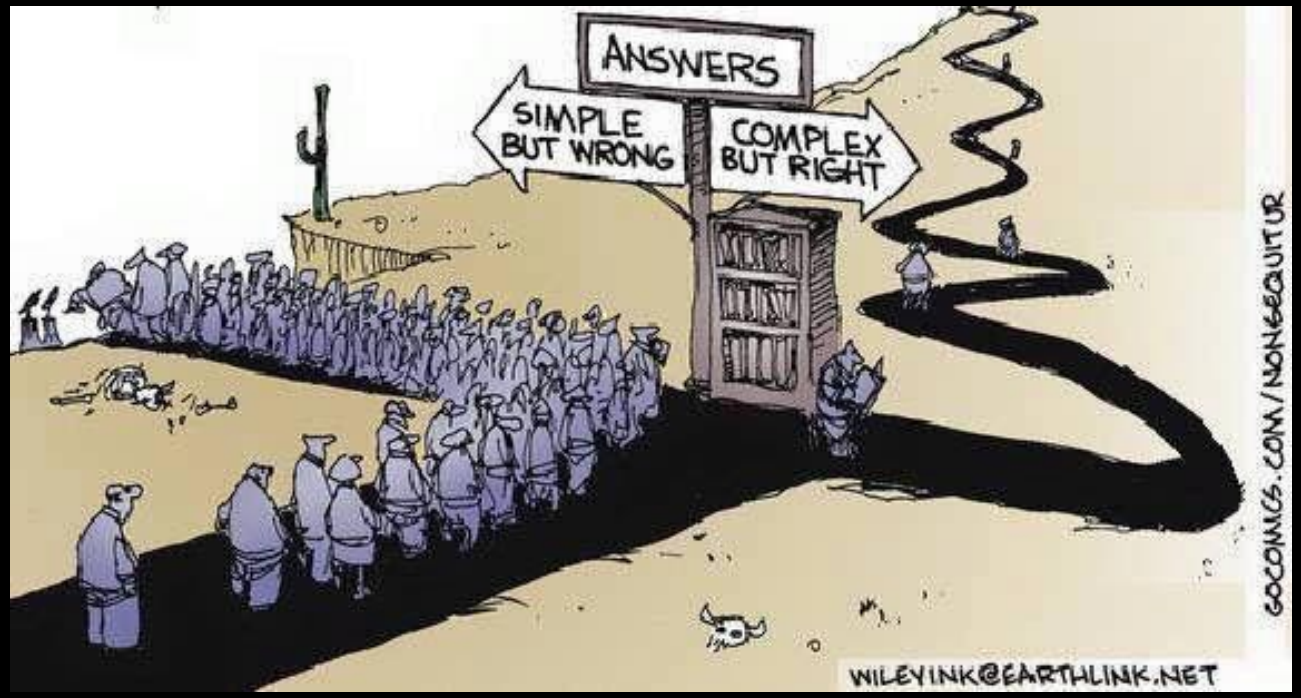


India Inc. Round Table towards Green Recovery

E-Mobility, Clean Energy Technologies and Lithium-Ion Batteries

Stefan Louis

26/08/2020

Current context on e-mobility

Context	Details
eMobility is an established global megatrend	• Battery costs have fallen by 75% in last 7 years – faster than forecast • Globally >1 mn EVs sold in 2017 – 2X of sales in 2015 • OEMs have committed to more than $100 Bn of investments • 20-30% of 4W sales in 2030 predicted to be full battery or plug-in hybrid
Trend is being significantly reinforced by 'shared mobility'	• Fleets demanding low maintenance and TCO effective vehicles
Classical automotive profit pools and ecosystems are starting to get disrupted	• Profits from conventional pools will fall from ~98% to ~60% in next 15 years • New players are emerging in this ecosystem
Multiple governments are supporting eMobility through pro-active interventions	• Reducing vehicular emissions a key driver shaping policies • China and Norway are leading examples globally

