India Smart Grid Forum

ISGF White Paper

ELECTRIC COOKING

THE WAY FORWARD

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Electric Cooking – The Way Forward

Abstract

About 4 million people die prematurely from diseases caused by household air pollution, primarily from cooking with firewood, charcoal and biomass. As of 2019, 63% rural and 18% urban households in India use firewood, dung cakes or biomass for cooking. In 2019, nearly 600,000 people died of household air pollution in India. Having electrified almost all households in the country and with surplus electricity generation capacity, India should actively promote electric cooking. Increasingly higher share of electricity is being produced from renewable resources and during many time slots during the day, cheap electricity is available on the grid. During 2018-19, 1500 million LPG cylinders were distributed in the country which is not sustainable from the perspective of cost and energy efficiency. New city gas distribution networks cost Rs 25,000 per connection. In order to meet the NDC targets it is imperative that emissions from the kitchen must be reduced drastically. Electric cooking is the fastest and least cost route to achieve these multiple targets which will also reduce LPG imports saving billions of dollars leading towards *Atmanirbhar Bharat*.

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About India Smart Grid Forum

ISGF is a public private partnership initiative of Govt. of India with the mandate of accelerating smart grid deployments across the country. With 170+ members comprising of ministries, utilities, technology providers, academia and research, ISGF has evolved as a Think-Tank of global repute on Smart Energy and Smart Cities. Mandate of ISGF is to accelerate energy transition through clean energy, electric grid modernization and electric mobility; work with national and international agencies in standards development and help utilities, regulators and the Industry in technology selection, training and capacity building.

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1 Introduction

With surplus electricity generation capacity and having electrified almost all households in the country today, India is heading towards an electric future. Electricity being the cleanest fuel at the user-end and increasingly larger share of it being produced from renewable sources, one very important area requiring electrification is cooking. Globally, around 3 billion people cook using firewood, charcoal, biomass, dung cake or kerosene which creates in house air pollution. Globally about 4 million people die prematurely each year from diseases caused by household air pollution. India tops the list with 800 million people continuing to use firewood, dung cakes, charcoal or crop residue for cooking. While 76% of urban households in India have access to liquefied petroleum gas (LPG), 63% of rural households still use firewood or biomass for cooking[1]. Even in urban India, about 18% households use firewood or biomass for cooking as of 2019[2]. According to a study by World Resources Institute (WRI), while the average PM2.5 in rural India is in the rage of 22 to 112 µg/m³, the indoor PM2.5 concentration ranges from 106 to 512 µg/m³. This explains why 600,000 people died of household air pollution in 2019 in India[3].

In the recent past, the Government of India (GoI) has undertaken several targeted programmes to provide urban and rural households with access to clean cooking energy and to electrify almost all households in the country. Pradhan Mantri Ujjwala Yojana launched in 2016 provided credit-linked subsidised LPG connections to over 77 million households till August 2019 making the total LPG connections to 150 million households. While Deen Dayal Upadhyaya Gram Jyoti Yojana (DDUGJY) completed electrification of all the 619,000 villages by April 2018, another very successful program, SAUBHAGYA, has electrified almost all (>99%) households by March 2019. India is aiming to be a gas-based economy with the target to meet 15% of its primary energy demands through natural gas by 2030. Piped Natural Gas (PNG) is expected to play an important component of this plan. City Gas Distribution (CGD) licences have been issued to towns in 228 districts of the country and the PNG networks are being built on fast track. As of 2019, there were about 5.4 million domestic customers of PNG which was scheduled to reach 10 million by 2020 (Covid-19 lockdown has slowed down the activities in 2020). In 2020-21, GoI allocated a budget of Rs 37,256 crore to LPG subsidies and an additional Rs 3,659 crore to Kerosene[4] subsidies.

