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**Electric vehicle uptake challenge**

Globally, countries are rapidly moving towards the electrification of its transport sector in a bid to reduce their oil import bill and their carbon footprint in line with the Paris climate treaty.

China, the US, and western European countries are leading the world in this regard where eastern Europe and India are in the premature stages of their electric vehicle (EV) markets. The government of Pakistan announced its Electric Vehicle policy 2021-2025 in June, which focuses on buses, trucks and 2-3 wheelers while leaving out cars in the first phase.

This was followed by the announcement of the EV policy for four wheelers, which is set to remain in force till June 30, 2026. Both policy drafts focus on tax breaks, capping of custom duty, reduction in toll tax, and exemption from FED subsidies and import duty on machinery for the manufacturing of EVs, but do not offer direct consumer subsidies on the purchase of electric vehicles.

Direct consumer grants on the purchase of EVs are a norm worldwide and are given by governments to partially offset the additional costs consumers pay for a cleaner vehicle. Even in countries where there was a considerable direct subsidy available for consumers on purchase of electric vehicles, sales dropped after governments phased subsidies out.

For instance, in Denmark, when the government phased subsidies out, sales of electric vehicles dropped significantly around the 2017-2018 period. Although governments intend to give initial financial push and cushion to the sector as it serves the economy in the long run, they do not want the sector to become entirely dependent on them. As of now, western European countries and China are phasing out their direct consumer subsidies. The US, under Biden, will reintroduce subsidies on the purchase of EVs because of their effectiveness.

There is no denying that EVs are good for the environment and economy, but at the same time they can have detrimental effects on the electricity grid. These effects are increased peak demand, reduced reserve margins, and voltage stability and reliability issues. Electric vehicles basically require charging stations which are installed at the most vulnerable side of grid – the low voltage distribution side.

Most of the grid infrastructure at the distribution side can rather easily bear the AC charging of vehicles, which is a slow process and takes around three-five hours, but not direct current (DC) fast-charging stations. The installation of even one DC fast-charging station at the weak bus can bring the whole feeder down and increase the power losses to as high as 85 percent.

All eleven distribution companies in Pakistan, including 10 publicly owned and one private, need to identify weak and strong buses in their system and plan for the potential uptake of EVs accordingly. This may involve the upgradation of distribution system or mere barring of the installation of EV fast-charging stations at weak buses in the beginning. To mitigate these effects, there are solutions available for instance smart charging, vehicle to grid integration and distributed storage which are highly expensive, but the fiscal space can be generated by the better management of distribution losses over the years which are in double digits and are the highest in the region.

There are also fast-charging solutions available which suggest that instead of installing a fast-charging station at the low voltage distribution side, install the charging station at the medium voltage side of grid, which is far more capable to withstand the load. Along with the need for fiscal space, distribution companies need to transform their business model as well which presently depends on buying electricity from major power producers through Central Power Purchase Authority and selling it to consumers. The more units they sell, the more revenue they will generate.

In developed countries, business models of utilities are being transformed to incorporate distributed generators and ensure their connectivity with the grid alongside major power producers. Localised generation and balancing of grid will benefit the consumer but will take a toll on the utility sector’s revenue stream, which is resisting this change especially in third world countries and regions, for instance, in Africa.

To understand the grid upgradation requirements, let’s look at the public transport sector of Lahore. Excluding the 66 metro buses, we have around 200 speedo buses operating in Lahore and if we were to replace these buses with electric buses and employ 80 kW charger to charge electric bus overnight, it will require the additional 16 MWs of grid capacity. Sixteen MWs is equivalent to the grid capacity requirement of 5,333 houses in Lahore if we take 3000 Watts to be the peak capacity requirement per house.

What Pakistan needs right now is to reduce its distribution losses, which has plagued the entire sector, on war footing. These losses stand at around 18 percent where aggregate technical and commercial losses of Pakistan’s power sector account for 29.7 percent which are the highest in the region. These losses directly impact the electrification rate in the country which in Pakistan’s case is 74 percent (the lowest in the region), meaning that 26 percent of the population has no access to electricity.

Along with the electrification rate, it will impact the electrification of the transport sector in the country as it dries up the fiscal space needed to make necessary grid upgradations and grant subsidies. For our readers to compare, aggregate technical and commercial losses of certain regional countries are as follows: Sri Lanka (10 percent), Turkey (14.8 percent), Bangladesh (21.9 percent), India (23.9 percent), Nepal (24.4 percent). Where their electrification rates are: Sri Lanka (100 percent), Turkey (100 percent), Bangladesh (75 percent), India (82 percent), Neal (77 percent).

If we do not carry out necessary reforms in the power sector especially aimed at reducing losses, it will greatly hamper our ability to electrify the transport sector. Ten years from now when countries will have drastically reduced their oil import bills and carbon footprint through widespread penetration of EVs, we will be dealing with crippling current account deficit, high levels of pollution, and inequality followed by low life expectancy.

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