

## *EV Industry in India*

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**&**

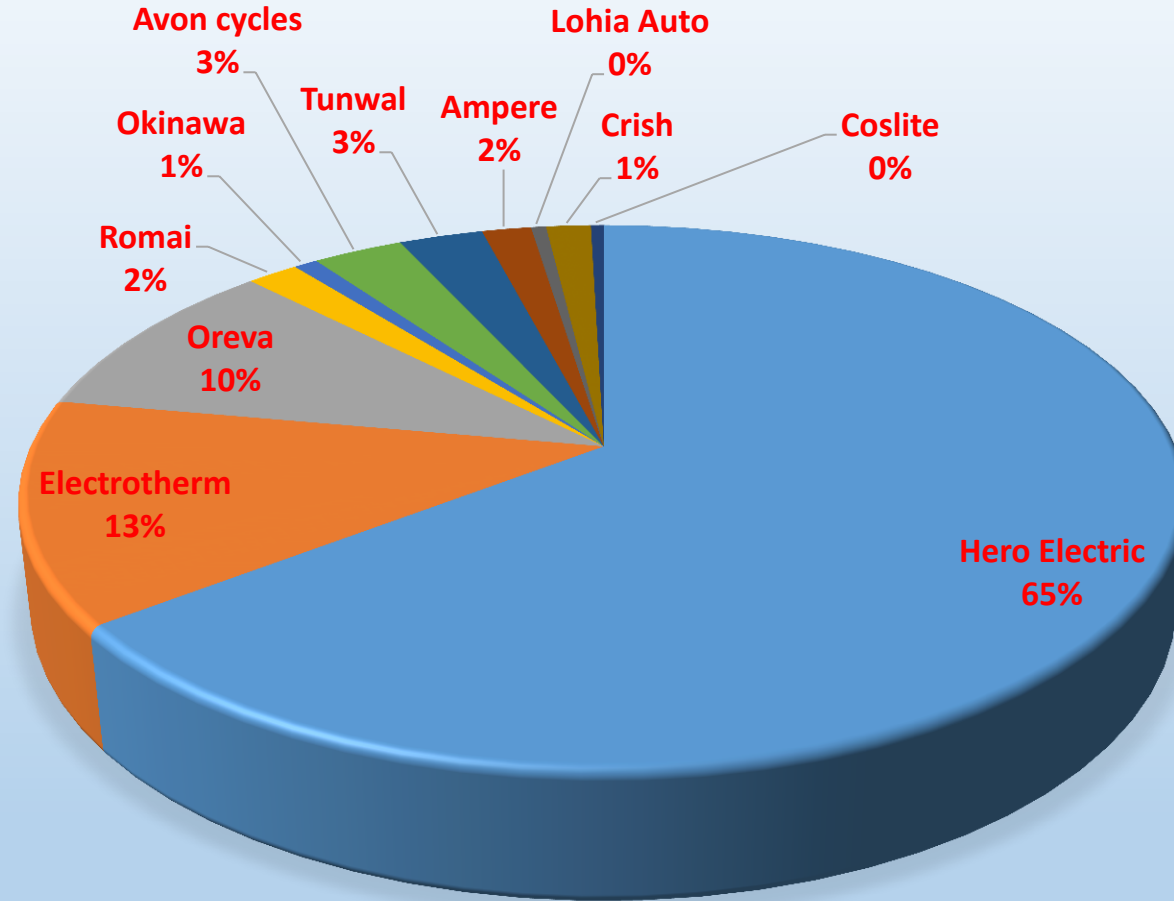
**CEO Global Business: Hero Electric Vehicles Pvt Ltd.**



