



Centre for
Energy Finance

Financing India's Mobility Transition –

A USD 206 billion market opportunity
(FY21 – FY30)

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Energy Access



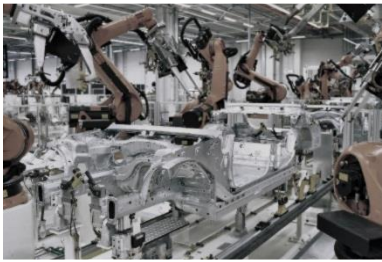
Renewables



Power Sector



Industrial Sustainability &
Competitiveness



Low-Carbon Pathways



Risks & Adaptation



Technology, Finance, &
Trade



CEEW Centre for Energy
Finance

Build evidence.

Consistent, detailed monitoring & analysis of clean energy markets – investment, payment schedules, market trends, etc.

Create coherence.

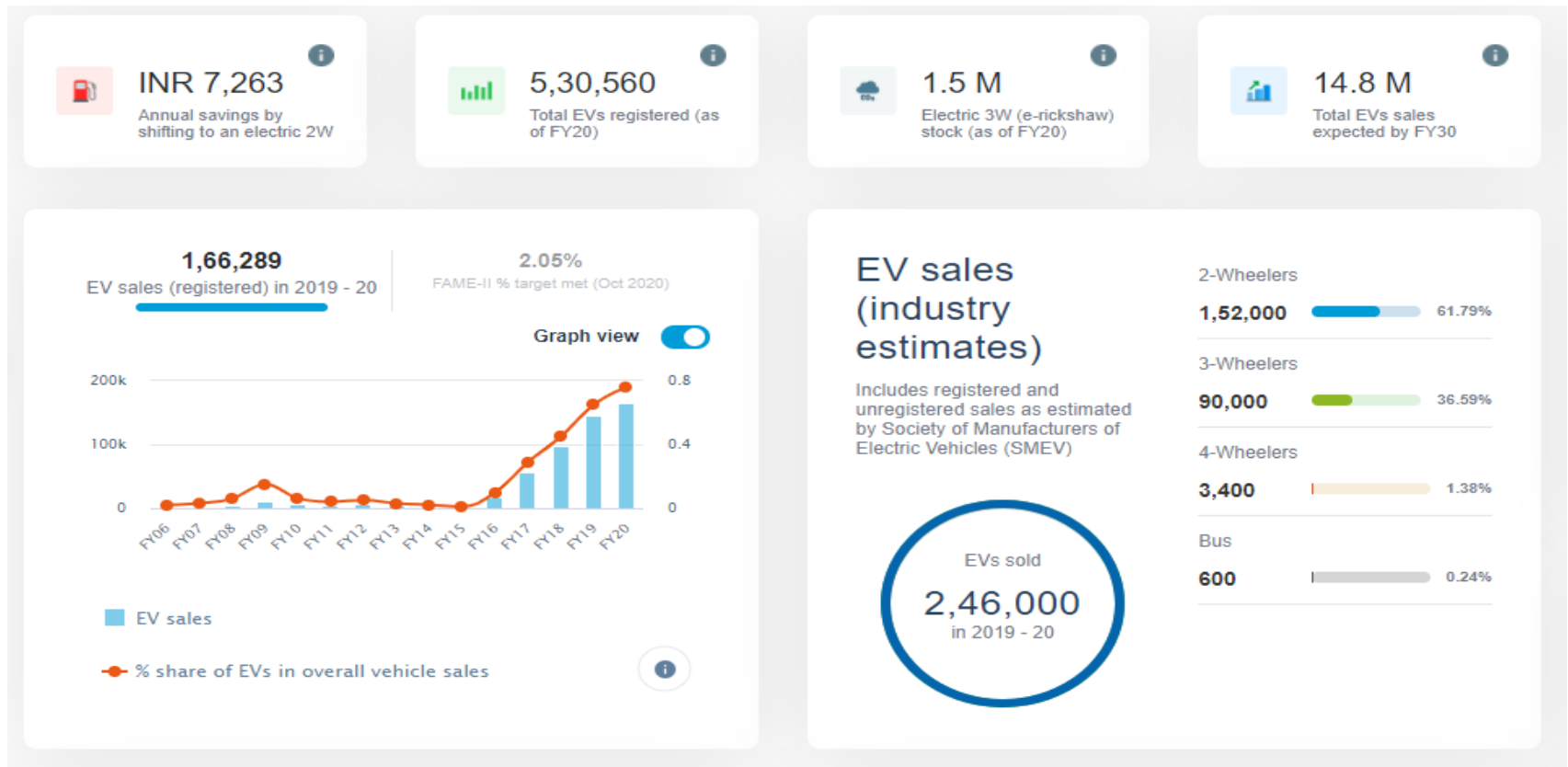
Periodic convening of multi-stakeholder groups to deliberate on market activities in clean energy

Design solutions.