xEV vehicles to account for ~50% of the global market by 2030

Mobility impact

Upto 2021

Advanced ICE to gain volume upto 2021, while declining trend beyond 2021

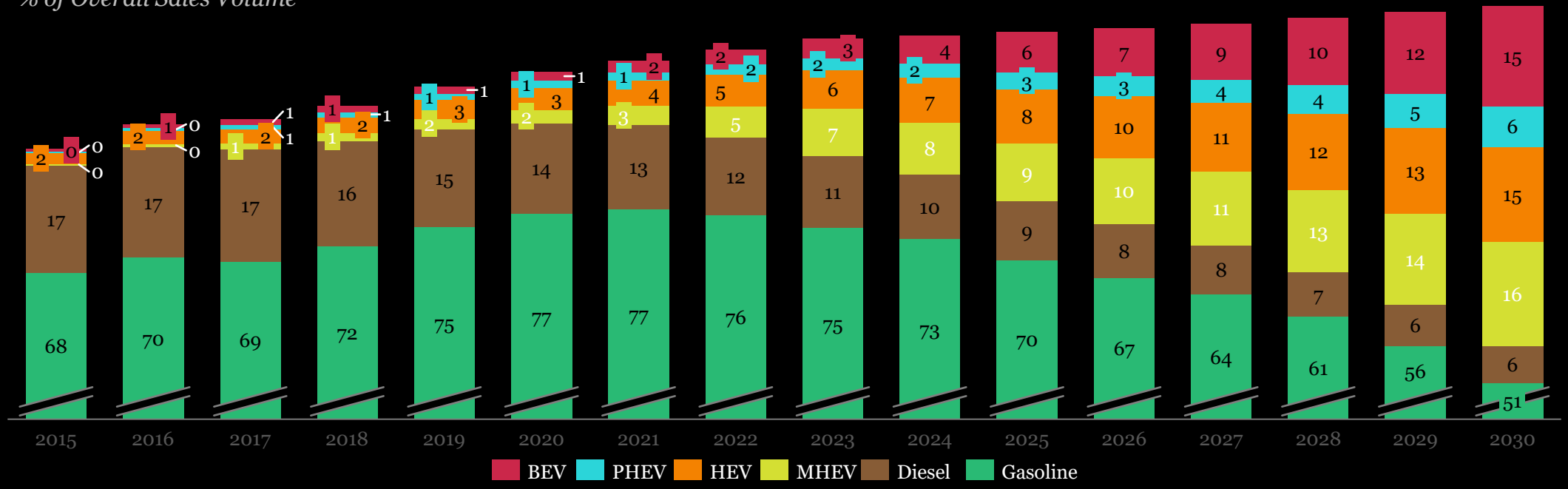
2021 to 2025

Regulation-driven growth for BEV and MHEV

Beyond 2025

TCO-driven growth for BEV (battery costs fall and high consumer demand)

% of Overall Sales Volume



Source: BCG analysis

Global view: Countries have different imperatives for commitment towards EV penetration

Netherlands

- Reduce CO2 emission
- Improve energy efficiency
- Reduce fossil fuel dependence
- Reduce noise pollution

France

- Meet EU emission criteria
- Ensure competitiveness of French automotive industry

United Kingdom

- Focus on ultra low emission manufacturing and R&D
- Improve energy security
- Lower carbon emission
- Reduce air pollution

