HRIMAN Motors LLP

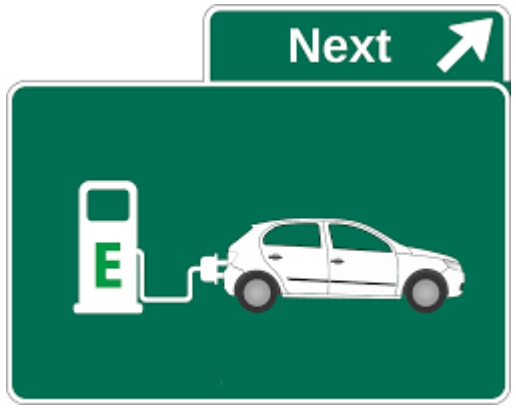
DR. RUSHEN CHAHAL

The Opportunity

1. GLOBAL ELECTRIC VEHICLE OPPORTUNITY AT A GLANCE
2. ELECTRIC VEHICLE MARKET IN INDIA

Electric vehicles- Automotive of the future

The EV revolution has hit the car market very hard. EVs are on track to accelerate to 54% of new car sales by 2040. Tumbling battery prices mean that EVs will have lower lifetime costs, and will be cheaper to buy, than internal combustion engine (ICE) cars in most countries by 2025-29*



Green powertrain concepts
Increasing number of electric and hydrogen-powered vehicles

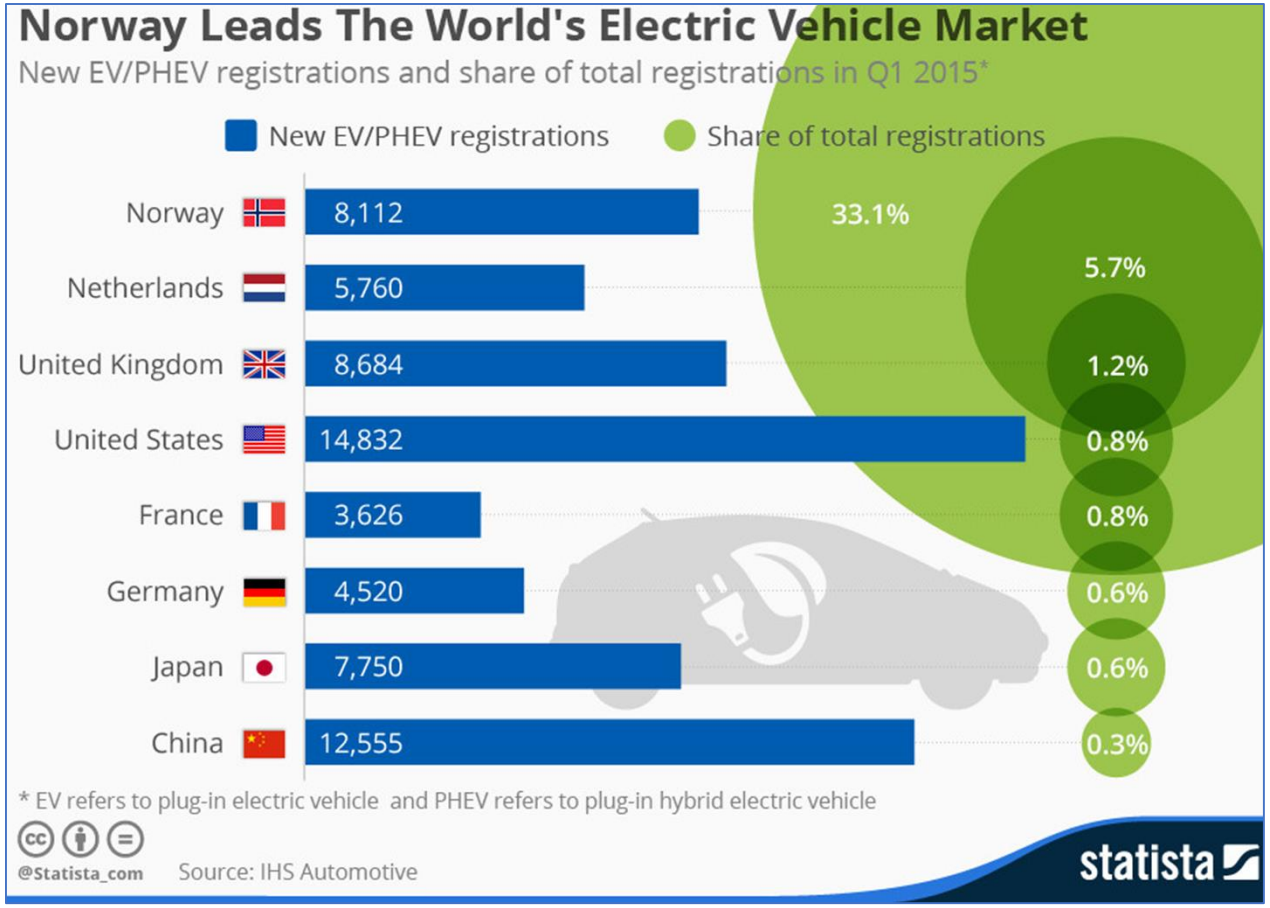
Augmented reality – new driving pleasure
Big data-enabled fun drive

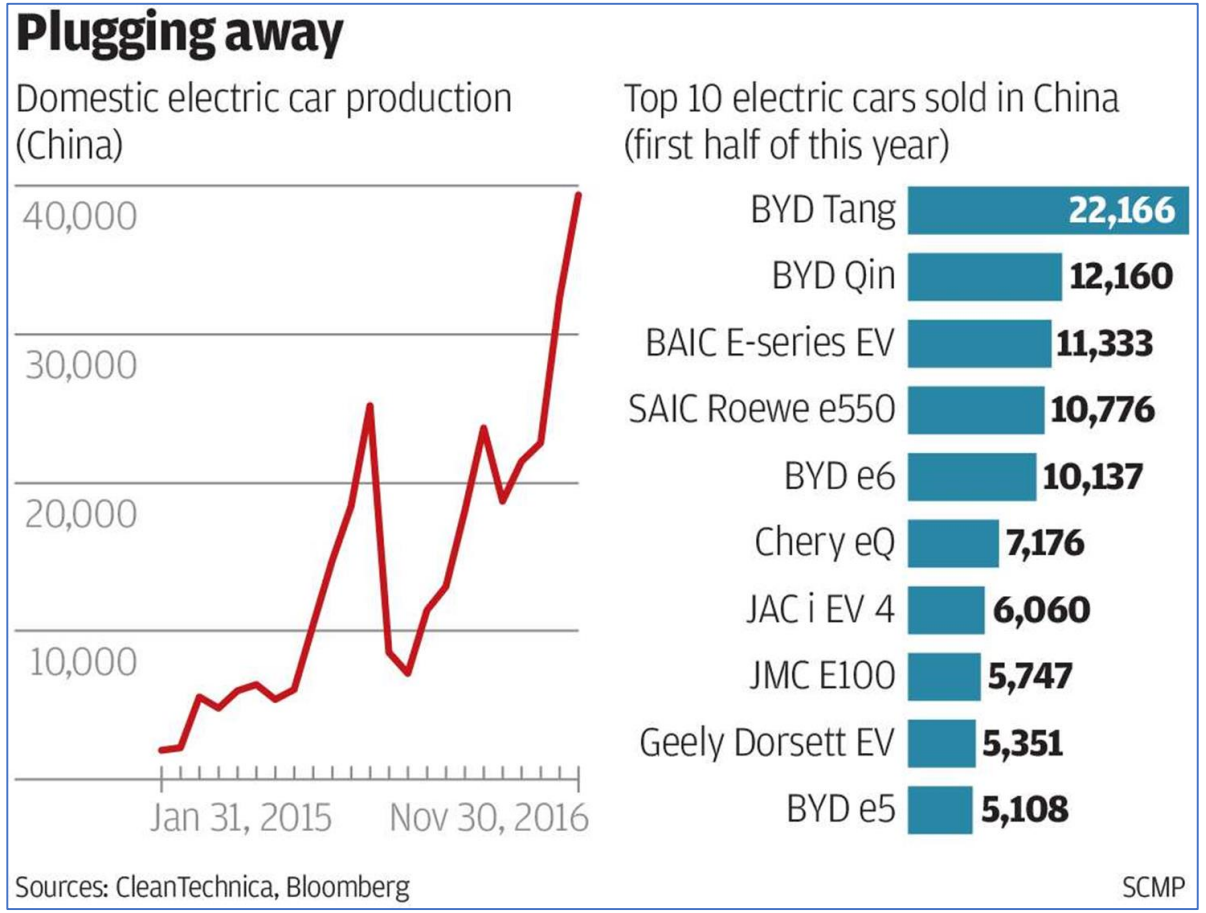
Fun car experience
Changing interior requirements enabled by autonomous driving

