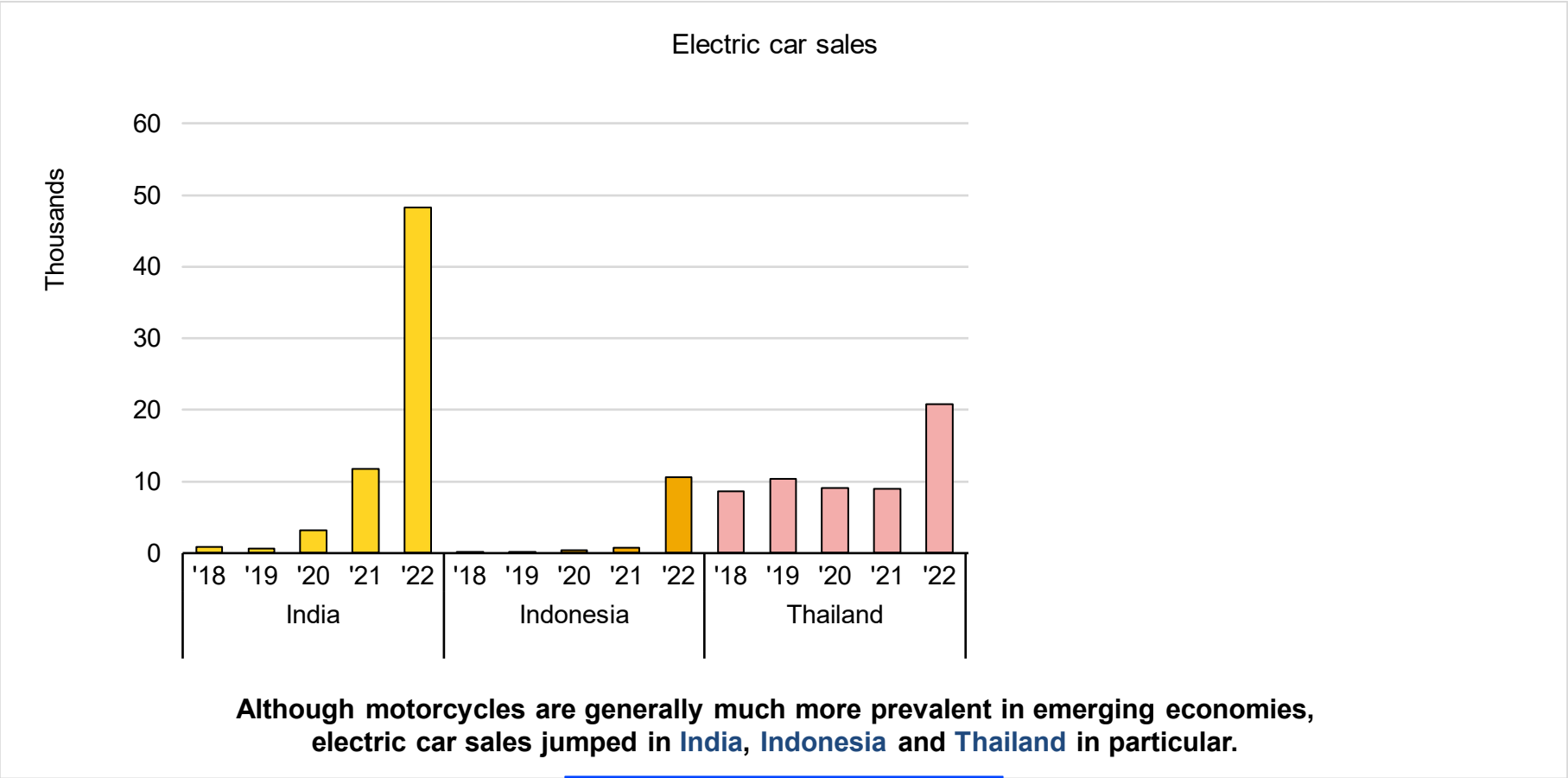
Dr. Elizabeth Connelly

# Recent trends in electric cars

# Electric car sales exceeded 10 million in 2022

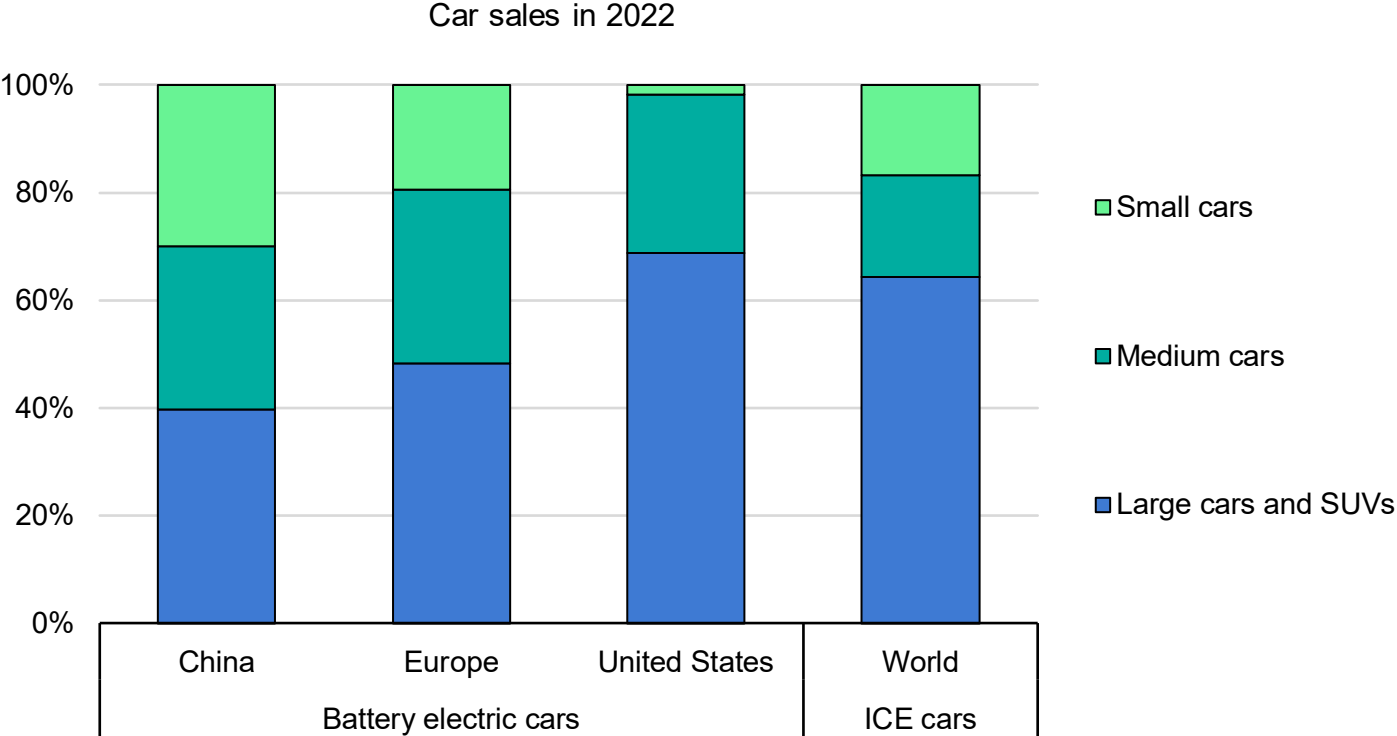


# Electric cars are beginning to sell in emerging economies



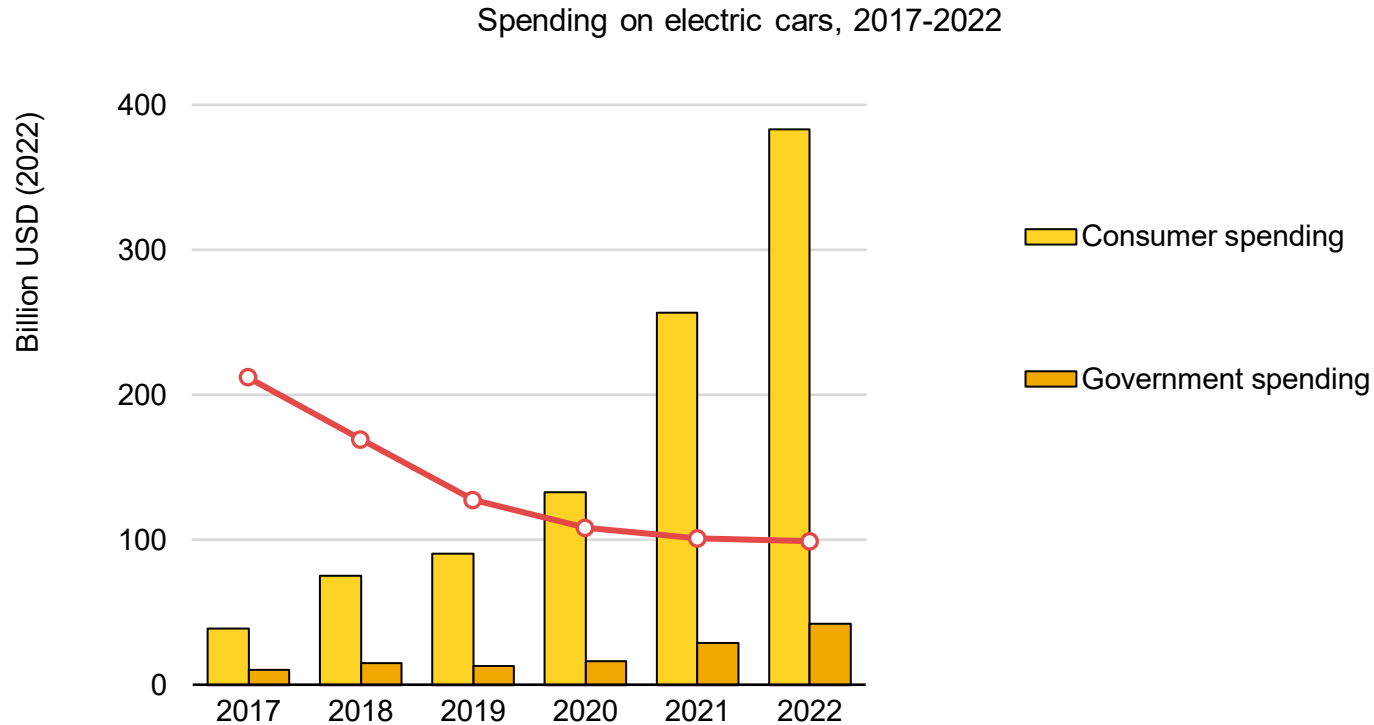


