

Dealing with the Unfolding Uncertainties in Energy Markets

KAPSARC-IEF Thought Leadership Workshop

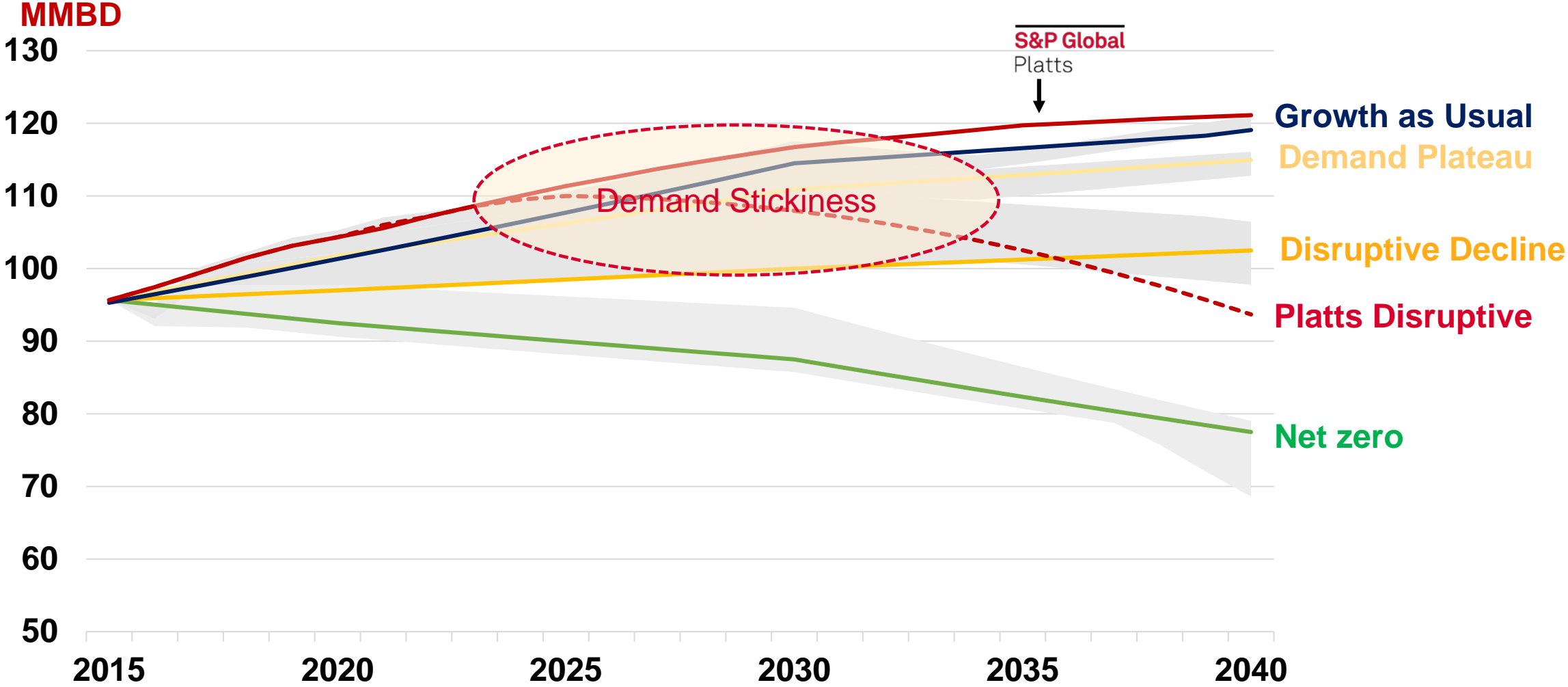
February 15th, 2018



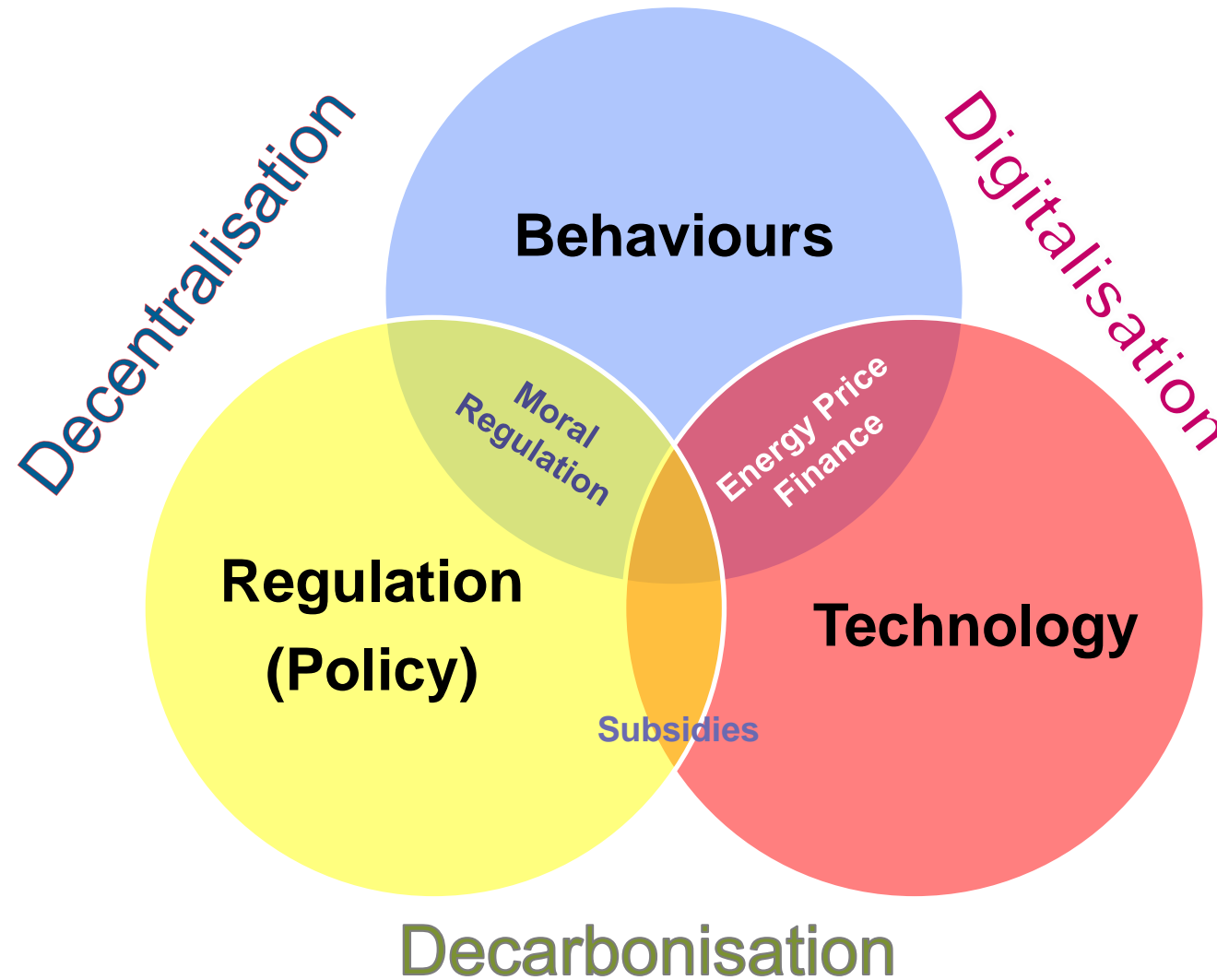
S&P Global
Platts

Chris Midgley
Global Director of Analytics
S&P Global Platts

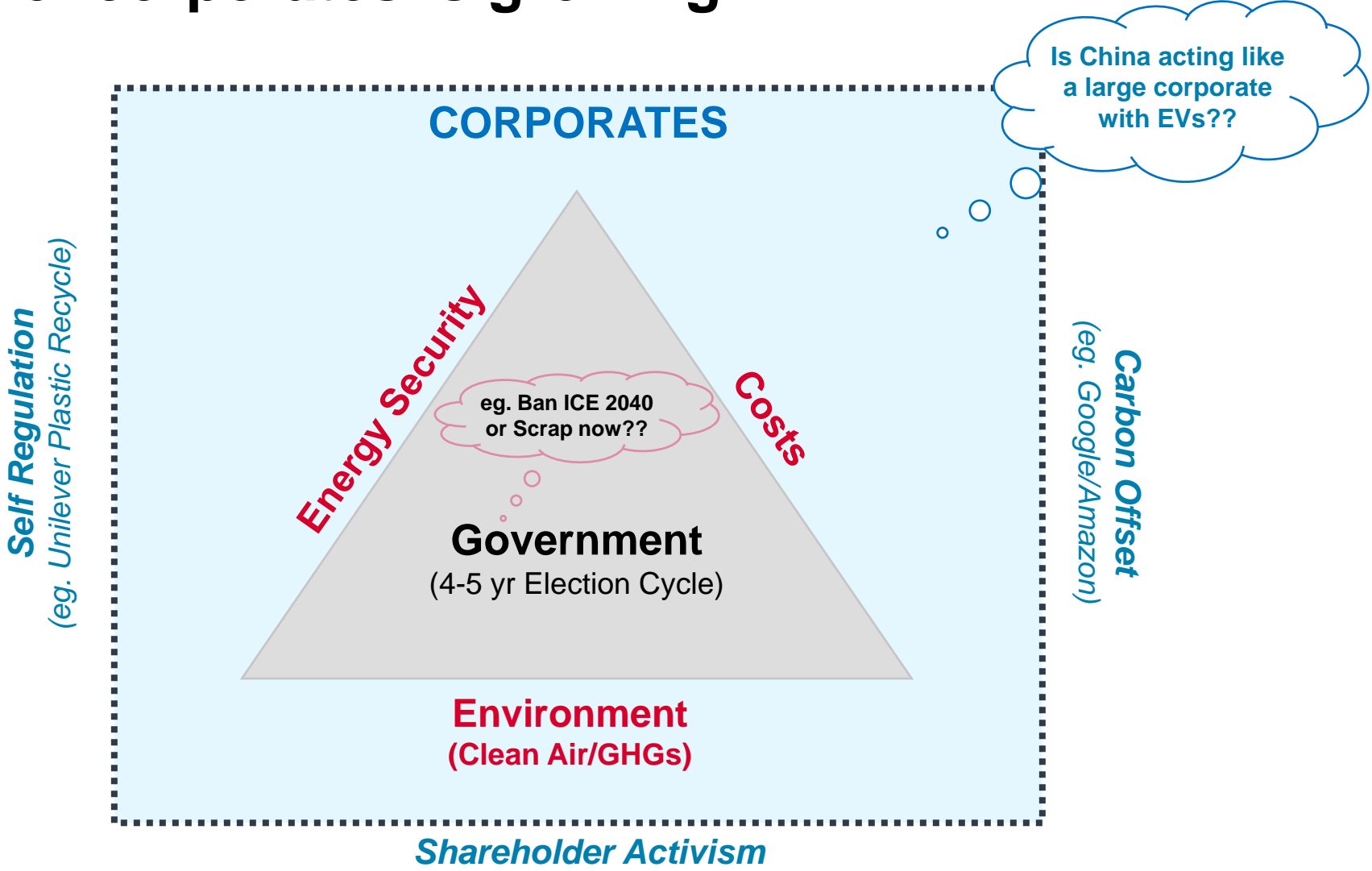