With every home already connected to the electric grid, it makes immense economic sense to promote electric cooking which is the preferred mode of cooking in many developed countries. Transporting LPG cylinders is expensive and inefficient from the perspective of energy efficiency and cost involved. Billions of dollars of investment is required for building new PNG networks in towns across the country. While the thermal efficiency of the LPG stoves is about 55–57%, that of electric cookers is in the range of 74 – 84%. Wide variety of electric cooking appliances are available at affordable prices which include electric pressure cooker, induction cooktop, hot plate, kettle, microwave oven, electric oven, electric rice cooker, steam cooker, air fryer etc. Electric cooking is cost-effective, safer, more energy efficient, and require less maintenance than the conventional cooking methods and is free of emissions. Presently, about 24% of the electricity consumed in India is generated from renewable resources and planning to

[1] According to the Petroleum Planning & Analysis Cell (PPAC) of Ministry of Petroleum & Natural Gas, there were 265.4 million domestic LPG connections by March 2019 which was estimated to reach 278.7 million by March 2020. This perhaps included multiple connections in one household and small businesses. However, several other studies and reports indicate majority of the rural households continue to use firewood/biomass for cooking.

[2] Source: Roadmap for Access to Clean Cooking Energy in India – https://bit.ly/39diPuX

[3] Source: Report by Health Effects Institute, USA

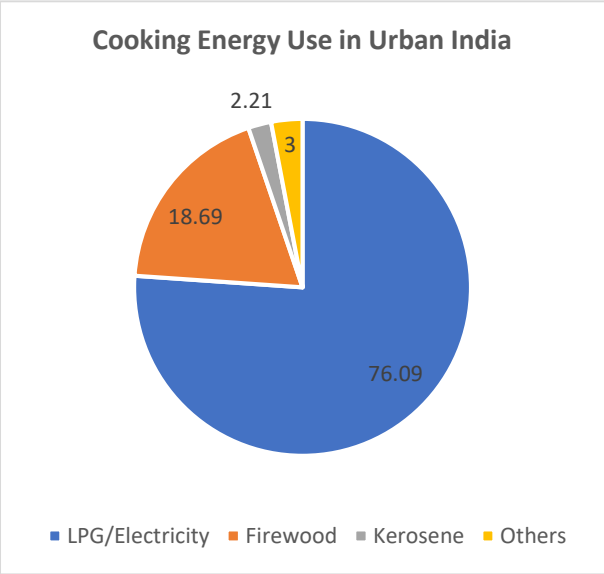
[4] Source: Demand for Grants 2020-21 Analysis Petroleum and Natural Gas – https://bit.ly/3nW7Rhr

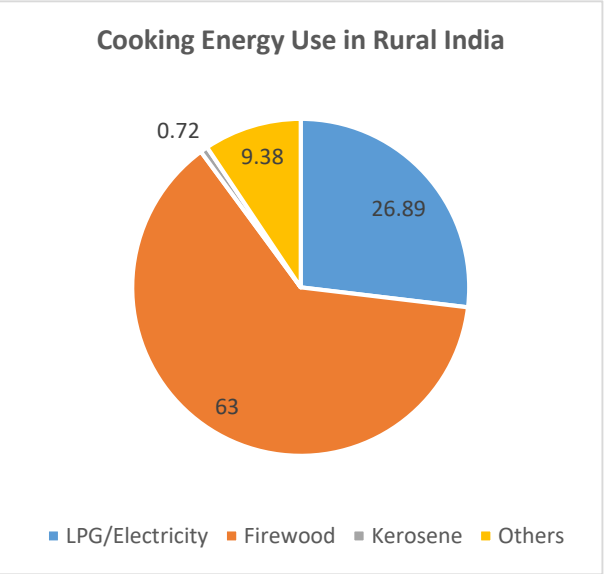
expand it to 40% by 2030[5]. For comparison of consumption of LPG cylinders with that of electricity, 10 LPG cylinders (of 14.2 kg each) per year can be substituted with 1460 units (kWh) of electricity at the rate of average 4 units per day[6]. India has surplus electricity generation capacity and during many time slots throughout the day, electricity is cheaper on the grid and can be allotted for cooking at subsidized rates. This will also help increase the electricity demand and balance the load on the grid as well as improve the finances of the electricity distribution companies. Electric cooking will avoid import of LPG thus saving billions of dollars and help towards *AatmaNirbhar Bharat.*

More importantly, to meet the 2030 NDC targets committed by India, emissions from the kitchens must be reduced considerably and electric cooking is the least cost and fastest option to achieve that.