# Large models and SUVs dominate car sales



Large cars and SUVs made up over **45%** of electric car sales in 2022. This has important implications for **critical minerals** demand.

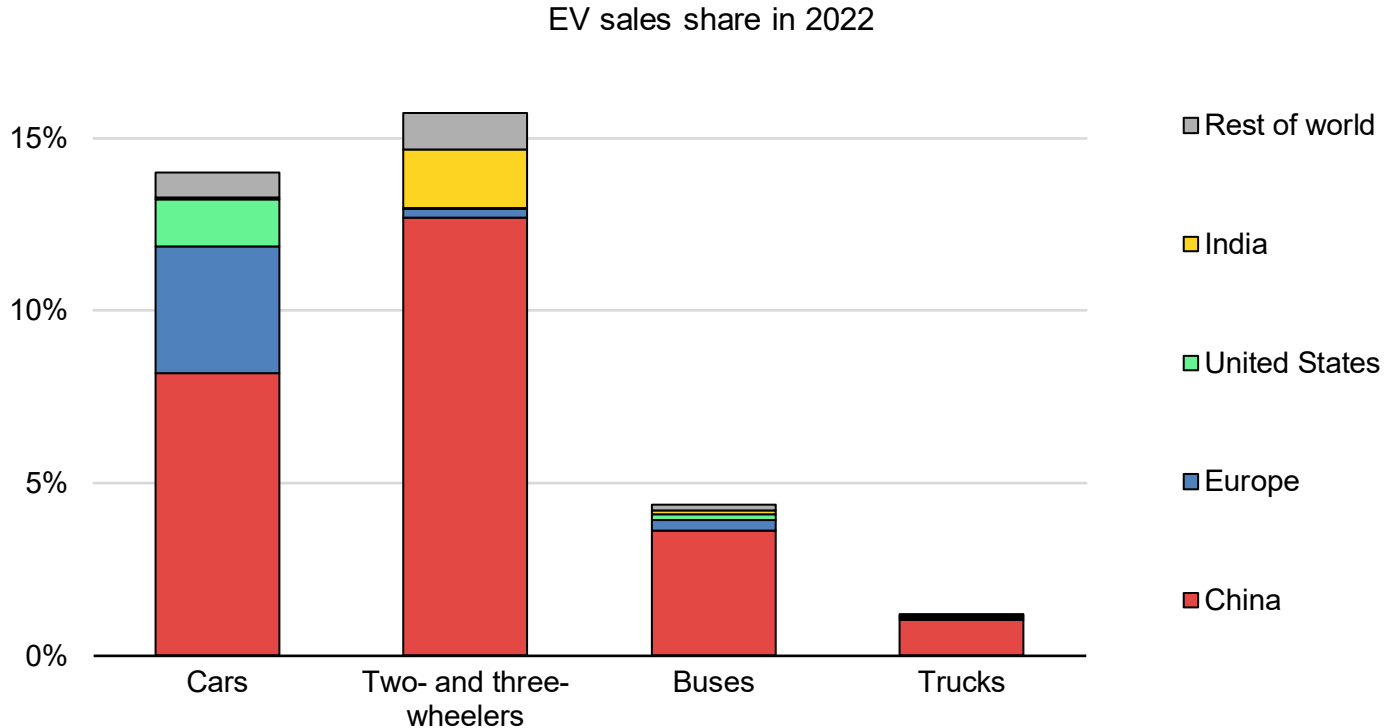
# Sustained policy support underpins EV growth



