

ADOPTING HOUSEHOLD SOLAR IN PAKISTAN

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Getting our stories and our knowledge to formulate a consensus narrative on power in Pakistan, is fundamental to creating a sustainable and secure energy future for Pakistan. Here, we will cover an aspect of this power debate which is doing the rounds; the utilisation of home solar or simply roof top solar solutions towards energy independence or shall we call power independence. The further focus is on the household roof top solar and solutions thereby; with the caveat that transition to direct current (DC) devices is now a non sequitur in the 21st century urban household debate; so alternating current (AC) utilisation at household level is the focus.

The independent power producer, or IPP, a term that has gained notoriety in all languages spoken in Pakistan, is an entity that produces power, generates electricity, and then supplies it to the end consumer as a standalone commercial entity. Currently almost all large private and public electricity generation companies, utilising fossil fuels and non-fossil fuels and sources, spread all over Pakistan, are categorised as IPPs (or GENCOs).

Traditionally the provision of electricity to the end consumer, the household in this case, has been a flow-process starting from the GENCOs to the national transmission company (the National Transmission and Dispatch Company) to the ESCOs (also known as Distribution Companies or DISCOs) and through them to the end consumer. The electricity enters the household consumer through an electricity meter which keeps tab on how much electricity is being utilised by the household. All electricity being

distributed around the household after this ‘meter’ is thus within the control of the household consumer. Hence the term “behind the meter” refers to the distribution of electricity beyond after the electricity meter.

Since the induction of the uninterrupted power supply systems (UPS), each household having a UPS became a standalone independent power producer (IPP). The UPS, not to be confused with the global courier service is nothing but a power bank with a DC output sent to the household power supply, behind the local DISCO’s meter, through an inverter that converts the DC to AC power—that storage came to Pakistan before Musk, our power sector must be lauded, pun intended.

This was followed by the advent of methane gas (Sui gas) and the petrol and diesel generators at household level, often still coupled with a UPS. Again, being “behind the meter” this was a further solidification of households as individual IPPs.

Getting back to the household (HH) solar discussion, all HHs utilising roof top or standalone solar are thus essentially individual IPPs. This is now cemented with the allowance for net metering—implying that a HH can technically sell electricity back to the DISCO. Technically, once the electricity is sent back to the DISCO’s local power grid, it is again part of the DISCO’s electric supply.

Today, and since the last decade, an emerging trend is localised generation, distribution, and utilisation of electricity; as the renewable and other means of

generation as well as the tools for managing electricity flow have become more portable and readily available, especially at a smaller scale. Localised grids and electricity generation, therefore, refers to the production of electricity close to where it is consumed. Typically, this also implies greater reliance on the use of renewable energy sources such as solar, wind, and biomass to generate electricity—not simply localised fossil-based power sources.

Localised grids are designed to connect relatively small-scale energy producers to consumers. This entire system of relatively small-scale generation and local grids is generally managed by local communities, local authorities, or private companies, depending on the location's political, economic, and social context.

This system avoids long distance transmission and related losses and other insecurities. Despite being considered suitable for only remote areas and sparse locales, where costs of extending central electricity transmission can be forbidding, these systems can also be well suited to many central and accessible areas.

This then is what has created the possibility of “behind the meter arbitrage of electricity” in our neighborhoods—something that has been prevalent in many urban localities in developed countries for a decade or more. In simple terms it is the phenomenon of a local community, say, your street, getting together and generating and buying and selling electricity from each other, behind the meter.

A critical aspect of this localised electricity arbitrage is having access to your own local electricity distribution network operating behind the meter or having access to your local grid which has been ‘cordoned-off’ for local use. Let us assume that we have the ability for this to happen in urban neighborhoods in Pakistan, utilising roof top solar as a generation source, what then?

Will this bring ‘energy independence’ or ‘energy security’? The two terms have varying implications at local HH and at national levels. At the national level, it implies maximising ability to control the resources and means required for generation, transmission, and distribution of electricity—lowering forex component as well as use of locally available fuels is a critical component of this ‘independence’ or ‘security’.

Now let us analyse the scenario that we focus on maximising HH roof top solar as well as transition to personal electric mobility. Pakistan, presently does not manufacture quality solar panels, let alone having an edge in emerging solar generation technologies; nor do

we manufacture or have any edge in the required electricity distribution and management paraphernalia. This implies massive imports and thereby massive forex requirements. Should we progressively internalise a lot of the required manufacturing, we will still be beholden to inputs and secure integration within the appropriate solar technology global value chains.

A further issue is that of managing the load or demand requirement on days which are not sunny or when load requirements overshoot the supply. This load can of course be met through the central grid, but grid independence has another major issue, what do all the national IPPs do when they are unable to sell electricity! They shut down. Powering up these behemoth IPPs is an intricate process involving both the time for getting back online as well as the management of the commercial aspect of idling till such time when they are required by the central grid. This thus points us to the need for storing electricity at the HH level as well as nationally. Pakistan, unfortunately, is well behind the times in the storage game as well.

So, what do we do? The solution lies in incentivising adoption of solutions tailored to localities and geographies rather than approving a single brush stroke national HH solarisation policy or in fact incentivising electric mobility across the board. The idea of this article is not to discourage the transition to renewables, rather it is to encourage pragmatic HH level as well as national level decision making to realistically target energy security.

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