Norway

- Meet climate goals
- Establish EV industry

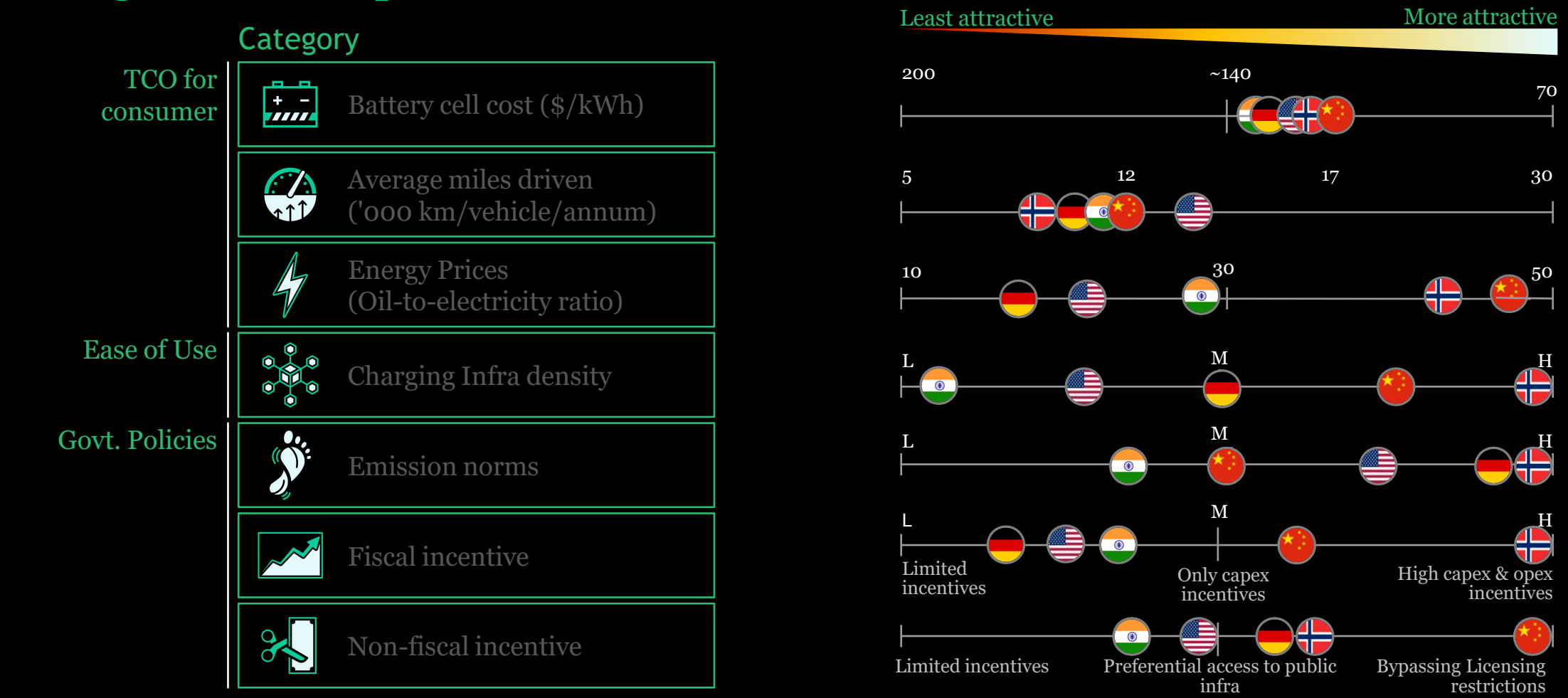
Germany

- Become market leader in electromobility technology
- Reduce dependence on oil
- Foster social acceptance

China

- Introduce diverse transport options
- Reduce dependence on oil
- Develop an efficient clean, green, low-carbon, and modern transport system

India view: Adoption in India has lagged so far, mainly due to lack of infra and government push

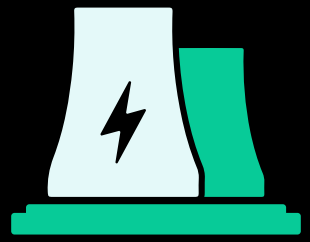


Note: Norway has 25% VAT exempt in addition to the lower annual fees which works out to be ~10% on 5 year TCO basis; Emission standards-attractiveness score of the country is a based on the Euro equivalent car emission norms adopted by the country and 2020 CO_2 emission targets set by it

Source: BCG Report: “The Future of Power Train", IEA: “Global EV Outlook 2017", ICCT:"Comparison of leading electric vehicle policy and deployment in Europe

