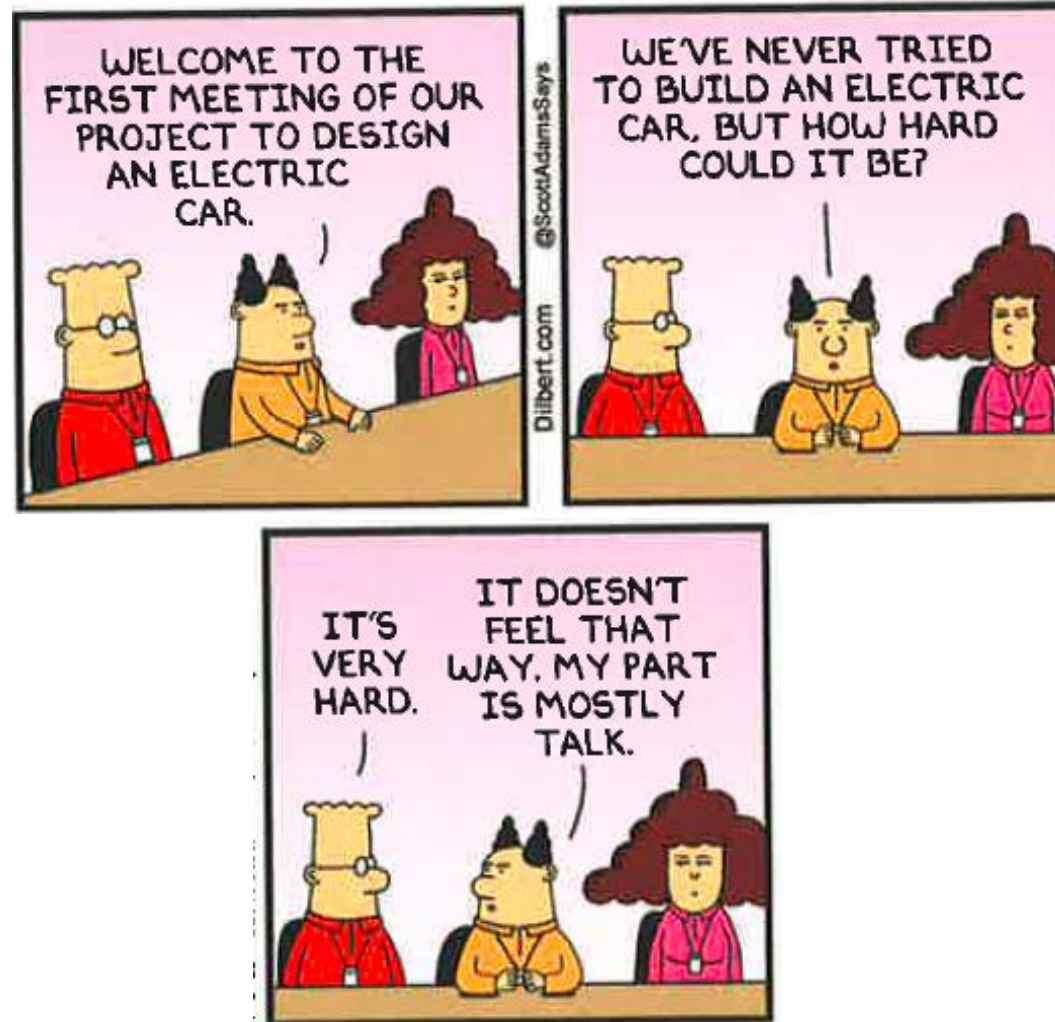


From Bolts to Volts A view on automotive technology migration

David Hudson, Tata Motors



#bolt2volt



The Tata footprint cover the world with operations in more than **100 countries** spread across **six continents**, and over **660,000 employees** worldwide

