**Going in circles on the power sector circular debt**

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Our government seems to be going in circles on the on the issue of circular-debt in the power sector as every few months it raises consumer tariffs (the latest being another 1.95 rupees per unit) hoping to cover the costs of electricity supply in the country, only to find consumers compelled to squeeze their demand further and also seek other alternatives to grid supply. It must break this vicious cycle and use some other more promising solutions to tame this monster which has already grown to fearful proportions. One such solution is to reshape the electricity demand of consumers through a set of imaginative policy initiatives to maximize utilization of the existing generation, transmission, and distribution assets.  
In addition to excessive losses in the system and lack of full cost recovery, both our leaders and experts also cite suppressed demand among the critical factors that are feeding the circular-debt because it leads to shrinking of revenue base, and in turn, increasing the capacity component in the power supply costs. The government should continue making every effort to reduce the excessive losses and improve revenue recovery, but it should not ignore the critical role of consumer demand in dealing with the above issue as the entire power sector edifice is built and operated on serving electric demand of consumers.  
Electricity demand of consumers, in any power system, varies continuously in time—over the next hour, day, week, month, season, next year, and so on. Electric utilities use a variety of techniques and technologies to serve these demands in their systems in as reliable and economic a manner as is practicable for them. For additional details on this issue, that is, how electric utilities manage the random occurrences of demand on their systems, interested readers may refer to this writer’s 2-part essay, “Resource adequacy issues in Pakistan’s power grid” (Daily Times: December 05 and 11, 2020).  
Accurate forecasting of demand by consumers is a challenge that every power system planner confronts, albeit unsuccessfully unless s/he is lucky. Any error in forecasts translates into either over- or under-capacity in the system, each with its own perils. It’s as much an art as it’s a science. Despite use of sophisticated forecasting techniques and tools, the target generally remains elusive, forcing one expert forecaster to declare, “There is one common feature shared by all forecasts: they’re all wrong!” Does that mean we should stop developing forecasts? Not at all! It only means that we must acknowledge their limitation and work around the uncertainty inherent in them.

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Electricity demand forecasting involves essentially predicting two aspects of demand: how much electricity consumers will want and exactly when? This second aspect is also called “demand or load profile”. A typical daily profile would look like a bell, starting from a low, reaching a crest, and then falling back to the low again. The cycle repeats every day, except that over the forecast horizon, the peak varies substantially and there is also considerable adjustment in the way it rises or falls. Both have tremendous impact on the investment and operating costs of a utility. A system with less pronounced peak enables the utility to serve it using base-load generation (capital-intensive but more-efficient) while for a system with sharply rising peaks it’s compelled to use quick-start and fast-response power plants (generally less capital-intensive but less-efficient too).

Last year, our government had started an effort to stimulate electricity demand in the country by offering reduced tariff to consumers during winter for any extra consumption. Currently, it’s also weighing options to win back the industrial consumption that had shifted to captive plants due to poor-quality and high-cost of grid-based supply. Both are good efforts and must continue but the government will need to embrace these efforts within a comprehensive and structured program to guide demand growth in the country to align its magnitude and shape with the nation’s strategic objectives. Demand forecasting may not be an exact science, true, but the government can still influence its growth considerably by heeding the advice of the noted management thinker Peter Drucker, “The best way to predict the future is to create it.”

There are multiple ways the government can influence both the magnitude and shape of the future electricity demand in the country. Below, however, we just scratch the surface of three of such options: (i) flattening the consumers’ electricity demand curve by shifting demand from peak- to off-peak periods; (ii) using storage options to maximize the use of existing generating facilities and those expected to come on line in the next few years; and (iii) guiding, imaginatively and creatively, the future demand growth which gradually leads to improved system load factor (reducing the difference between their low and maximum demand) on the demand side and enhanced system capacity factor (the capacity utilization of available assets) on the supply side.

Using tariff incentives to industries to boost consumption is a good first step but a more comprehensive tariff relief would be better. The government must review its plan to eliminate time-of-use (TOU) tariffs as it would not provide any positive results and may even encourage consumption during peak hours. Instead, the government should encourage cost-reflective tariffs that improve efficiency and promote equitable distribution of costs. Currently, such tariffs are restricted to consumers having TOU-enabled meters only. It should expand this scheme to all commercial and residential consumers and also need to increase the rate difference between peak- and off-peak to induce consumers to make any meaningful shift in their consumption.

The government’s ambitions to win back the industrial consumption that has switched to captive generation (roughly estimated around 5,000 MW) within the industries are also good. But before it wins back the lost consumption in these industries, the government will need to win back the trust and confidence of the industrial consumers. Process changes in industries and decisions to increase existing production or add new production capacity require considerable lead times and confidence on the continued availability of reliable and affordable electricity supplies.

A promising option for filling the lean demand periods is use of “pumped hydro” schemes which operate as a generating plant during peak but as a pump to push water from a lower reservoir to a higher one during off-peak periods using cheaper electricity from plants which may remain idle or under-utilized otherwise. Though some existing hydro plants can be modified into pumped hydro, their true benefit will come if some natural terrains in Balochistan can be developed for this purpose. These facilities can also store excess electricity from renewable power generation not only in that province but can also be used to channel excess generation from other renewable resource rich areas of the country.

The government should also shape-up the future demand in the country by catalyzing activities that contribute to filling the valleys of the demand curve. Demand management is not just about conservation and efficiency improvement; it also involves building demand to harmonize it with the nation’s strategic objectives. For this purpose, the National Energy Efficiency and Conservation Authority (NEECA) and the National Transmission and Despatch Company (NTDC) should join hands to explore such possibilities and incorporate them in the future long-term power development plans of the country. Just as an example, a thoughtless promotion of Electric Vehicles and associated charging facilities can exacerbate the already steep demand curve whereas a carefully devised policy and set of regulatory and financial incentives can contribute significantly to leveling it off.

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