	TRADITIONAL FOSSIL FUEL POWERED AUTO	ELECTRIC & DIGITAL AUTO
Key Differentiation	Drive experience	Design	Functionality	Cheaper to drive, pollution free and easy to maintain	New entertainment experience while being driven

Source: Bloomberg New Energy Finance

Market Landscape for EV Cars





China Latest EV Sales

Second Best Selling car is a 2 seater: **Zhidou D1/D2**

Price: 11000-16000 Euros

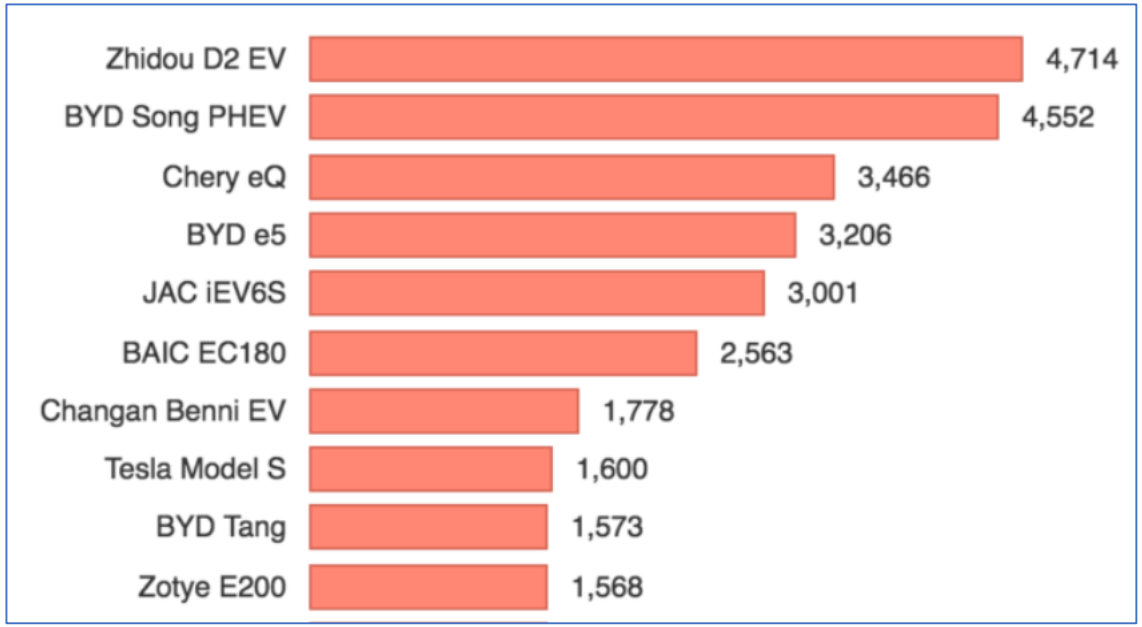
There have been months when it has been the top seller too

