

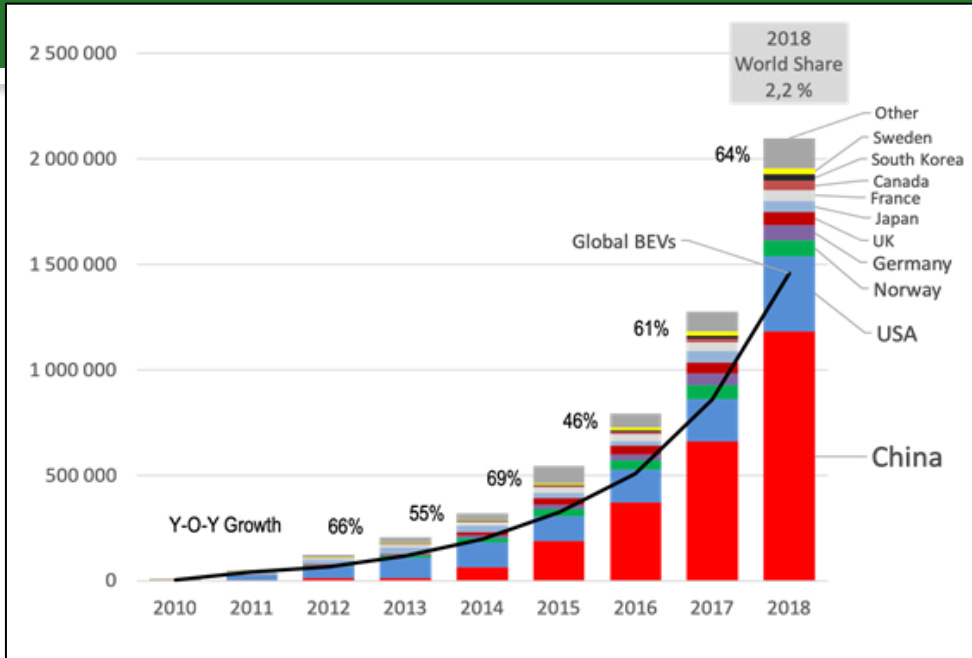
# EV in the Philippines : State and Initiatives



# What to expect?

- **Global and ASEAN EV Trends**
- **Why EV in the Philippines?**
- **EV Local Updates**
- **Demand Projections**
- **Moving Philippine EV Forward**

# Global EV Trends



Country	2025	2030	2032	2040	2045
France				●	
Ireland		●			
Netherlands		●			
Norway	●				
Slovenia		●			
Sri Lanka				▲	
Sweden					▲
Scotland			●		
United Kingdom				●	

● ICE sales ban or 100% EV sales target    ▲ Fleet without ICEs

Country / Region	EV Target or Objective
Canada	- 10% zero-emission vehicle (ZEV) sales by 2025, 30% by 2030, and 100% by 2040 (Clean Energy Canada, 2019) - 75% of new LDVs will be HEVs, PHEVs or BEVs from 2019 - 80% of government fleet procured are ZEVs
China	- 5M EVs by 2020, including 4.6 million PLDVs, 0.2 million buses and 0.2 million trucks
European Union	- 15% sales of electric cars and plug-in hybrids by 2025; 30% by 2030
Finland	- 250,000 EVs by 2030
France	- Full electrification of new buses by 2025 - All electric cars nationwide by 2040 (Davies, 2017)
India	- 30% electric sales by 2030 - 100% BEV sales for urban buses by 2030
Ireland	- 500,000 EVs and 100% EV sales by 2030
Japan	- 20-30% electric vehicle sales by 2030
Mexico	- 30% electric car sales by 2030
Netherlands	- 10% electric car market share by 2020 - 100% EV sales by PLDVs by 2030 - 100% electric public bus sales by 2025 - 100% public bus stock by 2030
New Zealand	- 64,000 EVs by 2021
Norway	- 100% EV sales of PLDVs, LCVs and urban buses by 2025 - 75% EV sales in long-distance buses - 50% in trucks by 2030
Korea	- 200,000 EVs of PLDVs by 2020
Slovenia	- 100% electric sales by 2030
Sweden	- 30% electric car sales by 2030
United Kingdom	- 396,000 to 431,000 E-cars by 2020
United States	- 20% market share target for electric passenger vehicles by 2020, 50% by 2025

# ASEAN E-Vehicle Stock

Country	Electric Vehicle Stock	Reference Year	Source
<b>Indonesia</b>	<ul style="list-style-type: none"> <li>▪ ~1,000 electric cars</li> <li>▪ ~3,000 electric two-wheelers</li> </ul>	2017	<u>Solidiance</u> (2018)
<b>Philippines</b>	▪ ~ 3500 e-trikes	2019	Biona et al (2019)
	▪ 952 e-motorcycles	2017	LTO (2017)
	▪ ~ 252 e-jeeps	2019	Biona et al (2019)
	▪ 64 e-cars	2017	LTO (2017)
<b>Singapore</b>	<ul style="list-style-type: none"> <li>▪ 380 PHEV cars and LDVs</li> <li>▪ 701 BEV cars and LDVs</li> <li>▪ 32,545 HEV cars and LDVs</li> <li>▪ 4 BEV buses</li> <li>▪ 23 HEV buses</li> </ul>	2018	Land Transport Authority (2018)
<b>Thailand</b>	<ul style="list-style-type: none"> <li>▪ 122,631 HEVs and PHEVs</li> <li>▪ 1,454 BEVs</li> </ul>	2018	EVAT (2016)
<b>Vietnam</b>	▪ 1,086 electric cars	2015	Nguyen and Nguyen (2015)
	▪ 150,000 electric two-wheelers	2013	

# ASEAN Electric Vehicle Targets and Projections

Country	Description	Date announced
Indonesia	2.1 million motorcycles and 2,200 electric cars by 2025	January 2019
Philippines	Best case 2030 vehicle stock projections: 200,000 plug-in hybrids 60,000 e-cars 70,000 e-trikes 40,000 e-jeepneys 5,000 – e-buses	July 2019
Thailand	1.2 million electric vehicles by 2036	March 2016
Singapore	1,000 BEVs by 2020 800 BEV taxis by 2022	June 2016 October 2018
Singapore	100,000 electric cars, 100,000 electric motorcycles, and 2,000 electric buses by 2030	August 2017
Vietnam	100,000 electric cars by 2020	August 2013

# ASEAN Charging Infrastructure

Country	Status	Target / Plans	Major players
Indonesia	<ul style="list-style-type: none"> <li>- 1300 stations nationwide</li> <li>- 1100 stations in Jakarta</li> </ul>	<ul style="list-style-type: none"> <li>- Multiple companies have expressed interest in the EV market</li> </ul>	<ul style="list-style-type: none"> <li>- Agency for the Assessment and Application of Technology (BPPT)</li> <li>- Mitsubishi</li> <li>- Honda</li> </ul>
Philippines	<ul style="list-style-type: none"> <li>- 1 public Level 3 Charging Station</li> <li>- Approximately 4 private and government Level 3 Charging Stations</li> <li>- Level 1 and 2 Charging Points used in battery swapping operations for public transport service</li> </ul>	<ul style="list-style-type: none"> <li>- 200 stations by end of 2022</li> </ul>	<ul style="list-style-type: none"> <li>- QEV</li> <li>- UniOil</li> </ul>
Malaysia	<ul style="list-style-type: none"> <li>- 400 stations as of September 2018</li> </ul>	<ul style="list-style-type: none"> <li>- 3000 stations by end of 2019</li> </ul>	<ul style="list-style-type: none"> <li>- chargEV</li> <li>- First Energy Networks</li> <li>- GreenTech Malaysia</li> </ul>
Thailand	<ul style="list-style-type: none"> <li>- 50 units of Level 2 chargers</li> </ul>	<ul style="list-style-type: none"> <li>- 690 stations by 2036</li> </ul>	<ul style="list-style-type: none"> <li>- Greenlots</li> </ul>

Source: Own elaboration based on Consultancy Asia (2018), Engel et al (2018), and Greenlots (2018)