Designing and proof of concept of fit-for-purpose business models & financial solutions in clean energy

India's EV story – Sector at a glance (1/n)

- Total number of registered EVs stood at 530,560 till FY20. Approximately, 50% of EVs were added in FY20 alone, with two - wheelers contributing to over 60% of the new vehicle stock.
- India has a network of 1827 charging stations as of FY20 led by the Maharashtra which has the maximum number of charging stations. Slow chargers contribute 36% of the total number of charging stations



What is size of the opportunity presented by India's EV sector?

What is the quantum of investment (public and private) needed across segments to drive mobility transition?



Estimating the contours of EV adoption in India till FY 30 - demand estimation of electric vehicles adoption across categories, battery pack requirements and public charging infrastructure requirements.



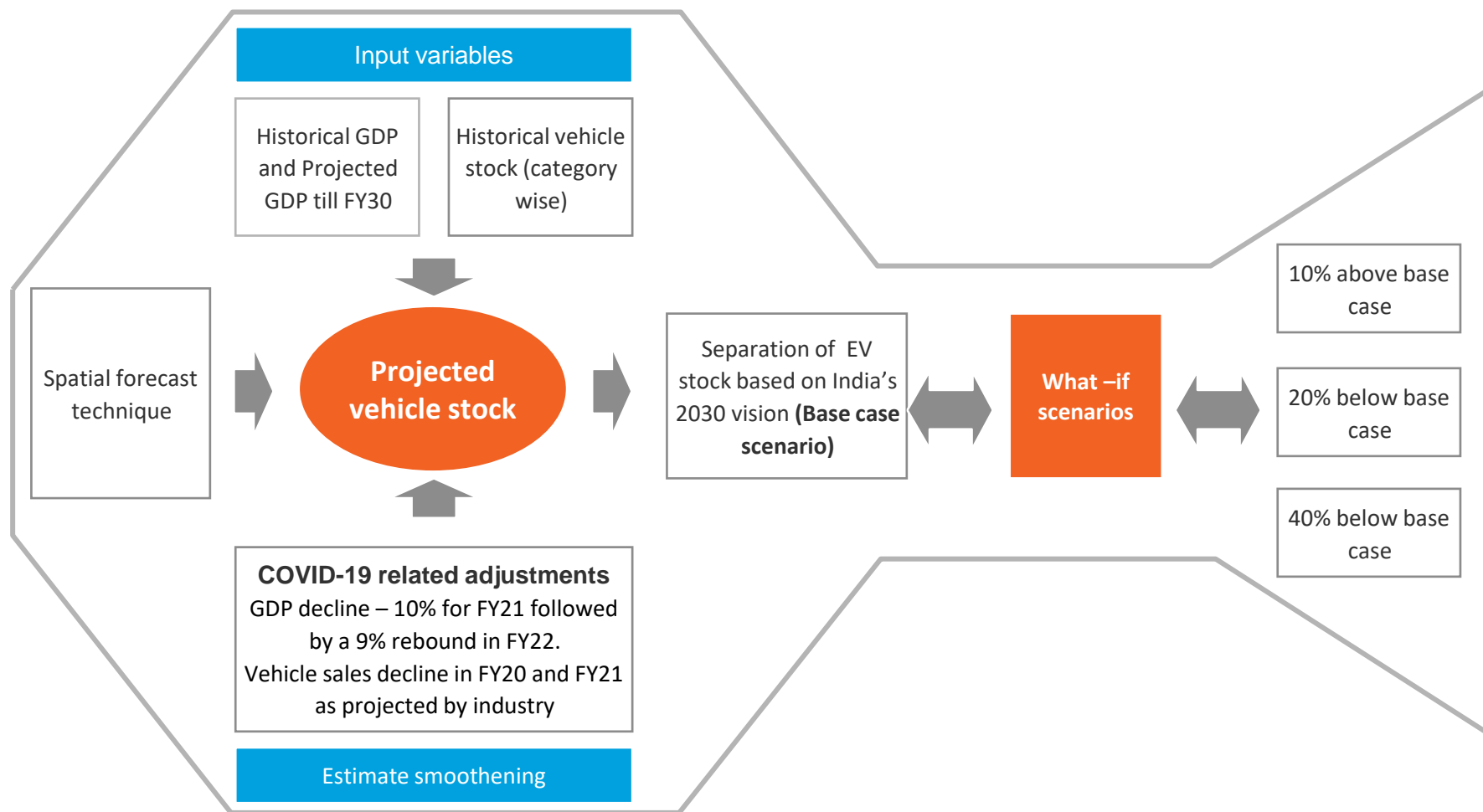
Sizing EV investment opportunity for manufacturing and deployment – investment required from and for OEMs, battery manufacturing, charging infrastructure and end-consumers



Identifying barriers to accessing capital and solutions to attract investments at scale for an electric mobility future envisioned till 2030.