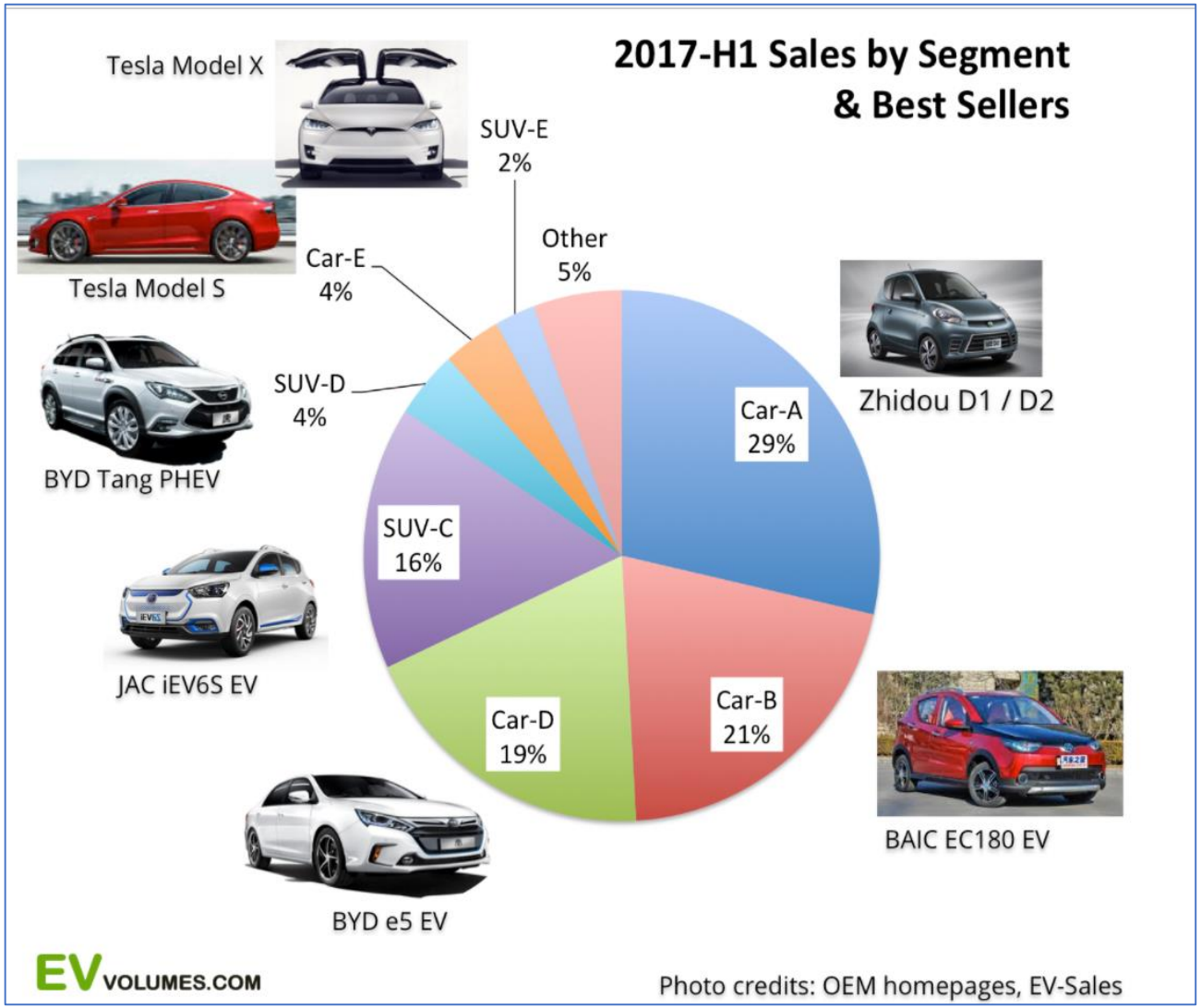
Range: 110 to 150 kms

Battery : 20 Kw LFP

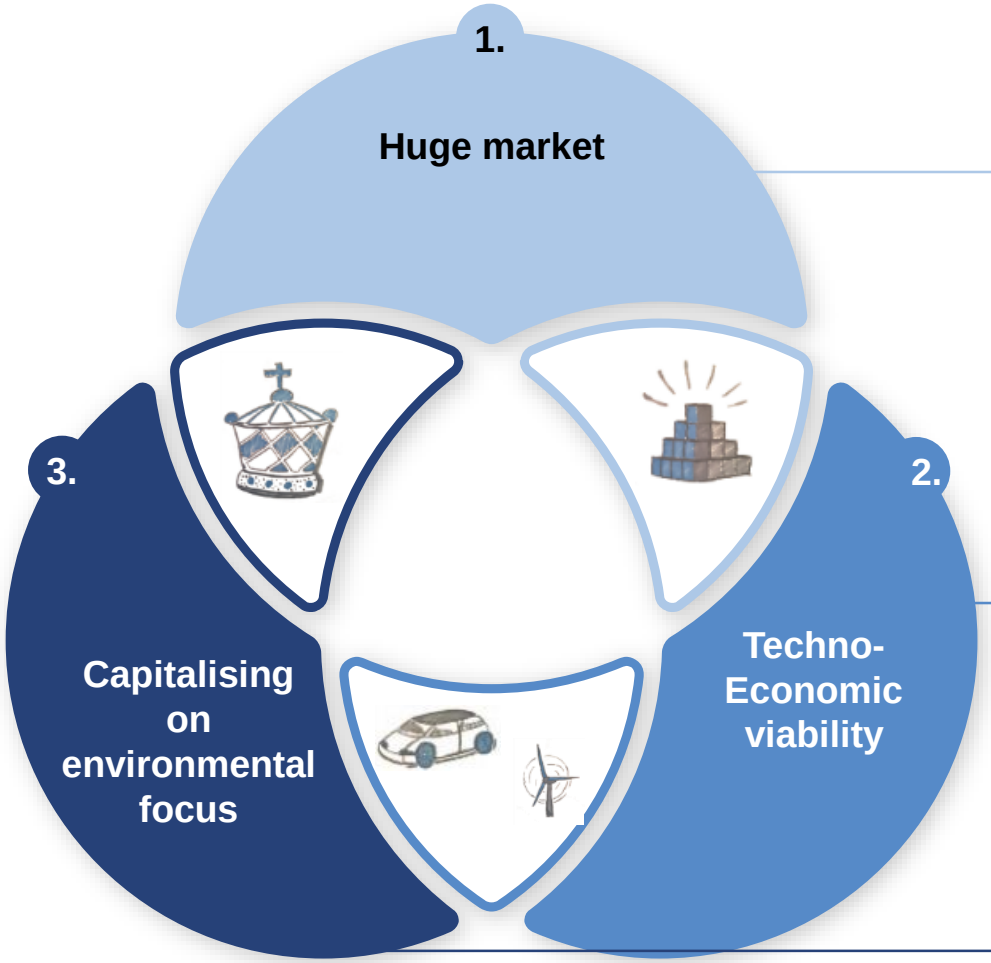
Top Speed : 80 km/hr

Brakes : Disc, no ABS





EVs in India: Why it's a real opportunity in India now?

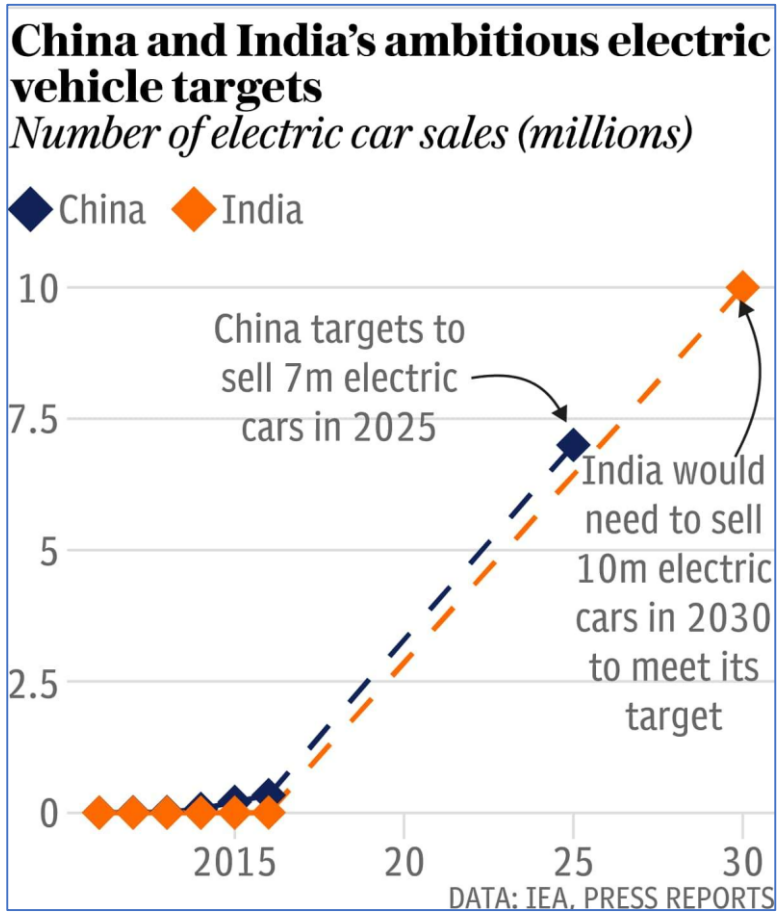


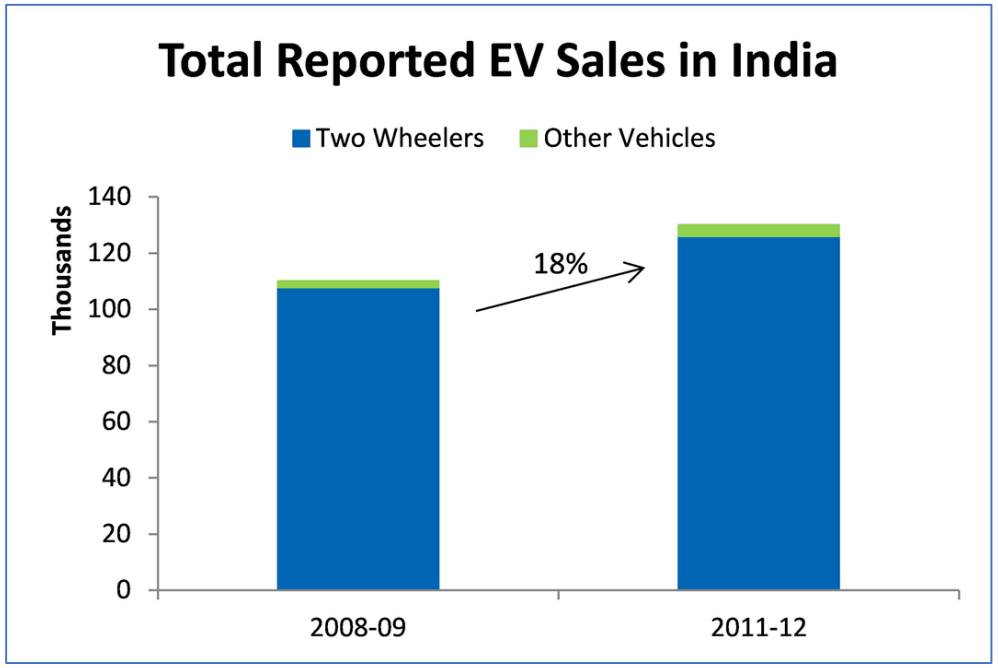
- 17 million two wheelers sold per annum
- 3 million 4 wheelers
- Electric about .001% or less
- Latent Market that has been created by the likes of Reva- sales volume limited due to irrational pricing

- Evolution of battery technology to suit the EV requirements
- Local design and development make it commercially viable

- Government push in India
- Environmental regulations
- Public Sentiment for the Environment

India Scenario





India's switch to electric vehicles will be rapid; 31m EVs by 2040

By *Rahul Oberoi*, ETMarkets.com | Updated: Sep 07, 2017, 11.29 AM IST

3 Comments

India sold only 25,000 units of electric vehicles in FY17, a good jump from 16,000 electric vehicles sold two years ago.

