

# MicroSave India Focus Note#126

## Let There Be Light – Direct Benefit Transfer in Kerosene

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India is a social welfare state. [Rs 2,270 billion \(US\\$34.4 billion\) were allocated for subsidies in the budget for FY 15-16](#), which is approximately two percent of [India's GDP of Rs 125.4 trillion \(US\\$1,900 billion\)](#). These subsidies are meant to support vulnerable households, mainly through the Public Distribution System (PDS), which delivers essential food items, kerosene and/or domestic liquefied petroleum gas (LPG), and fertiliser subsidies to farmers.

[Rs 80 billion \(US\\$1.21 billion\) is set aside just for kerosene subsidy](#). However, the proportion of subsidised kerosene that actually reaches the intended beneficiaries is a matter of speculation.

[32.8 per cent households in India do not have access to electricity](#). Kerosene is still a major source of lighting in areas with little or no power supply. However, kerosene's use for cooking is limited to igniting cooking fuel, such as wood and dung cake, and seldom as a direct source of energy.

Encouraged by the [success of Direct Benefit Transfer in LPG \(DBTL\)](#), and in response to the loss of [41% \(or "leakage"\) of kerosene subsidies](#), the Government of India (GoI) is examining proposals and a suggestion to conduct a pilot-test to replace the kerosene subsidy with a cash transfer or alternative sources of energy.

In this context, *MicroSave* was requested to conduct a study with the following objectives.

1. Assess the current consumption pattern, consumer experience and the extent of dependence of consumers on kerosene;
2. Assess consumer preferences for different sources of energy for lighting and cooking;
3. Assess the feasibility of alternative energy fuels; and
4. Develop pilot models of potential alternative fuel(s) to replace kerosene.

We conducted the study in four states, selecting one district in each. These were Varanasi (Uttar Pradesh), Chatra (Jharkhand), Mahasamund (Chhattisgarh), and Medak (Telangana). We used qualitative (focus group discussion – FGD) and quantitative (structured interview) tools to study beneficiaries using kerosene. We conducted 32 FGDs and surveyed 1,412 beneficiaries using the quantitative tool. The main findings from the study are as follows.

### Current Consumption Pattern

1. 49 per cent households use kerosene for lighting purpose only;

2. 37 per cent use it for both lighting and cooking; and
3. 14 per cent use it as fuel for cooking only.

In states where [electricity consumption per capita is low such as Jharkhand and Uttar Pradesh](#), there is high dependence of households on kerosene for both lighting and cooking (ignition only).

### Consumer Experience and Preferences

Some consumers are using alternatives to kerosene:

Use of Alternative Sources of Fuel				
Source	Electricity	LPG	Solar	Bio-gas
Households that have used alternative fuel	68%	46%	3%	1%

We captured consumer experience and preferences for different sources of energy and alternative fuels on six parameters: availability, affordability, product reliability, maintenance /replacement cost, ease of use, and quality of output (light or cooking flame).

For lighting, we compared solar-powered home-based system and electricity; and for cooking fuel/ignition we compared fuel-wood, dung cake, bio-gas, and LPG.

Consumer experiences and preferences while using solar power and electricity for lighting are given below:

Parameters	Solar Power	Electricity
Availability	X	X
Affordability	X	√
Product Reliability	√	X
Low Maintenance	X	√
Ease of Use	√	√
Quality of Use	√	√

1. **Electricity**, though preferred by consumers on four out of six parameters, is not a practical alternative in the short to medium term because of its [low availability \(is not available in large parts of many states\) and low reliability \(frequent and long power cuts\)](#).

2. **Solar Power**: Despite limited experience of using solar power, consumers are aware that its use does not involve health hazards. They are also willing to switch to solar power, if an affordable and quality product that requires low maintenance and lasts long, is available.

Consumer experiences and preferences while using fuel-wood, dung cake and LPG for cooking are described below.

Parameters	Fuel Wood	Dung Cake	LPG Connection
Availability	X	✓	X
Affordability	✓	✓	X
Product Reliability	X	X	✓
Maintenance Cost	X	X	✓
Ease of Use	X	X	✓
Quality of Use	X	X	✓

1. **Fuel-wood and dung cake:** Consumers are aware of health hazards of these fuels. Although fuel-wood and dung cake are still the primary resources for cooking, given their adverse impact on health and air quality, consumers are keen to replace them with cleaner alternatives.