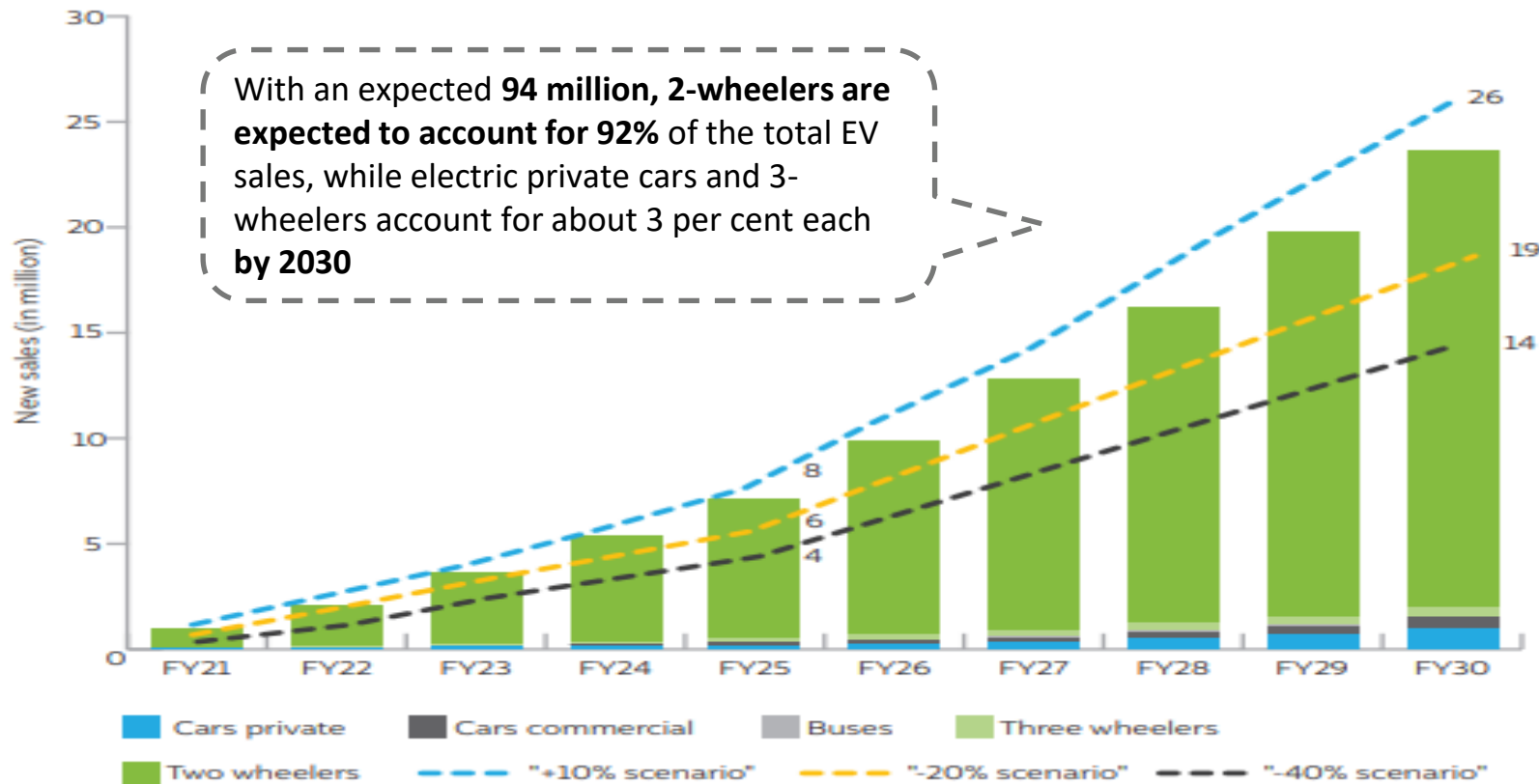
Approach and methodology

Estimating EV adoption based on scenario analysis



Base case scenario for EV - 70 per cent of all commercial cars, 30 per cent of private cars, 40 per cent of all buses, and 80 per cent of two-wheelers and 3W (NITI Aayog + RMI)

India's 2030 vision of e-mobility translates into 102 million EV sales by 2030 led by 2-wheelers



158 GWh of total battery demand - commercial cars lead the replacement demand for batteries while 2-wheelers lead the demand based on new vehicle sales

Battery demand estimation

Input variables

- Battery capacity requirements for each vehicle categories
- Projected new vehicle sales
- Demand for **replacement batteries** based on battery life, life of the average vehicle, and the average distance covered

Output

- Demand for batteries led by new vehicle sales
- Replacement demand for batteries
- **Total demand for batteries = New demand + Replacement demand**