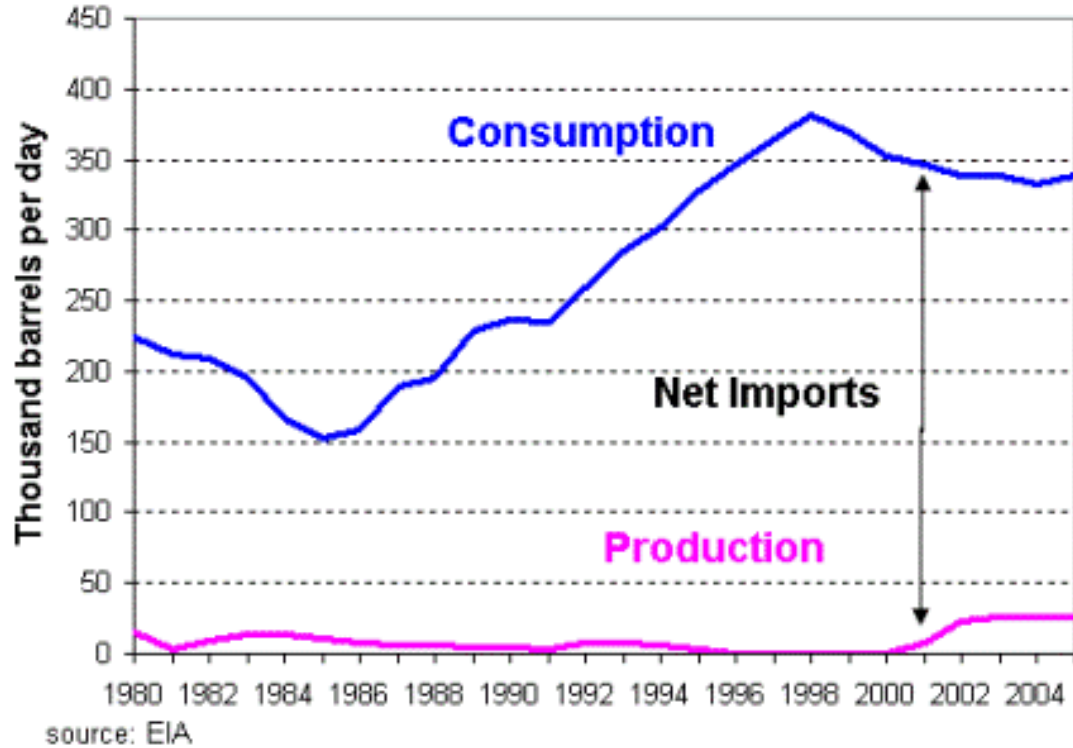
## Number of Electric Vehicle Charging Stations in Thailand

Data as of 31 January 2020

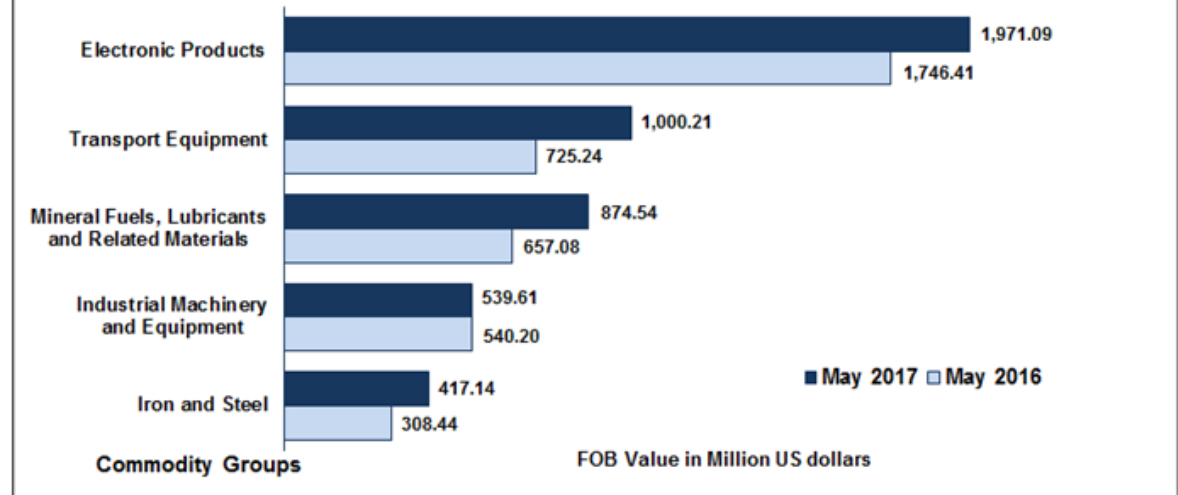


# Why EV's in the Phil? Energy Security

**Philippine Oil Production and Consumption, 1980-2005**



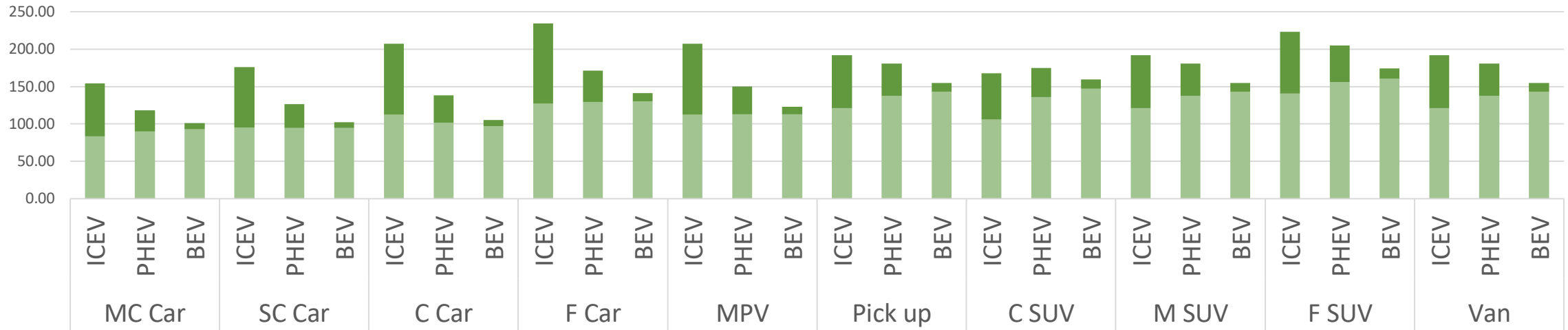
**FIGURE 4 Philippine Top Five Imports By Commodity Groups: May 2017 and 2016**



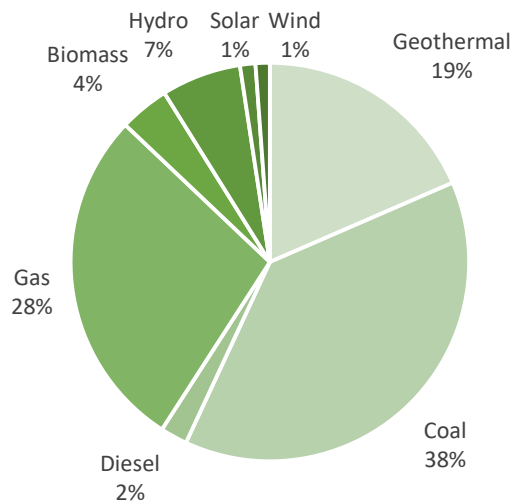


# Why EV's in the Phil ? GHG Mitigation

GHG Emission Factor (g/km)



■ Vehicle Use ■ Fuel Prod



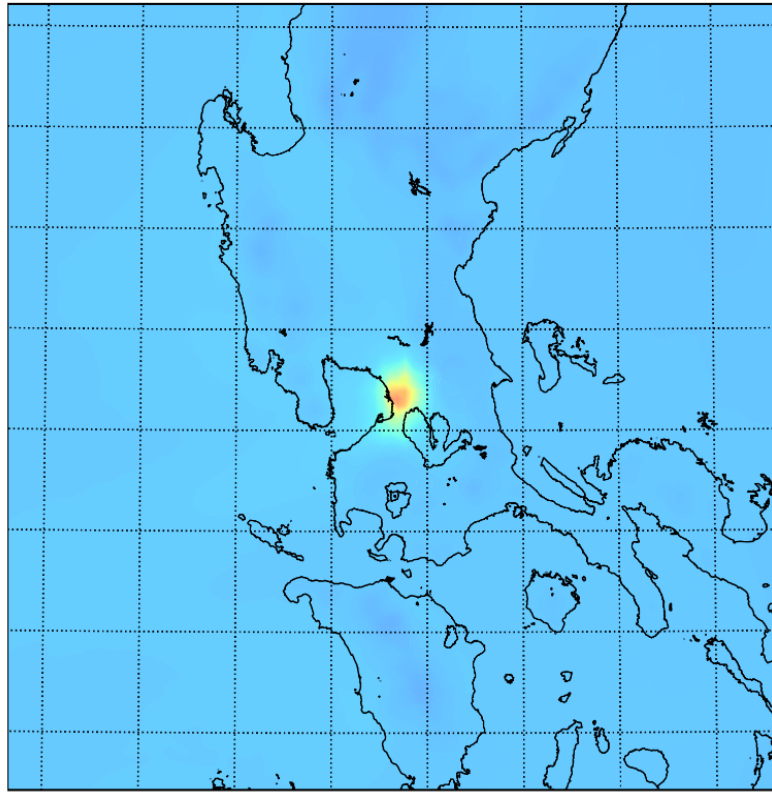
■ Geothermal ■ Coal ■ Diesel ■ Gas ■ Biomass ■ Hydro ■ Solar ■ Wind

