

# **Economic Perspectives on Electrified Vehicle Demand Scenario and Policy Backdrop**

TE<sup>3</sup> Conference  
Panel Introduction

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The views contained in this presentation represent Dr. Hughes-Cromwick's assessment and do not in any way reflect those of the University of Michigan. Dr. Hughes-Cromwick would like to acknowledge the excellent research support of Evan Leon, MBA student at the Ross School of Business, University of Michigan, and Alex Maranville, Master's student at the Ford School of Public Policy, University of Michigan.

## Five Key Points

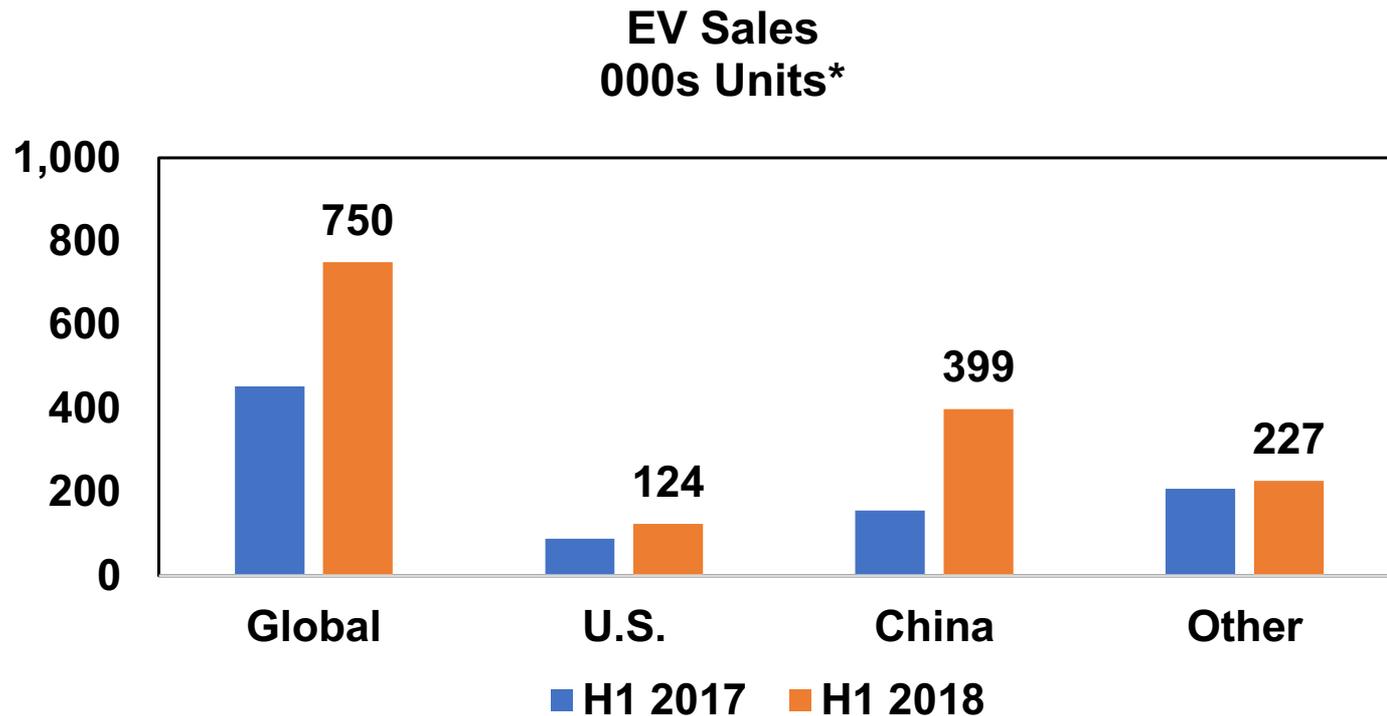
- **Fundamentals – economics and technology – of batteries for electrified vehicles (EVs) have improved**
- **Retail pricing parity of internal combustion engine vehicles (ICEs) and EVs is likely in the next five years**
- **Cobalt supply could be constrained, however technology innovation may “bail out” cost problem**
- **Global transition to EVs could put the mobility sector on a path to making a significant contribution to CO2 emissions growth slowdown**
- **Policy mix and a stronger pace of capex would accelerate this slowdown**