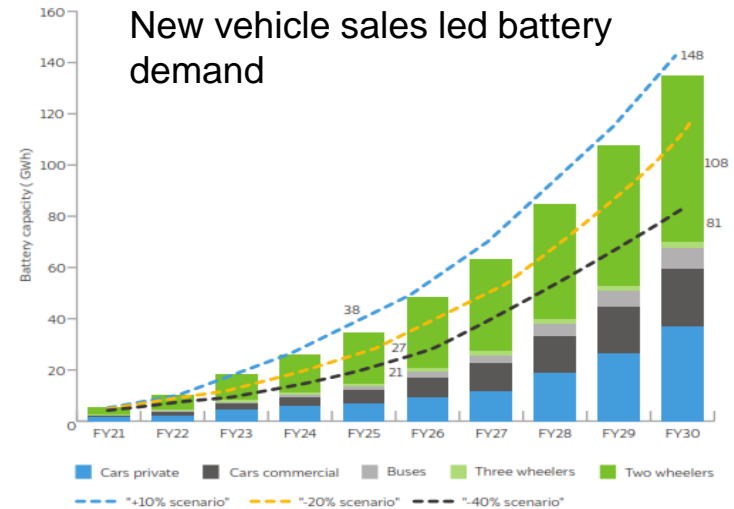
What –if scenarios

10% above base case

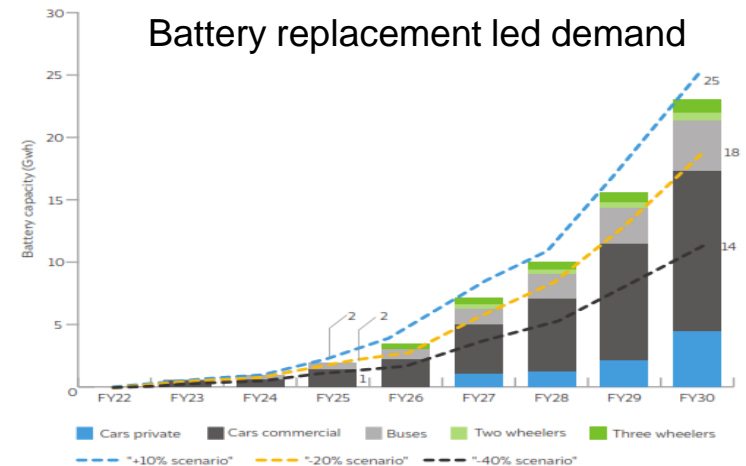
20% below base case

40% below base case

New vehicle sales led battery demand

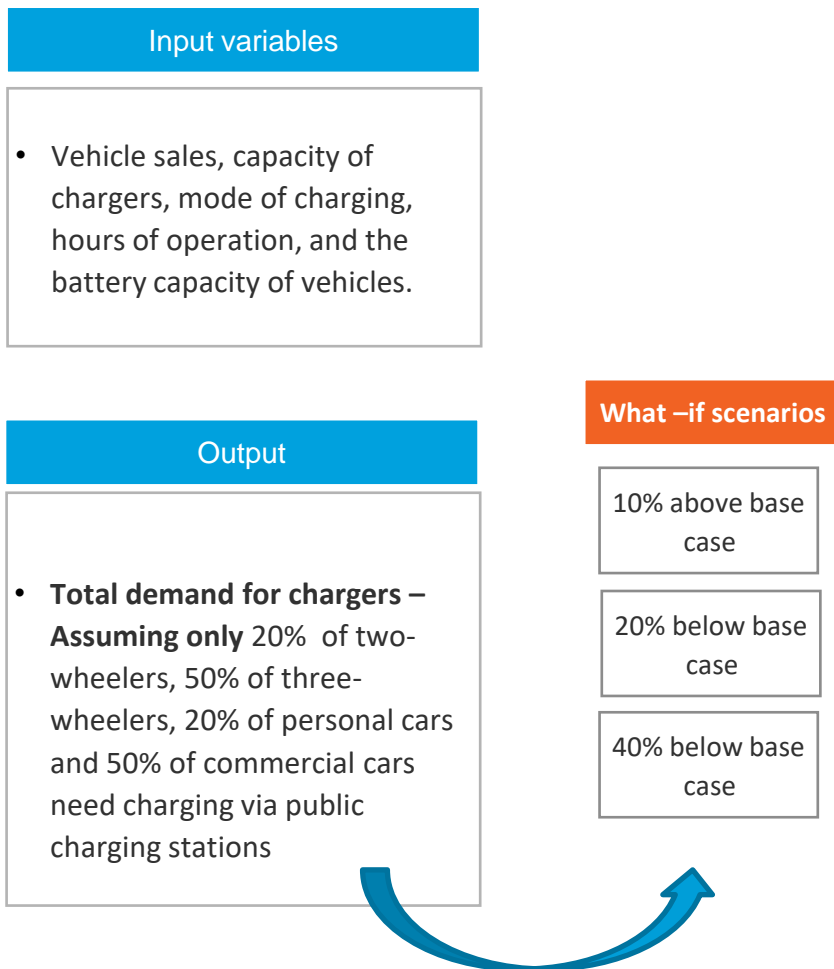


Battery replacement led demand

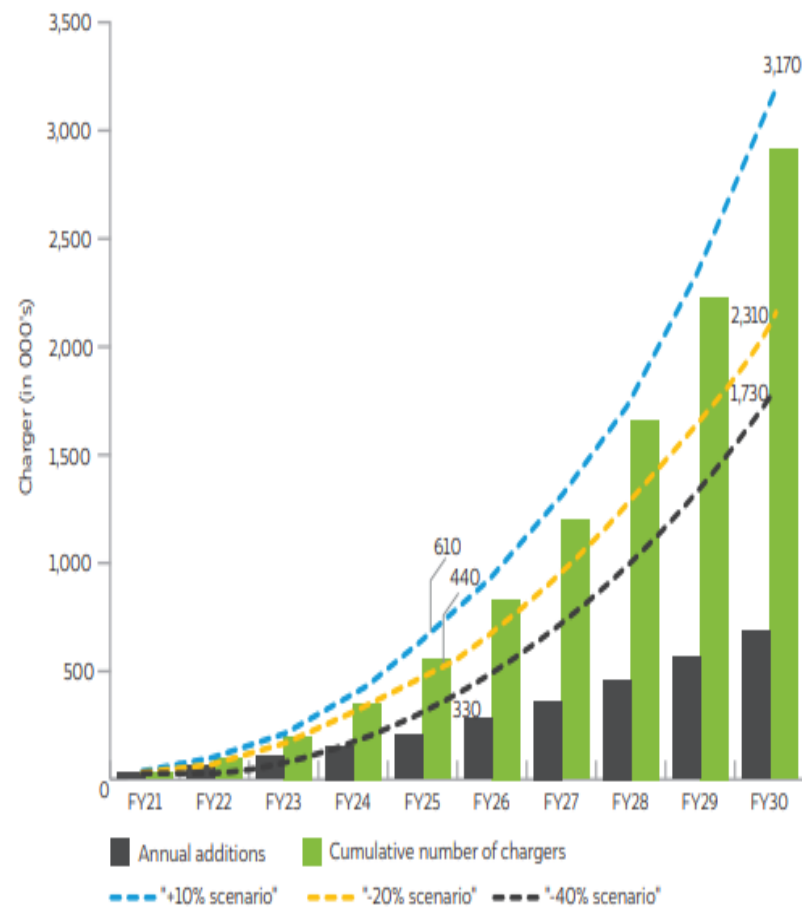


