EVs – The India Opportunity

Mahesh Babu, CEO – Mahindra Electric
India will have 7 Mega cities with population greater than 7m by 2030.
Factors driving urbanization

India by the numbers

- India’s GDP growth at the rate of 7%
- India is now the world’s 7th largest economy (Nominal GDP terms) – Will be 3rd largest in 2050
- 850mn of the 1.35bn people in India are under the age of 35
- Per capita income of around USD 1950 – Will be USD 13,660 by 2040

India - Nominal GDP

Source: PwC: World in 2050
India – A unique market

2 wheelers

• ~80% of all automotive sales in India are two wheelers – 21m in FY19
• Close to 2m are involved in courier services – huge market

3 wheelers

• India is one of the largest markets in the world for 3w – 0.7m sales in FY19
• 3w address one of the most important challenges of urban transportation – Last mile connectivity

Fleet

• Routes are defined and they operate in a limited geography
• Utilization of vehicle is close to 25-30%

Commercial

• 60% of the overall goods transportation in the country happens on road – Huge market
• High vehicle utilization in the sector

Personal

Penetration of private passenger cars in still low compared to other developed markets
Mobility needs a reset

To curb emissions and accelerate towards zero emissions, the government skipped BSV and is directly enforcing BSVI norms.
## India Policy Snapshot

### Vision

- NITI Aayog’s report on Transformative Mobility with BEVs

### Policy

- Karnataka first released state EV policy

### Implementation

- 5% GST for BEVs
- Tax exemption for EV owners
- Various states running EV bus pilots
- Utilities setting up charging infra.
- NTPC seeks pan India license to setup charging stations

### Auto makers pushed to make EV plans

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### Ban on fossil fuel-powered 2-, 3-wheelers: Govt plan on track despite automakers’ pushback

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India EV Policy Landscape

- 7 states and 1 UT have released their EV Policies
- 3 states have draft plans ready
Growth paths of global markets

**Forecasted BEV fleet penetration**

- **Growth in China**
  - Already largest EV market by volume
  - Mass vehicle route thro’ subsidy
  - Government led – People supported

- **Growth in Norway**
  - Largest EV market by Market share
  - Premium vehicle route thro’ mix of incentives and fees
  - Government led – People supported

- **Growth in US**
  - Premium vehicle route
  - People Led – Govt. supported

- **EV growth in India**
  - Mass vehicle route – with improving total cost of operations of EVs
  - (Government led – People supported)

Source: Ward’s, ACEA, CAAM, IHS, Morgan Stanley Research estimates
Factors driving electric mobility in India

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<th>Type</th>
<th>Route predictability</th>
<th>Vehicle utilization</th>
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<th>Ease of charging</th>
<th>Investment by OEMs</th>
<th>Policy intervention potential</th>
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3W: Three-wheeler; CV: Commercial vehicle; SCV: Small commercial vehicle; LCV: Light commercial vehicle.

Source: EY: Standing up India
Mahindra’s Electric journey

- **1999**: Mahindra launches first electric vehicle 8 seater Bijlee
- **2001**: Reva-i launched
- **2010**: Mahindra acquires majority stake in REVA
- **2012**: Mahindra Reva manufacturing facility inaugurated. IGBC platinum rating
- **2013**: Top 50 innovative companies
- **2013**: e2o launched
- **2014**: Quick2charge fast charging launched
- **2014**: Halo Sports car concept showcased
- **2015**: Only Indian team in Formula E
- **2015**: Successful deployment of Fleet business
- **2015**: Launch of GenZe
- **2016**: 4 new launches - e2o UK - e-Verito - e2o Plus - e-Supro
- **2017**: NITI Aayog Report, vision 2030 announced
- **2017**: Mahindra delivers first cars of EESL tender for 10,000 vehicles
- **2018**: Launch of TREO Auto Showcase - eKUV, eBus MESMA, +NEMO
- **2018**: Announced entry Into EV supercars
- **2018**: Inaugurated Facility expansion
Current R&D Capability

**CAPABILITY**

- **R&D talent pool**
  - 300+ Engineers
  - 80+ Researchers
  - 10+ Scientists (PhDs)

- **Patent Activity**
  - 13 Patents granted
  - 52 Ongoing patents
  - >150 Target for FY 20 for patents

**KEY ACHIEVEMENTS**

- **DESIGNED FOR INDIAN MANUFACTURING AND ENVIRONMENT**
  - High strength steel space frame

- **COST EFFECTIVE DRIVE TRAINS**
  - 7 patent applications
  - Hill hold and Regenerative braking

- **EXTENSIVE USE OF PLASTICS & COMPOSITES**
  - High impact ABS Plastic Sheets
  - No painting and reduces investment in production

- **IN-HOUSE EXPERTISE ON LI-ION BATTERY PACK & BATTERY MANAGEMENT SYSTEM (BMS) DEVELOPMENT**
  - 22 patents on battery and BMS technologies
  - Platform can support multiple batteries & capacities
Leading the way in shared mobility

LITHIUM- CORPORATE EMPLOYEE COMMUTING

OLA – PARTNERSHIP FOR SHARED MOBILITY IN NAGPUR

ZOOMCAR LAUNCHED IN MYSORE AND HYDERABAD

UBER AND M&M PARTNERSHIP ANNOUNCED

EESL TENDER DELIVERY IN PROGRESS, PHASE 1 COMPLETED

HRTC – CLEAN PUBLIC TRANSPORTATION

BAGHIRATHI ORDER RECEIVED IN BANGALORE

LAST MILE – MOU WITH TWU AND SMARTE FOR TREO
Our electric powertrain enabled cars have run more than **135 million electric kms** and counting.

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**REAL ON ROAD EXPERIENCE**

- 6000+ vehicles on road
- 90+ cities in India
- Across private and commercial segments
NEMO, which stands for "Next-Gen Mobility", is an e-mobility platform based on the cloud that enables a new generation of Electric, Connected and Shared mobility services.
Integrated sustainable mobility solutions (eg: Auroville community)

Vehicle deployment:
Offer our portfolio of EVs as suitable for the application

Enable mobility models:
Aims at enabling mobility models such as ride sharing, ride hailing and self-drive through

Enable eco-system:
Work closely with partners in creating eco-system (parking, charging infra) and integrate on mobility platform

Energy storage:
Support in End to End clean and green solutions – Mobility to Complete sustainable living

Partners:
Indian Institute of Science, Bangalore
Puducherry Smart City Development Ltd. (PSCDL)
THE NEW MOBILITY PARADIGM WOULD PRESENT OPPORTUNITIES FOR EXPLORING PARTNERSHIPS AND BUILDING ECOSYSTEMS WITH SYNERGIES ACROSS THE MAHINDRA GROUP

NEW MOBILITY PARADIGM
Thank you