## EV Scenarios

- **International Energy Agency's (IEA) latest Global EV Outlook 2018 (May 2018) projects 230 Mils units in operation by 2030**
  - **But this requires more aggressive policies and regulations (i.e., IEA's "EV30@30")**
  - **Baseline IEA scenario projects 125 Mils EV units in operation by 2030, nearly 46% fewer than the more aggressive EV30@30 scenario**
- **IEA's EV30@30 scenario implies EV sales growth at an average annual rate of 33% between 2017 and 2030**
- **If overall global light vehicle sales grows at an annual rate of 2% (slightly less than global GDP growth projections and under the 3.5% growth rate of global sales during 2005-2015), then ICE vehicle sales will peak in the early 2020s**
- **Questions: Can supply base deliver this outside of China? Will China lead at home and abroad? Will EVs be produced in Europe and U.S. and exported to China? Or will China produce EVs for their own market?**

## EV Sales in First Half 2018

- Global sales up 66% as compared to First Half 2017
- China has wholesaled 399,000 units in the First Half 2018
- U.S. sales have grown 40%, with an acceleration in Q3 led by Tesla
- Adoption of EVs growing at a solide pace in all other markets

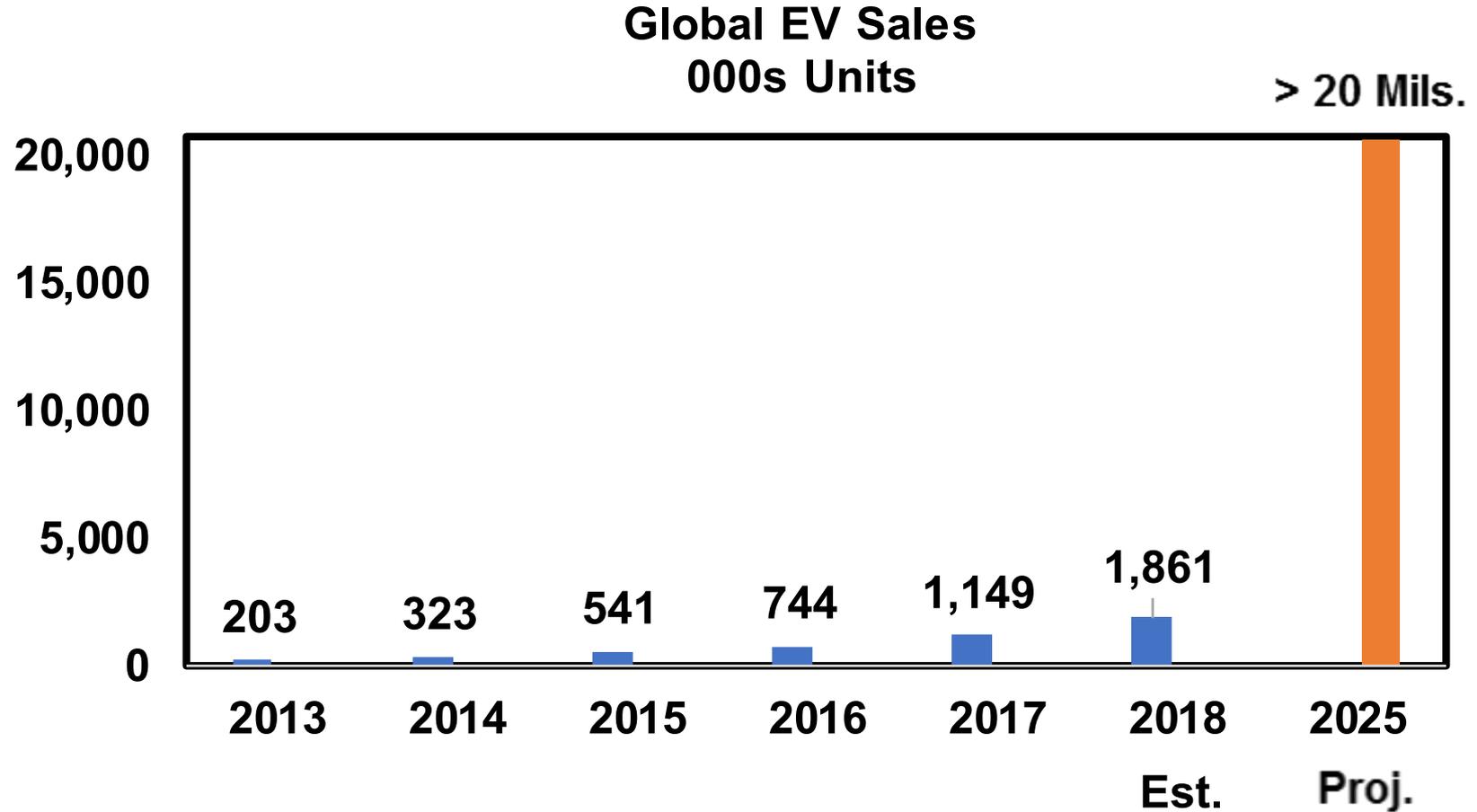


Source: [www.insideevs.com](http://www.insideevs.com) and <https://wattev2buy.com/chinese-new-energy-vehicle-market-china-ev-sales-h1-2017/>.