**Global total spending on electric cars reached USD 425 billion in 2022, with the share of government support in total spending around 10%.**

# Recent trends in other vehicle segments

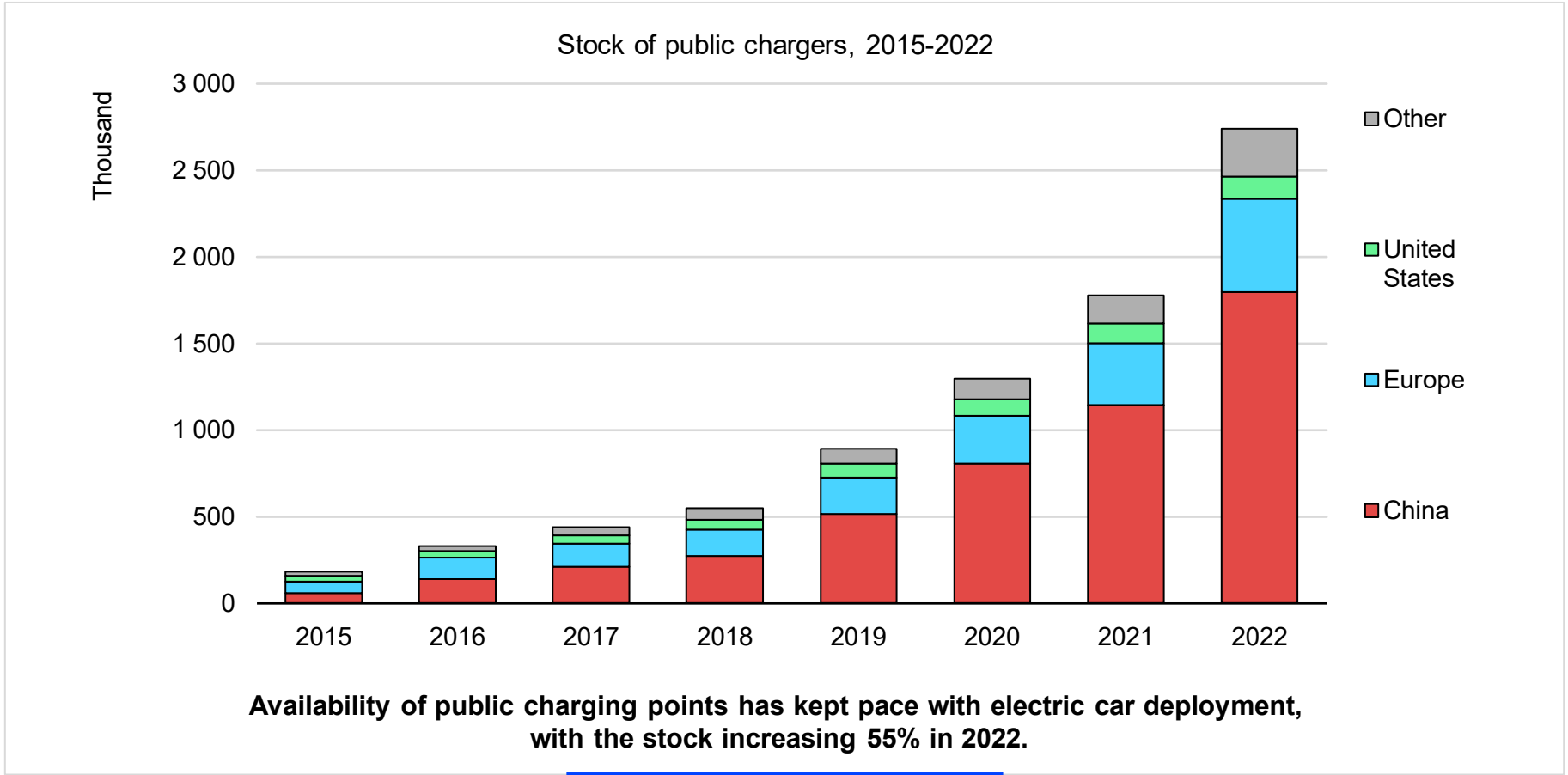
# Transport electrification is not only about cars



**Electrification is already widespread among two-/three-wheelers.  
Sales of electric buses are picking up; trucks are the next frontier for electrification.**