There is an 80MMB/d variance in industry outlooks for 2040 which creates unprecedented uncertainty



Boardroom worry about the 3Ds which will be influenced by technology, regulation and human behaviours



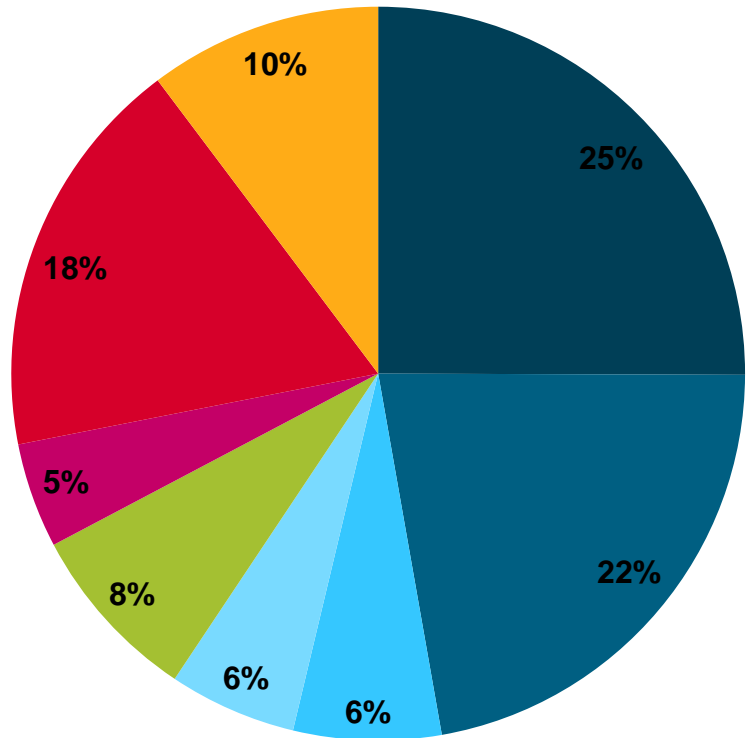
Increasingly venerable Governments face a difficult trilemma while the role of corporates is growing