2 Cooking Energy Scenario in India

Besides the in-house air pollution[7], the use of firewood for cooking has led to deforestation, soil erosion, water stress and GHG emissions. This is a well-recognized problem for decades but globally all efforts were focussed on improving the efficiency of cook stoves. The incremental improvements in the efficiencies of cook stoves over the years have been defeated by millions of cook stoves added each year as population increased and the poor and middle-income groups were deprived of access to clean cooking fuels. In a NITI Aayog paper, Arvind Panagaria and Anil Kumar Jain wrote "India chose to go for a two pronged strategy of LPG for urban India and biomass for rural India ….it may be stated that for rural India, which comprises 69% of the nation's population as per 2011 census, we have had no 'clean cooking fuel' strategy – instead we only had an 'efficient cook stove' strategy". As of 2019, 63% rural and 18% urban households in India still use firewood for cooking. According to a study paper by CEEW[8] in 2016, less than 1% rural households in the states they surveyed had the so-called efficient cook stoves. In 2016, GoI launched the nationwide LPG program which gave subsidized LPG connections to about 77 million households till August 2019. Kerosene use over the past ten years has reduced drastically which is a very good achievement.





[5] Source: CEA monthly installed capacity

[6] NITI Aayog Study Report – https://bit.ly/3pZJCkl

[7] An estimated 4 million premature deaths are caused each year by indoor air pollution caused by existing cooking practices still widespread in many parts of Southeast Asia, Latin America, and Africa. In Africa alone, the African Development Bank (AfDB) estimates that over 600,000 deaths per year are caused by existing cooking practices, the majority of which are concentrated in sub-Saharan Africa; (Hivos 2019 Report)

[8] CEEW Paper https://bit.ly/3nQ1BYo

Figure 1: Cooking Energy Use in Urban and Rural India (Census 2019)[9]

Firewood and biomass are gathered (not purchased) and hence even subsidized LPG cylinder is expensive for the poor; and many despite having LPG connections, continue to cook with firewood and dung cakes. Although NITI Aayog's Clean Cooking Energy Roadmap envisions to eliminate the use of all cooking arrangements that cause household air pollution across the country by 2025, the India Energy Security Scenario (IESS) tool projects that in 2047, under the optimistic 'Determined Effort Scenario', 20% of rural households will still be reliant on biomass for cooking.

2.1 LPG and PNG Programs

It is assumed that approximately 150 million households have LPG connections and 5.4 million have PNG connections, as already stated. This leaves 100 million+ more households without access to clean energy for cooking. At an average of 8-10 LPG cylinders per household per year, filling, transporting, storing, local distribution and transporting back the empty cylinders would amount to 1200 to 1500 million LPG cylinders per year[10]. Not to mention the gas leakage, injuries and other dangers that are involved in this process. Although thousands are employed in this logistics of LPG cylinder distribution, it is not an economically viable business that India should undertake for a long time to move billions of LPG cylinders to millions of homes annually. The difficulties at customer end with LPG refilling and consumption are myriad – timely delivery of cylinder at door step is a challenge, gas stoves are inefficient which require periodic cleaning and repairs, the kitchen gets dirty with black soot; and there are accidents from gas leakage. The thermal efficiency of the LPG stoves is about 55–57 per cent; much lower than the 84 per cent efficiency of electric induction cooktops.

The new CGD networks being built involve huge capex running in to several hundred crores of rupees per city. The average cost of laying new PNG network is around Rs 25,000 per customer. Building CGD network, its maintenance, metering, billing and collection processes are an additional cost to the economy. If the ultimate goal of the CGD network is to supply customers with clean cooking energy and the same goal can be accomplished more effectively with electricity already present in the consumer premises, why invest in constructing a parallel infrastructure? Electric cooking appliances can be promoted or provided in households for the fraction of the capex needed to create new CGD networks. In a developing country with competing demand for resources, a rethinking on investment on CGD networks as against promoting electric cooking is necessary.

3 Electric Cooking – The Way Forward

Today, a large range of electric cooking appliances are available at affordable prices that can cook all items in any regional cuisines in India. The range include electric pressure cooker, induction cooktop, hot plate, kettle, microwave oven, electric oven, electric rice cooker, steam cooker, air fryer etc. A detailed list of different makes and models of electric cooking appliances is presented at Appendix-A.