2. **LPG:** The only concern raised by 48% of consumers regarding use of LPG is the up-front cost of Rs 5,000 (US\$75) to purchase each cylinder. If this cost is taken care of and availability ensured, consumers are willing to refuel the cylinders on their own. We, therefore, suggest LPG as an alternative to kerosene for cooking.

### Models for a Pilot Test

Based on the analysis of consumer experience and preferences, simple solar-powered products (not household systems) and LPG emerge as the best alternatives to kerosene for lighting and cooking, respectively. We now examine the solar power and LPG alternatives available, and which suits the consumers best.

### Solar Power – Alternative for Lighting

Some of the solar-power based energy models for lighting are:

Solar Models	Advantage	Barriers
Micro-grid	Suitable for village level subscription	<ul style="list-style-type: none"> <li>High set-up cost - approx. Rs 500,000 (US\$ 7,575) for 5KVA</li> <li>Difficult to replicate</li> <li>High maintenance (recurring) cost - approx. Rs 12,000 - Rs 15,000 (US\$182 - US\$227) per month</li> </ul>
Solar home lighting system	Suitable for household	<ul style="list-style-type: none"> <li>High upfront cost – approx. Rs 12,000– Rs 25,000 (US\$182 - US\$379)</li> <li>High maintenance cost - Rs 2,000 (US\$30) – Rs 5,000 (US\$76) per annum</li> </ul>
Solar lantern	Affordable cost - Rs 750 (US\$ 11) to Rs.2,000 (US\$ 30) and replicable	<ul style="list-style-type: none"> <li>Maintenance cost (mainly biennial battery replacement) of Rs 380 – Rs 1,000 (US\$ 6 – US\$ 15) is low but requires technical support.</li> </ul>

Based on costs, ease of use, health hazards and replicability of the model, solar lanterns are the only viable model. The cost of a solar lantern, including a bulb and a mobile charger, is in the range of Rs 750(US\$ 11) to Rs.1, 000 (US\$ 15). It is equivalent to the total annual expenditure (household expenditure and government subsidy) on purchasing kerosene from the PDS shop at present (see table below).

Total Expenditure on Kerosene	
Household expenditure per annum	Rs.576 (16*3*12) (US\$8.72)
Government subsidy per annum per household	Rs.432 (12*3*12) (US\$6.54)
Total expenditure per annum per household	Rs.1,008 (576+432) (US\$15.27)
*Kerosene rate at FPS (Fair Price Shop) – Rs. 16 per litre	
*Household entitlement – 3 litre per month	
*Subsidy on Kerosene as announced by GoI for FY 2015-16 - Rs.12 per litre	

Given that batteries last up to two years, this model provides a much better option for lighting for poor households without adding any financial burden on them or the government.

### LPG – Alternative for Cooking

Some of the LPG-based cooking alternatives are discussed below.

Cylinder	Advantages	Barriers
14.2 Kg	Lasts for 2 months	<ul style="list-style-type: none"> <li>High up-front cost, i.e. Rs 3,500 (US\$ 53) – Rs.5,000 (US\$ 76)</li> <li>High refuelling cost Rs.800 (US\$ 12)</li> </ul>
5 Kg with burner	Low upfront cost approx. Rs.2,000 (US\$ 30) and refuelling cost Rs.155 (US\$ 2.3)	<ul style="list-style-type: none"> <li>Currently distribution of this model is not in place</li> </ul>
2 Kg with burner	Low upfront cost approx. Rs.1,500 (US\$ 23) and refuelling cost Rs.70 (US\$ 1)	<ul style="list-style-type: none"> <li>Frequent refilling leading to inconvenience and additional transportation cost (and thus financial burden).</li> </ul>

Based on the analysis above, we suggest the “5 Kg cylinder with burner” for cooking purposes. However, this will require the development of a distribution system – something that we anticipate that the private sector will do rapidly if the GoI were to start driving this model.

### Conclusion

Consumers have shown their preferences for cleaner fuel sources as alternatives to kerosene and other energy sources, provided availability of quality product is ensured at affordable price, with robust delivery and support systems. The proposed pilot test will provide more insights into the policy and implementation level changes necessary to make the switch from kerosene a success. This will allow an informed, efficient and successful roll-out of the programme at the national scale.