India may be slow in embracing electric vehicles, but once it takes off, the adaptation will be fast. The nation is estimated to see 30.81 million electric vehicles sales by 2040. That number comes from Amitabh Kant, CEO of NITI Aayog.

Addressing the annual convention of SIAM, India's auto industry lobby, Kant on Thursday said electric vehicles trend is set to grow in the country and India aims to reach zero emission by 2040.

India Scenario

Home » Industry

Last Published: Wed, Oct 11 2017. 08 51 AM IST

10,000 electric cars highlight steep path to India's ambitions

The pursuit for all electric new car sales in less than a decade-and-a-half is part of Narendra Modi's plan to champion the cause of combating climate change

Govt Target
the automobile sector's massive conversion will cut its oil bill by some $60 billion, reduce emissions by 37%, and curb the burgeoning demand for road infrastructure over the next 13 years.

livemint

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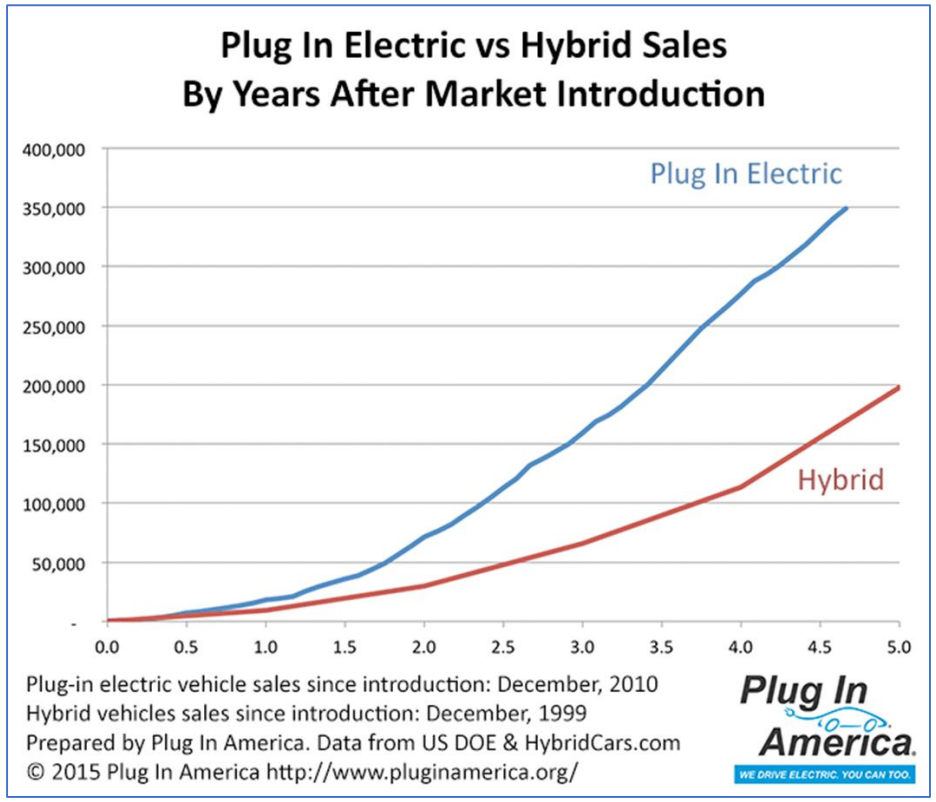
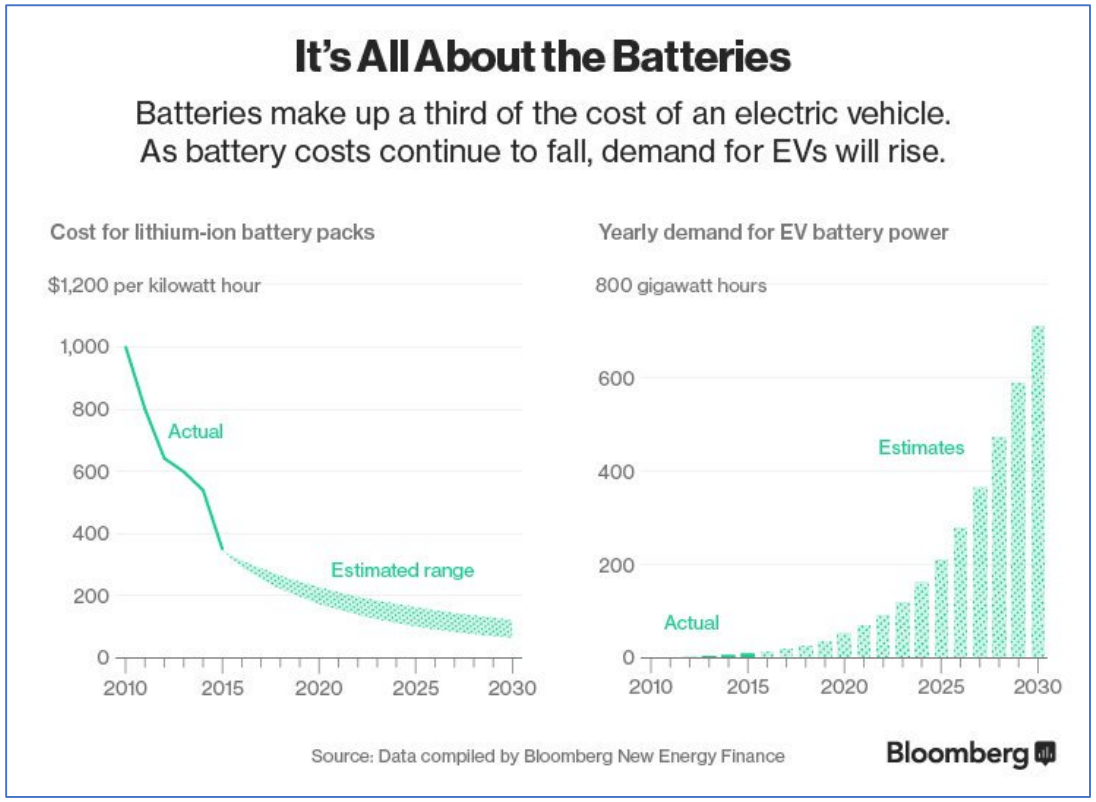
Last Published: Tue, Apr 05 2016.