Sectors

Tata Group

Engineering

IT & Communications

Materials

Energy

Chemicals &
Agribusiness

Consumer products

Services

Tata Motors Group

Tata Motors

↳ **Tata Motors European Technical Centre**

Jaguar Land Rover

Tata Daewoo Commercial Vehicle Company

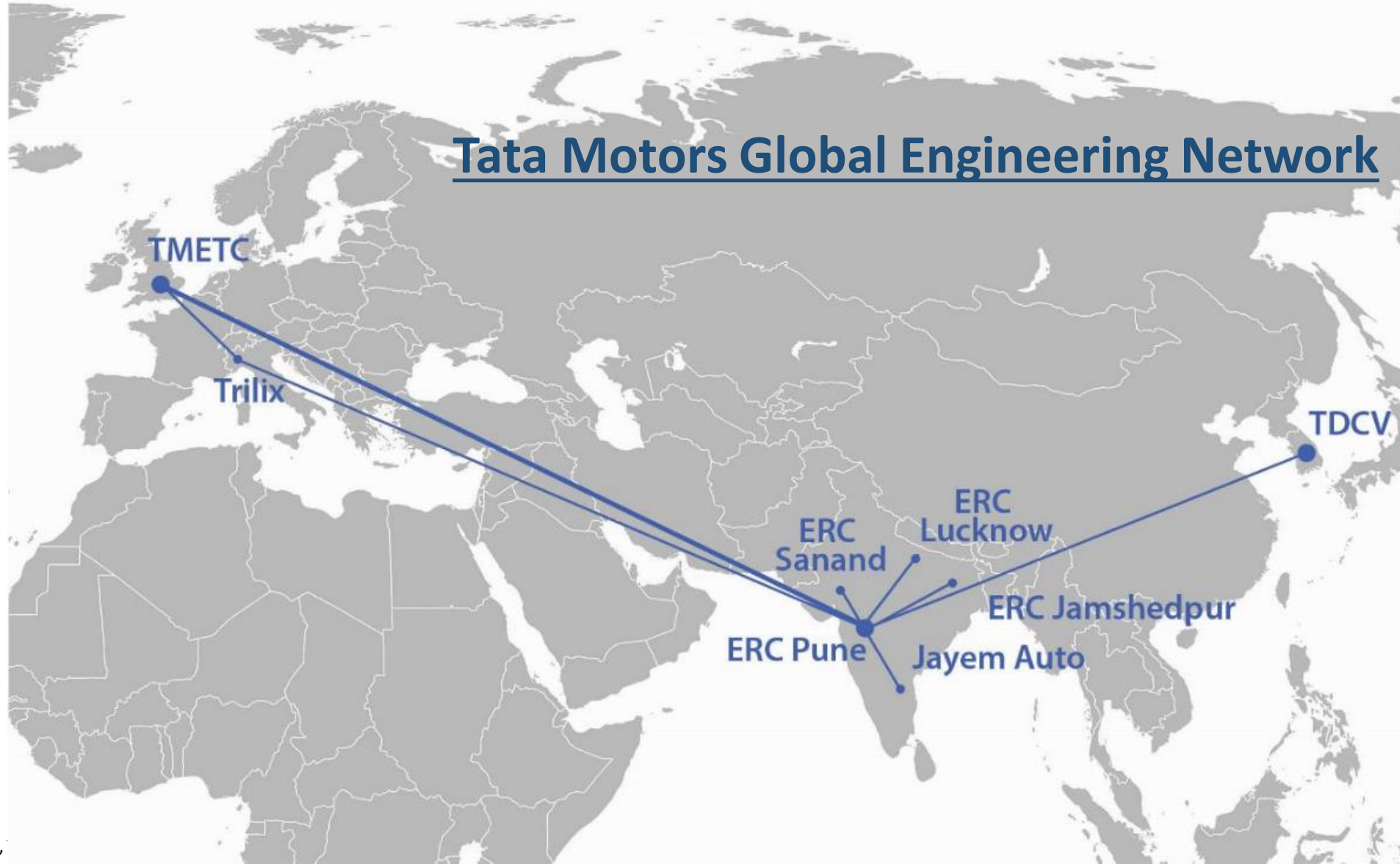
*Tata Motors Consolidated FY 18-19



- “Salt to software”
- \$110 billion revenue (2017-18)
- 29 publicly-listed Tata enterprises with a combined market capitalisation of \$103 billion

- Revenues of \$44 billion in 2017-18
- Operations in the UK, South Korea, Thailand, South Africa, and Indonesia
- Industrial joint venture with Fiat in India
- Indian market leader in commercial vehicles
- Among the top in passenger vehicles with winning products in the compact, midsize car and utility vehicle segments