102 million EVs by FY30 will need deployment of 29,38,000 public chargers

Public chargers demand estimation

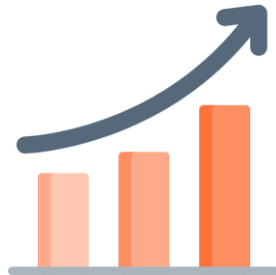


Number of chargers



Estimating investment opportunity presented by the deployment of EVs till FY30

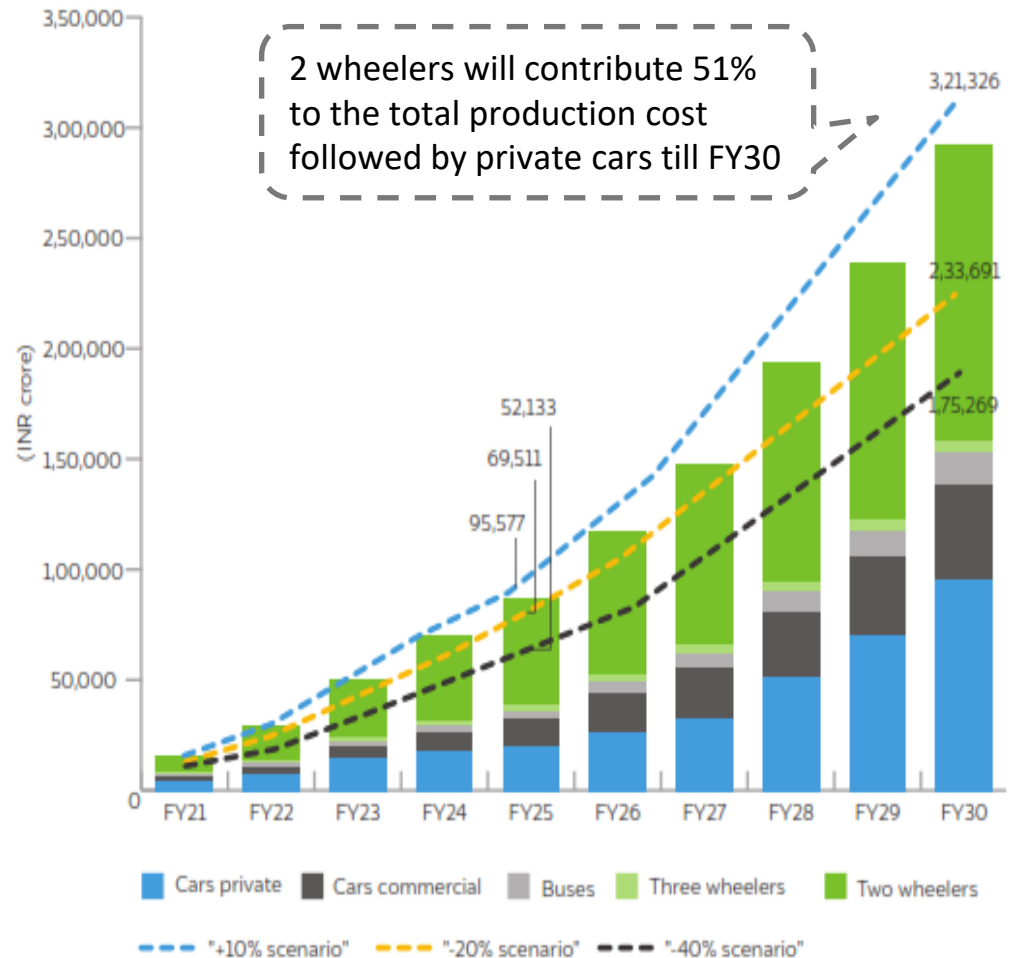
Mobility transition presents a USD 177 billion investment opportunity for OEMs by FY30