India's electric vehicle sales grow 37.5% to 22,000 units

Of the 22,000 units, only 2,000 were four-wheelers

Market Facts

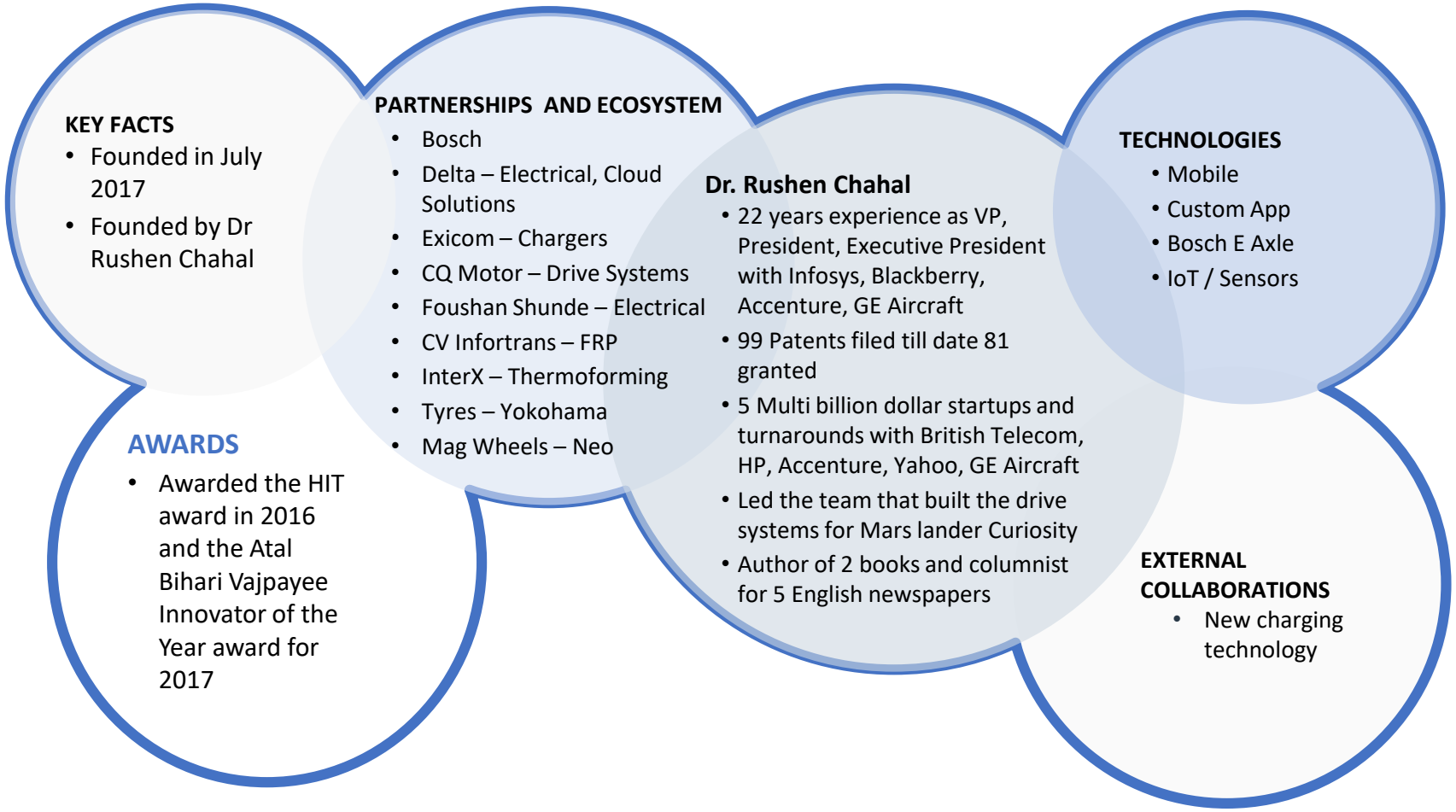




INTRODUCTION TO THE COMPANY AND IT'S FOUNDER MEMBERS

HRIMAN MOTORS LLP

Manufacturer of Electric Cars and Utility EV's



The team

- **Dr Rushen Chahal- founder**

  - 99 Patents filed till date 81 granted; 5 Multi billion dollar startups and turnarounds with British Telecom, HP, Accenture, Yahoo, GE Aircraft; Managed Category C parts for GE Transportation – a spend of 4 B USD for 9 years
  - Vice Chancellor of one of India's largest Medical, Paramedical, Engineering university with 14 colleges
  - Author of 2 books and columnist for 5 English newspapers

- **Prabir Chakravorty- automotive lead**

  - Former head of R&D at Hindustan Motors
  - Head at GM for Vehicle Engineering
  - Magna Steyr India – head engine development
  - Volkswagen India – Technical Advisor

- **Shishir Saini- technical lead**

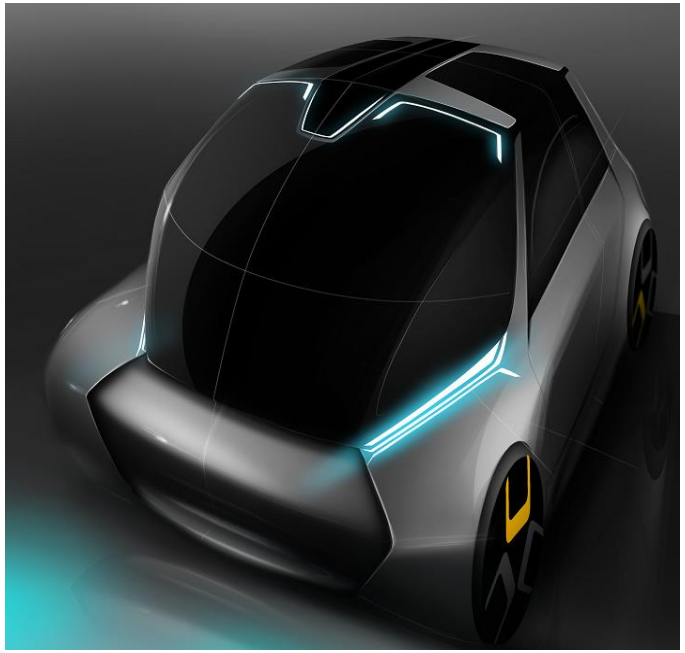
  - Electronics Engineer with expertise in battery technology
  - Design of mobile towers seamless power backup solutions
  - Worked with all battery/cell technologies – Lead Acid, Thin Plate, Lithium, LFP, NMS, NCM etc.
  - Expert at adapting various cell technologies to applications, packaging and building battery management modules
  - Expert on IP 65 and 67 requirements

- **Vineet Khanna- international operations lead**

  - London based expert in commercials and operations
  - Cranfield MBA with Industrial Engineering
  - Global work experience across multiple sectors
  - Management consulting background

PRODUCTS BEING DEVELOPED AND THEIR LAUNCH PLAN

Our strategy: Target the alternate market, provide value for money products using latest technologies. Use technology and design for market disruption



Two seater Car

First product

- 2 seater Car RT 90
- Trellis Frame for absolute safety
- FRP Shell on top – 2 mm solid structure
- LED Lighting, Aluminium Alloy Chassis
- Disc Brakes plus ABS on all 4 wheels
- Fully Connected car
- Travel Range – 150- 200 kms

Second product

- 6 seater Bus
- Radically new design with an infinite battery – charging time – 10 mins
- Range 140 kms