- TMETC was established in September 2005 to help accelerate Tata Motors' (TML) development
 - European centre, based in the UK
- Primary role – provider of engineering services to TML
 - Focus on future passenger car technology and product engineering processes
- Mandate to provide engineering services to third parties and participate in collaborative research work
 - Maintain exposure of team to best practices and technologies
- Team members recruited from global OEMs, consultancies and first tier suppliers
- Commitment to developing new talent and continuous professional development
- Involvement in UK/EU networks (eg SMMT, Automotive Council, InnovateUK, AESIN ...)
 - Supported AESIN workstreams on ADAS/HAV & More Electric Powertrain since inception
 - Member of Steering Board



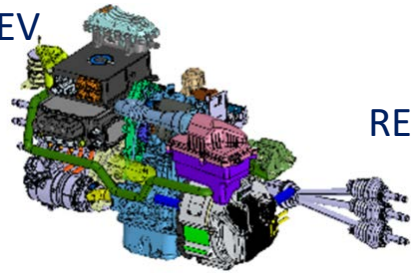
Electric & Hybrid Technologies



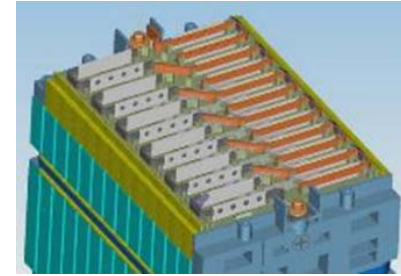
Vista EV



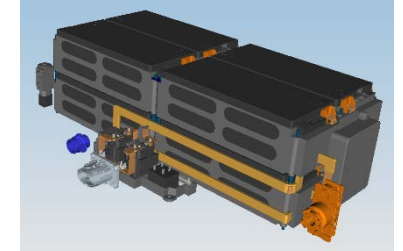
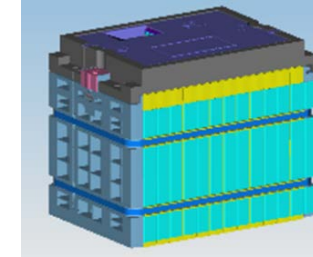
REEV powertrain



Ace EV



Electric & Hybrid
Vehicle Batteries



Energy Storage

Advanced Engineering

ADAS
(Advanced Driving
Assist Systems)