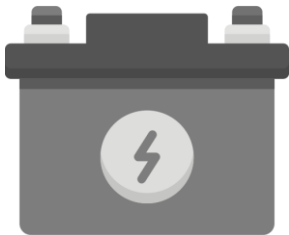
- To calculate the production costs of EVs we calculated direct costs like production and assembly costs based on balance sheet of OEMs.

	2W	3W	4W	Buses
Average material costs	76%	72%	76%	73%

- Annual production cost = Direct cost of producing EV (in %)*Projected cost of vehicle (Battery + non-battery component)**

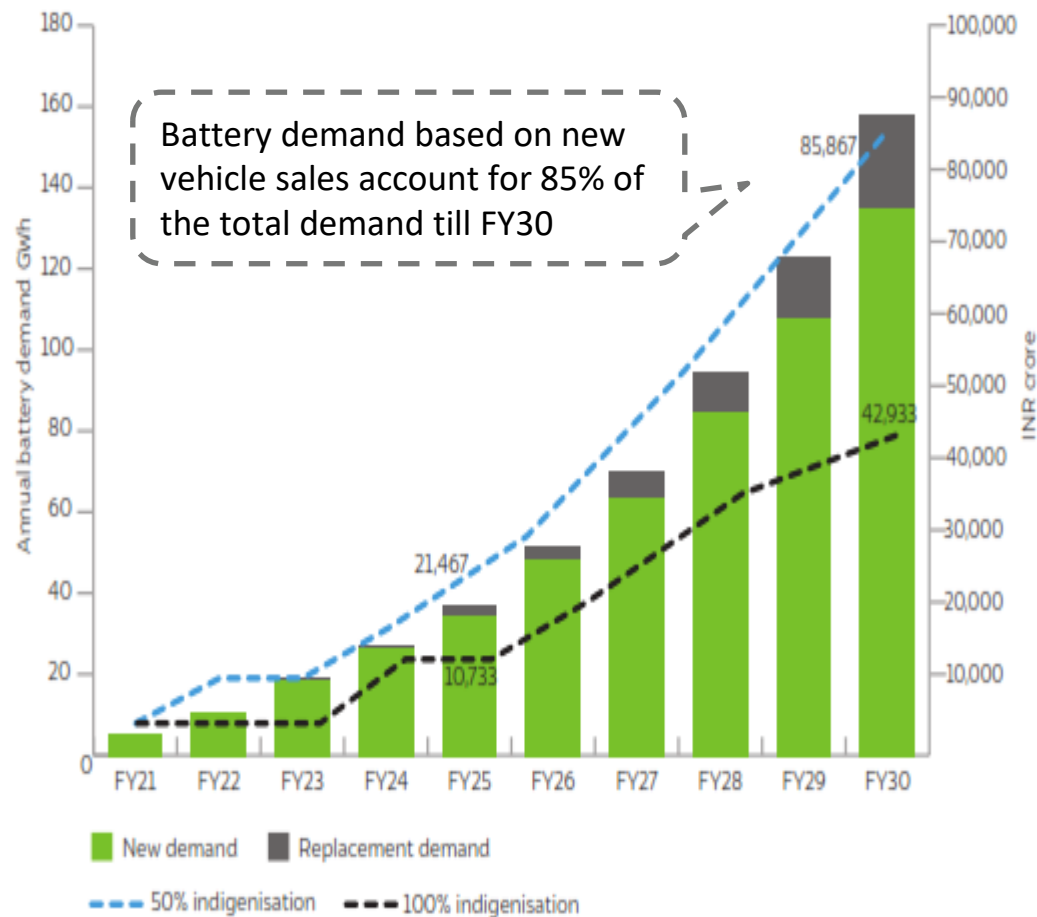


158 GWh of battery demand to create USD 12.3 billion investment opportunity under 100% indigenisation scenario by FY30

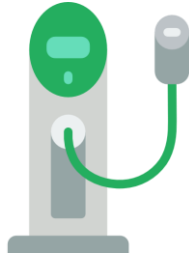


Approach

- Total battery demand = New demand for batteries + Replacement demand for batteries.
- CAPEX cost for setting up a 10 GWh production capacity is assumed to be USD 0.73 billion
- Investment requirement for battery manufacturing = $\text{CAPEX cost} \times \text{total battery demand}$
 - Under 100% indigenisation
 - Under 50% indigenisation