Hot plate is the most common electric cooking device which has a shock proof and stable body with a heat regulator that maintains a range of pre-set temperatures. It is safe and almost maintenance free. Most electric cooking devices have flat heating surface and hence it is efficient to use flat bottomed utensils. Induction cooktops operate on the principle of electromagnetic induction. In an induction cooktop ("induction hob" or "induction stove"), a coil of copper wire is placed under the cooking vessel

[9] https://bit.ly/3l565Jd

[10] According to PPAC data, oil marketing companies packaged 21.7 million metric tonnes (MMT) of LPG during 2018-19. At the rate of 14.2 kg per cylinder, this amounts to approximately 1500 million LPG cylinders.

and alternating current (AC) is passed through it to create oscillating magnetic field which wirelessly induces an electrical current in the vessel. This large eddy current flowing through the resistance of the vessel creates resistive heating. Since induction heating only heats the vessel placed over it, the air outside the vessel does not become hot, so the kitchen is comparatively cooler. Induction cooktops have a thermal efficiency of up to 84%. They are available in both, single burner and multiple burner models. The main advantage of induction cooktops is higher safety as the surface of the cooktop gets heated only if it is in contact with the vessel, thereby reducing the chances of burn injuries.

Microwave oven heats the food through microwave radiation injected directly into the food exposing the food to the radiation. Microwaves are produced inside the oven by an electron tube called a magnetron. The microwaves are reflected within the metal interior of the oven where they are absorbed by food. Microwaves cause water molecules in food to vibrate, producing heat that cooks the food. When thick food items are cooked, the outer layers are heated and cooked by microwaves while the inside is cooked mainly by the conduction of heat from the hotter outer layers. There are many discussions regarding the health effects of microwave and induction cooktops. However, there is no conclusive scientific evidence commonly accepted on this issue[11].

There is tremendous cost saving potential in using efficient electric cooking appliances such as slow cookers and electric pressure cookers. Over a one-hour cooking period, a pressure cooker uses approximately one quarter (¼) of the electricity of an electric hot plate. Over a 4-hour cooking period, the gains increase further - a pressure cooker is twice as efficient as a slow cooker, six times as efficient as an induction cooktop, and fully 7 times as efficient as an electric hot plate. Electric rice cookers and air fryers have also become very popular. The chart below from *Beyond Fire - How to Achieve Electric Cooking (2019)* by Hivos (and presented to World Future Council) gives the comparison of electricity consumption by different electric appliances for cooking.

[11] Both microwave oven and induction cooktop generate non-ionizing electro-magnetic frequency (EMF) radiation. Ionising radiation, which can remove tightly-bound electrons from atoms, causing them to become charged, is less risky in very tiny amounts (such as x-rays) but can cause problems when exposure is high (burns and even DNA damage). However, non-ionising radiation is a type of radiation that has enough energy to move atoms around within a molecule but not enough to remove electrons. Because the radiation from microwaves is non-ionising, it can only cause molecules in the food to move. In other words, microwave radiation cannot alter the chemical structure of food components. While the EMF from induction cooktops is in the range of 24 kHz that of microwave ovens is in the range of 2450 MHz. The US Federal Standard 21 CFR 1030.10 limits the amount of microwaves that can leak from an oven throughout its lifetime to 5 milliwatts (mW) of microwave radiation per square centimetre at approximately 2 inches from the oven surface. A measurement made 20 inches from an oven would be approximately 1/100th of the value measured at 2 inches from the oven. https://thehealthsciencesacademy.org.