Infotainment



Technology
Demonstrators

- Fuel Cell
- REEV
- BEV

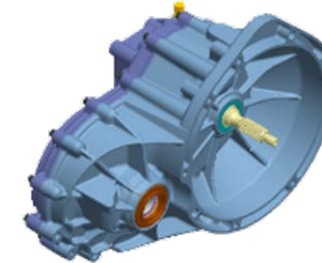
Low Cost
Auxiliary Power Unit



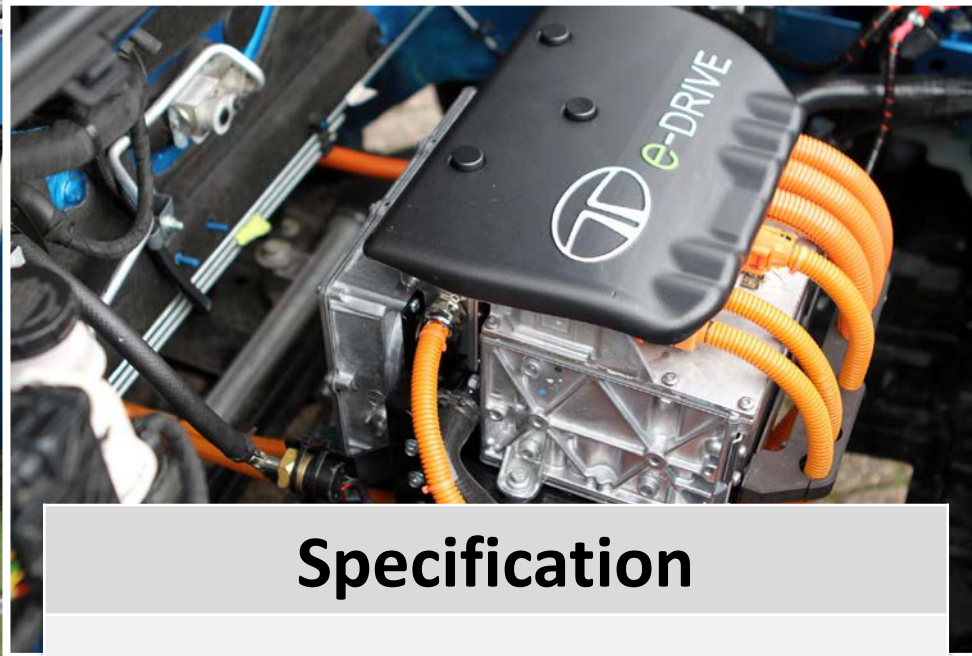
Powertrain



Aria 6 Speed
Automatic Transmission



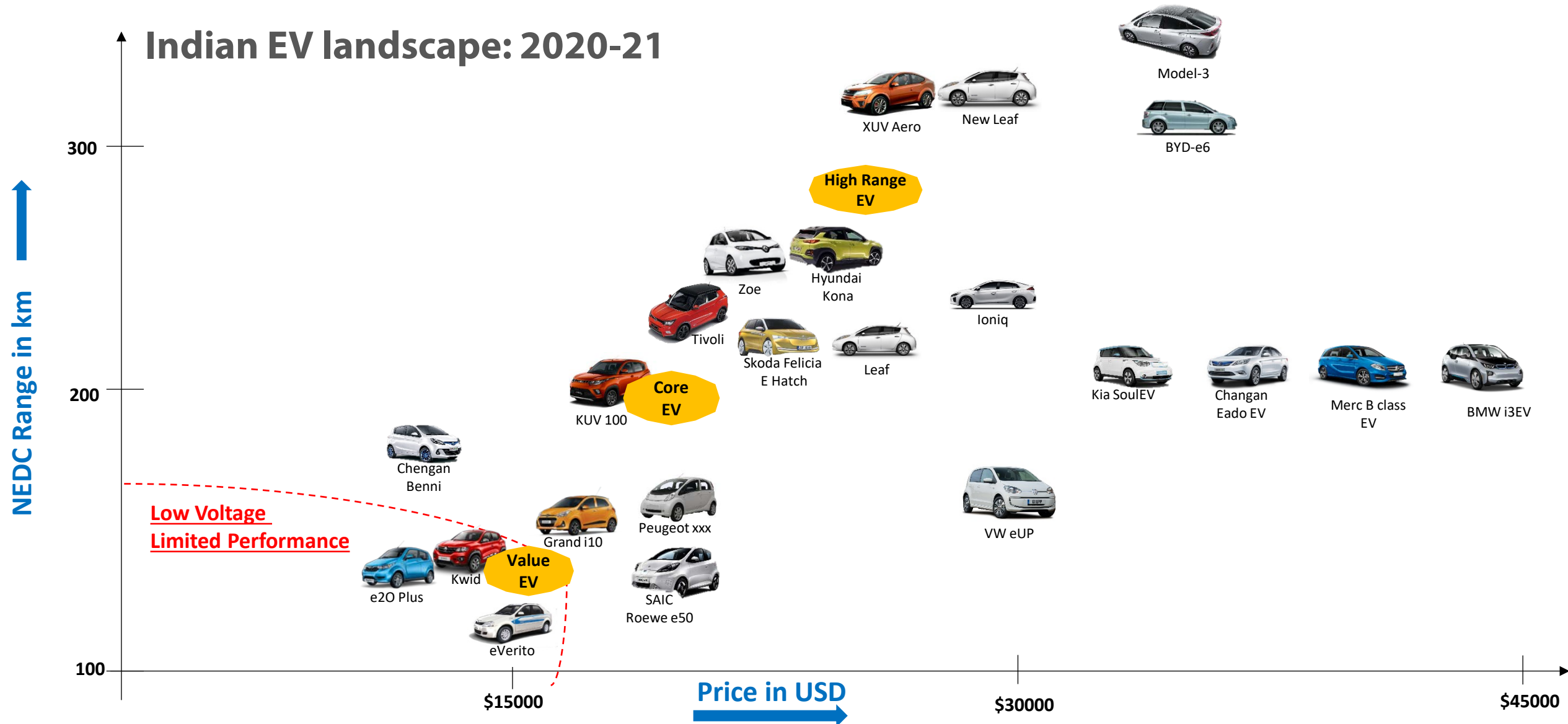
EV S150
Single Speed
Transmission



Specification

- Battery capacity: 13 kWh
- Motor peak power: 85 kW
- Motor peak torque: 200 Nm
- NEDC range: 88.3 km (Tiago EV)
- Acceleration 0-100 km/h: 10.7 s
- Kerb weight: 1209 kg





modularity

1. the use of individually distinct functional units ([modules](#)), as in assembling an electronic or mechanical system