**HERO**eLECTRIC  
India's Largest Selling Electric Bikes

# SMEV: India's only Govt Recognized Association Representing EVs

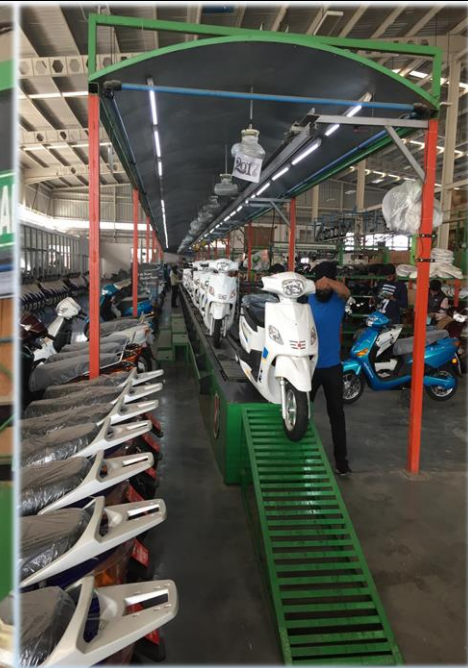
## SMEV: MEMBERS



**SMEV formed in 2008**

| SMEV Members                     | No. |
|----------------------------------|-----|
| 2-Wheeler                        | 11  |
| 4-Wheeler Members                | 1   |
| Battery & Component manufacturer | 4   |