# EV Scenario

2018 – 2030 annual growth of EV sales above 40%

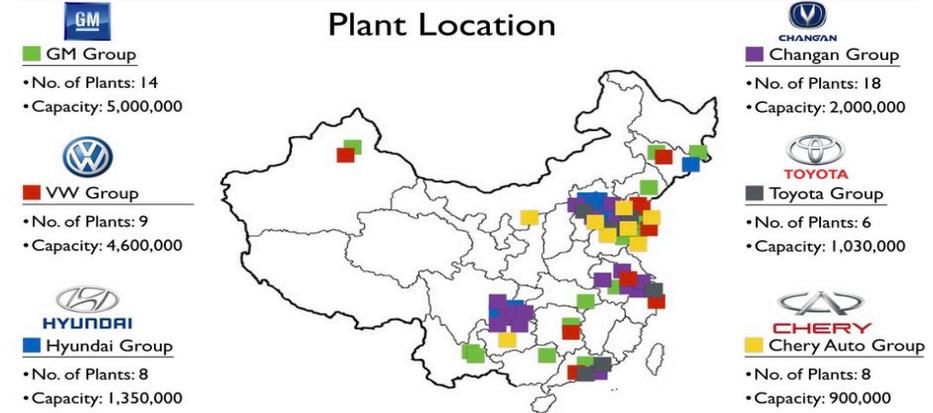
- More EVs sold than ICEs by 2029



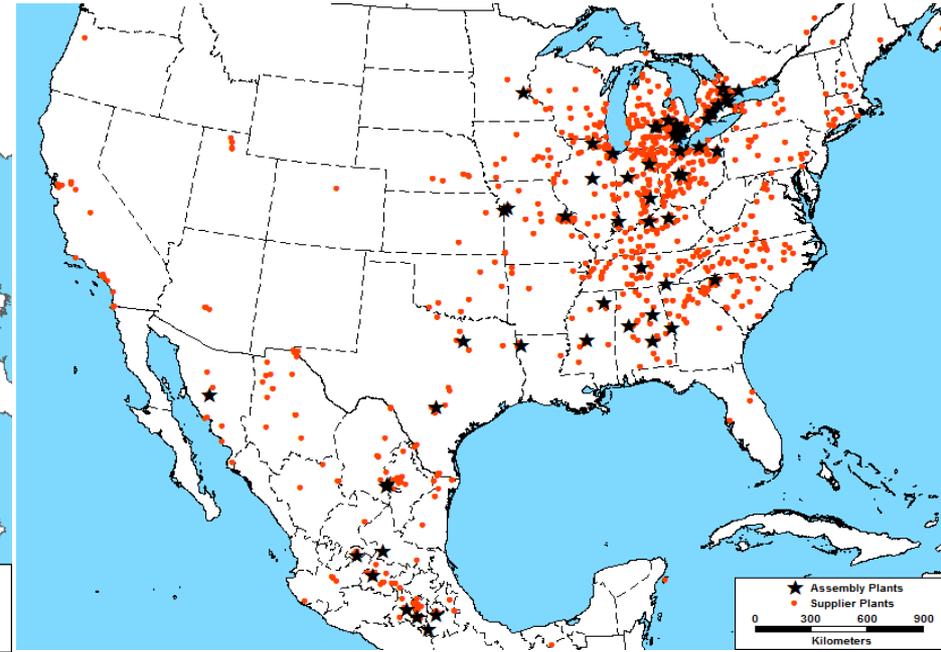
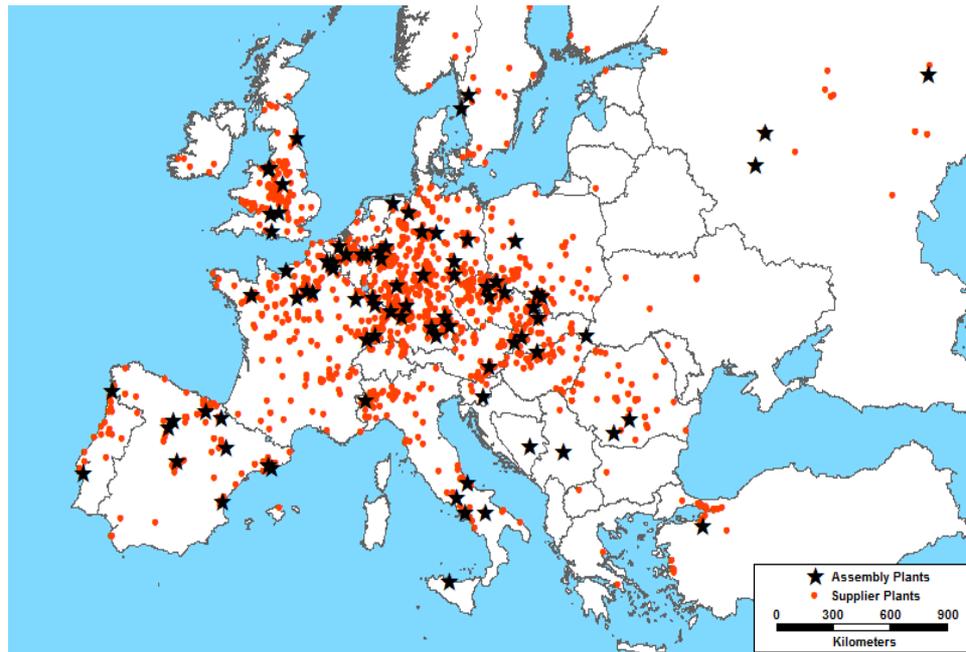
# Transition of Automotive Production and Supply Base

- Electrified platform basis for automated vehicle content
- Fewer components
- Capex cost to retool plants
- Multiplier effect on communities
- What about data ownership and predictive analytics / AI from vehicle data?

## China Automotive Statistics Production Capacity 2016



Source: AutoBook Research



## Recap

### EV scenario hinge on several factors:

- **Demand side**
  - Pricing parity with ICE vehicle retail prices
  - Battery pack pricing will be a key determinant of topline EV retail quotes – which will be influenced by minor metals pricing
  - Policy stimulus – China support substantial
- **Supply side**
  - Technology: Innovations could speed the pace of EV growth
  - CAV content: Fits with EV platform better than ICE?
  - Supply side policy stimulus