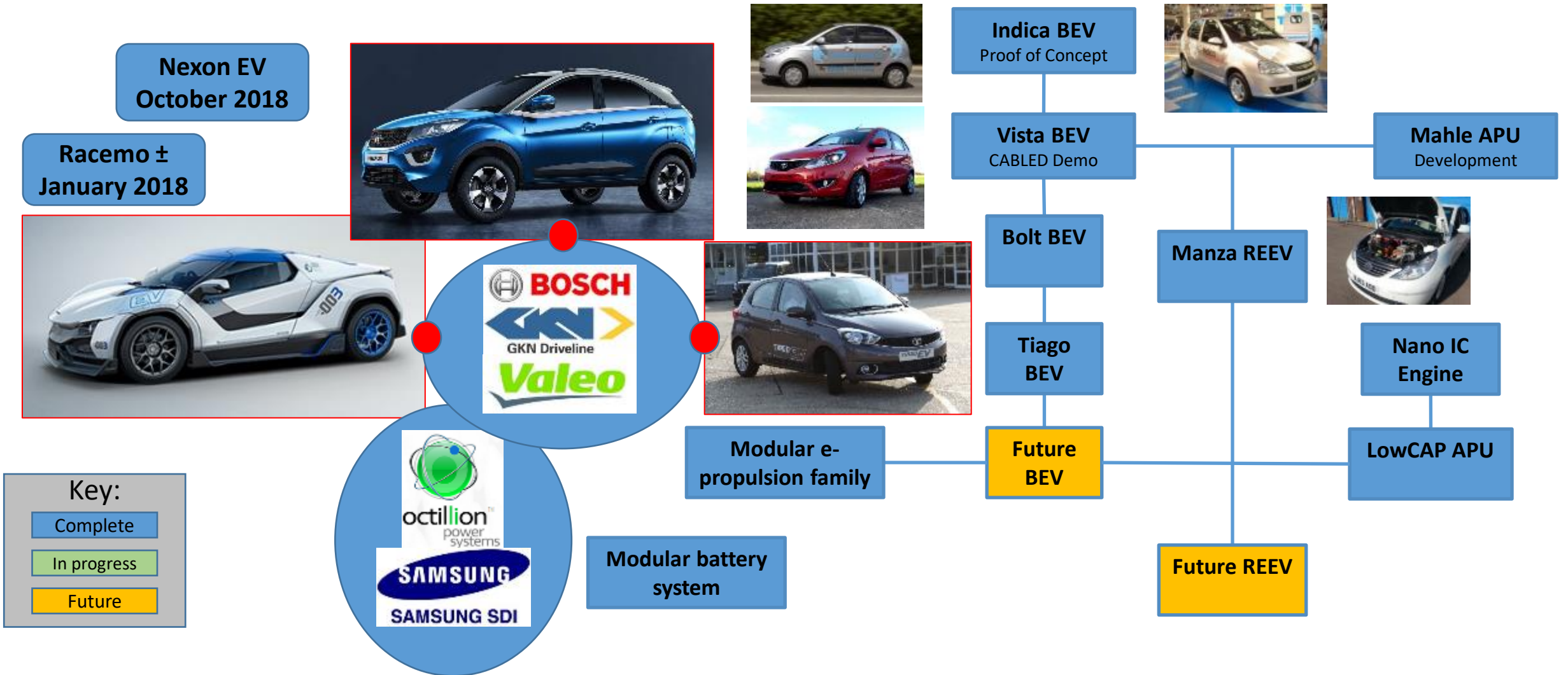
commonality

1. a sharing of features or characteristics in [common](#); possession or manifestation of [common](#) attributes.
2. a feature or characteristic held in [common](#):

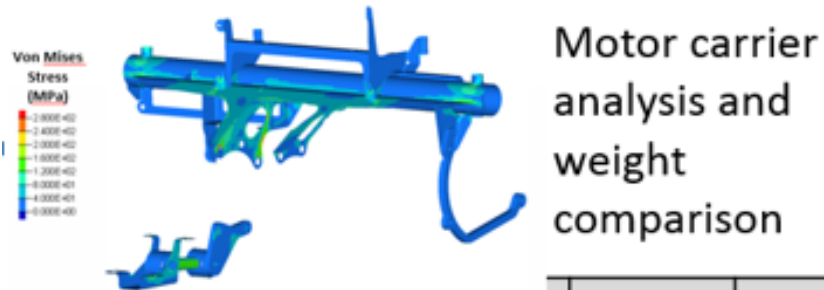
flexibility

1. susceptibility to modification or [adaptation](#); willing to be adaptable:

