Electricity as a clean cooking option in two states in India

Population of over 823 million (IEA,2014) in India still use biomass fuels and lack access to clean cooking technologies. There is an urgent need to provide these households with clean cooking solutions, if India has to meet the SDG-7 of UN which emphasizes universal access to affordable, reliable and modern energy services by 2030. Access to clean cooking fuels has been a daunting problem where major shakeup is needed even after 70 years of independence.

LPG access in rural households is mere 11% in India (Census 2011). As a result, there is large scale reliance on biomass fuels as around 87% households still use these (Firewood, crop residues, dung, charcoal). Can Ujjwala scheme floated by Ministry of Petroleum and Natural Gas reach in all corners of India? Is a cylinder based LPG-delivery system sustainable for all corners in India?

On the other hand, electricity access is much higher and nearly 70% of rural households already have energy source within their households, the same has to be exploited and used in tandem with other sources. Can Ujala scheme floated by Ministry of Power light up all households in the next few years? To cook with electricity, one can use hotplates, induction cookers and other devices. However, a large scale transition from biomass to electric cooking is not demonstrated so far. LPG and electricity together are complimentary and can help rapid and clean access to cooking energy.

To show this new pathway IRADe took up this study in two states to demonstrate the feasibility of these options of using Multi-fuel strategy that focuses on modern energy that is economically available. And also benefits from the scale effect – it could bring.

Ujjwala and Ujala scheme that needs mobilization at grass root level for cooking and lighting needs.

How to link these options with grid energy is another aspect requiring a detailed study. How households could benefit from extensive rural electrification and off grid solutions through use of hot plate, induction cookers for meeting cooking energy needs. They can also operate on solar PV, provided the wattage is sufficient and the devices are DC operated.

Under this backdrop the following objectives were planned for the study in Rajasthan and Chhattisgarh State.

A LPG supply Analysis:

Analysis of current LPG supply strategies in the 2 states and in 2 districts in each state as follows:

•LPG supply and availability and expansion plans for each district and company and distributors available.

•Implications of cylinder based delivery on the time, costs and resources needed (cylinders, LPG and energy for transportation) and scalability of LPG access in short time.

B Electricity supply and other outputs

- Analyse the availability of electricity in each of the districts, quality of supply, issues and constraints. Select suitable districts where electric cooking is likely to be needed due to low LPG availability, biomass dependence and electricity availability.
- Field Survey to capture community perception from lower economic strata of rural/peri urban area for using combination of clean cooking options for cooking with LPG, solar devices and electric cookers and their willingness to accept the Clean Energy Technology for cooking. This will be done in 2 districts in each state and 50 households in each district.
- Field demonstration of electric cooking in the select villages and 10 houses in two district in two states.
- Report findings and suggest a strategy for rapid transition to modern fuels. Bring out specific policy level recommendations for the region and Scale up strategies to increase use of Clean Energy Technology by Lower Economic Strata.
- The project will help in understanding upscaling issues in cooking energy access in the country.
- Will help in understanding the health impacts due to indoor kitchen pollution.
- Time saving in fuel collection and consequent other productive activities that can be taken by women in agriculture and related sectors
- Develop suitable policy level indicators to enhance and upscale cooking energy access.
- Gender inclusion in clean cooking energy policies. Empowering women in improving their quality of life and better involvement in agriculture based livelihood opportunities. Developing champion women in the districts.
- Linking local energy access needs to National and global goals.
- Grid stability issues with SEB's and DISCOMS in case of electric cooking. (Peak demand, surge, availability, quality).
- Use of micro solar grids to support electric cooking needs coupled with other commercial needs like petrol pump, mobile towers, health centers/schools.
- Help India to access Climate change funds more effortlessly.

While most of the research and action projects focus either on one fuel or one device, the present project will focus more holistically to understand the needs of the local areas and what other innovative devices can be thought of in providing clean cooking access. Several studies in the past have delved upon the benefits associated with the access of clean cooking fuel across world.

Only recently, Vice-Chairman Niti Aayog has also spoken in favour of use of electricity as a clean cooking energy source as almost 70% households in the country have access to it.