## Country-level Social Cost of Carbon / Database Explorer

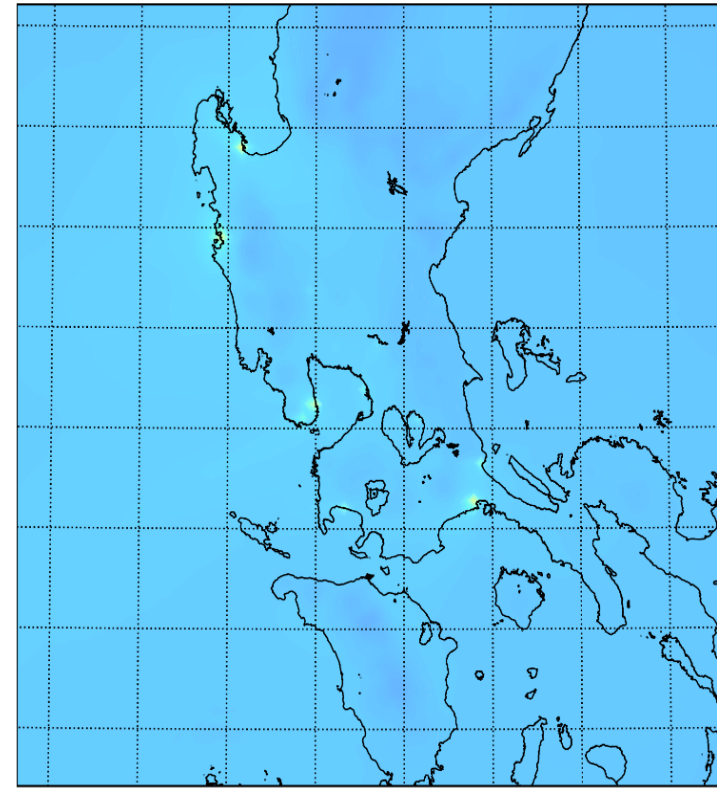
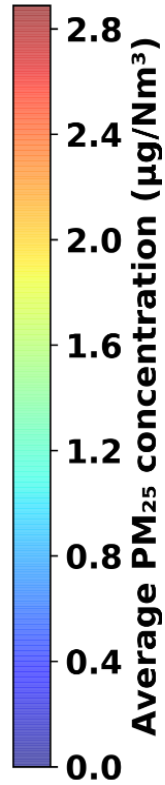




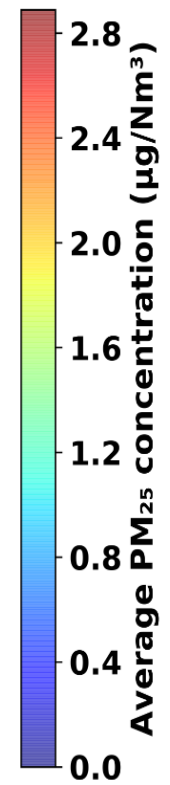
# Why EV's in the Phil ? Health Benefits



Baseline Jeepneys



Electric Jeepneys

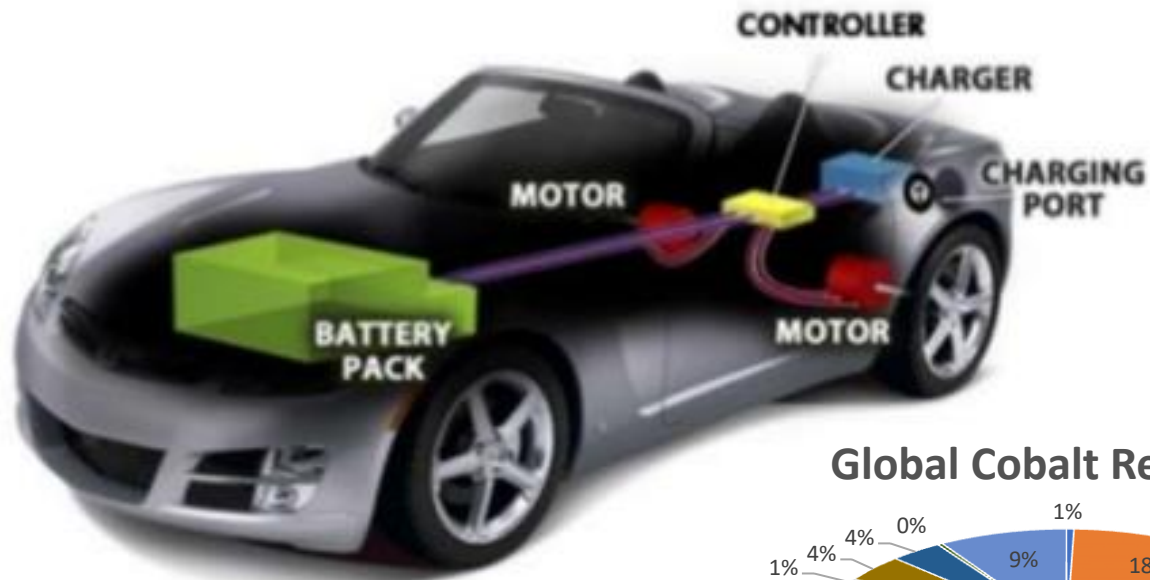


## Annual Health Benefits in Millions Php

Scenario	CAR	NCR	Region 1	Region 2	Region 3	Region 4A	Region 5	Total
Scenario 2 E-Jeepneys	-0.26	17,170.77	-12.96	-0.05	240.11	1,430.18	0.00	18,827.79

# Why EV's in the Phil ? EV Simplicity means New Opportunities

**Moving Parts**  
**18+ vs 2000+**

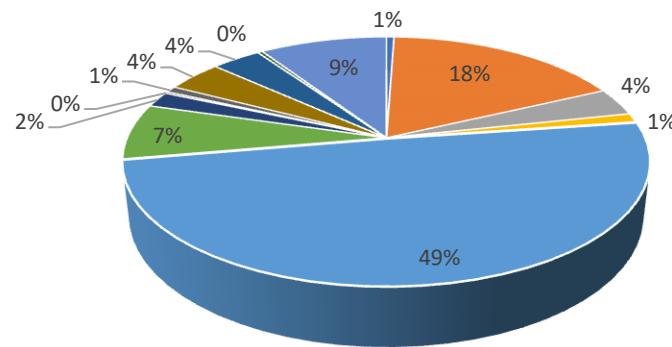


10 new car companies aiming for the big leagues

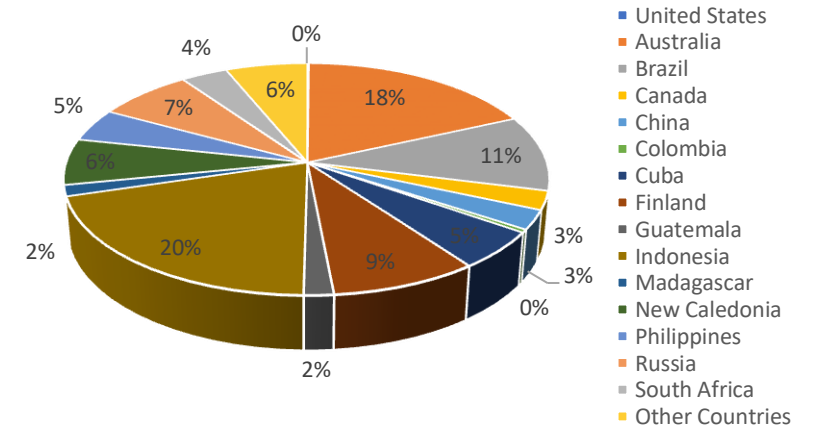
Rookie automakers offering electric roadsters, boxy commuter vehicles