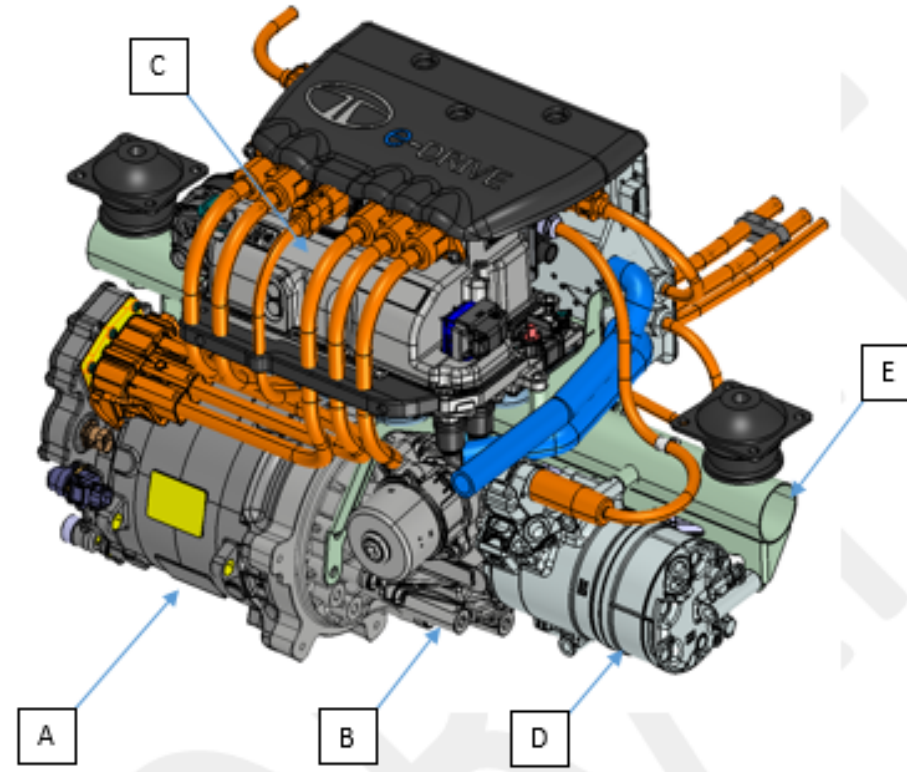
The TMETC EV family tree



- Similar shape to IC powertrain
- Integrated unit suitable for current build sequence
- Allows off-line assembly testing
- Based on proven motor and transmission



	Material	Mass (kg)
VW Golf VII e-Golf 2014	Aluminium	4.95
Renault Zoe ZE 2013	Steel	18.18
Mitsubishi i-Miev 2011	Steel	7.10
Kite 4 - Design Modification 3	Steel	5.55
Kite 4 - Optimised Design	Steel	5.40



Motor	A
Gearbox	B
MCU (Inverter)	C
AC Compressor	D
Motor Carrier	E
Charger	F
Vac Pump	G
PDU	H
Cooling Pump	I

Tiago

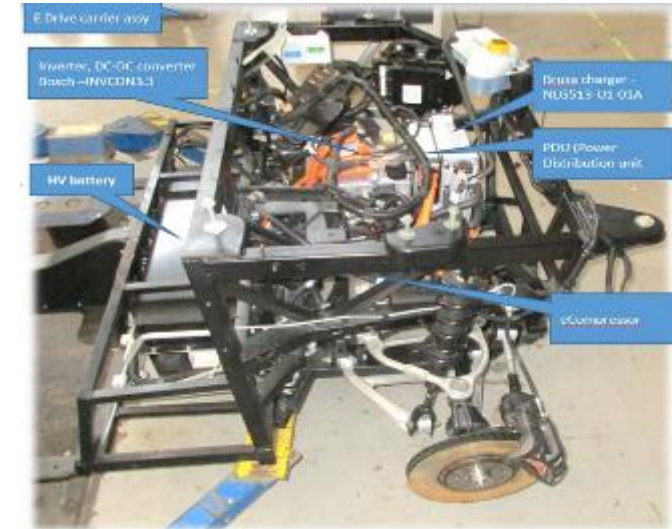


Nexon





Racemo ± (Delhi AutoExpo 2018)

