Electric Vehicles: The Future of Development and Deployment

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ABSTRACT

More than two million electric vehicles (EVs) were sold globally in 2018, a trend expected to grow over the coming decades. The smart deployment of EVs and EV infrastructure will be an important part of broader mobility planning and offers opportunities to connect markets and supply chains. However, market opportunities would also bring more competition: Competition between EV manufacturers in different countries, competition for batteries between renewable energy storage and EV batteries, etc. The question of how we incorporate EV innovations in our market will become more important.

SUMMARY

Globally, EV market has been growing rapidly. However, there are regional variations. Each country has different levels of incentives and mandates. In terms of the U.S., EV subsidies are winding down, which can add another layer of uncertainty in the U.S. market. Nonetheless, because the U.S. market accounts for only 20% of the entire market. The general EV trend will be maintained.

Nick Albanese, *Senior Analyst, Electrified Transport, Bloomberg NEF*

- Passenger EV sales are growing quickly; it is expected to hit 7 million globally by the end of 2019
- China accounts for 50% of the global market sales
- Electric buses are also growing fast. Particularly, 99% of EV bus share is concentrated in China
- Revenue from passenger EVs is rising; It was $75 billion in revenue in 2018, BNEF expects, it would exceed a hundred billion dollars in revenue in 2020
- EVs are still only 2 to 4% of annual sales in most major markets
- The sales vary by region; In California, EV sales account for over 8% of new car sales. In Norway, it was over 40%, going to hit 50% in 2019
- EV subsidies are winding down in the U.S. as EV is getting more cost-competitive.
- Most governments are tightening their fuel economy standards. Only the U.S. is rolling back the standards
- The U.S. market accounts for only 20% of the entire market. As such, regardless of the U.S. situation, the most vehicles will be sold in which the fuel standards are in place
- City-level restriction on ICEs can be a big driver of EV sales
- Public charging infrastructure is taking off

- Lithium-ion battery prices have fallen 87% since 2010; the battery accounts for 40% of the capex of an electric vehicle
- Manufacturing capacity will more than triple by year-end 2023, bring pack prices below $100/kwh by 2025
- Consumers are going to have cheaper EVs in the mid-2020s
- Only a third of the US passenger vehicle fleet will be electrified by 2040
- Global oil demand from road transport peaks in 2030
- Both EVs and ICEs get cleaner to operate
- Absolute CO2 emissions rise for at least another decade

Garrett Fitzgerald, *Manager, Mobility Transformation, Rocky Mountain Institute*

- There are variabilities why countries are interested in EVs: Energy Security, Air pollution, Climate Change, and Growing markets and opportunities
- EVs alone do not address land use and parking issue, which are the real tangible issues in the transportation sector
- California is a leading state in the U.S. in terms of transportation electrification; Nearly half of EVs are in California
- California did this by both taking federal and state-level measures
- Utilities are going to play a large role in transportation electrification, which can be a great opportunity for them to increase their revenues
- Subsidy size matters as people are making a decision based on the upfront cost
- EV policy portfolios should be tailored to unique county conditions and governance systems

Jonas Meckling, *Assistant Professor, University of California Berkeley*

- The combination of incentives and mandates is the key driver
- EVs being the key innovation game in clean energy technologies
- EVs present major transformation in car manufacturing
- Apart from stimulus package, US manufacturing policy for EV largely absent
- As a result, the U.S. is a net importer of batteries

Q&A

***Q**: What is the biggest factor, if that is taken away, to drive down the EV growth?*

A: Fuel efficiency standards would be the long-term factor. If you pull this back, automakers automatically change their long-term plans.

***Q**: Would you tell me the intersection between the shared mobility service and EVs?*

A: Based on BNEF research, 5 to 8% of global vehicle miles traveled (VMT) last year was taken in some forms of the shared mobility service. It is expected that this will hit 20% by 2040.

***Q**: It is obvious that battery technology is a key driver for EVs. Meanwhile, we also have the renewable energy industries that use batteries a lot. Which market is which?*

A: Historically, consumer-electronic was the largest demand sector for lithium-ion batteries but as of 2019, it was passenger EV. So, now, EVs are the largest market for that. Stationary storage is a much smaller market, relatively.

***Q**: Now that the price parity is likely to come soon, what is the real impact of CAFÉ in a real way?*

A: The biggest impact is that automakers today do not have certainty on which type of vehicles they need to be producing at scale. So, as the price parity comes, the main benefit is removing that uncertainty.

***Q**: Why are we not talking more about how electricity for EV is sourced?*

A: A lot of policies aren't about carbon necessarily. However, some states are setting specific targets.