C. Project Innovation

The project is innovative and unique in the sense that it addresses multiple cooking devices and energy choices for meeting the needs. For e.g. a household could have a conventional biomass stove, the same can be in any case be replaced with clean electric cook stove, etc. however if the household has access to LPG then electrical cooking devices, like electric cookers can also be promoted as standby.

Clean cook stoves though reduce around 30-50% emissions as compared to conventional biomass stoves the suggested interventions of solar cooker and electric cooker will have a greater scope of even bringing the reduced emissions to still lower values.

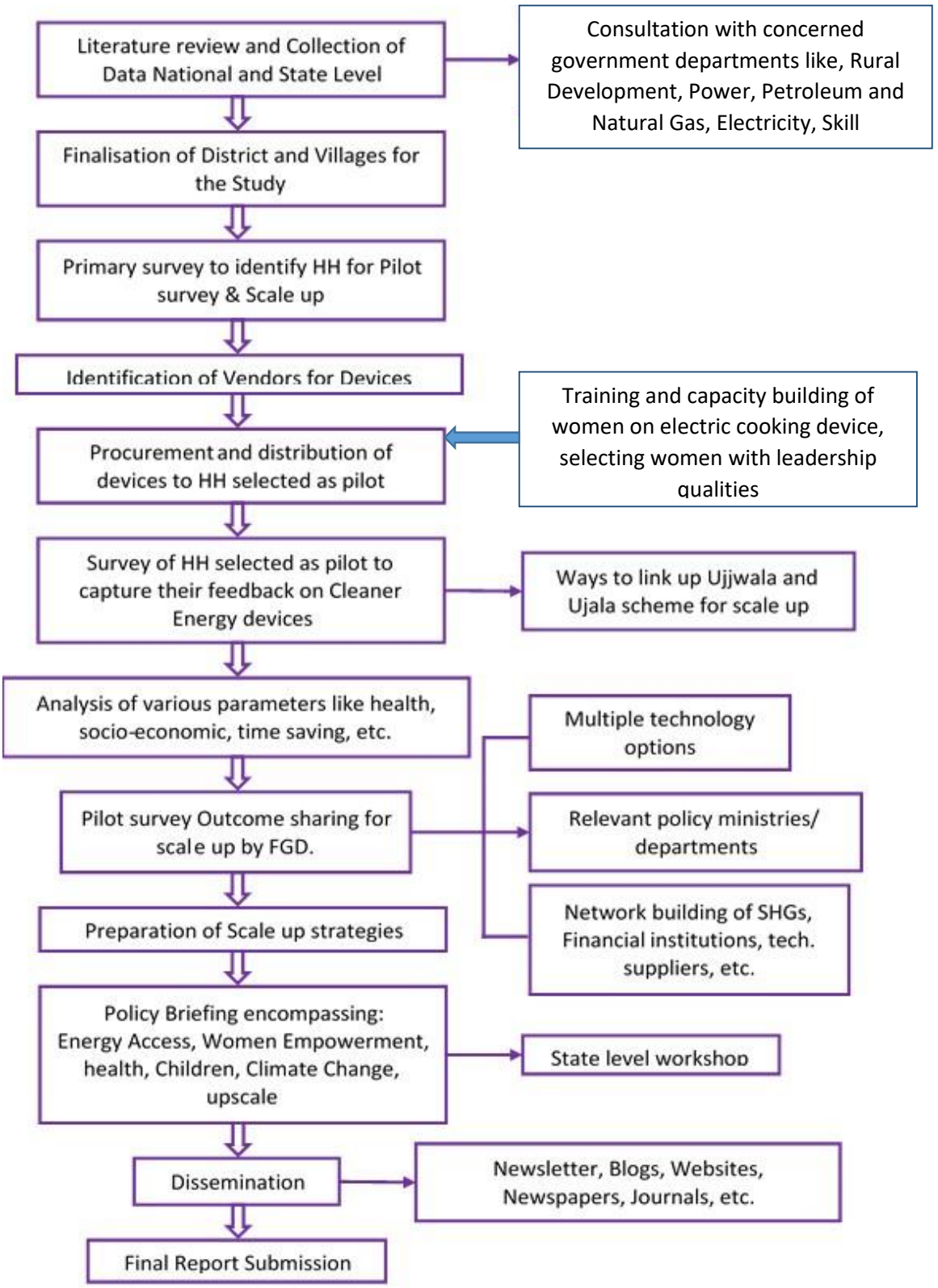
Behavioral change in adopting the new devices and constraints in cooking local dishes and any variations in taste of the cooked meals will also be undertaken with the project.

