Virtual Impact of Electric Vehicles on Oil Demand

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EVs Forecast Variation by 2040

Source: Kha, 2018.
Goal & Objectives

Investigating the Impact Level of EVs on Oil Demand.

Objectives:

• To examine EVs deployment and its industrial prosperity against oil market dynamics.

• To assess required additional fuels for the power plants to meet EVs demand.
Analysis Logic
Macro Level

- Oil prices vs. EVs sales growth dynamics.
- Oil demand vs. EVs market progress dynamics.
- EVs market progress indicator: The Krane Shares Electric Vehicles and Future Mobility ETF (KARS)
- KARS is an index tracking global stocks involving the production of EVs, autonomous driving, shared mobility, lithium and/or copper production, lithium-ion/lead acid batteries, hydrogen fuel cell manufacturing.
- KARS inception date was 18 January, 2018.
- Implication of EVs energy demand on power sector and eventually on oil demand.
Correlation

- Correlation coefficient between oil prices and EVs growth sale is 0.90.

- Fuel economics: Present cost of EV’s battery component is $190/kWh, e.g., a 100 kWh battery becomes $19,000 component of an EV. This cost does not include other parts of the car.

- Correlation coefficient between oil demand and KARS price is -0.95.

- Short-term negative correlation between oil demand and EVs industrial development confirms the long-term fuel economic effect.
Implication (1/2)
EVs Energy Demand —> Oil Demand

- By 2030, fleet oil demand is 26.7 mboe/d.
- By 2030, under EV30@30 scenario, the passenger vehicle requires less 3.5 Mboe/d (i.e., 23.2 Mboe/d).
- Not accounting for the power generation, transmission and distribution losses, it is assumed that power system needs to generate additional electric energy equivalent to 3.5 Mboe/d for EVs.
- Efficient internal combustion engine (ICE) is the primary driver to flattening oil demand.

By 2030, EV30@30 scenario, number of EVs is 215.6 million (constituting 13% of the total passenger vehicles).
For the purpose of the analysis in assessing the severity level of EVs on oil demand, it is assumed that 13% of the PVS in 2030 is entirely independent of oil product fuels.
By 2030, under the EV30@30 scenario case, 1,267 Mboe (equivalent to 2,153 TWh) of additional energy to be generated by the power sector to meet the EVs demand.

The additional 2,153 TWh would be generated by mix of fuel-based technologies (not by one particular technology).

Distributing the 2,153 TWh using the % contribution.
Note that ...

- Transportation (aviation, commercial and passenger vehicles) oil demand annual average growth rate 2.3% through 2016 - 2040.
- Average share of oil in supplying the transportation sector in coming 2 decades is more than 90%.
- The growth is expected to flatten (almost) by 2030 due to efficient ICE.
- Oil demand is compensated by the growth number of vehicles.
- Oil byproducts (plastics & polymers) composites in vehicles are rapidly growing: 155 kg/vehicle in 2016 and expected to reach 350 kg/vehicle in 2020.
Policy Implications
Net Oil Exporting Countries

Strategic transformation from being energy supplier to added value products supplier (various sectors including transportation):

• Expanding and enhancing the local chemical and petrochemical industries.
• Investing in global markets that demands chemical and petrochemical feedstock.
• Integrating domestic refiners with number of international chemical and petrochemical complexes.
• Investing in and establishing environmental friendly fuel production facilities serving the global commercial transportation and manufacturing sectors.
• Investing in environmental cleaning technologies
Conclusions

• EVs is not a genuine threat to oil demand.
• Historical and present evidences suggest that EVs sales growth is restrained by oil prices.
• Rapid improvement of ICE fuel consumption performance is the bottle neck facing at EV deployment growth.
• To compensate for the additional energy needed for EVs, EVs deployment delays the flattening of the oil demand growth, and consequently, delay the phasing out of oil from the power sector.
• The threat on oil demand arises for those adopting a policy that corners oil as a source of energy.
• Oil-based economy countries are recommended to transform from the policy of “Exporting Oil as a Source of Energy” to the policy of “Exporting oil products/byproducts as a feedstock to various industrial sectors.”
Thank you