- **We can build it!!**
- **We have Nickel and Cobalt**

Global Cobalt Reserves



Global Nickel Reserves

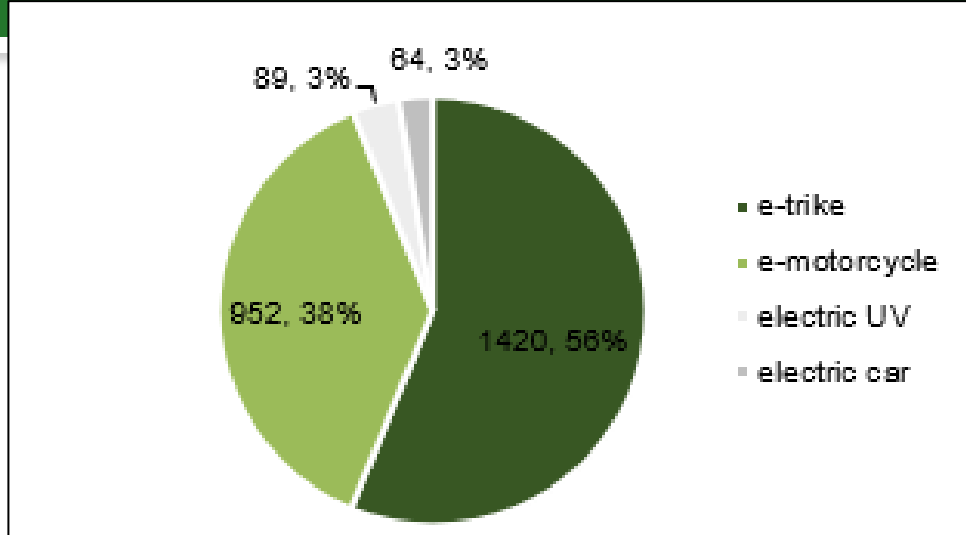


# Phil EV Industry

- **Philippines**
- **Eco-PUV Program**
- **Some Local E-Jeepney and E-Trike Companies**
- **Exploring possibility for a local battery industry**
- **Thailand is leading the way**
- **Indonesia is focusing on Battery Production**
- **Vietnam established its own automotive / EV company**

Item	Thailand	Indonesia	Malaysia	Vietnam
Annual Local Demand	~3.45 million (Marklines, 2019)	~1.3 million (Marklines, 2019)	~0.56 million (Marklines, 2019)	~0.4 million (Pearson, 2018)
Reported Industry Developments	<ul style="list-style-type: none"> <li>- HEV models locally assembled: Toyota Camry, Nissan X-Trail and Honda Accord since 2009</li> <li>- PHEV assembly of BMWs since 2016</li> <li>- Toyota, Nissan, Honda, Mazda, Mercedes Benz, BMW, SAIC-CP Motor Company, and Thai-Japan joint venture FOMM received approval for new EVs, PHEVs and HEVs production</li> <li>- Battery production investment applications, including BMW investments on a battery factory, are being evaluated</li> <li>- Local car company, Vera Automotive, founded in 2015, launched its first EV in 2017</li> </ul>	<ul style="list-style-type: none"> <li>- A 50,000 tonnes annual nickel smelting capacity plant to be built for EV nickel battery production. Output would be exported to China (</li> <li>- Hyundai plans to develop a plant for a nickel-cobalt joint venture project in Indonesia</li> <li>- Volvo and Renault EV investments in EV production, including the construction of factories</li> </ul>	<ul style="list-style-type: none"> <li>- Great Wall Motors eyeing Malaysia as its EV production and distribution hub in ASEAN</li> <li>- Geely Holding Group of China acquired 50% stake in Proton Holdings Bhd</li> </ul>	<ul style="list-style-type: none"> <li>VinGroup, local leading conglomerate, has formed Vinfast as its car manufacturing arm. VinFast activities include: <ul style="list-style-type: none"> <li>- partnership with EDAG German Engineering company to develop BEVs</li> <li>- Planned launch of 3000 electric buses in 2019 as a result of the partnership with Siemens Vietnam that supplied technology and parts</li> <li>- Partnership with LG Chem to locally produce batteries for electric scooters and electric cars</li> <li>- Partnership with Bosch and LG Chem to manufacture and roll out e-scooters by 2020</li> </ul> </li> </ul>

# Local EV Updates : Vehicle Stock and Models



**As of March 2019**

- **E-Trikes – 1,511 units, 16 models**
- **E-Jeepneys – 252 Units, 21 models**
- **More than 50 LEV Models**

EV Model	Passenger capacity	Nominal Voltage (V)	Battery Capacity (kWh)	Range (km)	Charging mode	Fast charging time (hrs)	Max. Charging Rate (kW)-Standards
<b>BEVs</b>							
Mitsubishi I-MEIV	4	330	16	95	slow and fast charging	0.5	Not Known
Hyundai Ioniq	5	360	28	280	slow and fast charging	0.75	70 - CHAdeMO
Hyundai Kona EV	5	230	64	415	slow and fast charging	1.2	50 - CCS
BYD E6	5	316.8	61.4	300	slow and fast charging	2.5	22 - GBT
Nissan Leaf	5	384	40	243	slow and fast charging	0.5	50 - CHAdeMO
Nissan Sylphy ZE	5	NK <sup>4</sup>	60-90	338	slow and fast charging	0.75	50 - CCS
Chevrolet Bolt 2017	5	350	60	383	slow and fast charging	1.5	50 - CCS
<b>PHEVs</b>							
Mitsubishi Outlander	5	300	12	35	slow and fast charging	0.5	22 - CHAdeMO
Hyundai Ioniq PHEV	5	240	8.9	46	slow and fast charging		3.3 - CCS
BYD Qin sedan hybrid	5	500	13	70	slow and fast charging		Not Known
BYD Tang hybrid	7		18.4	80	slow and fast charging	1	Not Known



# Local EV Updates : Vehicle Stock and Models

## Locally Available Battery Electric Vehicle



**Nissan Leaf**



**BYD E6**



**Hyundai Ioniq EV**



**DongFeng ER30**



**Hyundai Kona EV**

# Local EV Updates : Vehicle Stock and Models

## Locally Available Plug-in Hybrid Vehicles



**Hyundai Ioniq PHEV**



**Mitsubishi Outlander PHEV**



**Jaguar Range Rover Sport P400E**



**BYD Qin PHEV**



**BYD Tang PHEV**



# LTO Administrative Order

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## ELECTRIC VEHICLE GUIDELINES AND REGULATIONS

- Classifications
- Operation
- Recording and Registration





# Vehicle Parts and Standards Development

## 63 EV Related Standard Adopted

### DTI approves new International Standards on electric road vehicles

Thursday, 23 May 2019 02:25



The Department of Trade and Industry's Bureau of Philippine Standards (DTI-BPS) approved the following International Standards (IS) of the International Organization for Standardization (ISO) and the International Electrotechnical Commission (IEC) on electric road vehicles, as Philippine National Standards (PNS):

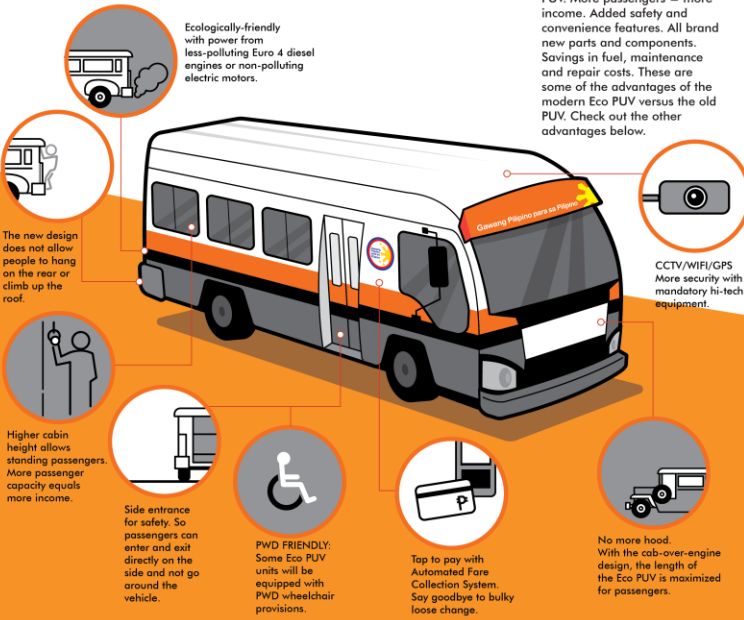
Vehicle		Notes	Charging Infrastructure		Notes
Range		Testing protocols only	On-Board Charging		Fairly comprehensive
Energy Consumption		Testing protocols only	Off-Board Charging		Fairly comprehensive
Driver User Information		Limited to instrumentation	Wireless Charging		
Recycling and Re-Use			Vehicles as Electricity Supply		
Vehicle Labelling					
Electrical Safety		Fairly comprehensive			
Drive Train		Limited to safety			
Operating Characteristics		Provide conditions under which the vehicle should operate			
<b>Legend</b>			<b>Battery</b>		
Regulations			Performance		Testing protocols only
Voluntary			Durability		Testing protocols only
None			Recycling		
Partial		(half)	Battery Re-Use		

# PUV Modernization Program

## THE ECO PUV VS. OLD PUV

The modern Eco PUV – ecologically-friendly na, economically helpful pa!