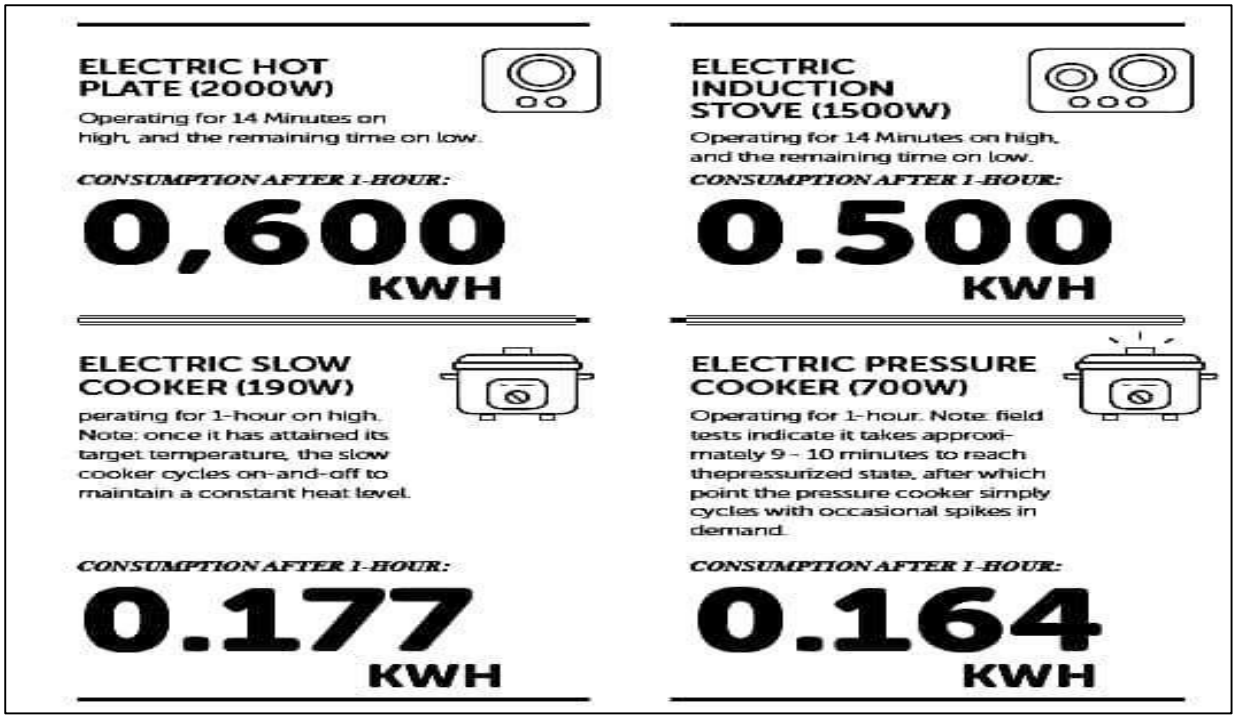


Figure 2: Overview of Electricity Consumption Profiles of Different Cooking Appliances[12]

The table below presents the pros and cons of LPG and electric cooking.

Table 1: Pros and Cons of Gas v/s Electric Cooking

Gas Stoves	Electric Stoves	Induction Stoves
		
Pros		
• Great control over the heat • Wide range available • Perfect for cooking Indian dishes • No restraints on utensils types • Generally faster to cook	• No fear of inflammation • Great in energy efficiency • Releases less heat output	• Simple to use and setup • Multiple cooking option with auto switch-off • Great energy savings • Heats the utensil and not the entire stove • Does not cause heating issues like gas stoves

[12] Beyond Fire How to Achieve Electric Cooking (https://www.hivos.org/document/beyond-fire-how-to-achieve-electric-ooking/)

Cons		
• Could prove dangerous due to their inflammable gas • Surroundings can heat up • Produces GHG	• Hot elements could accidently burn your hands at times • Takes more time to heat up; Much slower cooking times for Indian food (Dal+Curry+rice/rotis) • No electricity, No cooking • Can only be used for flat surface utensils	• Initial expenditure is high • No electricity, No cooking • Limited types of utensils that you can use on this. New type of utensils required which is expensive for rural India.
Comparing the Energy Efficiency		
40% Energy Efficiency	74% Energy Efficiency	84% Energy Efficiency
Costs of the Heating 10L of Water		
Rs 5.09 – For Subsidised Cylinder Rs 10.8 – For Unsubsidised	Rs 5.2 Per 10L of Water	Rs 5.91 Per 10L of Water