Future products

- 4 seater electric car
- More details yet to be finalised

RT 90 electric

Launching Feb 2018

4G LTE

NFC

Bluetooth

Lithium-Ion PRO

200 kms range

10 mins Charging

Onboard Diagnostics

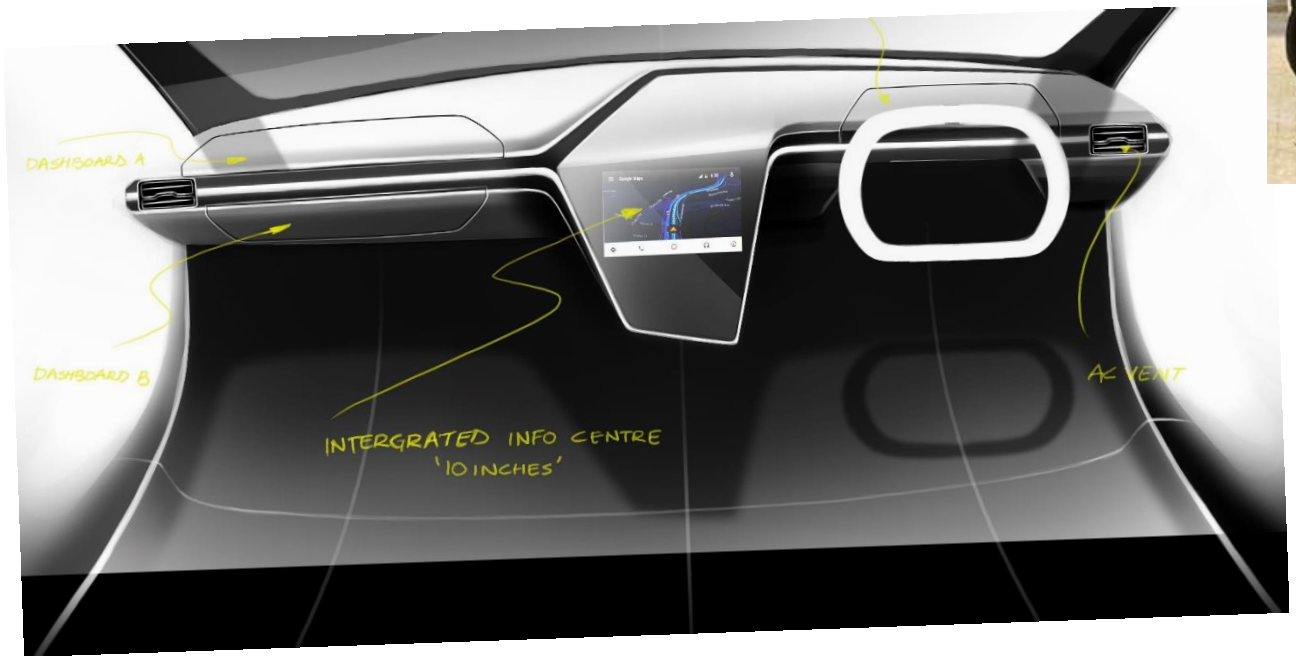
Top Speed 77 km/ph

HRIMAN MOTORS LLP

www.hriman.com

#MakeInIndia

Dashboard

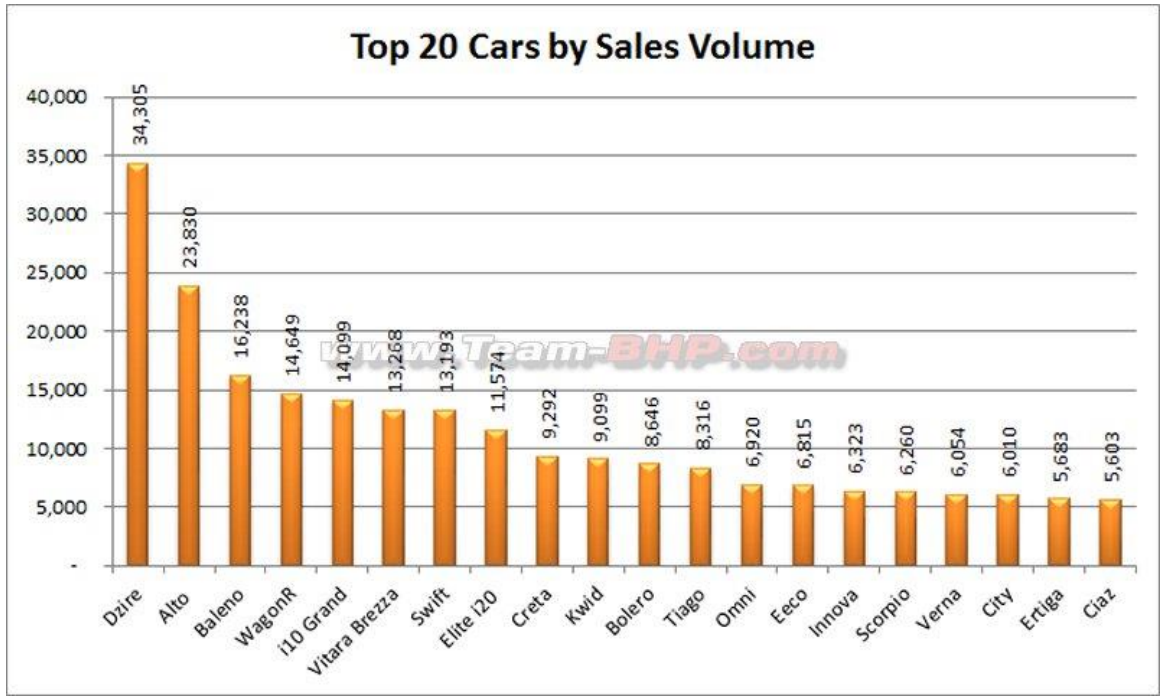


Six seater bus

Product positioning: Car sales spread by cost

- Current car sales in India: the tipping point is INR 700K 90% volume under this price point
- Small Cars contribute to more than 80% volume

	Diesel	CNG Gas	Petrol	Electric
Running Cost per Km	3.35	2.80	5.00	.42
Maintenance Cost per km	1.57	1.60	1.40	.25
Total per km	4.92 INR	4.4 INR	6.40 INR	0.67 INR