# Hero Electric Vehicles Pvt Ltd



# Indian Roads



# EV Population in India: till now (units)



50



7,000

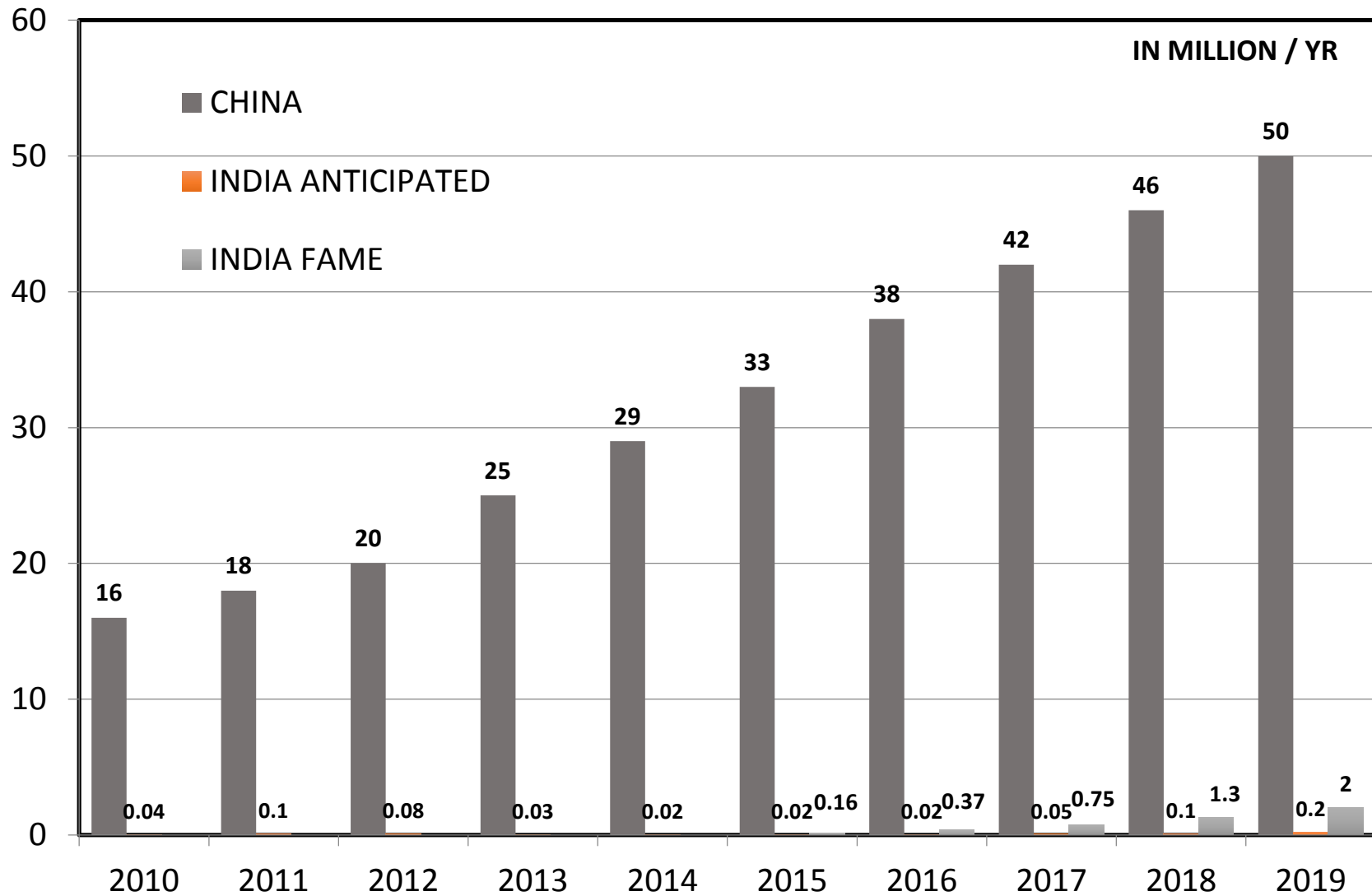


400,000









600,000

# Catching up with China.....OUT OF REACH !



# Consumer Expectations

| Current   | Current Specs  | Expected Benchmark Specs   | Expectation  |
|---|--|--|--|
|   | <ul style="list-style-type: none"> <li>• 250 W – 500W motor</li> <li>• Speed &lt;25 km/hr</li> <li>• Range &lt;60 km/charge</li> <li>• Lead batteries</li> </ul>   | <ul style="list-style-type: none"> <li>• 1000W- 3000W motor</li> <li>• Speed 45-60 km/hr</li> <li>• Range min 60km/charge</li> <li>• Smart Connectivity</li> <li>• Lithium batteries</li> <li>• Price- under \$1000</li> </ul> |   |
|   | <ul style="list-style-type: none"> <li>• Speed &lt;100 km/hr</li> <li>• Range 100-120 km/charge.</li> <li>• Lead batteries</li> </ul>                              | <ul style="list-style-type: none"> <li>• Top speed &gt;100 km/hr</li> <li>• Range 150+ km/charge</li> <li>• Lithium batteries</li> <li>• Price- under \$8000</li> </ul>  |   |
|  | <ul style="list-style-type: none"> <li>• 500W – 1000W motor</li> <li>• Speed &lt; 25 km/hr</li> <li>• Range &lt; 80 km/charge</li> <li>• Lead batteries</li> </ul> | <ul style="list-style-type: none"> <li>• 1000+ W motor</li> <li>• Speed &gt;25 km/hr</li> <li>• Range &gt;80 km/charge</li> <li>• Lithium batteries</li> <li>• Price- under \$2000</li> </ul>                                  |  |

## Additional Common Features

- Battery Swapping Mechanism
- Rapid chargers
- Public Chargers

# EVs make a lot of sense in India



|                                  |            |
|----------------------------------|------------|
| <b>CO2 emission (Million MT)</b> | <b>250</b> |
|----------------------------------|------------|

| <b>PM category</b> | <b>Average levels <math>\mu\text{g}/\text{m}^3</math></b> | <b>Prescribed Limits <math>\mu\text{g}/\text{m}^3</math></b> |
|--------------------|---|--|
| PM 2.5             | 300   | 60   |
| PM 10              | 400   | 100  |

| <b>Crude oil Imports</b>       |     |
|--------------------------------|-----|
| Crude oil imported (Million T) | 183 |
| Foreign exchange (Billion \$)  | 112 |



# EVs – The need of the hour



Vehicular pollution contributes 20% of the India's total GHG emissions.



India had 3000+ per day premature deaths due to ambient air pollution,

*Source:- Institute for Health Metrics and Evaluation at the University of Washington in Seattle-2015.*



- “In 2010, wheat yields were 36% lower and the models show that 90% of that change was due to the pollutants.
- In the case of rice, 15% of yield decrease”

*Source:-University of California*

## ‘Paris Climate Agreement - 2016’ : India’ s stand

- To reduce emission intensity by at least 33% by 2030.
- To generate at least 40% electricity by non fossil fuel sources by 2030.
- To create an additional carbon sink of about 2.5bn – 3bn tonnes.