Source: www.hmezene.com

According to a NITI Aayog study in 2019, "*the consumption of 8 to 10 LPG cylinders (14.2 kg each) per year is equivalent to electricity consumption of nearly 4 kWh per day. This implies that at prevailing electricity prices, the electric solution costs about the same as the LPG solution at the crude oil price of around $40 per barrel. Hence, the electric solution to cooking would be financially feasible, especially if the government decided to give an electricity subsidy equivalent to that on LPG*"[13]. This fact is illustrated in the chart below:

Table 2: Comparison of cost of cooking with LPG and Electricity

Parameter	LPG	Electricity	Assumptions/Remarks
Energy in Mega Joules (MJ)	46.1 MJ/kg	3.6 MJ/kWh	
Price per MJ (INR)	1.38/MJ	2.22/MJ	LPG: Price of a 14.2 kg Cylinder assumed at Rs 900 Electricity Tariff of Rs 8/kWh considered
Efficiency of the Cooking Appliances	50%	80%	LPG: Average efficiency of LPG stoves at 50% is considered Electric Cooktops: 80% efficiency considered for calculations (induction cooktops efficiency is 84% while coil-top cooktops are in the range of 74-80%.
Scenario-1: To Boil 10 litre Water require 3.15 MJ			
Energy required with the cooking Appliance	6.3 MJ	3.94 MJ	50% efficiency for gas stove and 80% efficiency for induction cooktop is considered

[13] CEEW-NITI Aayog Report (*https://bit.ly/37bj7zX)

Cost to boil 10 litre Water	Rs 8.69	Rs 8.75	Cost of LPG and electric cooking is almost same
Scenario-2: To cook 1 kg rice require 1.5 MJ			
Energy required with the cooking Appliance	3.0 MJ	1.88 MJ	50% efficiency for gas stove and 80% efficiency for induction cooktop is considered
Cost to cook 1 kg Rice	Rs 4.14	Rs 4.17	Cost of LPG and electric cooking is almost same

For mainstreaming electric cooking, it requires cost-effective production and distribution of appliances, efficient after-sales facilities, standardised testing and quality standards, and creative options for end-user financing. Electric grid has reached every village and home. If electricity replaces cooking gas, the additional cost of transporting cooking energy can be avoided. The increasing share of renewable energy on the grid would further reduce the carbon footprint of cooking. Electric cooking can also make use of solar power in both urban and rural areas. This will be more viable in rural areas where electricity grid may not be very reliable but solar energy is easier to provide.

Due to erratic power supply with frequent outages in most parts of the rural areas, electric cooking has not made significant penetration in rural India. This situation will soon improve as the next goal of Government of India is to provide stable 24x7 power supply to all households. The connected load of 200-300 Watts was given to the newly electrified houses under the rural electrification schemes. The majority of electric cooking appliances, however, require 1000 watts (1 kW) or more. This would be a short-term limitation, and as we improve medium and low voltage networks in semi-urban and rural areas, the capacity can be upgraded for each household with a minimum load of 3-5 kW.. Network planning and equipment sizing must be done taking in to account the cooling and cooking loads that are likely to be added in the next 10-15 years. The capex for the grid strengthening may be taken up in phases, feeder by feeder by re-allocating funds from LPG subsidy.

There are often debates about inability to cook many Indian dishes on electric cookers. Difficulty in controlling heat on an electric cooker to prepare roti and dosa is another complaint. After extensive deliberations on these issues with different stakeholders, we believe that these problems can be overcome with practise and constant improvement in the functionalities and performance capabilities of different cooking appliances.

4 Electric Cooking – Balancing the Load on the Grid

By encouraging households to moderately adjust the timing of their cooking with electrical appliances so that the total load can be kept within the sanctioned limits during peak hours, electric cooking can assist the grid in demand growth and load balancing. The aim of such load-management techniques is not to regulate demand patterns strictly or to require users to cook at inconvenient times of the day, but rather to provide signals to customers to inform them when supply is more limited and when it is more abundant. With increasing share of renewable energy resources (solar and wind) which are intermittent, grid balancing or stable operation of the grid by matching demand and supply has become a major challenge. It is essential to have loads that can be interrupted (or shifted) to increase the flexibility of the grid. The cooking appliances if connected through a smart plugs, can be remotely turned on and turned off. There is surplus energy on the grid at several time slots in a day, and it could be made use for cooking by sending price signals (rebates on electricity tariff) to customers. Similarly, when supply is lesser than demand during peak hours, the higher tariff signals could prompt the customers to

turn off their cooking (and other) appliances. With a Time of Use (ToU) tariff for electricity, customers can voluntarily (either by automation or manually) change their electricity usage to reduce their energy costs. ToU tariffs unlock flexibility on the demand side and can thus increase the penetration of renewable energy and greatly improve the reliability and predictability of the system.