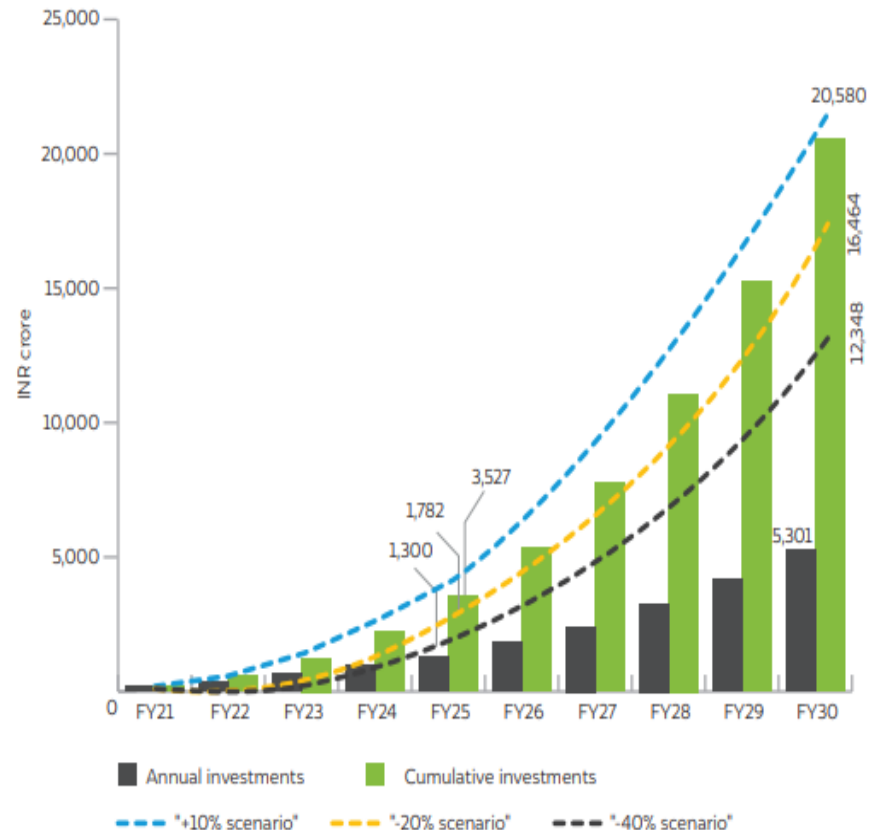
Achieving India's vision of e-mobility by 2030 will require 29,38,000 PCS and investment of USD 2.9 billion



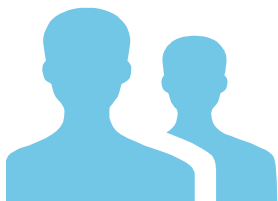
- Cost of chargers based on industry estimates

	CCS & CHAde MO	Type 2 AC	Type 1 DC	Bharat AC-001
In INR	12 lakh	2.2 lakh	42,000	15,000

- Initial installation and setup costs such as connection charges, land lease, and installation costs is assumed to add 20% to 50% of the cost of charger for putting up the PCS.



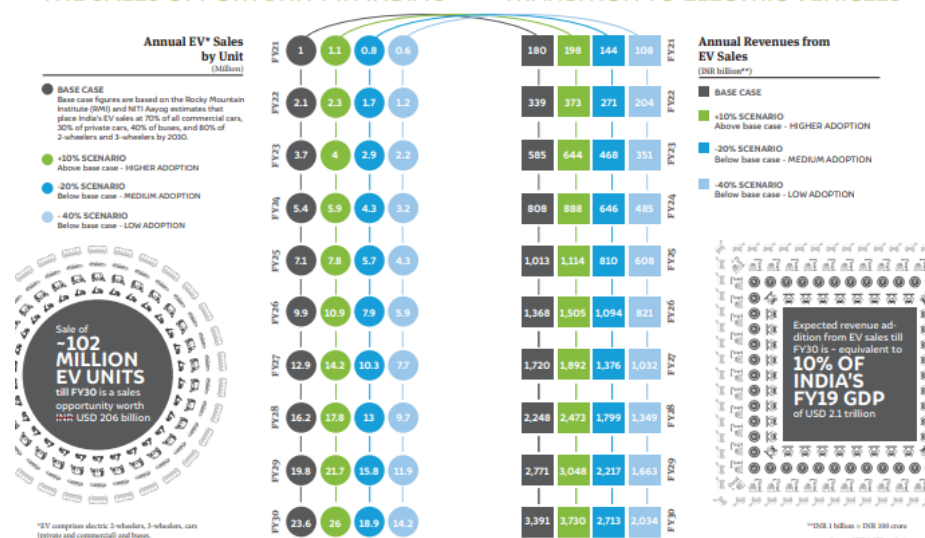
Mobility transition presents a USD 206 billion sales opportunity till FY30