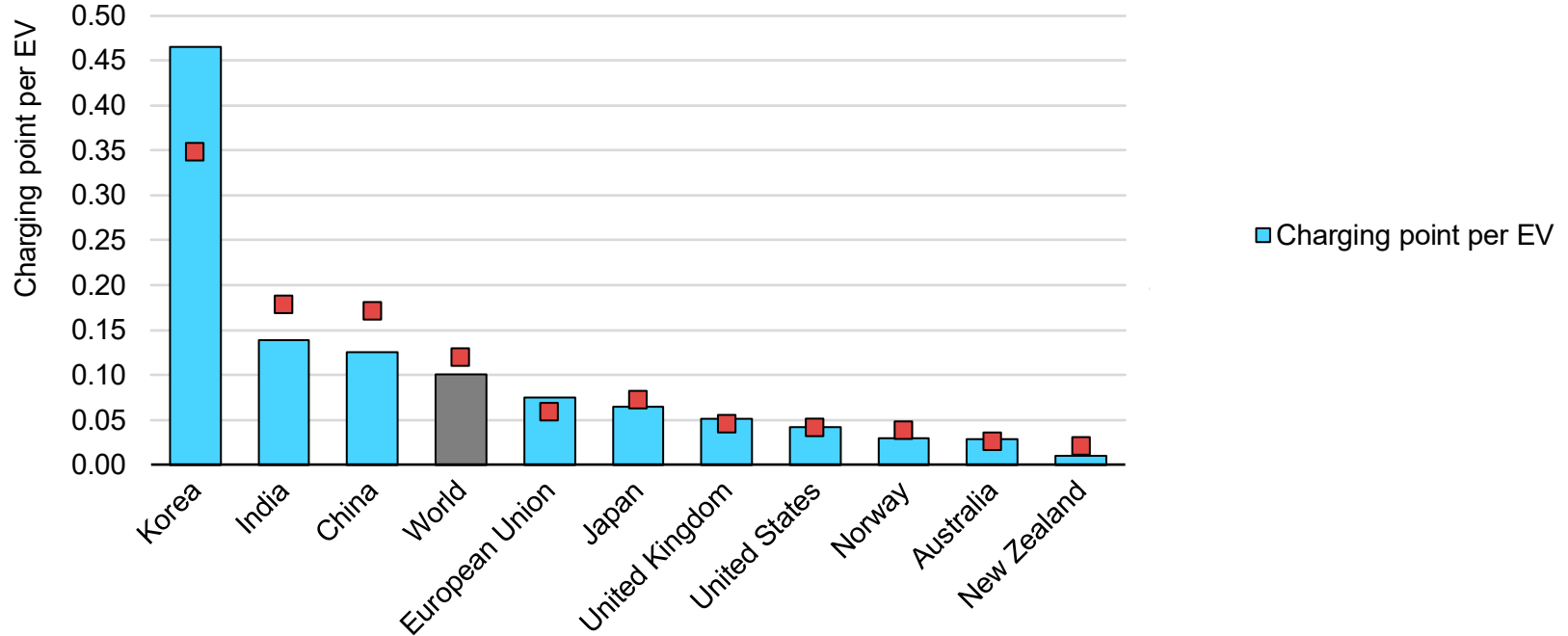
# Trends in charging infrastructure

# The global stock of public chargers has reached 2.7 million



# Globally, there is a ratio of 10 EVs per public charging point

Number of public charging points and kW per electric light-duty vehicle, 2022

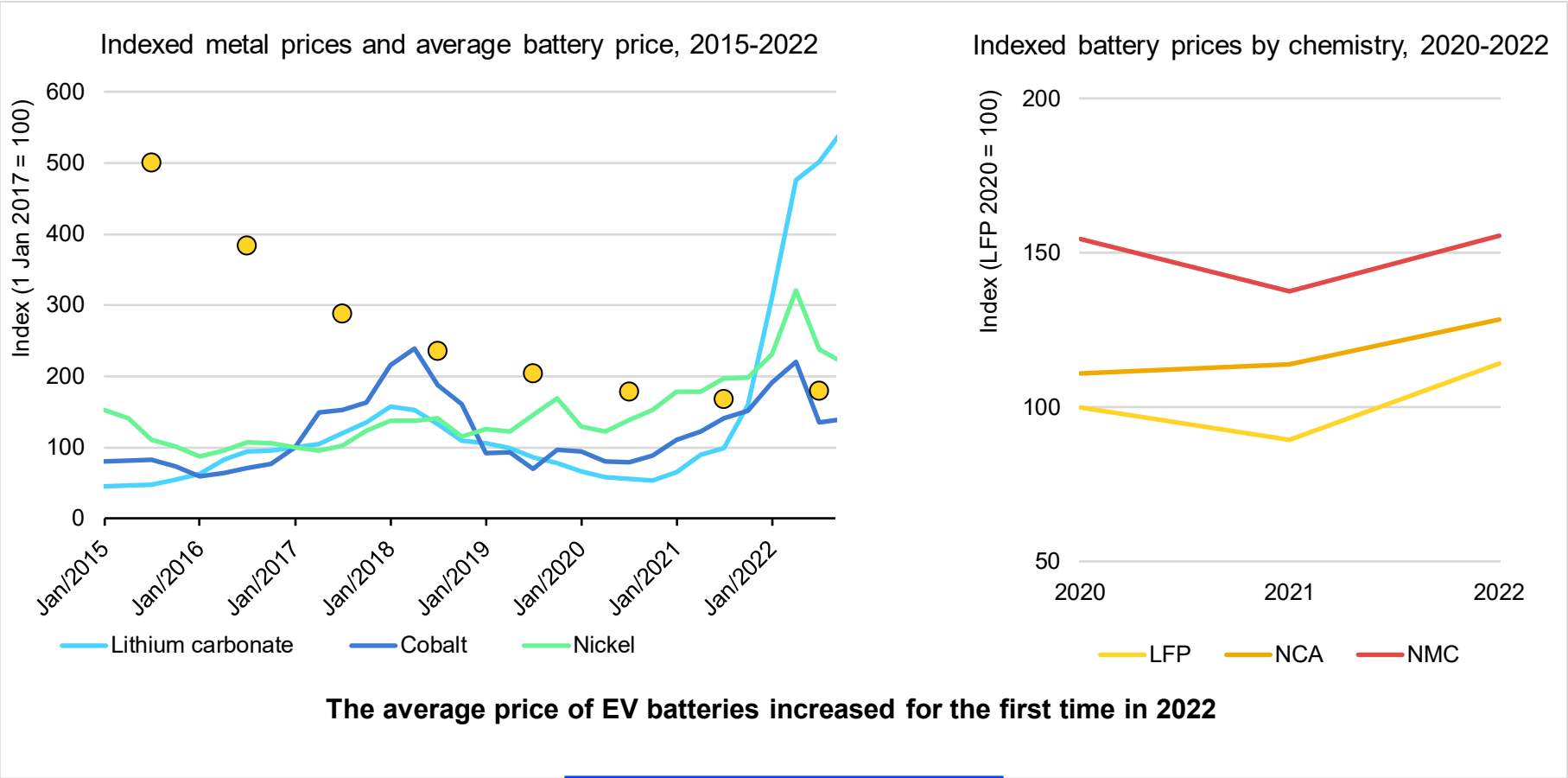


The availability of public charging points varies widely across regions.