Government of India is about to launch a new program mandating smart meters for all electricity customers which will be rolled out in next 4-5 years nationwide. Smart meters with two-way communication (between the utility and the customer) will help customers view their electricity consumption in real time and schedule many tasks (cooking, washing, ironing, water pumping etc) to non-peak hours when the electricity tariff is low.

Even 100 million households using electricity for cooking (@4 kWh per day) will contribute to additional 146 billion units (BU or TWh) of electricity consumption from the grid. This would improve the plant load factor of the generation assets considerably. This will also contribute to better utilization of the electricity generation assets which in turn would reduce the electricity tariff.

4.1 Electric Cooking – Saving Billions in Forex and Generating New Jobs

Government of India subsidy towards LPG and Kerosene is huge and most of these fuels are imported.

Subsidy Amount in INR (Crores)	2018-19 (Actual)	2019-20 (Revised Budget Estimates)	2020-21 (Budget Estimates)
LPG	20,268	34,086	37,256
Kerosene	4,569	4,483	3,659
Total Amount	24,837	38,569	39,915

Table 3: LPG and Kerosene Subsidies

Moving from LPG and Kerosene to electric cooking could phase-out these subsidies faster and re-allocate for strengthening the electricity distribution network in semi-urban and rural areas in a phased manner as well as subsidize appliances for electric cooking to the needy sections of the society.

Promotion of electric cooking will generate huge demand for electric cooking appliances. Almost all such appliances are manufactured locally in India with very little import content in few of them thereby promoting *Atmanirbhar Bharat*. This will also create large number of jobs within the country.

4.2 Electric Cooking – Helping Meet NDC Goals

The shift from firewood, charcoal, dung cake, kerosene and LPG/PNG to electricity for coking will reduce greenhouse gas emissions considerably and the indoor air pollution will be fully eliminated. India is making strong progress towards greening the electric grid with larger share of renewable energy. Under the Paris Agreement, India has committed to produce 40% of its total energy requirements from renewable resources thereby reducing emissions by 30% 2030. Switching to electric cooking will richly contribute to meet the NDC goals at marginal cost.

5 Recommendations

Today, electricity is the primary energy source for lighting, cooling (fans, air coolers and air conditioners), water pumping, washing, ironing etc in most households. Electric kettle, mixie and grinder are also commonly used in urban and rural households. People are familiar and comfortable with use

of different electrical appliances and it would not take much effort and time to motivate them to shift to electric cooking.

It is high time to admit that the ongoing *efficient cook stove* program has not made any impact in reducing indoor air pollution or reducing LPG consumption or in motivating people to move away from firewood and biomass for cooking. Several decades of efforts and resources have gone waste. Still several national and international agencies are engaged in the promotion of efficient cook stove initiatives. These must be stopped and all efforts must be targeted to promote electric cooking. Even if people adopt the "efficient" stoves, the impact from the incremental improvement in the efficiency is defeated by the sheer number of new units added each year.

Government should formulate new policies and programs to promote electric cooking. LPG subsidies may be re-allocated to fund the capex for strengthening the electricity distribution networks in semi-urban and rural areas. The minimum load for all electricity connections should be enhanced to 3kW to 5kW. We are no more in an era of scarcity, rather we have surplus electricity generation capacity. Medium voltage and low voltage network should be strengthened to support this minimum 3kW to 5kW load for all households. That will help people move to electric cooking as well as give them access to cooling. As the summer temperature in India keep going up every year, it would be difficult for people to live without access to cooling[14] and those who can afford an air conditioner will acquire it and providing load enhancements selectively will not be viable, particularly in rural areas.