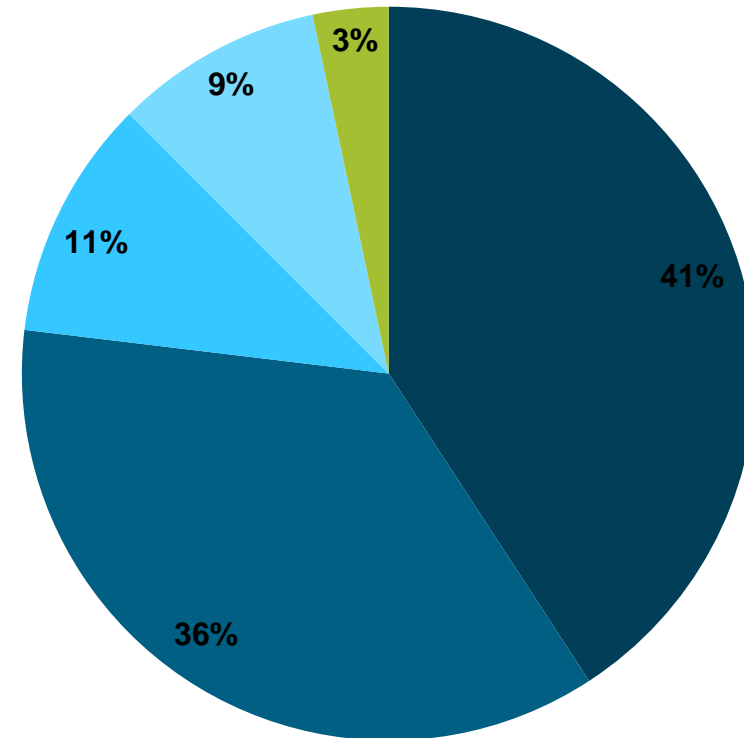
Transport make up just over 60% of global oil demand of which 77% is Road Transport.

2017 Oil Demand



- Passenger Cars
- Trucks and Other Road
- Aviation
- Marine Bunkering
- ResComPub
- Power Generation
- Non-Energy
- Other Industrial

2017 Transport Sector Demand



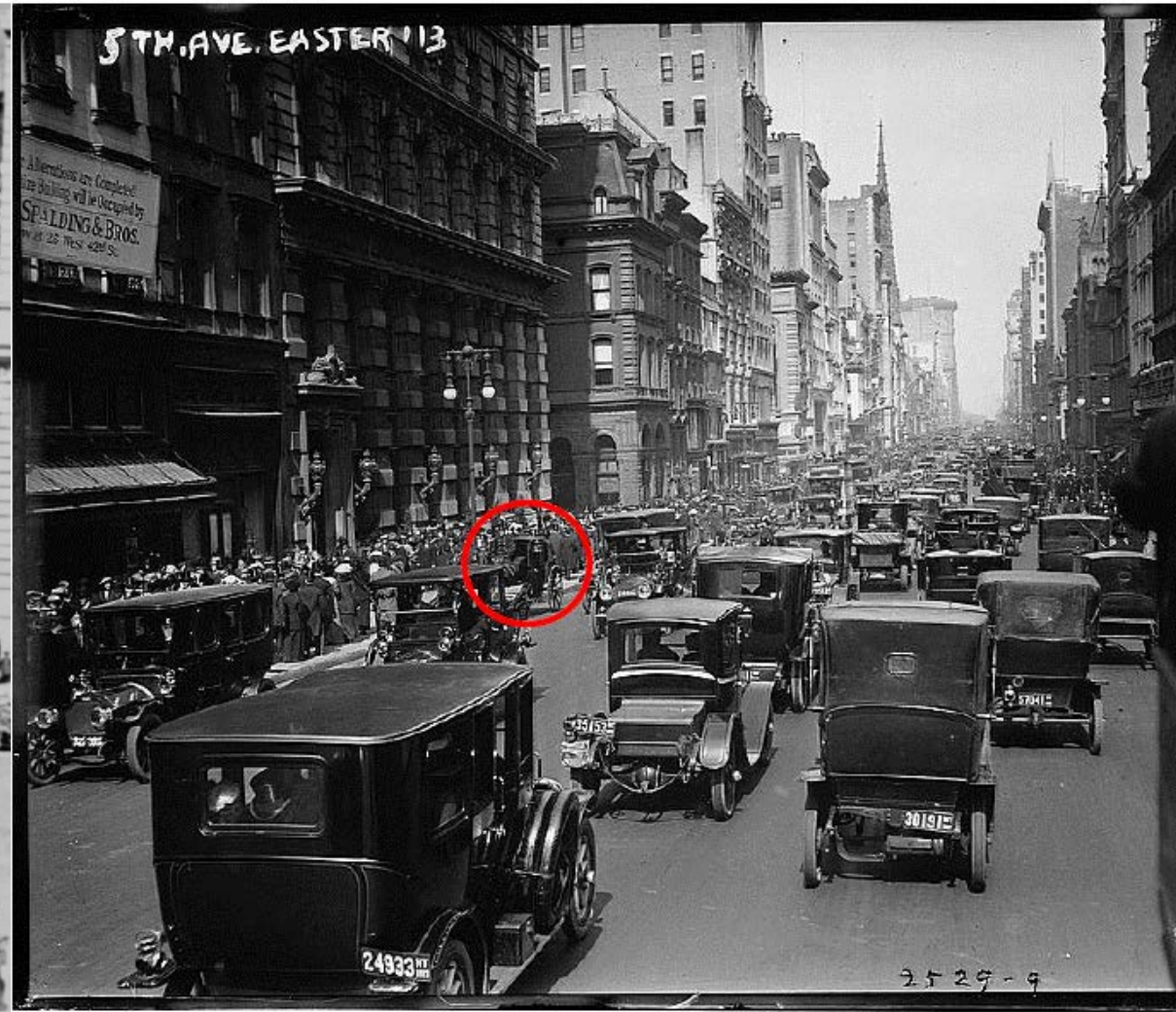
- Passenger Cars
- Trucks and Other Road
- Aviation
- Marine Bunkering
- Non-liquid fuels (all sectors)

Transport has already been through one major transformation which took just 13 years, will the next one be as quick?