# Trends in EV batteries



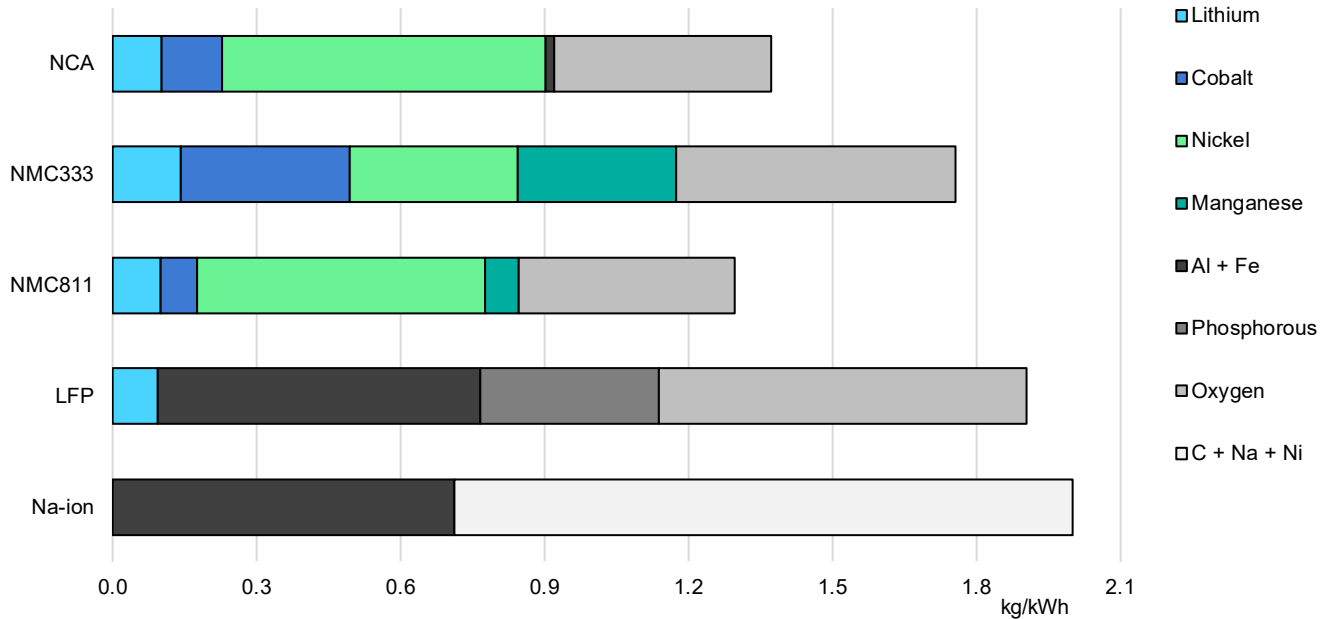
# Battery material prices increase in 2022



**The average price of EV batteries increased for the first time in 2022**

# Alternative battery chemistries on the rise

Material content and market share for different cathodes



**LFP batteries rely less on expensive metals like cobalt and nickel, leading to their recent increase in market share.**

# Policies to promote EV deployment

# Suites of policies were released in major markets



## Inflation Reduction Act

- Clean Vehicle Tax Credit
- Clean Heavy-Duty Vehicle Program
- Commercial Clean Vehicle Credit
- And others..



## Green Deal Industrial Plan

- Net Zero Industry Act
- Critical Mineral Act
- EU Battery Directive
  
- Plus revised CO<sub>2</sub> standards, Euro 7 regulations, and the Alternative Fuel Infrastructure Directive