Approach

- To derive the cost of EVs for consumers, we added the dealer margin on top of the OEM's margin to the production costs.
- Dealer margins vary across segments, from 4 -16 per cent. End consumer may end up paying far more due to insurance, registration charges, GST charges

USD 206 BILLION THE SALES OPPORTUNITY IN INDIA'S TRANSITION TO ELECTRIC VEHICLES

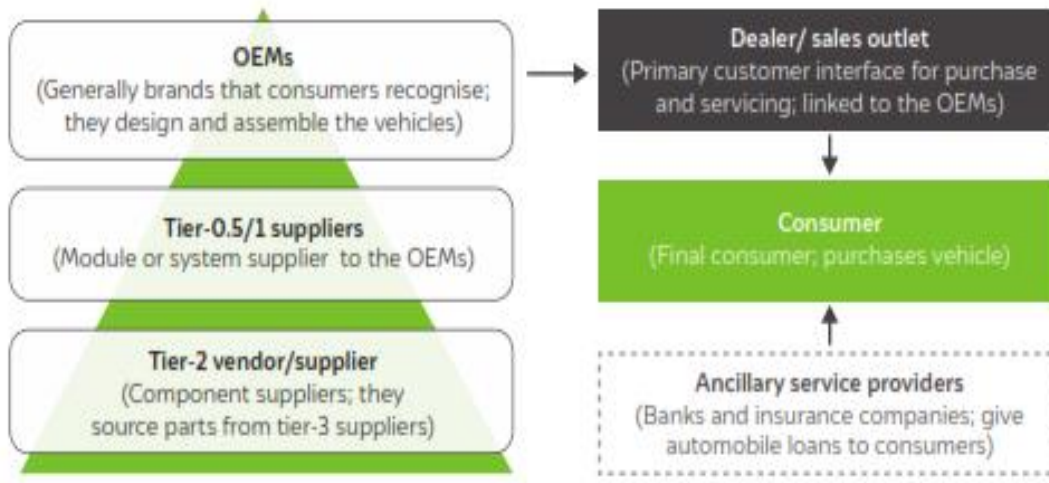


Revenue addition via sales highest for 2-wheelers followed by private cars

Barriers and solutions to accelerate the flow of EV investments

Barriers and solutions to accelerate investments required for EV production

- India's EV sector is dependent on SME OEMs and Tier 2 and 3 auto-component suppliers
- Smaller OEMs and Tier 2 and 3 auto-component suppliers face significant barriers in accessing capital due to –
 - **the size of their balance sheets,**
 - **low certainty of cash flows, and the long gestation period of investments**



Partial Credit Guarantee

- Can enable banks to extend credit to SME OEMs and auto component suppliers if a percentage loss guarantee is provided

VC & SME assistance fund

- Long term equity finance which can boost SME OEM's capital base.
- Seeking collaboration with larger OEMs

Barriers and solutions to investment flow for charging infrastructure deployment

- **Charging infrastructure business**

- Weak business case for setting up charging stations due to:
 - low and unknown future demand for EVs
 - lower cash inflows versus the high investment requirements for setting up the business
 - business model



Charging infra investment facility

Public money funded facility which can provide financial assistance in the form of VGF or direct subsidies for lowering the CAPEX requirements .

Capping rental cost for PCS

Land cost comprises about 15% of the CAPEX cost for DC charging and 25% of the CAPEX cost for AC charging.

Targets for EV procurement

Mandatory targets can create demand certainty for charging point operators

Barriers and solutions for EV adoption by end-consumers

- **High upfront cost of EVs**
 - EVs upfront cost is typically 1.2X–3X more than similar ICE vehicles
 - Small-scale operators or individual owners like three- wheelers drivers and individual commercial car drivers/owners may find it difficult to raise loan due to lack of credit history
- **Scale of investments required**
 - if only 50 per cent of the EV upfront costs, i.e., INR 7,21,000 crore (USD 103 billion) required throughout FY21–FY30 is financed through debt, the banking sector will have to more than triple its current advances of INR 2,17,000 crore (USD 31 billion) towards vehicle loans in the next ten years (RBI 2020)



Annualisation

Annualisation would distribute the upfront cost of EVs as well as operating costs (including fuel, maintenance, and insurance) into equal annual costs,

Disincentives for ICE vehicles

Disincentives, in the form of duties or environmental cess levied on the purchase of ICE vehicles, would increase their cost compared to EVs

Innovative business models

Innovative business models for battery reuse/recycling/leasing can reduce the upfront cost of EVs

India's EV sector presents an opportunity for innovation, entrepreneurship, technological advancement, indigenous manufacturing, new jobs, and sustainable development.

\$206 bn

Market opportunity and investment window created by EV sales till FY30

10%

Expected revenue addition from EV sales = 10% of India's FY19 GDP of USD 2.1 trillion

203%

Increase in EV production from 0.53 million in FY20 to 102 million by FY30

26,316

Saves 26,316 Mt Carbon dioxide by FY30

<https://cef.ceew.in/solutions-factory/publications/financing-india-transition-to-electric-vehicles>



Thank you

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