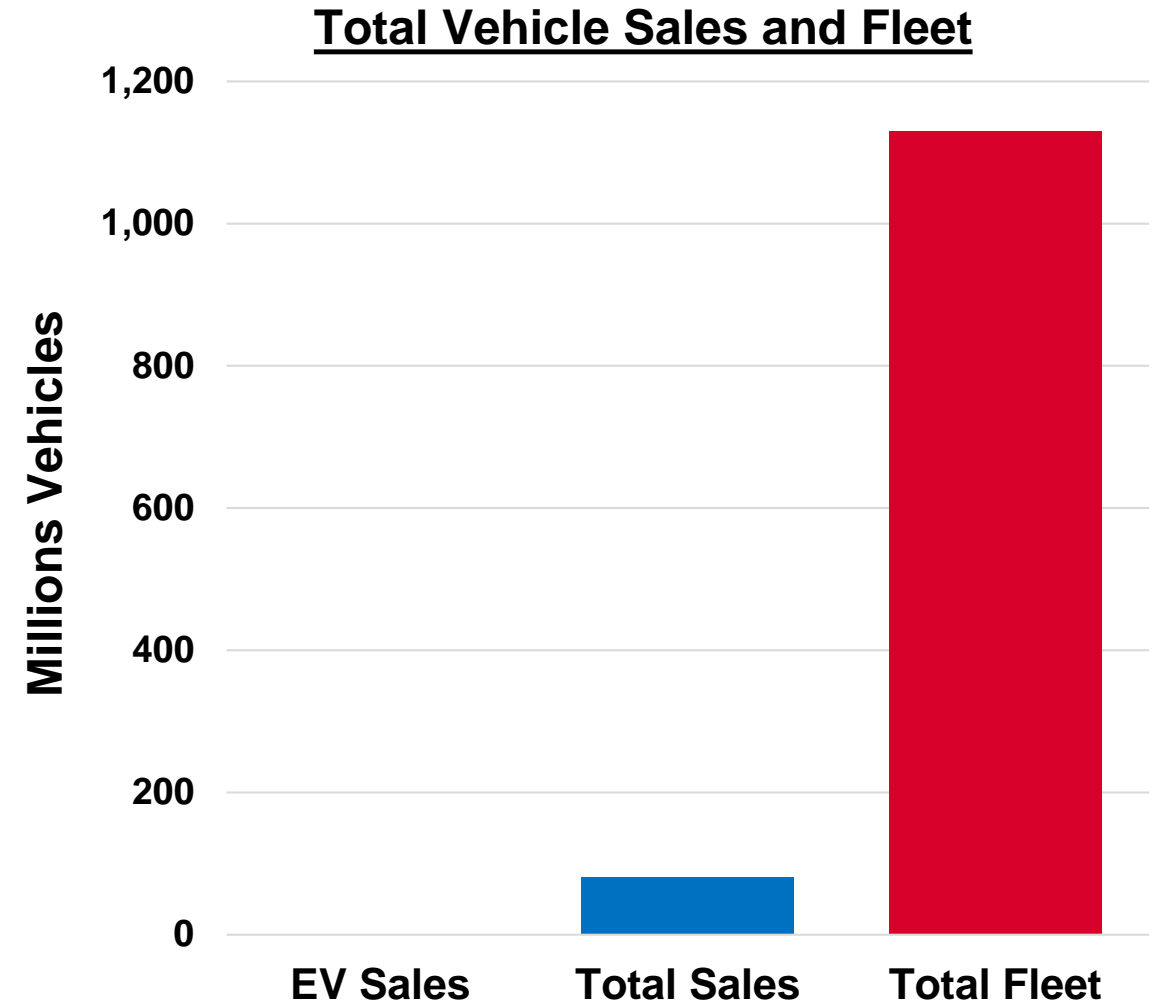
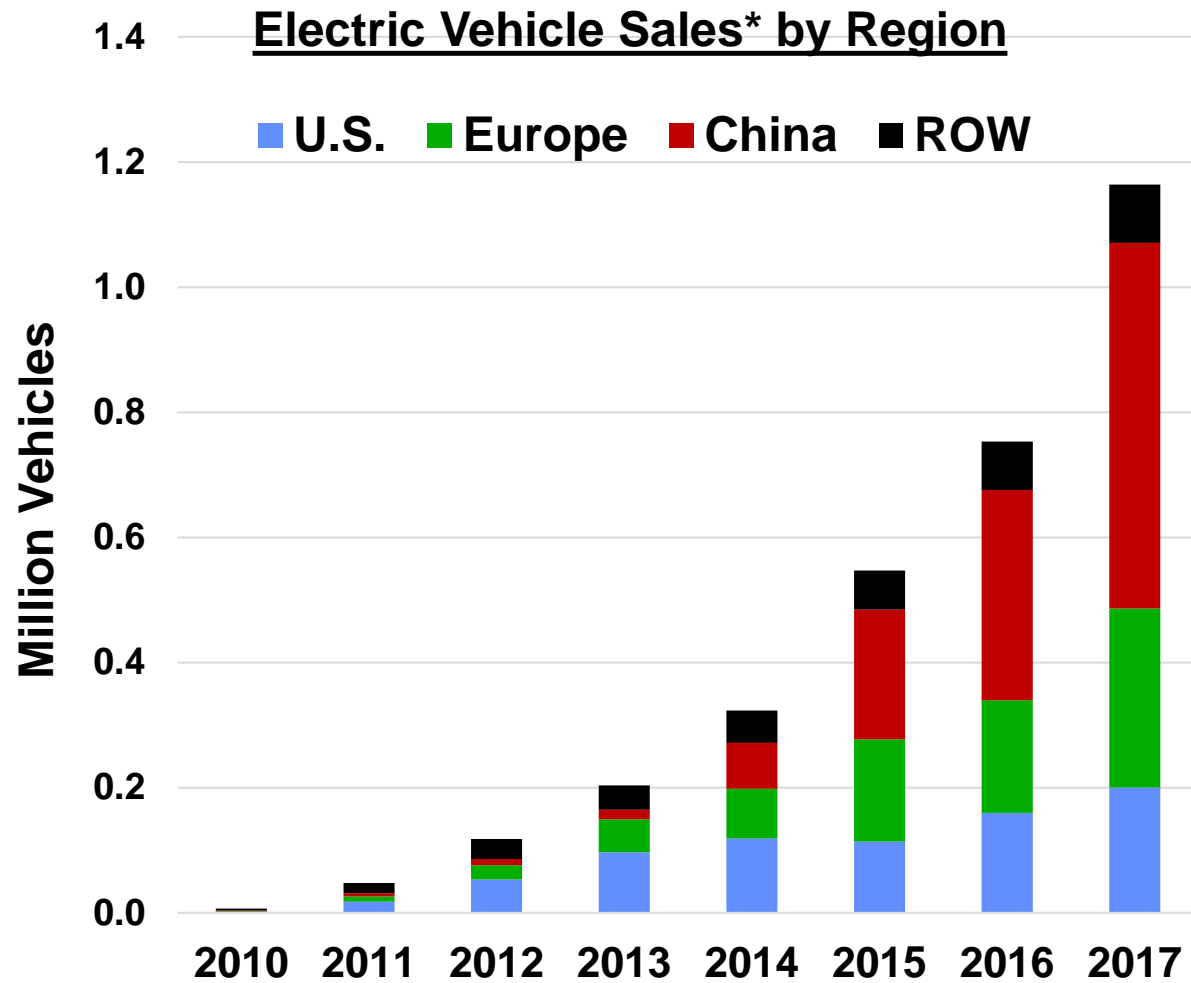
Easter Parade: 5th Avenue, April 15, 1900: Spot the Car