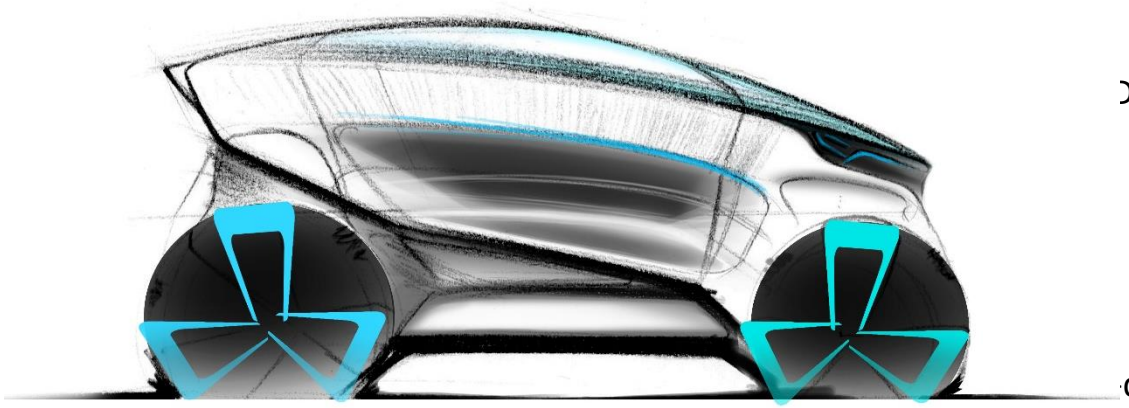
Manufacturer Charts

Manufacturers	Sep-16	Oct-16	Nov-16	Dec-16	Jan-17	Feb-17	Mar-17	Apr-17	May-17	Jun-17	Jul-17	Aug-17	Sep-17	Market Share (%)
Maruti	1,34,762	1,23,679	1,26,220	1,06,388	1,33,768	1,20,599	1,27,695	1,44,081	1,30,248	93,057	1,53,298	1,51,270	1,50,521	49.36
Hyundai	41,216	47,566	37,545	39,201	42,017	42,327	44,757	44,758	42,007	37,562	43,007	47,103	50,028	16.40
Mahindra	19,158	23,181	12,389	15,716	19,152	18,972	23,068	17,802	18,735	15,020	18,331	17,609	23,145	7.59
Honda	14,773	15,069	7,928	9,920	15,529	14,565	18,950	14,480	11,278	12,804	17,085	17,365	18,257	5.99
Tata	14,620	16,412	12,730	10,846	12,906	12,277	15,433	12,827	10,855	11,176	14,933	14,340	17,286	5.67
Toyota	12,067	11,651	11,309	12,747	10,336	11,543	13,796	12,964	10,914	1,973	17,758	12,017	12,335	4.04
Renault	12,123	12,395	9,566	11,225	8,756	11,173	12,188	9,545	8,639	6,840	8,961	9,585	10,874	3.57
Ford	9,018	7,508	6,876	5,566	7,995	8,338	8,700	7,618	6,742	6,149	8,418	7,777	8,769	2.88
Volkswagen	3,929	5,534	4,014	4,348	4,060	3,965	4,792	3,673	3,231	3,870	4,753	4,159	4,603	1.51
Datsun	3,970	4,702	2,987	2,535	3,239	3,609	4,141	3,076	2,544	3,377	3,478	3,701	3,866	1.27
Jeep											935	2,020	2,151	0.71
Skoda	1,216	1,468	860	1,042	1,220	1,206	1,695	1,372	1,064	1,018	1,417	1,756	1,735	0.57
Nissan	987	1,404	985	1,177	1,103	1,198	1,168	1,141	1,163	1,204	882	1,080	1,137	0.37
Fiat	602	646	266	390	288	319	353	292	340	210	185	239	209	0.07
HM-Mitsubishi	68			37	30	-	69	52	24			63	55	0.02
Chevrolet	2,101	3,001	2,808	3,020	1,808	1,809	1,318	883	361	672	565	18	-	0.00
Grand Total	2,70,610	2,74,216	2,36,483	2,24,158	2,62,207	2,51,900	2,78,123	2,74,564	2,48,145	1,94,932	2,94,006	2,90,102	3,04,971	100.00

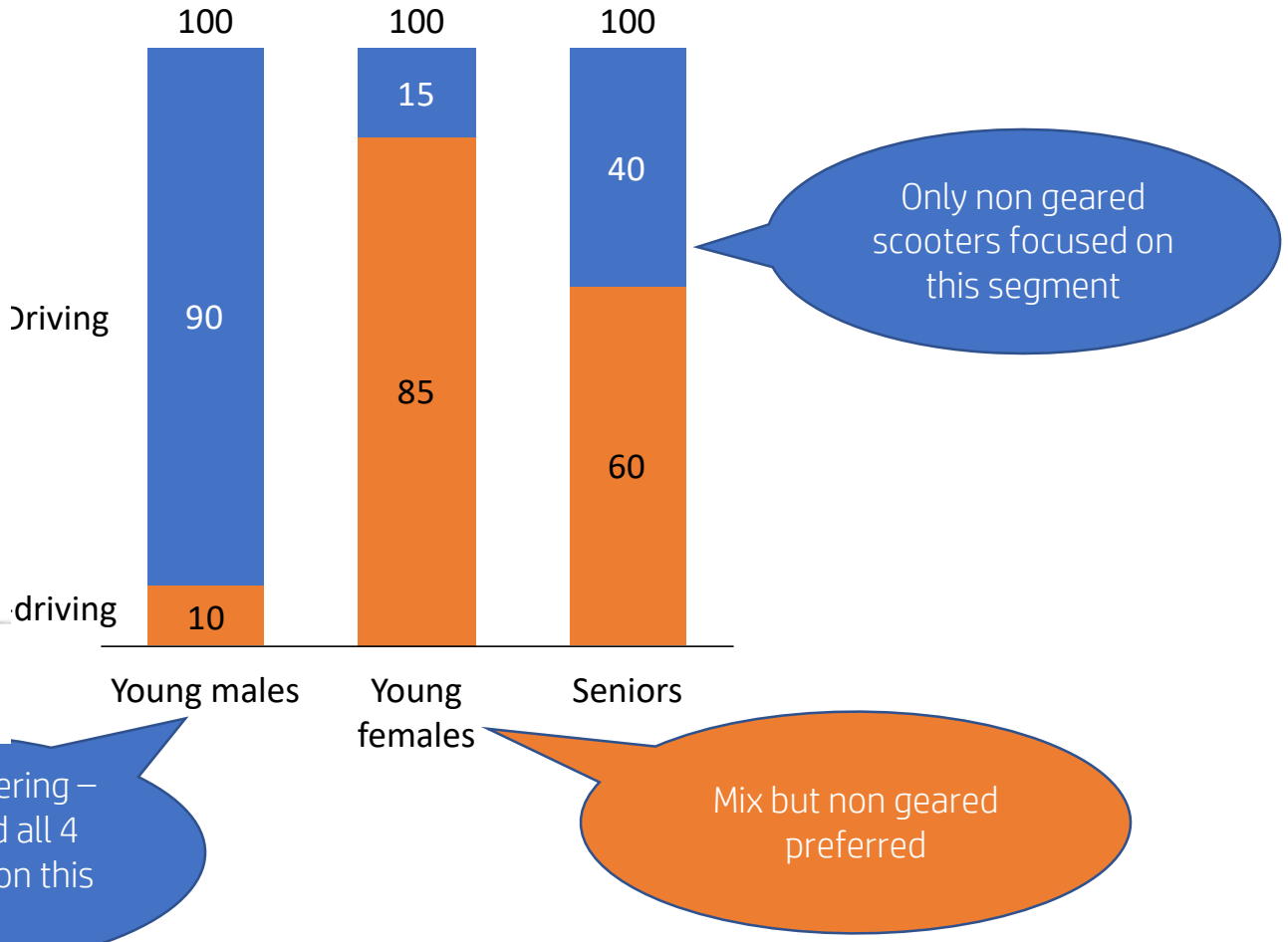
Huge Manufacturing, Retail, Service infrastructure already created by multiple manufacturers but utilization is under 35% for the overall industry

Product Positioning: demographics

Total Driving Population in India – >550 Mn



Four seater Car



There is not a single properly priced offering that targets more than 65% of the market and offers convenience/security/safety/comfort. All cars too are simply configured to target the office going population which is only c35% of the total market

Product positioning: Price

OPPORTUNITIES IN AUTOMOTIVE

DIGITISATION OF CUSTOMER EXPERIENCE

Digital customer experience and insight offer design and after-market individualisation of products for each customer

ELECTRIC TECHNOLOGY

Electric vehicles can disrupt current market structures

ELECTRIC & DIGITAL VALUE CHAIN

Digital value chain can drive 25% higher productivity

Initial Target Markets

01	**Bangalore – as the acceptability of EV's already very high**
02	New Delhi – EV points accessibility
03	Jaipur, Udaipur and similar clean but small cities
04	Avoid cities with extremes of temperature initially

Our high-level plan

- FB and Linked in campaigns started – Round 2
- Production to increase to 1500 cars a month

