Industrialization and Sustainable Mobility: Indian Experience

Promit Mookherjee

Observer Research Foundation

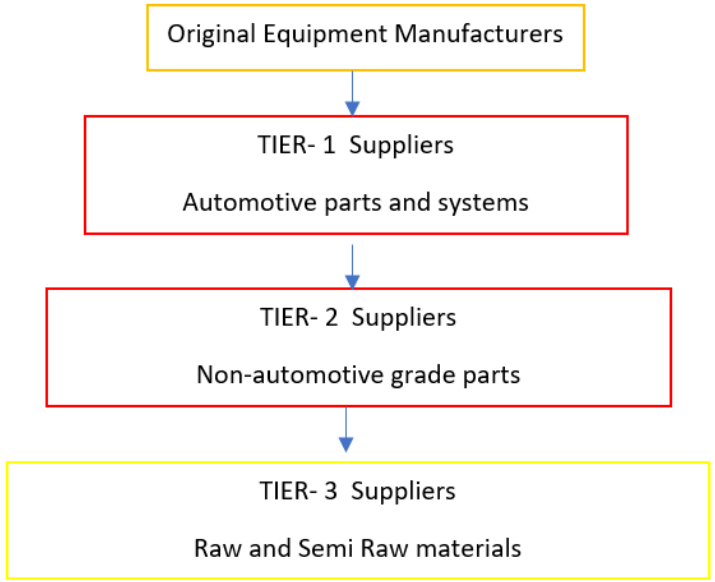
24/03/2022

Evolving Industrial Policy in India

- Industrial policy in India has evolved significant from protectionist policies and large public sector post independence to a more liberalized system with large FDI inflows and increased privatization.
- However, the share of manufacturing in India remains low at around 17% of GDP.
- Recent national manufacturing policy aims Increase share of manufacturing to 25% of GDP, focus on indigenous production, ease of doing business, digitization.
- Make In India program: Encourage companies to develop, manufacture and assemble products made in India and incentivize dedicated investments into manufacturing.
- **Industrialization opportunities from sustainable mobility: electric vehicle manufacturing, charging infrastructure, battery manufacturing, railways, and metro rail.**

Industrialization and electric mobility

- Automotive industry is a key part of efforts to increase industrialization in India.
- India has the fifth largest automobile manufacturing market in the world. The industry contributes directly to around 7.1 percent of the GDP and 22 percent of the manufacturing GDP.
- National Automotive Mission aims to increase share of automobile industry 12% of GDP and 40% of manufacturing GDP
- The switch to electric mobility has created a new paradigm in the manufacturing ecosystem.