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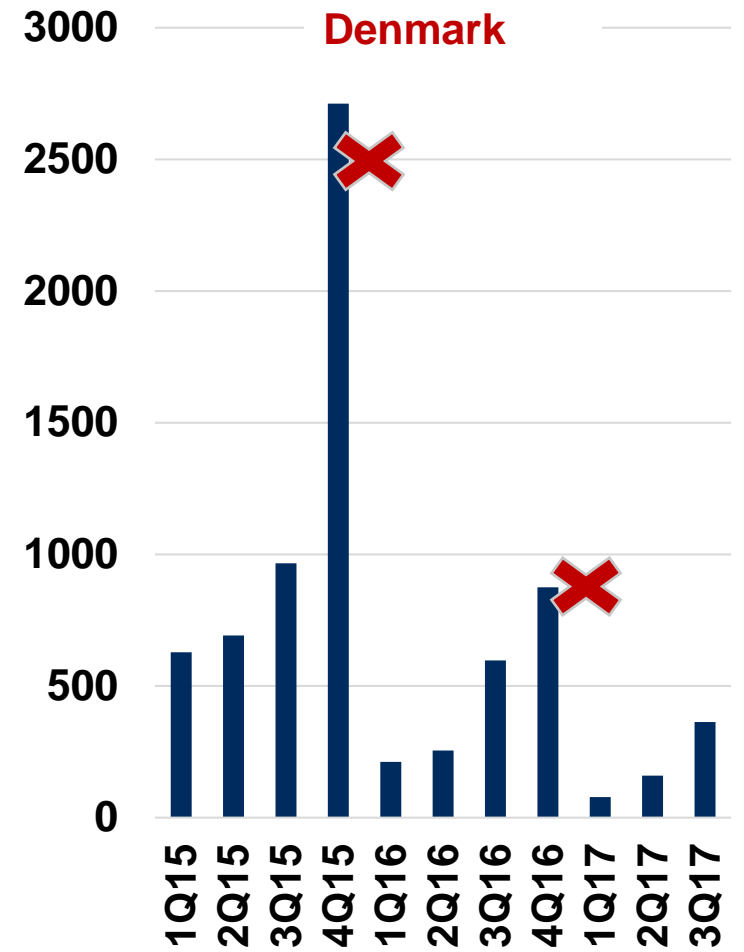
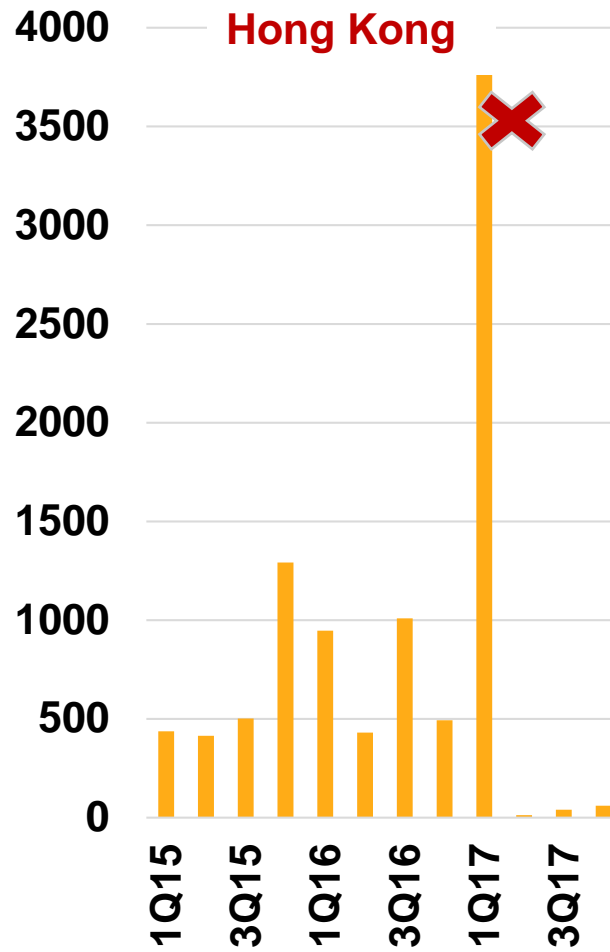
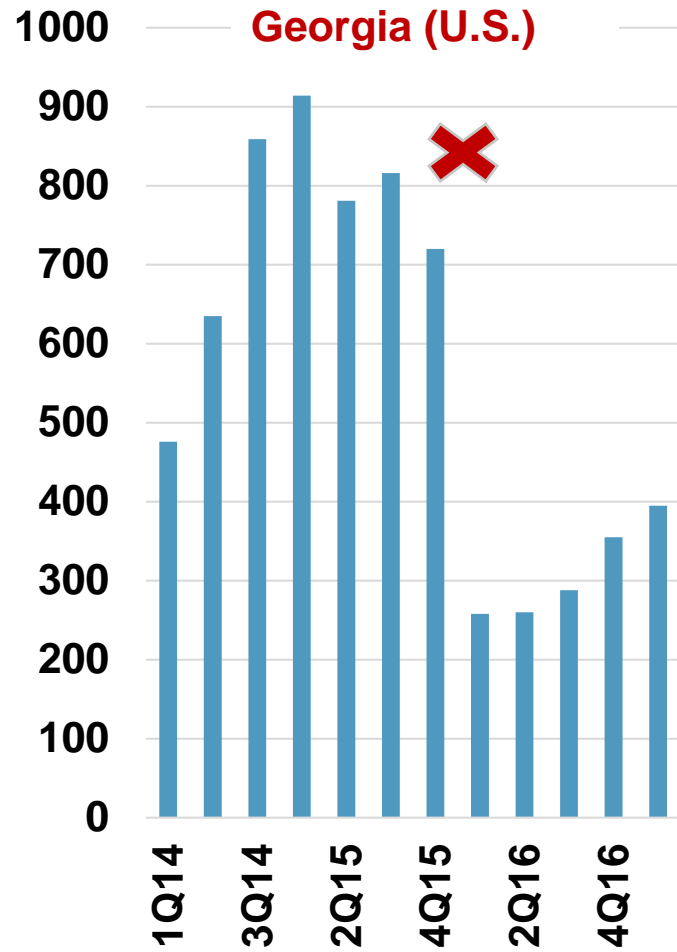
Easter Parade: 5th Avenue, March 23, 1913: Spot the Horse

EV sales have risen rapidly (esp. in China), however it remains a fraction of all car sales and of the total fleet.