# India is a two wheeler country

|                           | For total petrol 2W population at present | For petrol 2W that will be purchased next year |
|---------------------------|---|--|
| No. of 2 Wheelers (units) | 160 Million                               | 20 Million                                     |
| Petrol consumed (L)       | 300 Billion                               | 30 Billion                                     |
| Fuel cost                 | \$32 Billion                              | \$3 Billion                                    |
| CO                        | 5.4 Million tons                          | 0.6 million tons                               |
| HC + NOx                  | 3 Million tons                            | 0.4 Thousand tons                              |
| CO2                       | 111 Million tons                          | 13 Million tons                                |

# What if 1% of two wheelers are converted to Electric

|                           | For total petrol 2W population in 2020 | Impact of Replacing 2-Wheelers Population with Electric 2- Wheeler in 2020 |
|---------------------------|--|--|
|                           |  | Replacing just 1%  |
| No. of 2 Wheelers (units) | 220 Million                            | 2 Million  |
| Petrol consumed (L)       | 66 Billion                             | 660 Million  |
| Total Fuel Cost           | \$60 Billion                           | \$6 Billion  |
| Crude oil (L)             | 142 Billion                            | 1 Billion  |
| CO <sub>2</sub> Emission  | 151 Million tons                       | 1.5 Million tons   |



# A slow start – an uncertain future

| <b>Electric 2 wh</b> | <b>15-16</b> | <b>16-17</b> | <b>17-18</b> | <b>18-19</b> | <b>Total for 4 years</b> |
|----------------------|--------------|--------------|--------------|--------------|--------------------------|
| Govt. says           | 163,921      | 317,437      | 755,569      | 1,278,687    | 2,515,614                |
| SMEV thinks          | 20,000       | 25,000       | 75,000       | 130,000      | 250,000                  |
| Achievement (%)      | 12%          | 8%           | 7%           | 8%           | 10%                      |

A lot needs to be done to catch up on  
Government Targets

# Should I...Should I not...

Current Customer Expectation



Reality is!!

Poor performance- Starting trouble or something deeper?

**THE 5 LAC ODD  
ELECTRIC TWO WHEELERS  
SOLD IN THE COUNTRY  
TILL DATE  
ARE TO BLAME  
.....TO CERTAIN EXTENT**

SMEV feels that  
at-least  
1 Million High performance  
Electric 2W In 2017  
Can create an inflexion point  
By creating visibility  
And  
establishing TCO advantage to  
Get back to NEMMP figures

# 1 Million E2W in 2017....How Easy.... How Difficult ?





# Choice is Clear

## Incentivize



## Disincentives

- Pollution guzzling vehicles should be disincentivised.



## Mandate

- Companies in delivery business should be made to shift to EVs.



# Government Initiatives

## NEMMP:

- Around 20% subsidy on all EVs, with target of 6 -7 million EVs by 2020.

## Smart city initiative:

- Planned to have 100+ smart city with hybrid/electric public transport

## Green Urban Mobility Scheme

- To promote use of hybrid/electric public transport.

## Consortium:

- PPP model for components of electric vehicles.