## Examples of key EV related policies

OEM sales mandate



Production Linked Incentive



2022

Critical Minerals Strategy



Indonesia Battery Corporation



Critical Minerals Strategy



2023

Battery Strategy



Supply

Demand

Multiple state level EV policies



EV incentives



EV incentives



EV incentives



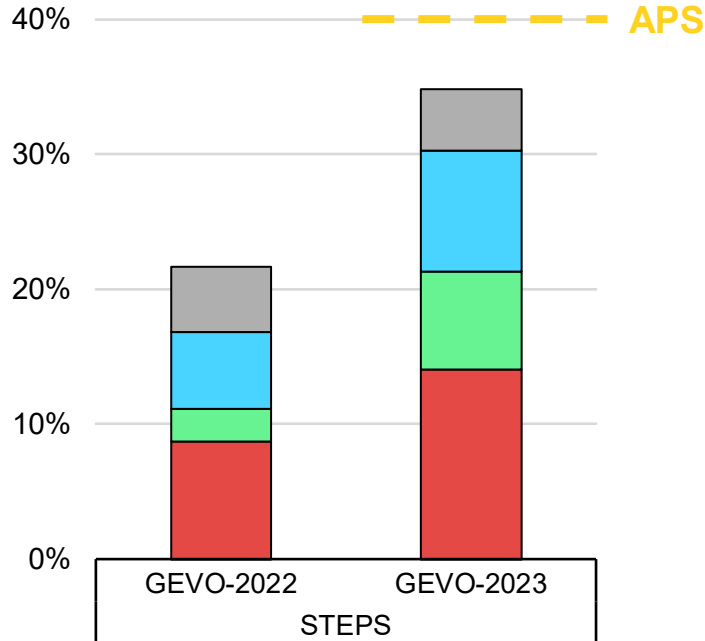
EV Strategy



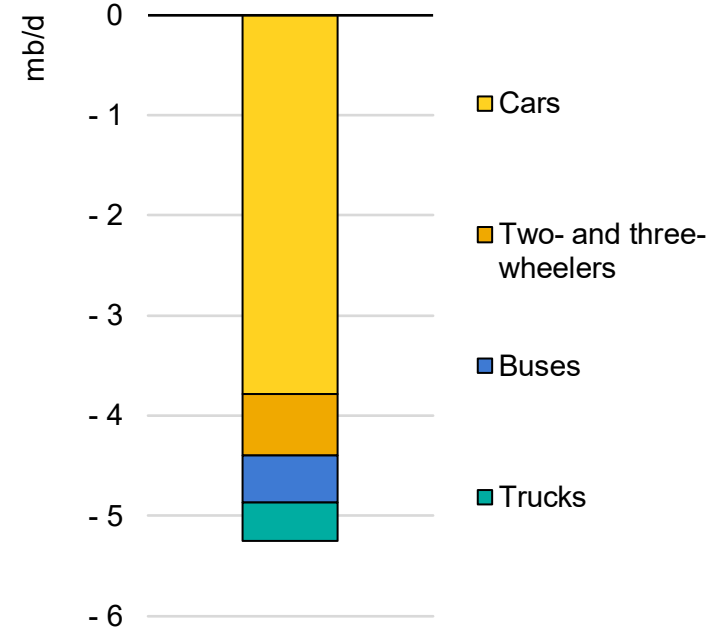
# Outlook for electromobility

# Policy implementation is catching up with targets

Electric car sales share, 2030



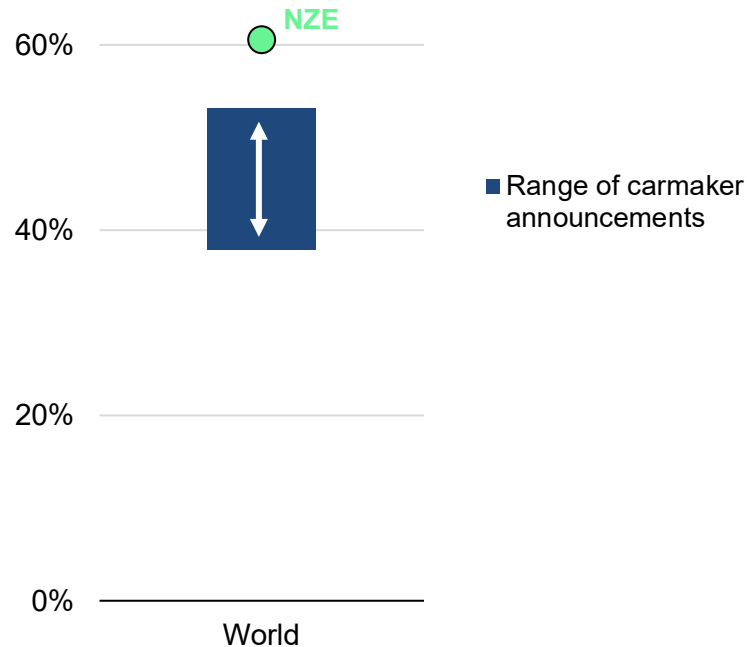
Oil displacement in STEPS, 2030



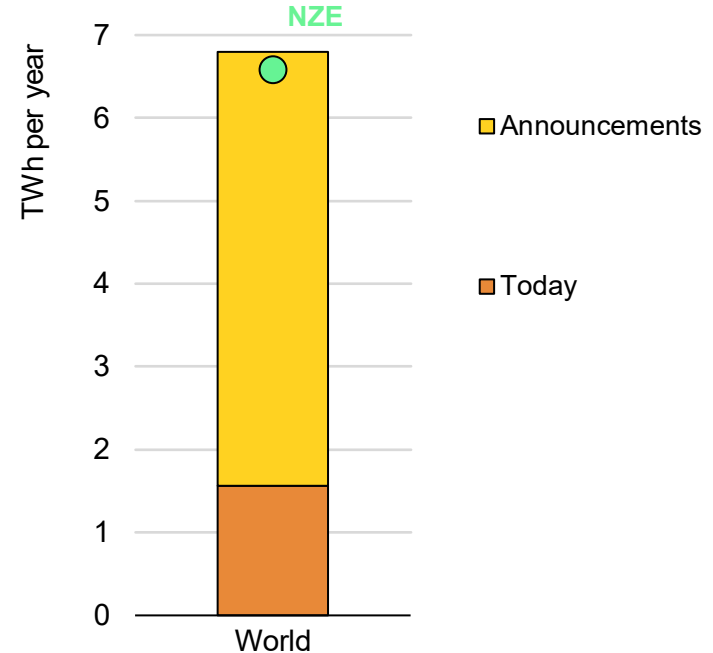
**A strong growth outlook to 2030 is underpinned by governments delivering on their pledges and market dynamics. Today's policies are set to avoid over 5 mb/d of oil consumption in 2030.**

# Industry announcements suggest that more ambition is possible

Electric car sales share, 2030



Battery manufacturing capacity, 2030



**The automotive industry and its supply chains are transforming.  
Policy must ensure that investment flows effectively to all steps of the supply chain.**

# Policy recommendations



# Five recommendations to governments

1

Adapt support for electric cars

2

Expand EV infrastructure

3

Kickstart the heavy-duty  
market

4

Promote adoption in emerging  
and developing economies

5

Ensure secure, resilient and  
sustainable EV supply chains

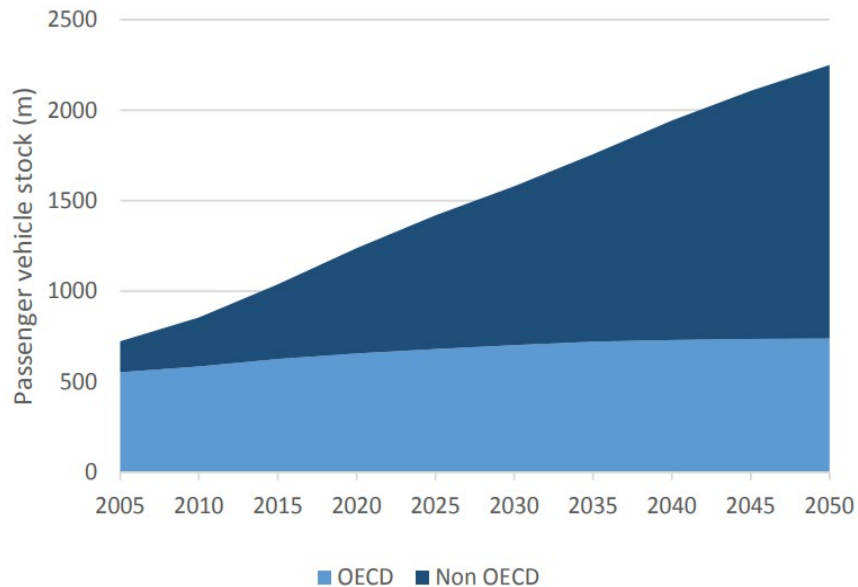
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# Global Electric Mobility Programme

New Paradigms of Policies for Electric Vehicles  
(EVs) and EV Infrastructure Expansion for  
Developing Countries



# A Global Approach is needed

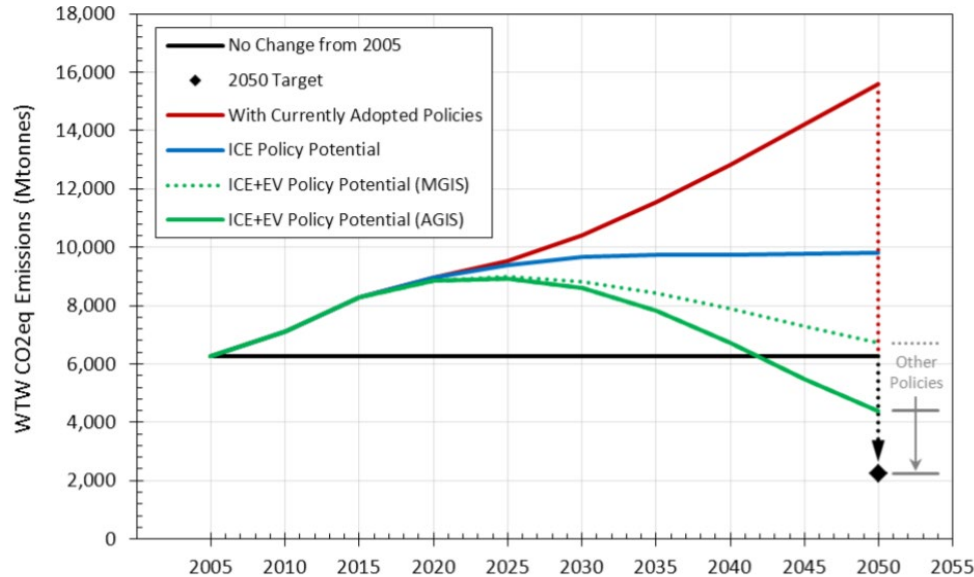


- The global vehicle fleet is set to double by 2050
- All of this growth, 1+ billion vehicles, will take place in non-OECD countries
- The transport sector is set to go from one quarter to one-third of all energy related GHG emissions
- Many conventional vehicles are still going to be added, with a time-lag in fleet turnover of 20 years