Future adoption in India will have few key critical drivers

1



Urban pollution

70+ ug/m3

Key pollutants already above acceptable standards of 40

2

CO2 emissions

2,299 MT

India is the fourth highest emitter of CO2 in 2018

Given thermal mix of power, limited impact possible from electrification

3

Fuel consumption

112 MMT

Only 18% of the demand (petrol, diesel) is met by domestic production

Trade deficit

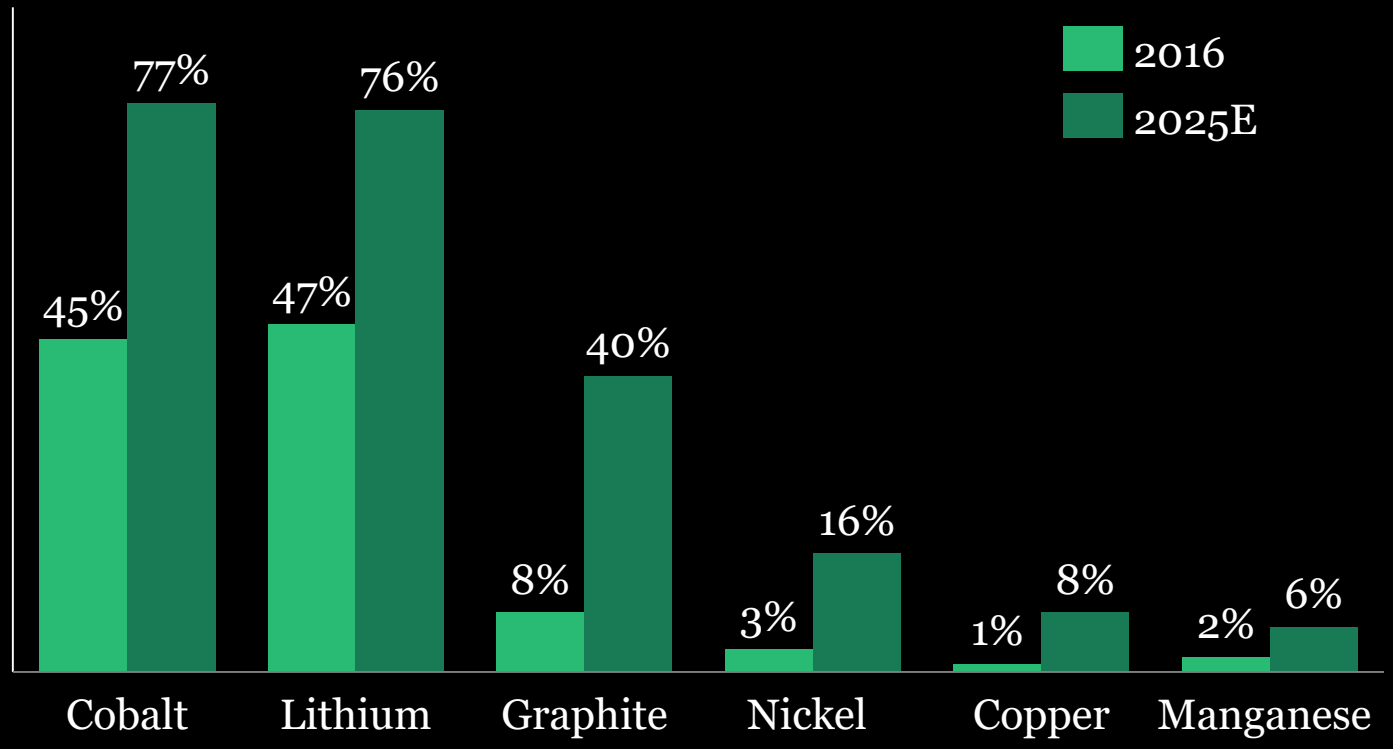
$ 162 Bn

Crude oil is 20% of 2019 imports ($112Bn in $465Bn)

Note: Contribution varies by city and also varies during different season – Winter having higher vehicular contribution
Source: TERI and ARAI study for Delhi, The Air Pollution Knowledge assessment City Prorgam, Study on Six Mega Cities, MOSPI (Ministry of Statistical & Programme Implementation), Petroleum Planning Analysis Cell, EU- EDGAR (Emission Database for Global Atmospheric Research), Central Pollution Control Board, SIAM report on alternate fuel, BCG analysis

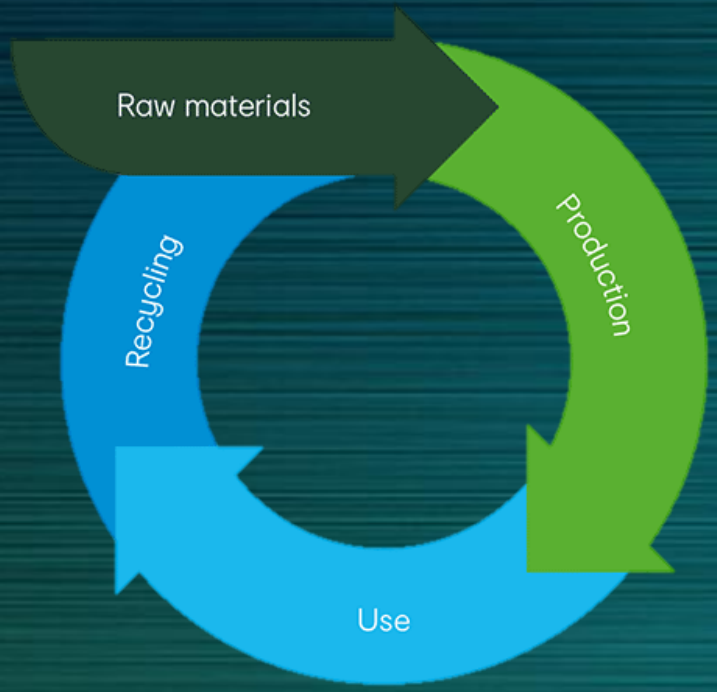
Battery storage led disruption expected in cobalt, lithium, graphite and nickel

Demand from battery applications as a % of total demand



Note : Cobalt, Lithium, Nickel and Manganese are used in cell cathode, Graphite in anode and copper in battery pack and LV wires of the electric powertrain
Source : BCG CMI model

But all these metals can be melted again and again




Inclusive transformation
through cooperation