### Increasing and managing India's residential energy consumption

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The Pradhan Mantri Ujjwala Yojana (PMUY) has taken LPG to over 90% of Indian homes. India is also expected to soon declare that all its households are electrified. While these are significant achievements, the stark reality is that India's per-capita energy consumption is only about a third of the global average and much lower than developed nations. India's residential energy consumption is also low at only 18% of national commercial energy consumption, as against a world average of about 30%. This is seen as one of the limiting factors in driving India's human development and therefore, there is a need to increase energy consumption in Indian households. The previous article in this series (*"100% rural electrification is not enough", 27/03/2019*) discussed measures required to translate the near-universal electricity connections to sustained use of electricity to promote enhanced and productive livelihoods. This article proposes some ideas to ensure that there is a similar sustainable shift to modern cooking fuel options in households, and to effectively plan and manage the resultant increase in residential energy demand.

# The cooking energy challenge

Over seven crore new subsidised LPG connections have been given to poor households under PMUY. While this is a good beginning, the harder challenge, as with electricity, is to ensure that households continue to use LPG or other clean-burning cooking fuels on a sustained basis for all their cooking. This requires action at four levels.

One, the supply push for clean-burning fuels should be augmented by creating a demand pull from households. Building mass awareness about the severe health impacts on women and children of cooking on traditional stoves, and overcoming gender, behavioural and cultural barriers that can hamper the fuel transition are needed for this. Two, the scope of the supply initiative should be broadened beyond LPG and include other clean burning fuels such as electricity, biogas and piped natural gas, as LPG may not always be the preferred or appropriate choice for all households in a country as diverse as India. Three, one has to go beyond providing connections and ensure consistent usage of modern fuels for all cooking in a household. This requires policy measures to deal with issues such as providing adequate and well-directed subsidy, country-wide establishment of suitable supply chains, and developing viable business models for rural distribution of LPG, biogas etc. Four, there should be well-defined targets for sustained use of modern fuels and reduction in household air pollution. Coordinating and managing these four levels of action requires a multi-ministerial programme perhaps anchored in the Ministry of Health, since this is primarily a health challenge, and driven from the Prime Minister's Office.

#### Understanding and planning residential energy consumption

On the topic of residential energy consumption, understanding how it will increase is important to be able to better estimate future demand and thus better plan for future supply. As rising incomes, increased electrification and a shift to modern cooking fuels lead to an increase in residential energy consumption, the drivers and patterns of this change need to be measured and understood. Richer information related to energy use in households can provide insights into income and price elasticities for energy demand, drivers for appliance purchase, fuel switching etc. In turn, this can support better energy demand estimation and improved energy efficiency programs.

Periodic surveys to collect nationally and sub-nationally representative data regarding aspects such as building characteristics, appliance ownership, appliance use and other factors that drive residential energy use can provide such information. Current surveys do not capture such information and are limited to appliance ownership. Several countries conduct such surveys, and with its rapidly increasing residential energy consumption, India should also institute such a survey, to be conducted by the National Sample Survey Office, to plan and manage its residential energy demand better.

# **Enhancing energy efficiency**

Energy efficiency measures will have a pivotal role in managing future residential energy demand so that the same energy services can be achieved with lower levels of energy consumption. Though the residential sector accounts for about a quarter of India's electricity consumption today, the ownership of large appliances like refrigerators and air-conditioners (ACs) is still very low. This is likely to increase steeply, making energy efficiency measures very important.

The Bureau of Energy Efficiency (BEE) runs a "star rating programme" to promote energy efficient appliances which has been fairly successful in creating awareness among consumers. However, three steps can help to strengthen the programme and realize its full potential. First, BEE should regularly revise the efficiency ratings upwards for all appliances. This has happened for appliances such as refrigerators and ACs. Thus, a 5-star refrigerator in 2019 consumes about 60% less electricity than its 2009 equivalent and a 5-star AC in 2019 consumes about 30% less than its 2009 equivalent. However, the ratings have not been revised for ceiling fans since 2010, with the result that about 80-90% of the 3-4 crore ceiling fans sold annually in India are very inefficient. Second, BEE should conduct national level awareness campaigns about star labels for various appliances. Currently, there is little awareness about this programme for appliances like ceiling fans, televisions or tubelights. Even when there is awareness, as in the case of refrigerators and ACs, there is little understanding of the actual monetary savings possible from energy efficient appliances over their lifetime that can offset their high upfront cost. Thus, a well-designed awareness programme can lead to increased uptake of higher efficiency models. Third, BEE should scale up its performance testing of a random sample of star-rated models in the market, and make the test results available publicly. Such public availability of test results will increase consumer trust in star labels and consequently increase the adoption of efficient appliances.

India is potentially on the cusp of a rapid increase in residential energy consumption. This increase needs to be facilitated by suitable policy and institutional design, planned through a better understanding of the likely drivers and patterns of residential energy demand and managed to be as efficient as possible.

One of the three articles on crucial challenges facing the Indian energy sector and some concrete ideas to address them.

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