# What does this mean for emissions?

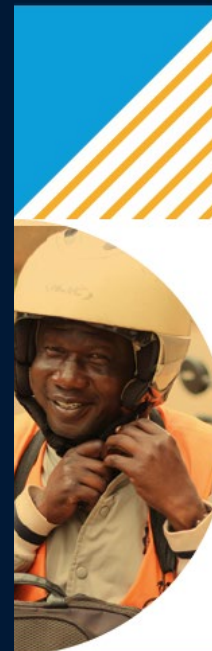
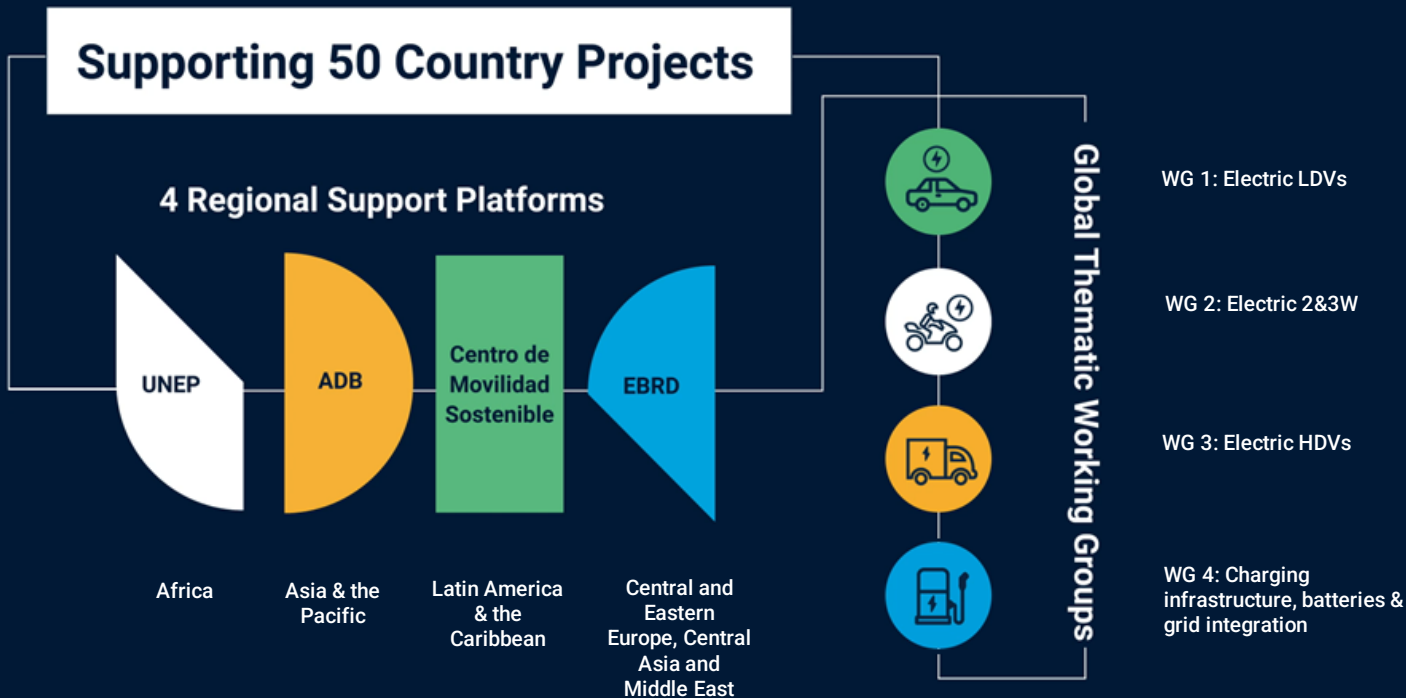
Change in Global Fleetwide Emissions



- Compared to 2005, transport emissions are set to more than double with current policies
- To reach the 90% decarbonization target all options – avoid, shift, improve – and all countries need to be included



# Structure of the Programme



- Supports more than 50 low and middle-income countries with more than USD 70 million in grants and over USD 250 million in loans at the national, regional and global level
- Funded by the GEF, the German Climate Initiative, the EU, the IEA Clean Energy Transitions Programme & EVI members, foundations and bilateral development aid
- Jointly implemented with partners such as ADB, EBRD, IEA, Centro Mario Molina Chile, UNDP, UNIDO and the SOLUTIONSplus project

# About the Country Projects



Building capacity  
and creating  
awareness



Establishing  
roadmaps and  
strategies



Developing  
national policy  
frameworks



Creating  
business models and  
finance schemes



Piloting  
electric vehicles  
on the ground





| Africa        |  |              |
|---------------|--|--------------|
| Burundi       |  | UNEP         |
| Cote d'Ivoire |  | UNEP / UNIDO |
| Ethiopia      |  | UNEP         |
| Ghana         |  | UNEP         |
| Kenya         |  | UNEP         |
| Madagascar    |  | UNEP         |
| Mauritius     |  | UNDP         |
| Rwanda        |  | UNEP / SOL+  |
| Senegal       |  | UNEP         |
| Seychelles    |  | UNEP         |
| Sierra Leone  |  | UNEP         |
| South Africa  |  | DBSA         |
| Tanzania      |  | UNEP / SOL+  |
| Togo          |  | UNEP         |
| Tunisia       |  | UNIDO        |
| Uganda        |  | UNEP         |
| Zambia        |  | UNEP         |
| Zimbabwe      |  | UNEP         |