6-setaer Bus launch at Mumbai Expo

2nd small model launch

- Production to commence at 600 cars per month
- Design approved for RT Bus

Auto expo launch Ver 1

Submission to ARAI – model 1

Prototype completed

Company founded, FB and LinkedIn campaigns started

Dec

Feb

July

2019

Apr

Feb

2018

Dec

Nov

Jul

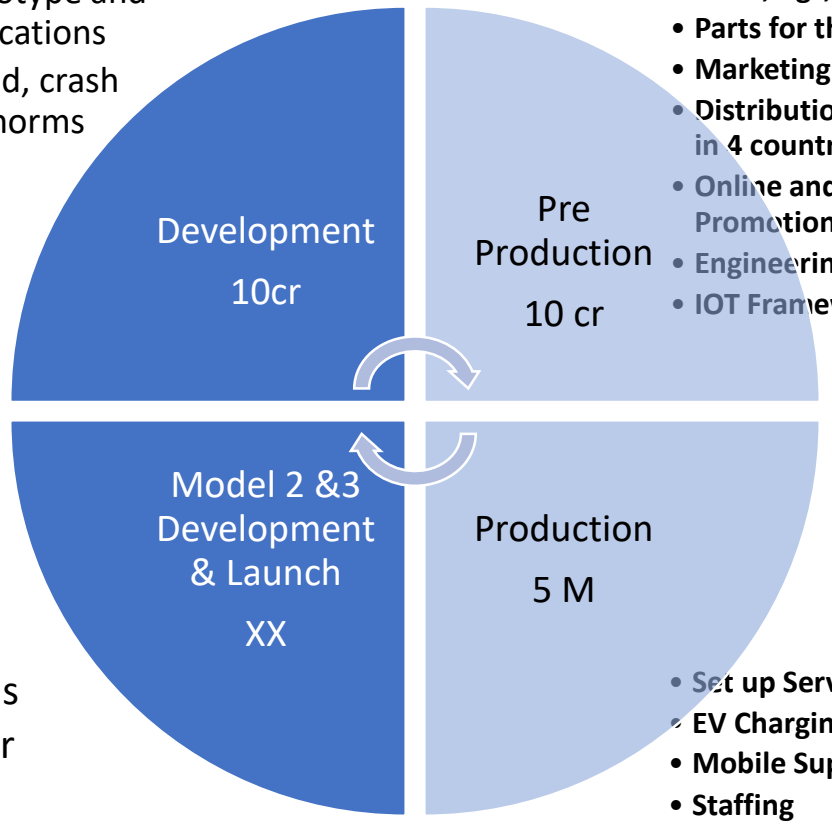
2017

	1 Launch	2 Grow	3 Lead
RT 90 -2 Seater EV	Starting March 2018 20 cars per month for 6 months	600 pm, post stabilization phase	1500/month = 18000 cars After first year
RT Bus – 6 seater rapid transport vehicle	Starting March 2019 20 buses per month for 6 months	1000 pm, post stabilization phase	100/day or 2500/month = 18000 BUSES first year

1. AN OVERVIEW OF THE BUSINESS CASE
2. DETAILS OF THE INITIAL INVESTMENT REQUIRED

Details of the initial investment required: spread for INR 20 CR

- Complete Prototype and all Legal Certifications
- 6 Cars produced, crash tested and all norms done



- **Tools, Jigs, Dyes**
- **Parts for the first Lot**
- **Marketing and Branding**
- **Distribution Network setup in 4 countries**
- **Online and Offline Promotions**
- **Engineering Teams**
- **IOT Framework**

- 6 Seater Bus
- 4 Seater Car
- Complete development and certifications

- **Set up Service Network**
- **EV Charging Network**
- **Mobile Support**
- **Staffing**
- **Upgrade Design Center**

Key challenges

1. TECHNOLOGY
2. BATTERY

Key Challenge I: Access to Technology

Challenge

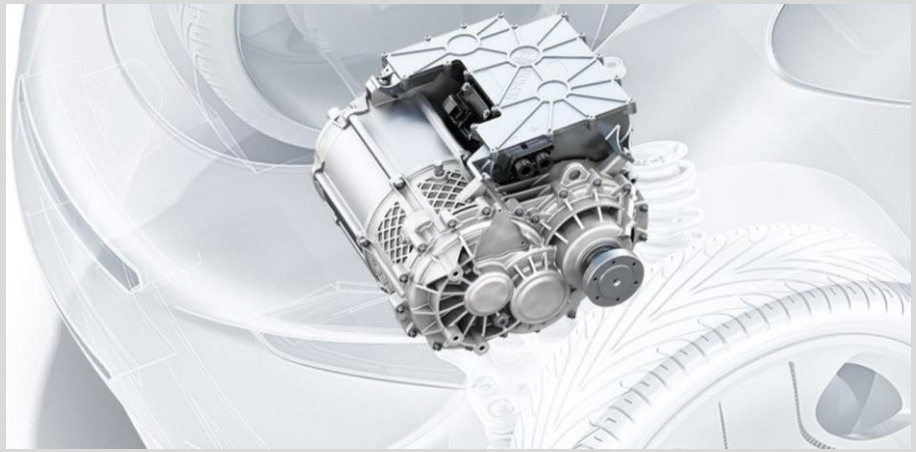
The growth will be rapid and time to develop technology will be minimal

Solution – Bosch Partnership

- Bosch has already developed the low voltage technology upto 20 KW – 48 V dc and the high voltage- greater then 50 KW AC solution
- Integrated Electronics and Gear Box with the Motor
- One Stop Solution
- Tested Technology, proved with Mercedes, Audi and BMW among others

Single Programable Vehicle Control Unit

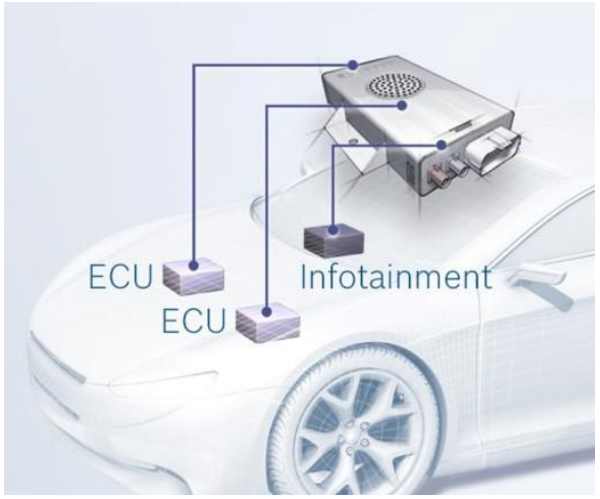
Bosch E Axle



Key Challenge I: Access to Technology

Scalable Platform – end to end

Display Systems



Connectivity Control Unit

Driver assistance systems

- Lane change assist >
- Lane departure warning >
- Lane keeping support >
- Predictive emergency braking system
- Rear cross traffic alert >
- Road sign assist >
- Intelligent headlight control >
- Adaptive cruise control >
- Cloud-based wrong-way driver warning >
- Construction zone assist >
- Driver drowsiness detection >

Safety

Driving safety systems

- Antilock braking system (ABS) >
- Brake boosting and brake-force distribution >
- Electronic stability program (ESP®) >
- Occupant protection system >
- Pedestrian protection system >
- Regenerative braking systems >
- Integrated Safety Systems >

Interior comfort systems

- Comfort actuators >
- Infotainment >

Steering systems

- Electric power steering systems (Servoletric) >

Battery for Electrical Vehicles

Characteristics	LTO	LiFePO4
Chemistry	Anode : Lithium Titanium Oxide	Anode : LiFePO4, Cathode : Graphite Electrolyte : LiPF6 & EC, DEC, DMC
Cell Type	Prismatic	Prismatic
Cyclic Life	14000 (0 -100%)	4000 (20-100%)
Operating Temperature	-30 to 60 degrees	0-55 degrees
Rated Capacity	@10C	@ 1C
Charging Time	10mins (0-100%)	100 min (20-100%)
Cell Capacity	20Ah, 2.3V	100Ah, 3.2V
Energy Density Wh/g	89	110
Manufacturer	Toshiba	Coslight/Narada
Efficiency (Charge / Discharge)	>95%	>95%
Safety	Safe for operations and environment	Safe for operations and environment