Introducing the modern Eco PUV. Ecologically-friendly because it is less or non-polluting at all. Economically-helpful because it is locally manufactured and assembled. Built in compliance with the new BPS PNS 2126:2017 standards for the modern Eco PUV. More passengers = more income. Added safety and convenience features. All brand new parts and components. Savings in fuel, maintenance and repair costs. These are some of the advantages of the modern Eco PUV versus the old PUV. Check out the other advantages below.



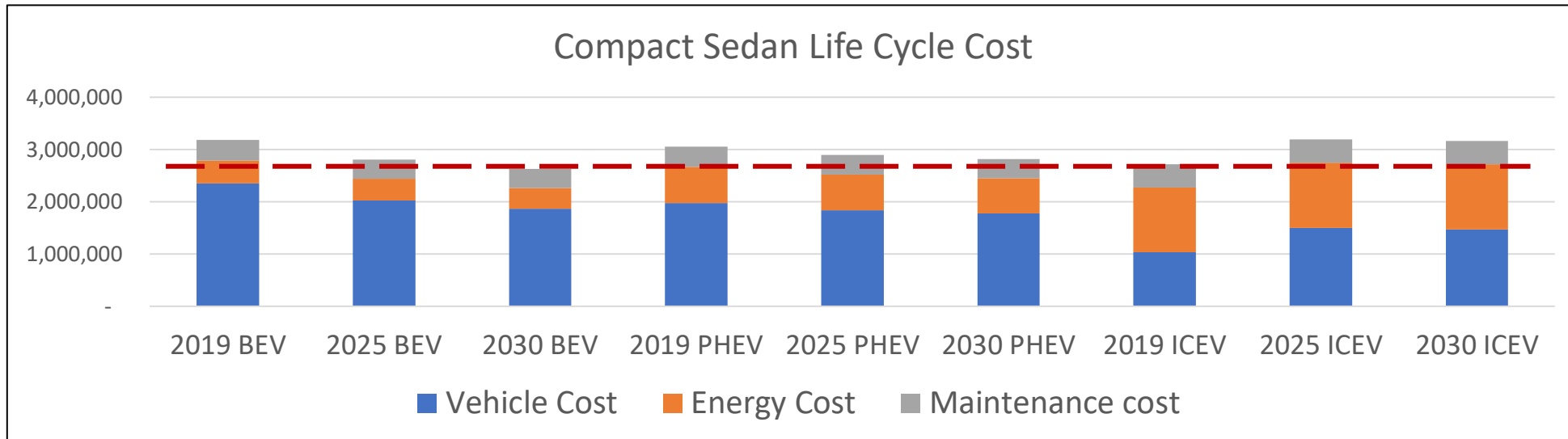
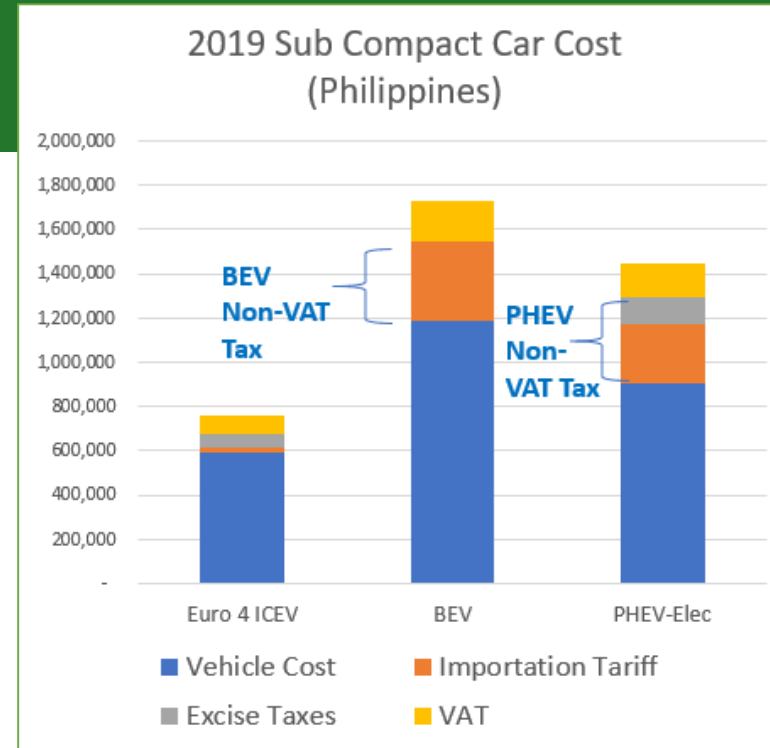
### ADVANTAGES OF PUV MODERNIZATION

- More income for the drivers and operators.
- Savings in fuel, maintenance and repair costs.
- 100% brand new parts and components; better fuel economy, less downtime due to repairs.
- Covered by standard auto industry product warranty.
- Added safety and convenience due to compliance to BPS PNS 2126:2017 covering dimensional limits for the modern Eco PUV; emergency exit.
- Aircon units available.
- Economically-helpful: Locally manufactured and assembled.



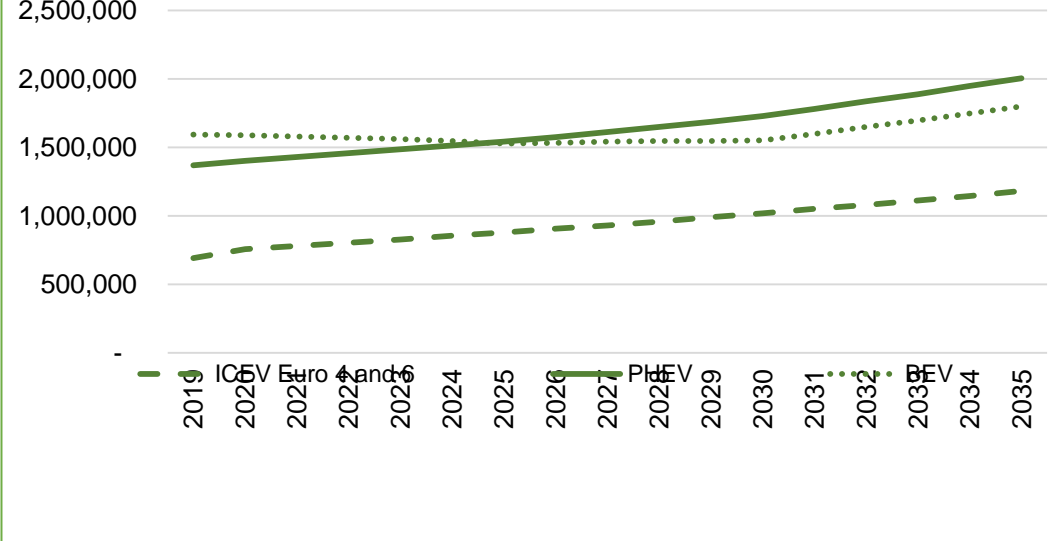
# EV Cost in the Philippines

Vehicle Variant	PHEV	BEV
Mini-Compact Sedan	1.56-1.93	1.95-2.41
Subcompact Sedan	1.47-1.91	1.84-2.28
Compact Sedan	1.54-1.91	1.81-2.28
Full-size Sedan	1.42-1.75	1.69-2.09
MPV	1.54-1.91	1.84-2.28
Pick-up	1.54-1.91	1.84-2.28
Crossover / Compact SUV	1.42-1.71	1.69-2.09
Mid size SUV	1.42-1.71	1.69-2.09
Full-size SUV	1.56-1.93	1.95-2.41
Van	1.47-1.91	1.84-2.28