To promote the electric cooking the immediate next steps recommended are listed below.

i. Assessment of feasibility of transition to electric cooking in urban, semi urban and rural area in different states in India

ii. Assessment of the electricity supply status and grid capability to support cooking appliances in households

iii. Estimation of capex to strengthen the medium voltage and low voltage grids to provide 24x7 supply as well as 3kW to 5kW connections to all households so that they could use electric cooking appliances and air-conditioners

iv. Life cycle cost comparison of building new city gas distribution networks to supply PNG as against strengthening the electric network for transition to electric cooking in semi-urban households

v. Estimation of annual cost of LPG cylinder distribution in rural areas as against strengthening the electric network which is one time cost

vi. Assessment of availability of electric cooking appliances in different regions, its cost and performance, roadmap for augmenting the manufacturing capacity of such appliances in the country

vii. Assessment of skill development and employment generation potential in the electric cooking domain as against the job losses in LPG distribution

viii. Detailed assessment of health benefit from transition from firewood/biomass/kerosene etc to

[14] ISGF White Paper on District Cooling Systems: https://indiasmartgrid.org/resourcecenter.php

electric cooking and avoided cost towards providing healthcare to millions suffering from indoor air pollution

ix. Detailed assessment and estimation of the environmental benefits from electric cooking by reducing GHG emissions and avoiding deforestation

x. Development of different strategies for promotion of electric cooking and campaigns for consumer awareness and adoption of electric cooking appliances and practices

xi. Technical feasibility studies for leveraging renewable energy for electric cooking and integration of cooking appliances with the grid – smart cooking with green electricity bought from the cheapest resource on the grid!

To conclude, we propose that a new program may be launched by Government of India with participation of all State Governments, electric utilities and all other related stakeholders and civil society associations. This program may be taken up in a mission mode.

APPENDIX-A: List of Electric Cooking Appliances with Indicative Prices

Table 4: Overview of Various Electric Cooking Appliances

Category	Sample Items with Photos			Price Range (INR)	Remarks (More model of Different makes)
	Power Demand (Watts)	Popular Brands	Picture		
Hot Plate	1000 Watts	BAJAJ VACCO, Electric TAWA HOT Plate		1,000	https://amzn.to/33HF20H
	2000 Watts	BAJAJ VACCO, Electric Coil Hot Plate		1,565	
	1500 Watts	ORBON Big Butterfly		2,159	
Electric Kettle	1800 watts	Philips HD9303/02 1.2-Litre Electric Kettle		2,230	https://amzn.to/3mFeDYE
	1500 Watts	Kent 16023 1500-Watt Electric Kettle		1,140	
Electric Pressure Cooker	1000 Watts	NutriBullet NutriCook Smart Electric Pressure Cooker		9,489	https://amzn.to/3g7x06h
	500 Watts	Prestige Delight PRWO 1-Litre Electric Rice Cooker		1,399	
	900 Watts	Glen Electric Steam Cooker		2,895	
Induction Cooker	2100 watts	Philips Viva Collection HD4928/01 2100-Watt Induction Cooktop		2,499	https://amzn.to/3g7GQVH

	1800 watts	Pigeon Induction Cooktop		2,229	
	1200 watts	Prestige Induction Cooktop		1,587	
	2000 watts	iBell Induction Cooktop		1,375	
Microwave Owen	1950 Watts	LG 28 L Convection Microwave Oven		17,940	https://amzn.to/36FIfjd
	2200 Watts	IFB 30 L Convection Microwave Oven		13,990	
	1200 Watts	IFB 20 L Convection Microwave Oven		7,321	
Electric Owen	1280 Watts	Pigeon by Stovektaft Electric Oven		3,260	https://amzn.to/3lDRMvq
	1200 Watts	Bajaj Majesty 1603 Electric Oven		3,899	
Air Fryer	1425 Watts	Philips Daily Collection HD9218		9,699	https://amzn.to/2IbFCw5
	1500 Watts	Kenstar Aster Digi Oxy Fryer		5,499	
Slow Cooker	200 Watts	Haden 189677, Slow Cooker		2,499	https://amzn.to/3gaFw4m
	280 Watts	Bergner Elite, Slow Cooker		2,779	