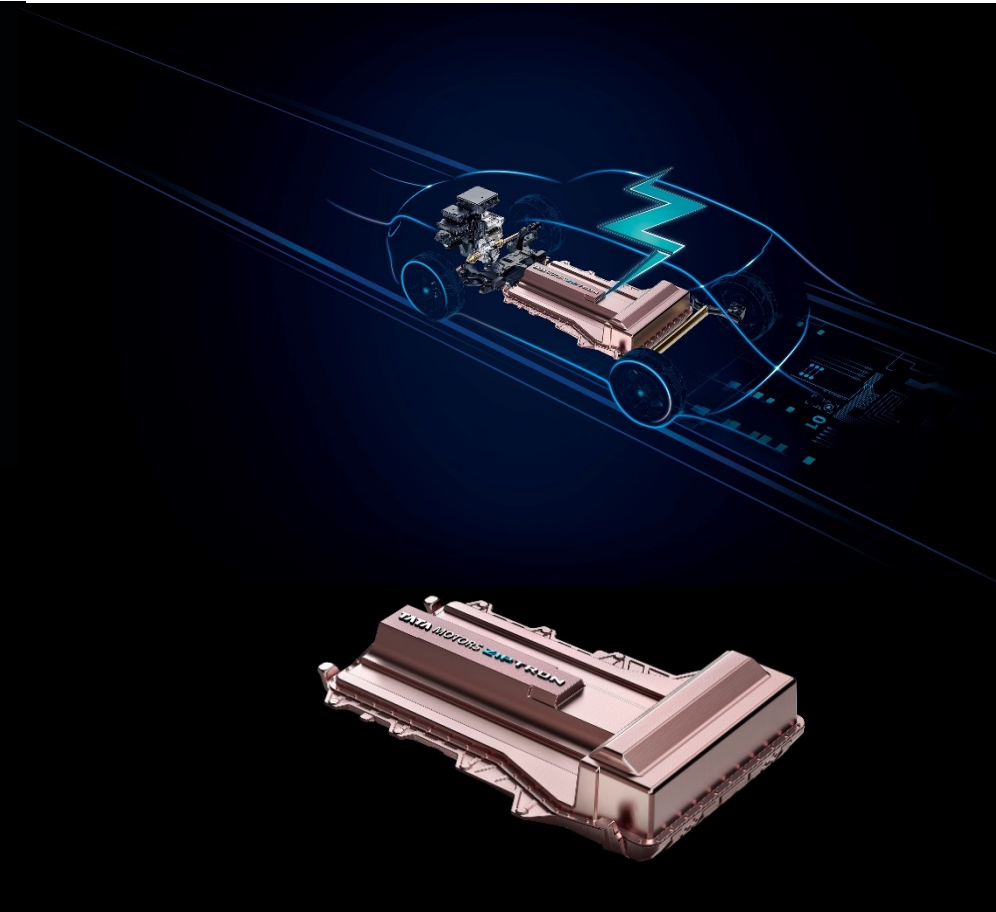
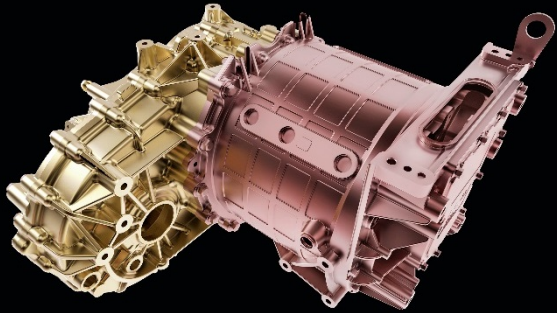


- E-Drive conversion BOM directly adapted from Tiago EV
- Identical battery and drive unit
- Electrical system configuration and software direct carry over
- Local sourcing of pattern parts from TMETC CAD
- On-site support by TMETC Electrical and Controls engineers for 10 days each during build in ERC



TATA MOTORS

ZIPTRON



- Announced 19th September
- First product launch early 2020
- Initial focus on domestic market

TATA MOTORS

ZIPTRON

- Parts sourcing has changed, but basic principles remain from UK concept work
 - Modularity
 - Commonality
 - Flexibility
- Architecture will allow rapid deployment of a range of vehicles into a fast-developing market
- Common parts will drive cost down across all platforms
- Minimised commercial risk



#bolt2volt

Questions?