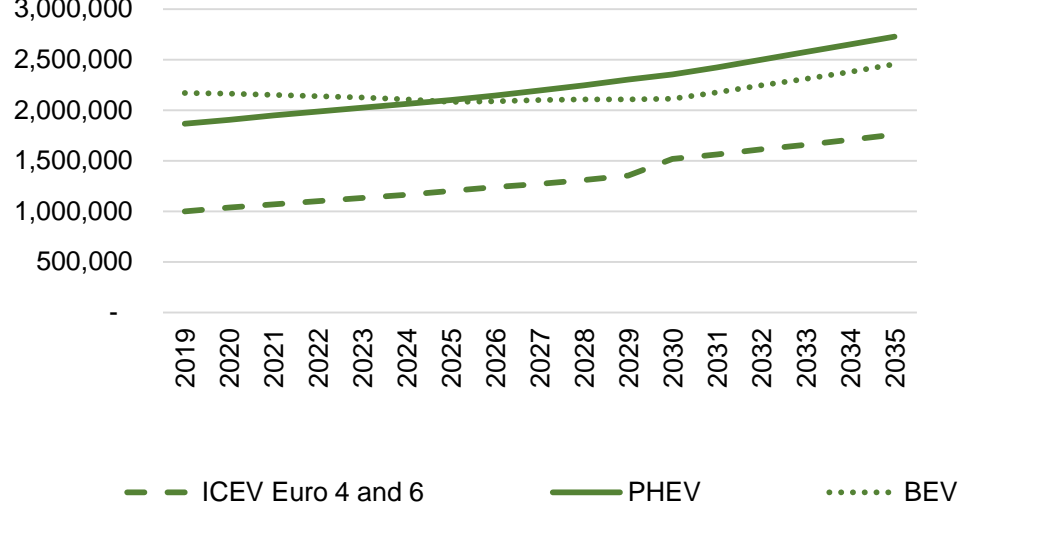


# Retail Cost

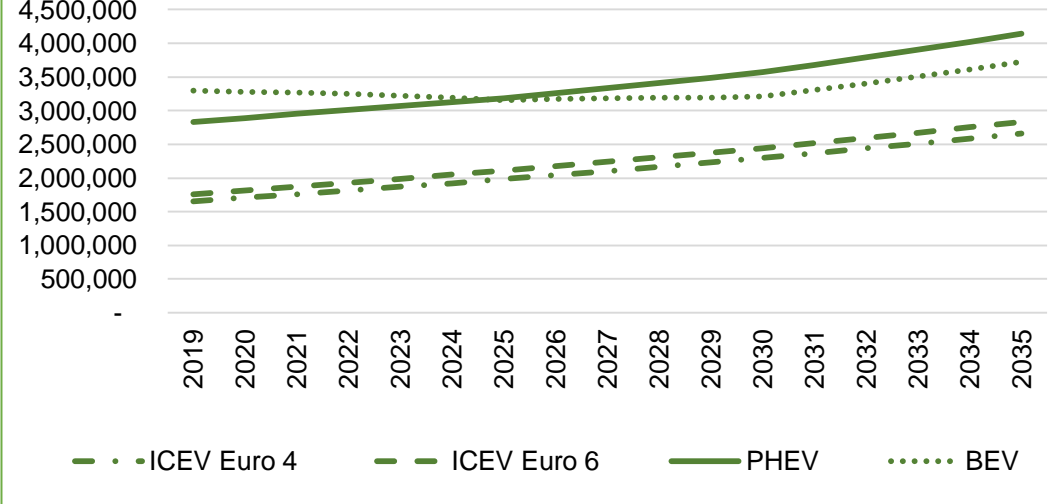
### Sub-Compact Car



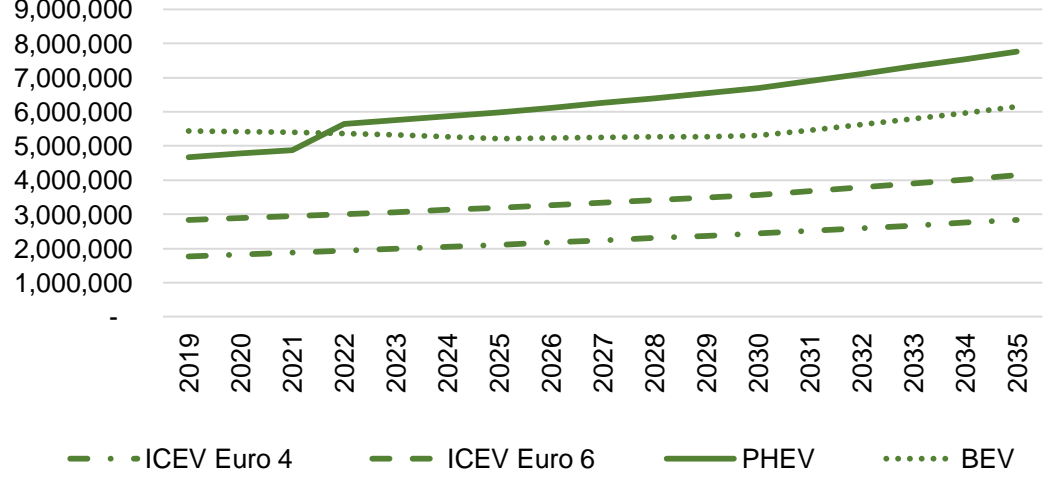
### Compact Car



### Mid-size SUV



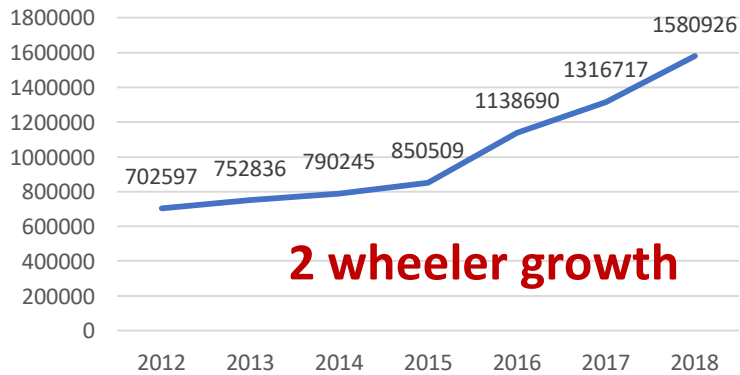
### Full-size SUV



# EV Potential Demand in the Philippines

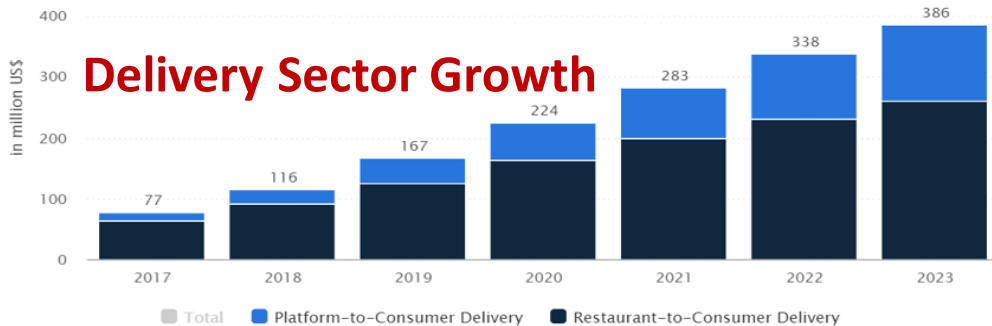
## Metro Manila Alone

Public transport mode	Number of units
City buses	4669
Provincial bus	9,028
Jeepney	75000
Taxi	8079
TNVS	66,750 <sup>36</sup>
Tricycle	84,475



## Tourism Industry

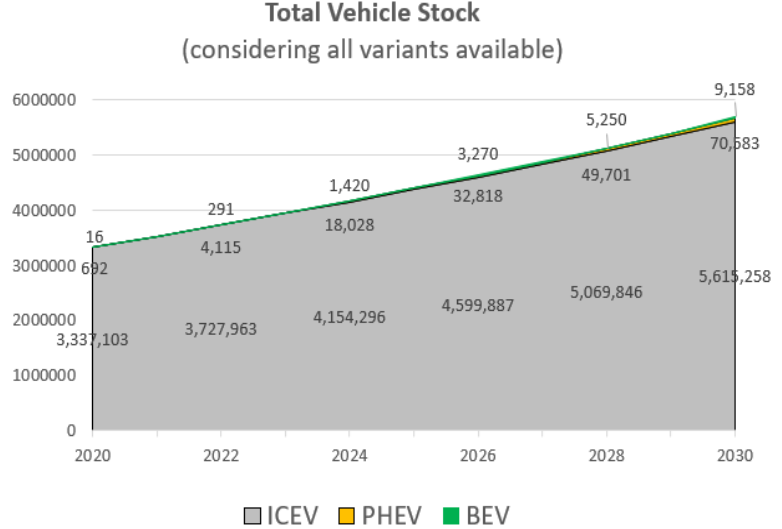
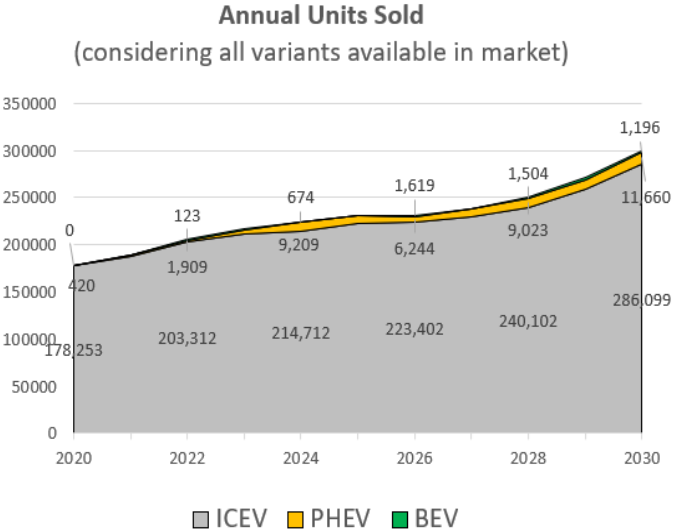
Establishment	Car / Sedan	Limousine	AUV / SUV	Van	Minibus	Chartered bus	Others
Hotels and motels	310	27	184	640	74	21	70
Resort hotels	122		76	351	35	43	102
Condotels	42			2	8		
Pension houses	11	1	7	38		1	2
Camping sites	6						
Short term accommodation activities	6		1	15		1	1
Other accommodation			1	1			
Transport operators, tour and travel agencies	4291	116	472	623	988	2377	36
<b>Total</b>	<b>4788</b>	<b>144</b>	<b>741</b>	<b>1620</b>	<b>1105</b>	<b>2443</b>	<b>211</b>