Use of electric cooking devices like induction cookers, controlled heating element cookers etc. are some of the new devices that would be used in the project as pilots.

Cost curve analysis and break-even curves for different types of energy supply would ensure an optimum design policy.

Barrier analysis for particular option of cooking will also be undertaken.

D. Project Approach – Use of Electric Induction Cooker as a means for clean and rapid cooking option



E. Training, Capacity building and distribution of 20 induction cookstoves and 40 compatible utensils at Kotputli, Jaipur and Tapukara, Alwar, Rajasthan state, India.

IRADe organised a half day training cum capacity building programme at Kotputli and Tapukara on 21st and 22nd September, 2017 respectively. The purpose of the event was to impart training to the rural women on the use of the electric induction cooker as a clean and efficient cooking device in lieu of biomass cook stoves or in lieu and conjunction with LPG cook stove. The programme detailed the benefits with respect ease of cooking, benefits to health, indoor pollution reduction, reduction in kitchen heat stress, reduction in burn incidents, possible cost savings compared to an LPG cylinder, time saving in cooking, etc. to the beneficiaries.

Under the programme training was provided by the cooking device manufacturer partner, i.e. M/s.TTK Prestige which provided the induction cooker model PIC.20 which was selected by IRADe. Two induction compatible utensils were also selected by IRADe and provided to the beneficiaries. The utensils comprised of a combination of any two stainless steel utensils, i.e. Fry pan, boiling vessel (*Bhagoni*) and large sauce pan (*Kadhai*) with flat bottoms.

The programme started with briefing the participants about the project, its need and requirements and what is expected from the participants. This was followed by a detailed briefing by the manufacturer's representative about the various functionalities of the induction cooker, namely wattage, temperature, presets, cooking options, do's and don't's, electricity consumption both wattage and amount, plug type requirement, wiring requirements, precautions to be adhered to in operating the device, device cleaning, types of food that can be cooked, etc.

Post this briefing the participants were shown the actual usage of the cooker and its functions by means of practical of water boiling, milk boiling, potato chips frying, etc. The participants were also given a hands on training on doing these activities by themselves in the event, this ensured proper confidence building among the participants and ensured engagement. A local language operation and do's and dont's were also circulated for better understanding of the women. Participants were also briefed about the electricity safety needs while operating the device, for e.g. not to wash the cooker with water, switch off the device when not in use, voltage fluctuations, faulty wiring in kitchen, sparking sound in switch board, etc. This ensured that the device would function for a period as stipulated in the warranty clause and ensure safety.

Finally, the cookers and utensils were distributed among the participants which were pre-selected post the primary survey analysis. The distribution comprised of signing a distribution agreement clause, promising to use the device and filling a 15-day activity performa post the distribution day. Field visit was then made to two-three households in the village to actually see and install the induction cooker in the kitchen or at an appropriate place. During the field visit it was again seen that the villagers have access to LPG but also use the traditional biomass firewood/crop residue challah for water boiling, some families also use the clay tandoor for cooking food.

Project Related Pictures – Jaipur District, Rajasthan

Project related briefing to participants on clean cooking, positive impacts

Training by TTK Prestige induction cooker manufacturer, knowledge partner

Practical demonstration of cooking activities, boiling, frying, roasting, etc.

Proper documentation of beneficiary prior to distribution of induction cooker

Distribution to 10 electric cookers to beneficiaries in the project

Installation of device in Kitchen and checking wiring and plug points – Ensuring quality

Project Related Pictures – Alwar District, Rajasthan

Project briefing to beneficiaries

Practical training and capacity building of 10 beneficiaries

Women given hands on training on boiling, frying

Induction cooker distributed to ten rural women beneficiaries.

F. Post distribution activities:

- **15-day monitoring** chart for breakfast, lunch, dinner, operation issues.
- **Detailed evaluation questionnaire** after 15 days on all aspects of usage, food taste, acceptability, health improvement, drudgery removal, **livelihood generation** options.
- Selecting a **champion woman** in the village/area for promotion and sale of cookers.