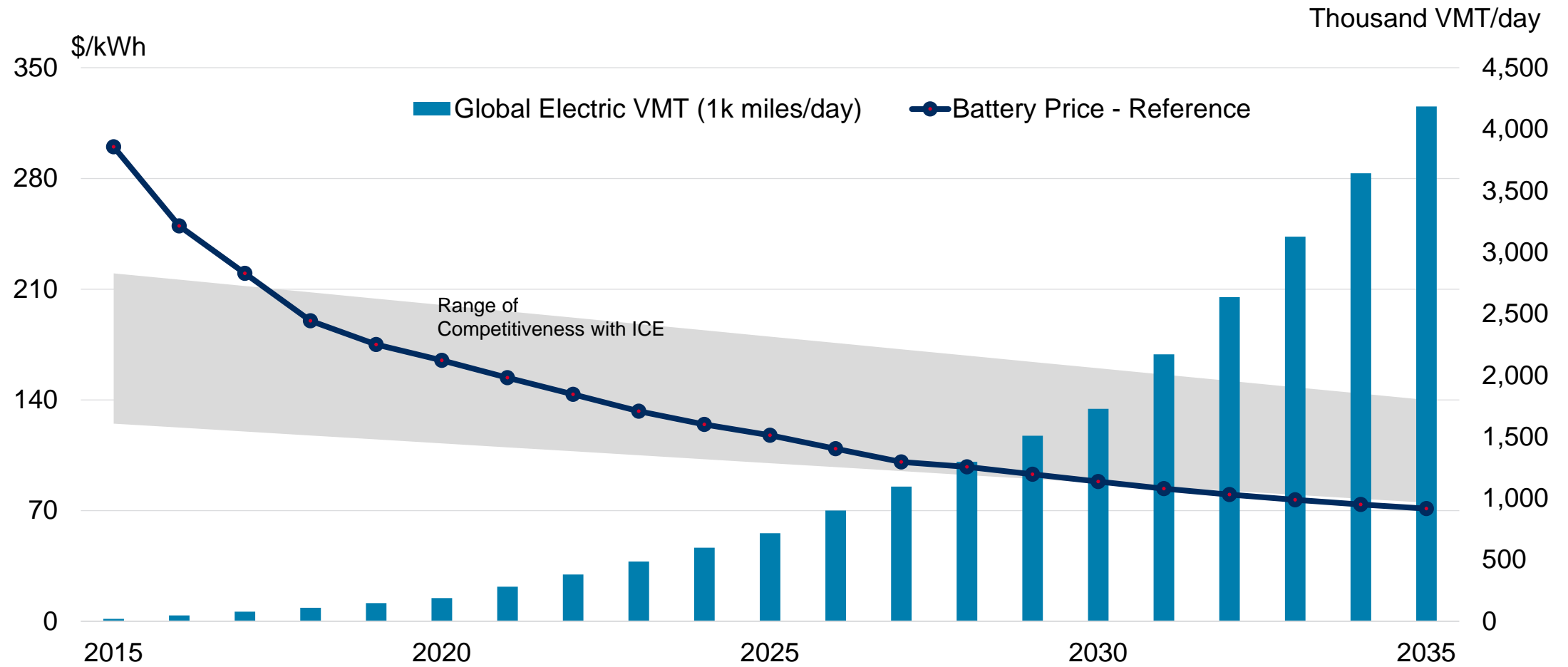
* Includes Plug-in Electric Hybrid vehicles (PHEVs) and Battery Electric Vehicles (BEVs)

EV uptake remains highly sensitive to the subsidies and incentives



Source: European Automobile Manufacturers Association; Georgia Department of Revenue; Hong Kong Transportation Department

In some countries EVs are starting to become economic but for majority battery costs need to drop much further



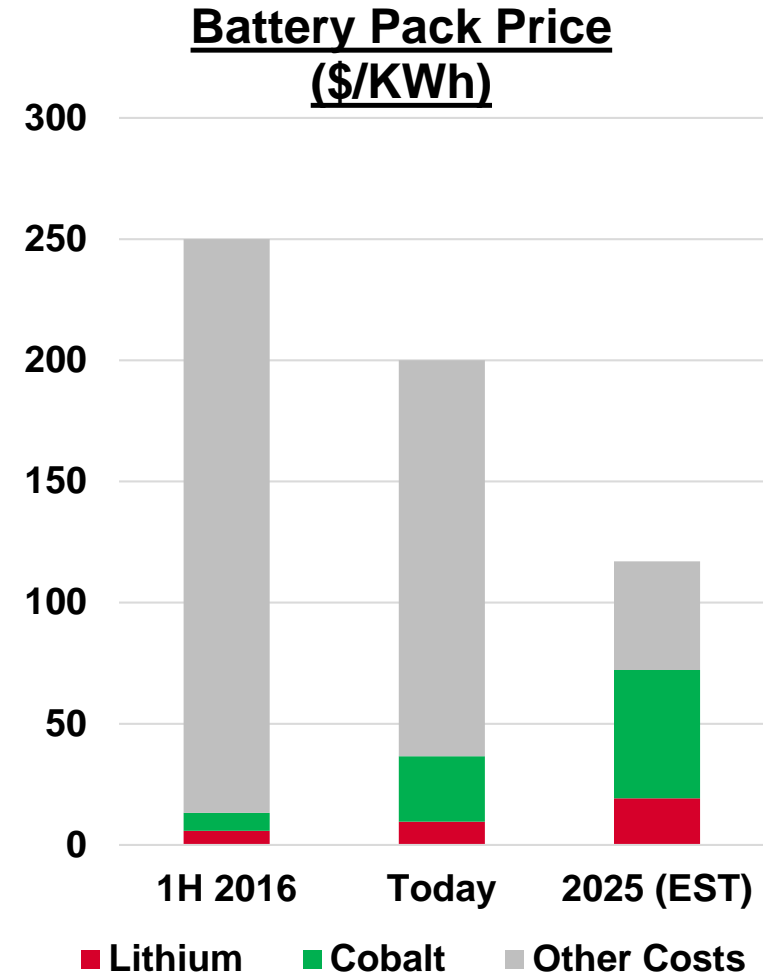
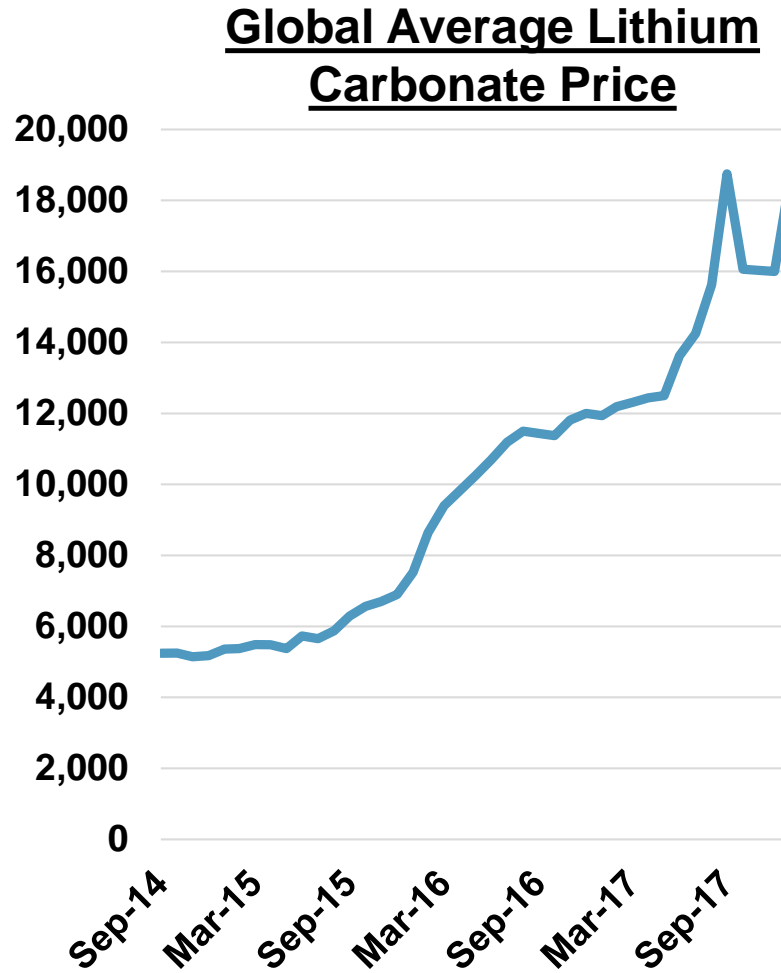
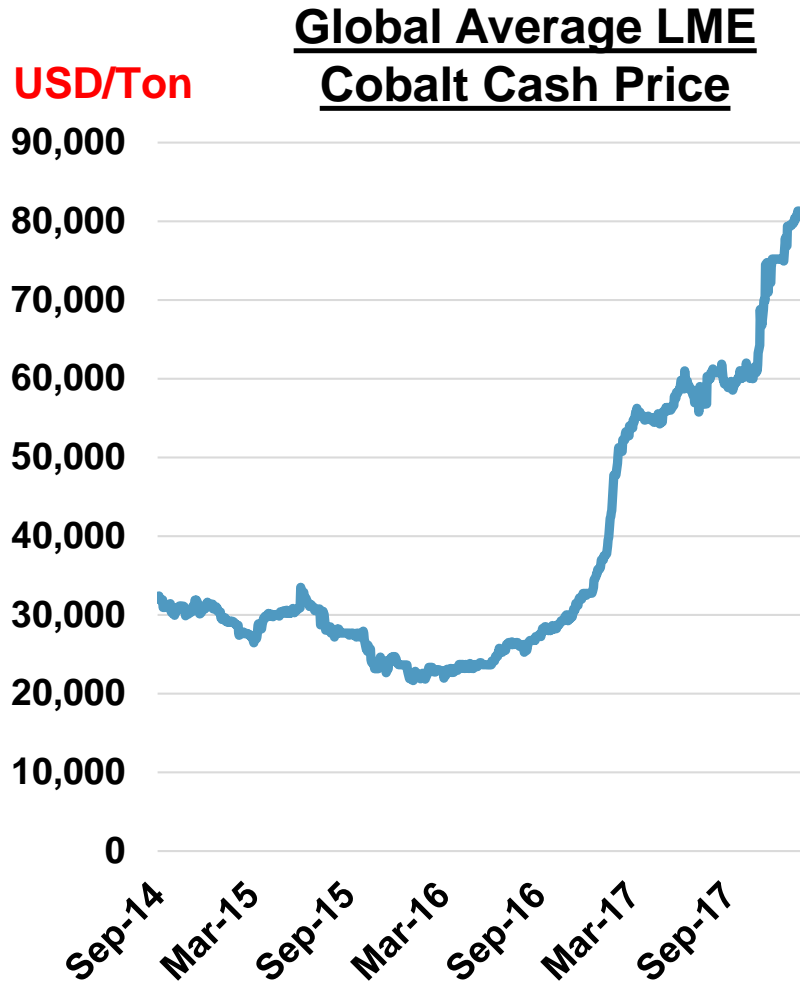
EV share of Global VMT:

2025: 0.6%

2030: 2.1%

2035: 4.3%

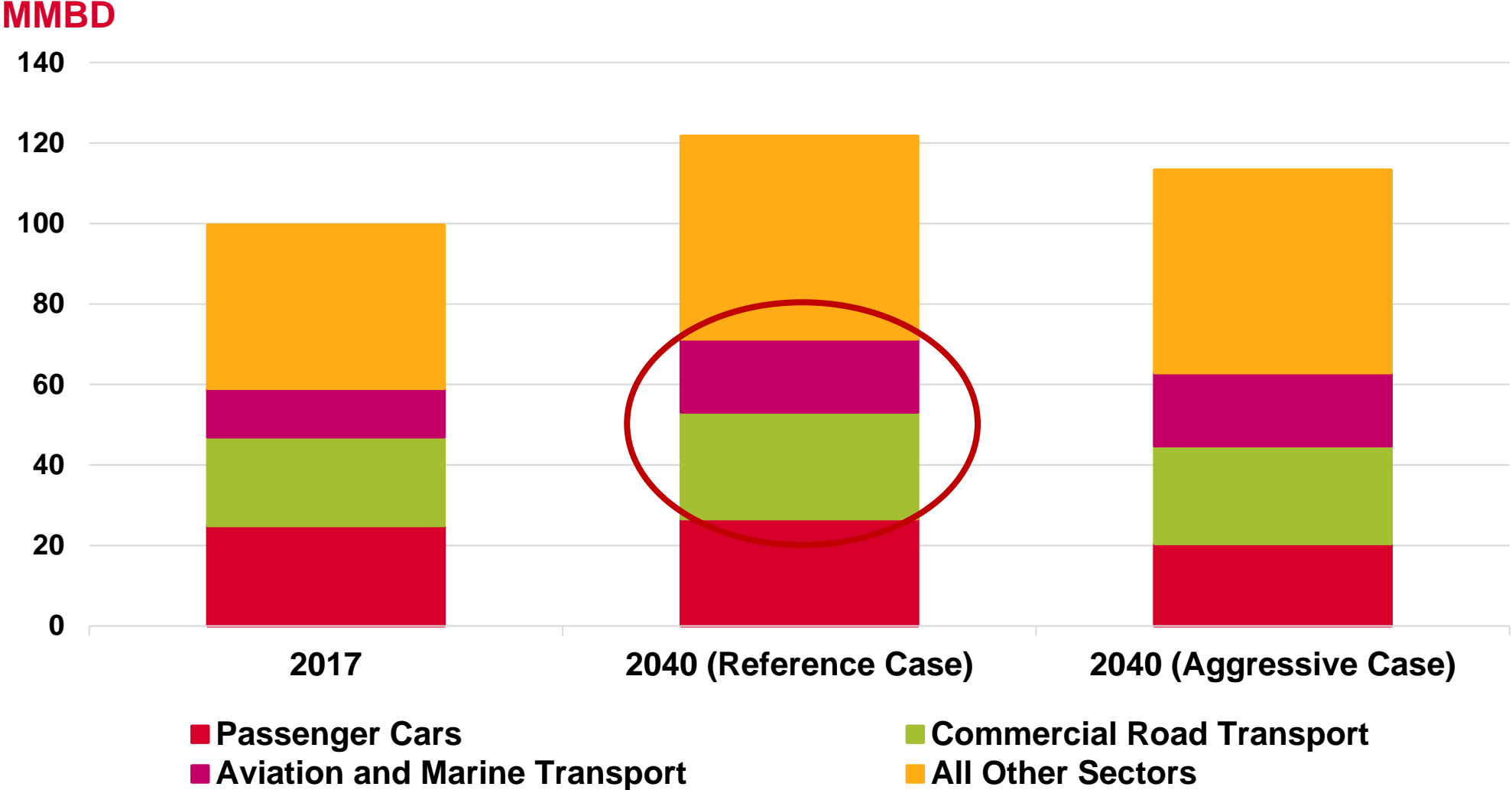
Rising Lithium and Cobalt Prices are increasing the ratio of materials costs in Battery Packs and the future price floor.