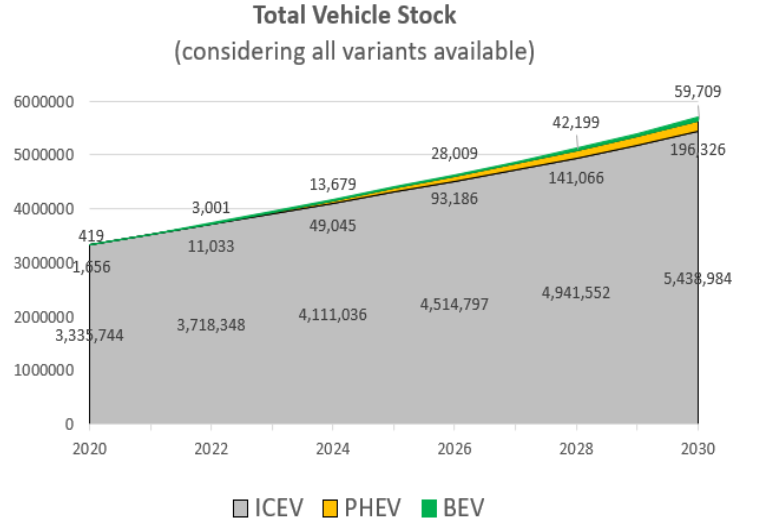
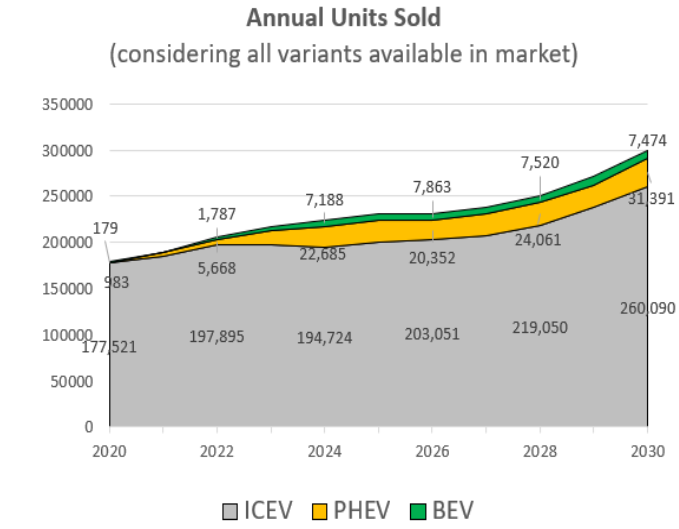
## Government Vehicles

Registration	2015	2015	2017	Average
New	12123	14643	11067	12611
Renewal	63978	64855	66174	
<b>Total</b>	<b>76101</b>	<b>79101</b>	<b>77241</b>	

# Household Uptake Projections



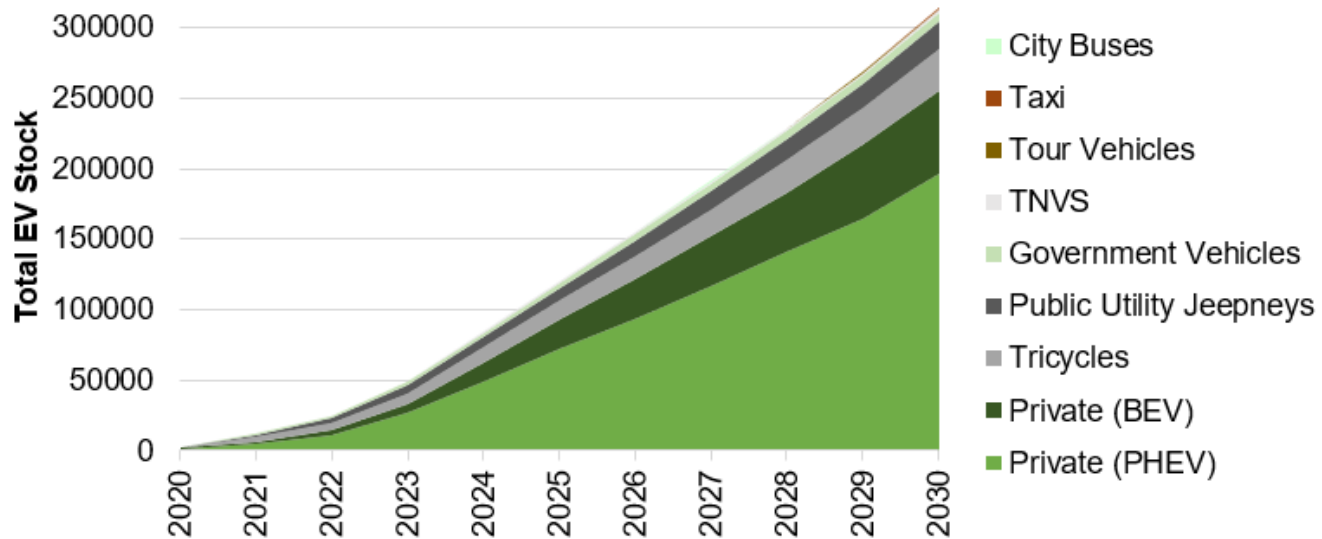
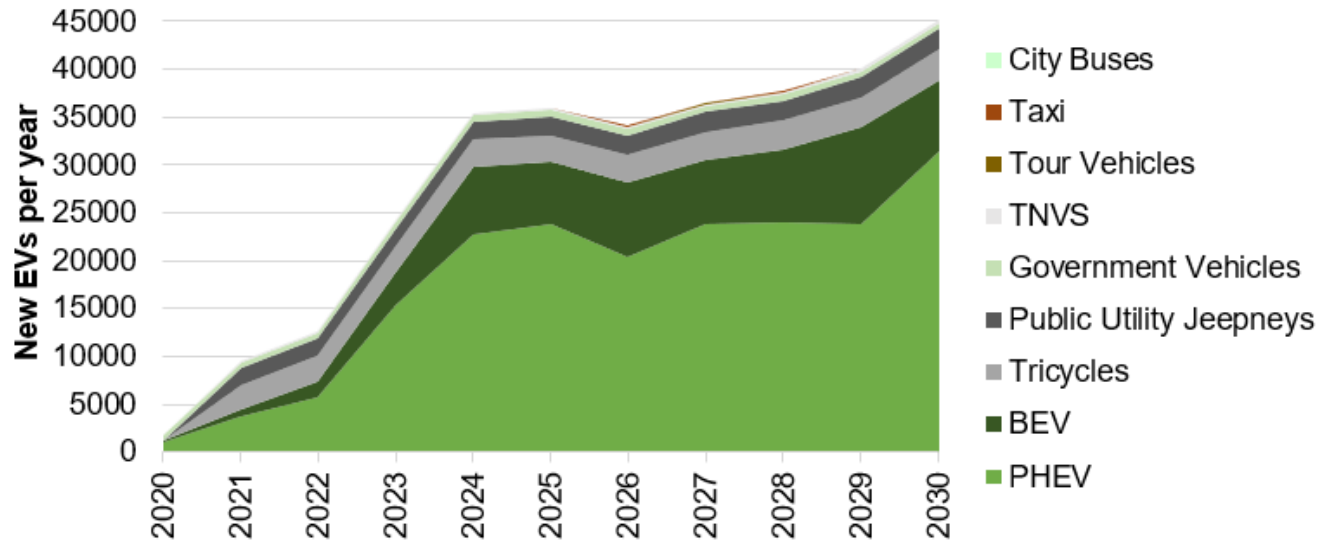
**Baseline Scenario**



