

# Electric cooking: lesson learned from a pilot study in Chhattisgarh and Rajasthan



The SAUBHAGYA scheme successfully reaches very high electrification rates, but the proportion of households with access to clean cooking energy is still low, especially for resource-poor households. India's SDG dashboard shows that only 43% of all Indian households had access to clean cooking fuels by the end of 2018. A major initiative taken by government to improve access to clean cooking energy in recent times is the Ujjwala Yojana driven by LPG only. A futuristic approach for clean cooking must address the issues like availability, affordability reliability and minimise emissions. The real question is can LPG be a primary cooking medium among all households. Considering the plethora of challenges associated with adoption of LPG as a universal clean cooking fuel in Indian households, it will be environmentally much prudent to initiate electric induction cooking. Rather we may chose to go for a combination of Ujjwala and Saubhagya to have clean cooking fuel for all households.

Electricity is often available in many more households than LPG clean cooking with electricity might be a better option. Electricity has multiple societal benefits, rather than addressing one specific role such as clean cooking; hence establishing an electrical infrastructure is vital for societal development. Simultaneously, the transition to e-cooking is through transfer of energy as electricity through cables- which also serves other household purposes, rather than in cylinders through trucks and tankers as required by LPG. Electric cooking is emission-free at the point of use. For a smooth transition to e-cooking, the availability of reliable and cost-effective electricity supply are essential considerations and the quality of power connectivity that provides high voltage reliable power.

IRADe conducted a pilot experiment to test electricity's potential in providing a viable option for clean cooking with induction cooktop in the rural and peri-urban areas of Rajasthan and Chhattisgarh. Selected 40 households in the study location were supplied with an induction and a set of compatible utensils.

Beneficiaries' women were trained about the cooking method and essential user know-how in technical collaboration with a leading manufacturer. Post-training and demonstration households cooking experiences in different cooking sessions were captured for 15 days to understand the problems concerning the induction cooker's operation, namely ease of operation, compatibility of cooking utensils, food preparation, and taste satisfaction.

Induction cook top is different from other traditional cooking stoves and new to Indian households. During the observation period, the intervention households used induction for boiling and frying cooking procedures. In Rajasthan 90% households, prepared lunch and 85% households prepared dinner whereas in Chhattisgarh all the 20 households prepared lunch and dinner on induction. Induction is preferred device for boiling, breakfast and evening snacks preparation. In Chhattisgarh, where quality of electricity is relatively better, 85% households said that induction fulfil major cooking needs as compared 65% in Rajasthan. In Rajasthan 95% and in Chhattisgarh 50% households showed their willingness to buy new induction and compatible utensils. No incidence of electrocution was reported while operation of induction and no unsafe incidents took place negating the fears of safety to the rural women. After two years to IRADe conducted a third survey telephonically for the purpose of post-project-monitoring, we found that 80% beneficiaries' households were still using them and many more households in the intervention villages wanted to buy and use.

Cooking typically is a major component of the whole energy requirement in a poor household. Therefore, to understand if cooking with electricity is cheaper than LPG, we need to compare cost of both fuel and efficiency<sup>1</sup> of both stoves. The cost of electricity may be more expensive, but the electric cooking stoves are much more efficient than an average LPG stove. In India, most LPG stoves are fitted with standard burner with average efficiency in the range of 60-65 % whereas an induction stove has an average efficiency of 80- 90%. Comparing the average cost of per mega joule (MJ) of effective energy by stoves we found that electricity is a cheaper option for cooking than even subsidized LPG (table.1). The final values may vary based on the cost of various sources available as the effective price of LPG or electricity may differ for different types of consumer.

**Table 1: Comparing costs of energy sources for a typical household for a month**

Definition	LPG stove	Induction
Unit required per month	1 Cylinder (14.2 kg LPG)	120 kWh
Cost (in Rs)	500 – subsidized 900 – Non Subsidised	360
Cost (in Rs) per MJ of effective energy	1.07 – subsidized 1.93– Non Subsidised	1.0

*Note: A household uses 4 kWh of electricity on average in cooking (Panagariya and Jain, 2017); LPG (1 Kg) = 50.4 MJ; Electricity (1kWh) = 3.6 MJ; Cost of electricity-Rs 3/kWh*

<sup>1</sup> The efficiency of stoves is based on the heat transferred to the pan kept on top of it. The efficiency also depends on the size of pan used compared to the size of flame/heating surface.

The pilot study though limited in scope, points out that induction can be a promising solution for clean cooking even in rural areas, peri-urban and urban settings where reliable electricity is available. In the remaining areas, the infrastructure will need to be strengthening to provide reliable supply of electricity of good quality. Some psychological and technical barriers were observed, which might overcome with increasing penetration. The study successfully quashed the widespread misconceptions that inductions are not adaptable to Indian cooking with live demonstrations and the cost of e-cooking is comparable with LPG. Once people get used to the idea of electric cooking it can be also installed in solar powered households where electricity is shared among many devices and purposes. It can be promoted through a government procurement system, along the lines of the Ujala scheme to reduce the cost of induction cooktop to make it more affordable for poor households.

### ***References***

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