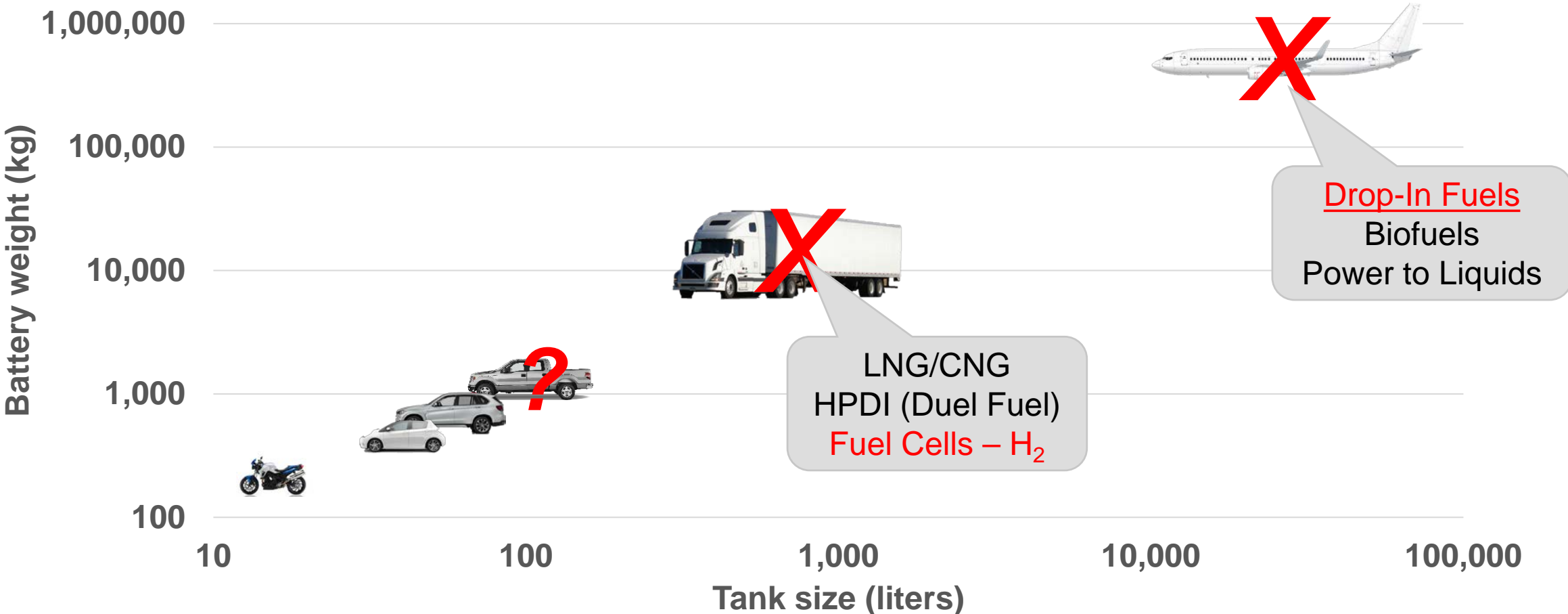
Source: S&P Global MI/SNL, Platts

Note: Assumes NCA battery chemistry. 2025 illustrates doubling of metals costs with no change in battery composition.

Even creating a disruptive case, demand stickiness slows down the rate of change in oil demand.

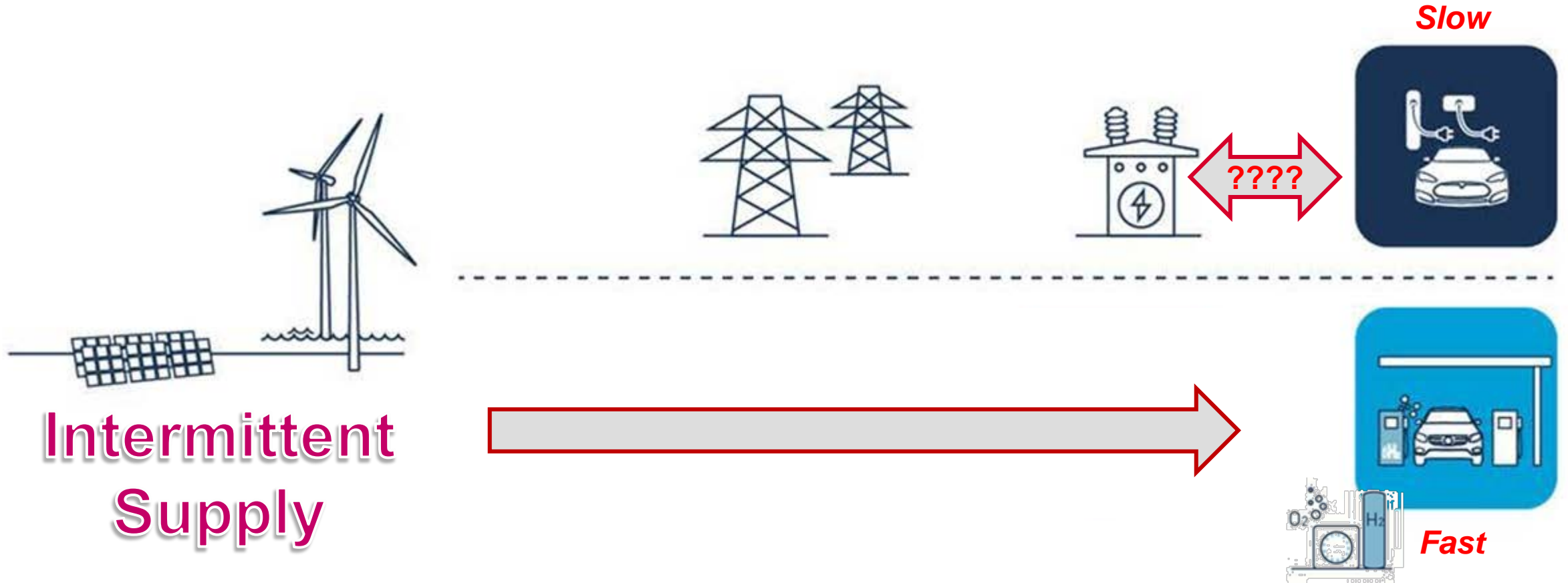


Battery weight is almost infeasible for heavy-duty trucks & planes so alternative solutions are needed to impact oil demand.



Sources: S&P Global Platts Analytics, U.S. EPA, California ARB
 Note: Energy Density of Gasoline 65 x Best Commercial Battery

At scale, Hydrogen provides a lower cost* solution to zero emission, high energy density fuelling integrated with renewables.



* Hydrogen infrastructure cheaper than electric charging once you get to 1m vehicles..

Decisions in the digital age?

Analytics is the answer.