**With Tax Incentive and Infrastructure Development**



# Will there be demand? Other Sectors with Regulations



- **Approximately 45,000 Annual Sales by 2030**
- **Approximately 300,000 EVs in vehicle stock by 2030**
- **Initial Demand - commercial, public transport and government vehicles**
- **Eventual Demand - Households**



# Senate Bill 1382, HB 4075, HB 4391

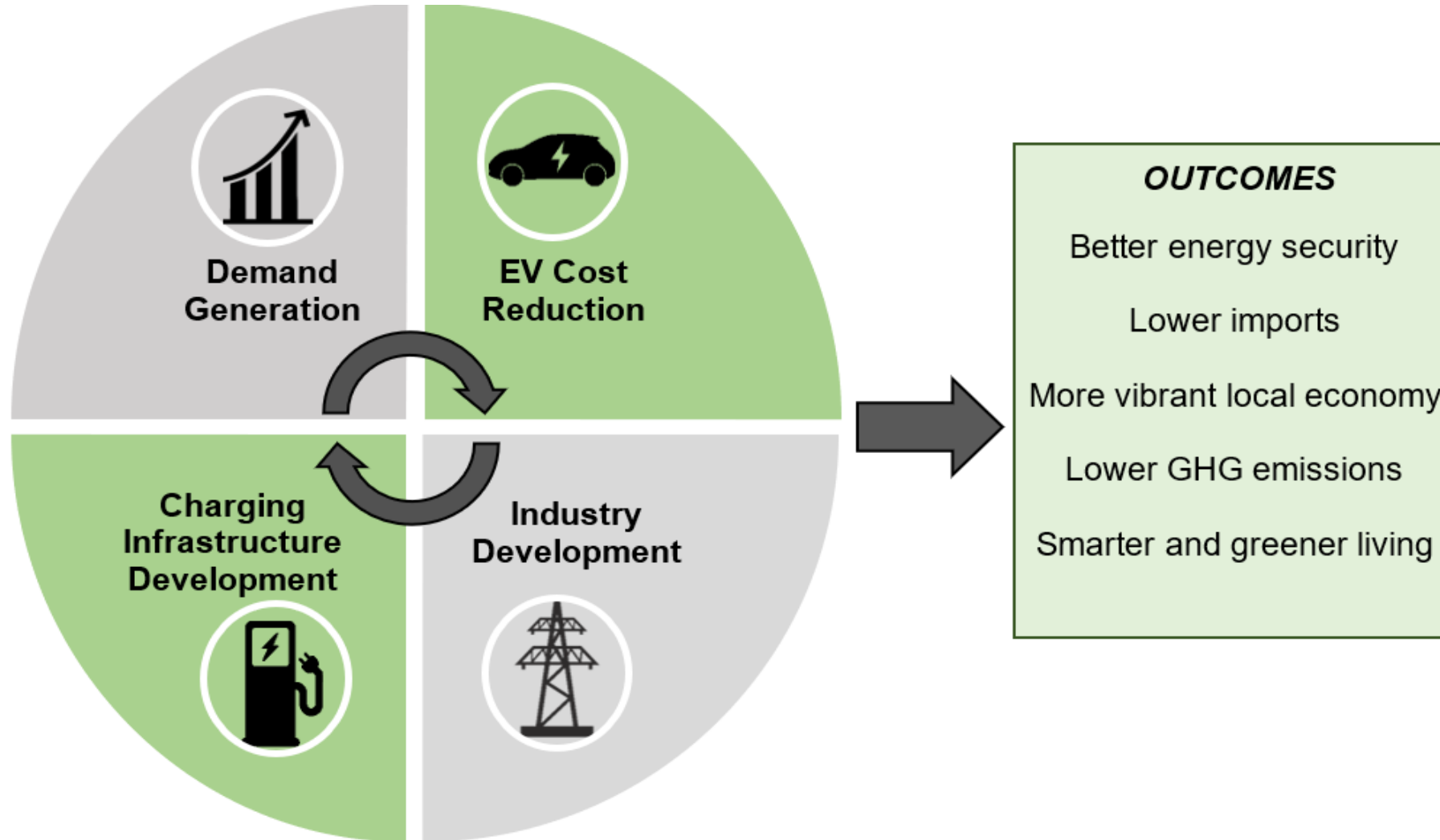
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## **ELECTRIC VEHICLES AND CHARGING STATIONS ACT**

- Role of Government Agencies
- Demand Generation and Industry Development
- Incentives



# Bringing Philippine EV Forward





## Demand Generation

# Bringing Philippine EV Forward

## Corporate Fleet

- Minimum 5% for logistic companies, Food delivery companies, Tour agencies, Accommodation / hotels, Utility companies
- Preferential terms ( i.e. Age limit, Fleet Size)
- Green Jobs Act eligibility prorated based on EV fleet share

## Public Transport

- Minimum 5% for bus, taxi and TNVS with longer age limit
- 50% of premium taxis with longer age limit
- All CBDs for Jeepneys
- Minimum percentage for e-trikes to be determined by LGU

## Government Vehicles

- 10% of all annual vehicle purchase
- Increasing percentage in the future

## Fringe Benefits

- Toll fee exemption
- Number coding
- Exclusively allotted parking lots
- Reduced annual vehicle registration rates



## EV Cost Reduction

# Bringing Philippine EV Forward

### Importation Tariff Exemption

- To cover both BEV and PHEV
- Minimum battery range should be explored in the future

### Excise Tax Exemption

- To cover PHEV since BEV no longer have excise taxes

### Value Added Tax Reduction / Exemption

- Exemption to be applicable to required adoption as indicated in the demand generation
- 50% reduction for all other purchases
- Until 2025

### EV Eco-PUV Programme

- Similar to Cars program but to focus on e-jeepneys and e-buses
- Additional incentives for each locally sourced major part



# Bringing Philippine EV Forward

## EV Charging Infrastructure Development Plan

- Short term to focus initially in “EV Lead Areas” and will be voluntary
- Medium term to include mandated installations in “EV Lead Areas”
- Long term to expand mandated adoption through out the country

## EV Charging Infrastructure Regulations

- To cover residential condominiums, office buildings, communal buildings, commercial buildings, commercial parking lots and tolled highways
- Corporate tax incentives and/or CSR program

## Charging equipment tariff and tax exemptions

- Importation tariff free importation of 20 kW and higher units
- Value added tax exemption

## Charging standards protocols and installation guidelines

- Market based and ASEAN considerations
- Standard operating procedures for private installations
- Streamlining of LGU permitting processes

## Reduced Power Rates and Charging Rates Setting

- Development of charging rate setting regulations Exemption from
- Exemption from payment of subsidy shares ( approx. 75 centavos )

## Demonstration Programs

- Multi-stakeholder with government as a key player
- Demonstration of various charging system business models
- To provide proof of concept of planned regulations



# Bringing Philippine EV Forward

## EV Assembly and Parts Production Incentive Program

- Eco-PUV Program
- Competitive program vis a vis ASEAN countries
- Coupled with local demand generation

## Local EV Industry Fund

- Soft loans to support continuous production of Local EVs

## Vehicle Classification Harmonization

- Standardized vehicle classifications used by LTO, BOC and BPS to facilitate registration of the EVs
- Work is on-going

## Specific Tariff Code for EVs

- Separate tariff code to facilitate exemptions for EVs
- In place already as per tariff commission

## EV Standards Testing and Capability Building

- Rationalize and plan-out phased adoption
- Local capability building program to implement standards
- Set energy economy , range and durability thresholds



# Bringing Philippine EV Forward

## Battery Local Manufacturing Roadmap

- Plan out and implement road map for the eventual production of the EV batteries capitalizing on the cobalt and nickel reserves of the country

## Transport and Auto Informatics Industry Roadmap

- Plan out and implement road map to develop the country as an outsourcing hub for transport and auto informatics capitalizing on the vast IT human resource of the country

## EV Human Resource Development

- Development and introduction of training and certification programs to ensure adequate and competent workforce to support EV and parts design, production, maintenance and operation.

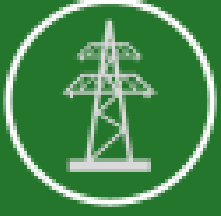
## Local EV Research and Development Program

- Develop and support R and D road map for the local EV industry
- Bid contract based
- Performance target based

## Information and Education Campaigns

- IEC for all sectors concerned
- Pilot programs in “EV lead cities”





**[Thank You]**