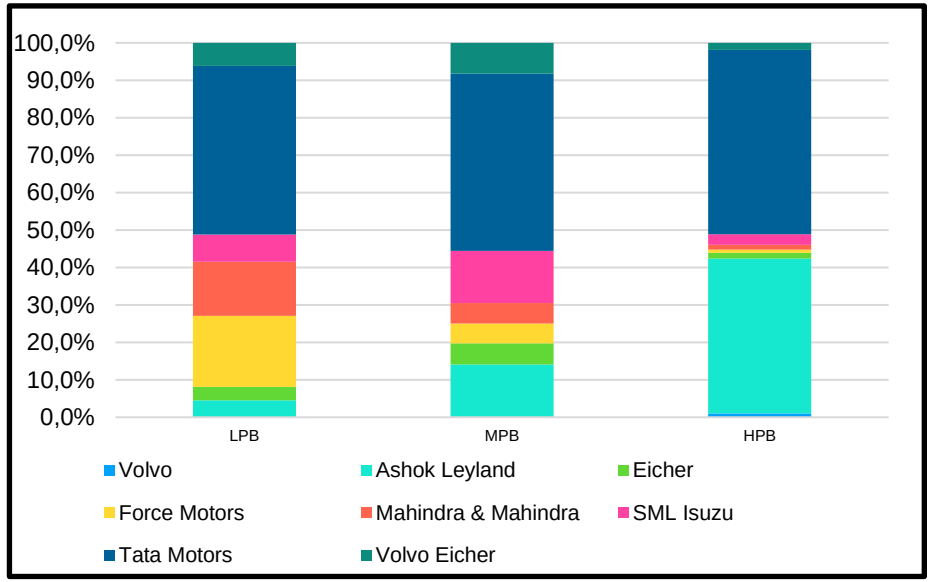


The whole manufacturing ecosystem will need to adapt to producing EVs

Evolving OEMS: Case of Electric Buses

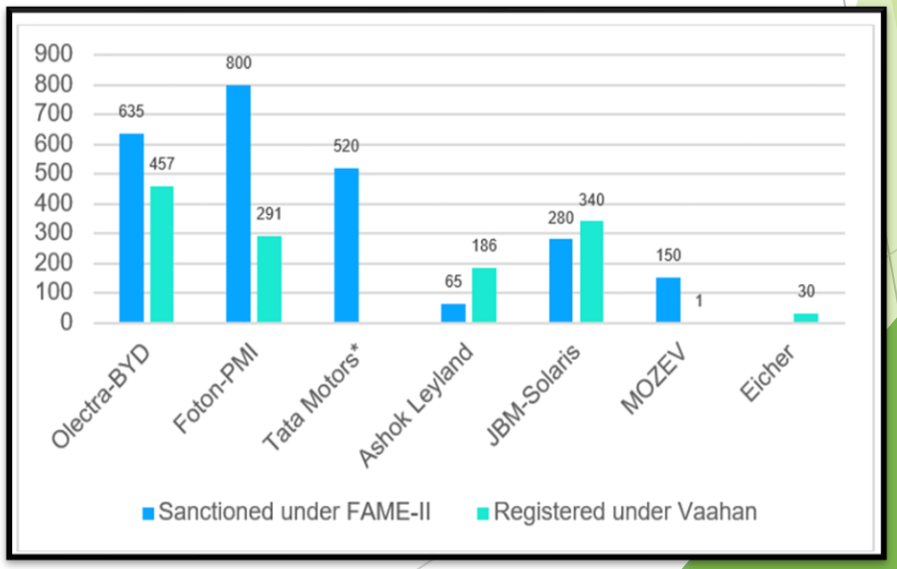
- Big legacy players have pivoted to manufacturing electric buses
- New players have taken considerable market share already.
- Most new companies are joint ventures between an Indian firm and a foreign firm, where the Indian firms rely on their counterparts for their design engineering
- OEMs are essentially assemblers, the off-the shelf nature of EV components has led to many new players

Traditional Market Shares for ICE Buses



Source: Vahan Database

New Entrants in the E-bus space



Source: UITP (2020) and Vahan Database

Automobile Component Industry

- Component industry contributes 2.3 percent to GDP and provides employment to 5 million. (ACMA)
- India has substantial manufacturing expertise in chassis and body components, transmission, engine components, and tires.
- EVs has much fewer parts than ICE vehicles, demand reduction could be an issue.
- The component composition is very different for electric vehicles, there is a shift towards batteries (40-50%), electric motor (20-25%) and other electronics systems (10-15%).
- Some favorable factors:
  - Increased consolidation and modularization among supplier
  - Newer players with experience in electrical systems entering the market
  - Increased demand from ancillary industries such as aerospace and agriculture

Critical component	Approx Net Localization
Batteries	10-15%
Traction motor and controller	0%
Wiring harness and connector	15-20% (high voltage)
Vehicle control unit	0-5%
DC-DC converter	0-10%
On board charger	0-5%
Electric safety devices	30-35%
Electric compressor	0%
Transmission	70-80%
Body and Chassis	85-90%
Tyres	90-95%

Source: Compiled from SIAM, ACMA, Nomura Research Institute, and stakeholder consultations

Industrial Policy for EVs

- Import substitution: High customs duties on fully-built, semi-knocked down and completely knocked down units. Phased increases in duties on EV components
- Production linked incentive scheme for electric vehicle and component manufacturing: Manufacturers get a sales based incentive ranging from 8-16% of sales value.
- Mandated local content of 50% to avail incentives
- State level policies for enticing EV manufacturers: capital subsidies, exemptions, land development incentives, concessions on infrastructure
- Focus on building local capabilities for the complete EV supply chain.

Battery Manufacturing

- Currently, almost complete import dependence for both battery packs and battery cells.
- National Programme on Advanced Chemistry Cell (ACC) Battery Storage:
  - Sales linked incentive of INR 181 billion till 2029 to build 50 GWH of ACC manufacturing capacity and 5 GWH capacity for high performance niche ACC technologies
  - Domestic value addition of minimum 25 percent at the start which has to be scaled up to a whopping 60 percent in the next five years
- Constantly evolving cell chemistries lead to risk of lock-in into production of sub-optimal chemistries.
- Mineral availability, especially lithium and cobalt, likely to be a big hurdle. So far, India's strategy to acquire these minerals is very passive.

Challenges to Industrialization

- Increased industrialization from electric mobility will depend on building local capabilities for component manufacturing and battery manufacturing.
- Newer models of technology transfer and increased spending on innovation
- Tradeoff between import substitution and faster growth in EV manufacturing
- Create the right skill sets for employment in the EV industry
- Raw material acquisition
- Lack of regulatory measures for EVs