| Asia & the Pacific |  |                   |
|--------------------|--|-------------------|
| Bangladesh         |  | UNDP              |
| Fiji               |  | UNEP / ADB        |
| India              |  | UNEP / ADB        |
| Indonesia          |  | UNDP              |
| Malaysia           |  | UNIDO             |
| Maldives           |  | UNEP              |
| Nepal              |  | UNEP / SOL+       |
| Philippines        |  | UNEP / SOL+ UNIDO |
| Solomon Islands    |  | UNEP              |
| Sri Lanka          |  | UNEP              |
| Thailand           |  | UNEP / UNIDO      |
| Vanuatu            |  | UNEP              |
| Viet Nam           |  | UNEP / SOL+       |

| Central & Eastern Europe, West Asia, Middle East |  |             |
|--|--|-------------|
| Albania  |  | UNIDO       |
| Armenia  |  | UNEP        |
| Azerbaijan                                       |  | UNEP        |
| Jordan   |  | UNIDO       |
| Lebanon  |  | UNDP        |
| Ukraine  |  | UNEP / EBRD |
| Uzbekistan                                       |  | UNDP        |

| Latin America & the Caribbean |  |             |
|-------------------------------|--|-------------|
| Antigua & Barbuda             |  | UNEP        |
| Argentina                     |  | UNEP        |
| Belize                        |  | UNEP        |
| Colombia                      |  | UNEP        |
| Costa Rica                    |  | UNEP        |
| Chile                         |  | UNEP        |
| Cuba                          |  | UNEP        |
| Dominican Republic            |  | UNEP        |
| Ecuador                       |  | UNEP / SOL+ |
| El Salvador                   |  | UNEP        |
| Grenada                       |  | UNEP        |
| Guatemala                     |  | UNEP        |
| Honduras                      |  | UNEP        |
| Jamaica                       |  | UNDP        |
| Mexico                        |  | UNEP        |
| Nicaragua                     |  | UNEP        |
| Panama                        |  | UNEP        |
| Paraguay                      |  | UNEP        |
| Peru                          |  | UNDP        |
| St. Lucia                     |  | UNEP        |
| Uruguay                       |  | UNEP / SOL+ |





# Example: GEF 7 E-Mobility in Sierra Leone

- **Objective:** Supporting Sierra Leone with the Shift to Electric Mobility
- **Executing agency:** Environmental Protection Agency – Sierra Leone
- **GEF Agency:** UNEP
- **GEF funding for activities:** USD 423,716
- **Expected implementation period:** 2021 to 2025



# Sierra Leone GEF7 E-Mobility: Project components, outcomes & outputs

## Institutionalization of low-carbon electric mobility

- The government has established an institutional framework and adopts a strategy for the promotion of low-carbon electric mobility
- Setting up inter-sectoral electric mobility coordination body
- Developing national e-mobility strategy
- Training of Key stakeholders in the EV Global Programme activities

## Low-carbon e-mobility demonstration

- Demonstrations provide evidence of technical, financial and environmental sustainability to plan for scale-up of electric mobility in Sierra Leone
- Implementation plan for demonstration
- Demonstration of ~20 electric bikes in a taxi fleet
- Sharing of demonstration results

## Preparation of scale-up and replication of electric mobility

- Conditions are created to shift market towards low-carbon electric mobility and accelerate introduction of appropriate electric vehicles in Sierra Leone
- Developing a financing scheme including a procurement guideline and business models for electric vehicle procurement
- Developing regulatory and fiscal policy incentives for electric vehicles

## Long-term environmental sustainability of low-carbon electric mobility

- Measures are developed to ensure the long-term environmental sustainability of low-carbon electric mobility
- Developing a study on integration of renewable power for electric vehicle charging
- Developing a scheme for re-use, recycling and sound disposal of used electric vehicle batteries



# Case study: Kenya

## Policy work in Kenya started under the Global Fuel Economy Initiative (GFEI):

- Development of a vehicle fuel economy baseline in **2014**
- Development and adoption of policy proposals to increase vehicle efficiency
  - Introduce age limit for used imported vehicles – In **2005** National Automotive Policy set age limit from imported cars to 8 years, progressively moving to 3 years (suspended)
  - Introduce fuel quality standard – Euro 4 fuels (50ppm sulphur) adopted by EAC in **2015**, and actually complying with Euro 5 fuels (10ppm sulphur)
  - Introduce emission standards for imported vehicles – Gazetted **July 2022** in EAC, implemented in EAC countries as of **1<sup>st</sup> January 2023**



# Case study: Kenya

## E-Mobility Policy support

- Series on technical reports on e-mobility in Kenya 2018 to 2020 together with ERC / EPRA
- Supporting standardization and regulation (KEBS) – as of 2021, Kenya has adopted 24 e-mobility ISO standards on safety, specifications, testing, on HEVs, mopeds and motorcycles and FCEVs
- Supporting fiscal incentives
  - In 2019, import duty has been halved for EVs
  - In 2022, an analysis of forgone taxes vs reduced fossil fuel import costs led e-mobility tax waivers in 2023 budget proposal
  - Proposed tax waivers are now included in the report on the consideration of the financial bill suggesting major tax and excise duty waivers for e-motorcycles, bicycles, buses and Lilon batteries
- Supporting National E-Mobility Policy and Strategy development
  - Kenya e-mobility toolbox formed the basis for strategy
  - Strategy will feed into National E-Mobility Policy
- Piloting 50 electric motorcycles in 4 fleets (2021 – 2022)
- Convening government, private sector and

**Holistic approach targeting the topic from all sides – awareness, capacity, strategy, policy & regulation, fiscal, financial & business, piloting.**



# Programmatic approach in LMICs

- Replicate lessons learnt
  - Strategic
  - Policy & regulation
  - Business & finance
- Support development of bankable projects
- Aggregate EV and EVSE demand
- Work on used EVs, battery end-of-life and circularity in LMICs
- Link to last-mile connectivity, active mobility and digitalization
- Integrate aspects of digitalization
- Facilitate coordinated funding
- Feed bottom-up results into top-down political processes



# Funding Opportunity: GEF8 Electric Mobility

## Overview of the main steps for developing an e-mobility project:

- Issue a Letter of Endorsement (LoE) to commit the GEF allocations (by the GEF OFP)
- Prepare a concept note (called a “child project”)
- Submit country concept note to the GEF along with the cohort other countries
- GEF reviews and approve the concept – 12 months period after concept approval
- Develop the detailed Project Document
- GEF reviews and approves the Project Document
- Project execution starts





# Thank you!



# Connect With Us Online

- **Clean Energy Solutions Center (CESC)**
  - [Check out our website](#)
  - [LinkedIn](#)
  - [CESC updates and event invitations](#)
  
- **Clean Energy Ministerial (CEM)**
  - [Check out our website](#)
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**Thank You!**