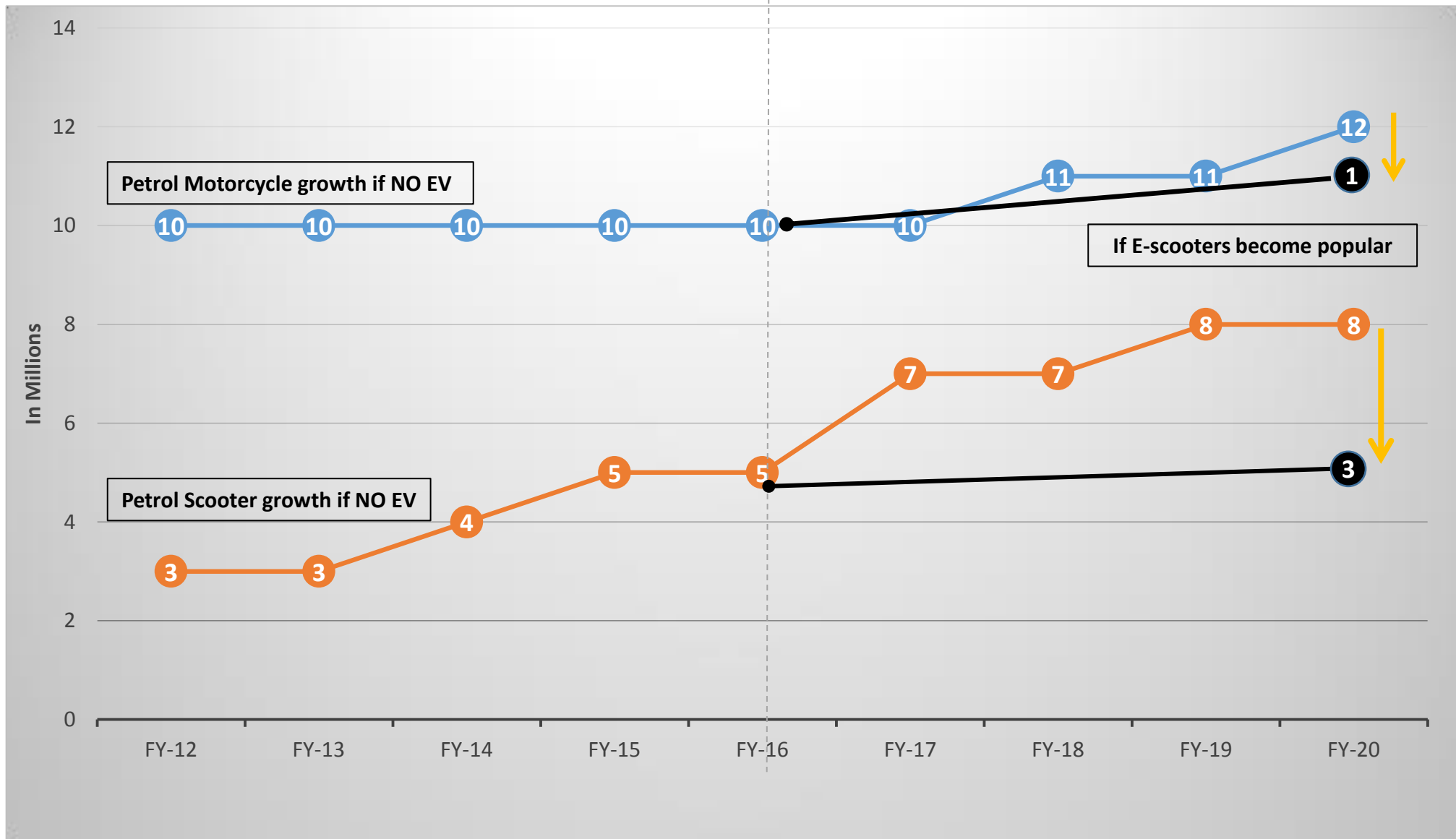
## R&D Funding:

- New technology upgrade, Power-trains, motors, etc.

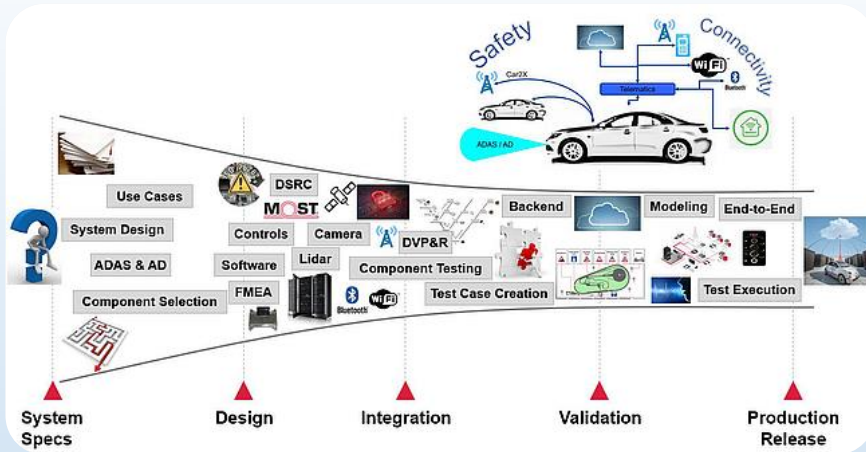
## Renewable Energy sources:

- Solar & wind energy smart grids to support EVs

# Likely Future of Petrol 2-Wheeler: India (in Millions)



# What's in for Taiwan Industry?



**System Integration Solution**



**Charging Infrastructure**



**Battery Swapping Infrastructure**



**OEM Supply**

*Come....Lets build a  
new future.*