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PATTERNS OF COOKING AND LIGHTING ENERGY USES IN KATHMANDU METROPOLITAN CITY

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Abstract

Households require energy for various uses like lighting, cooking, etc. Few studies have been done to understand the energy consumption in Kathmandu valley. This study has examined the energy consumption situation of core area of Kathmandu city by household survey methods in 2016 and found that households of Kathmandu were dependent on multiple fuels for residential energy consumption. The dependency of people was increasing on traditional energy. Rented households were dependent more on Liquefied Petroleum Gas than the owned households for cooking food as well as for lighting; rented households were depended more on electricity than owned households

Keywords: *Energy, fuelwood, consumption, Kathmandu, residential*

Introduction

Households require energy for various uses, lighting and cooking are the major areas; Cooking has received less attention by international and local communities (Kees and Feldmann 2011). In urban areas, more than 67.68% of the total households use LPG as their usual fuel for cooking, 67.26%, 18.8%, 7.44% and 0.28% depend on electricity, Kerosene and solar as well as bio-gas respectively for lighting (CBS 2011).

Consumption of petroleum (POL) products had registered a growth of 9.1 percent to 1,288,676 KL and that of LP Gas by 14.1 percent to 207,038 MT in FY2012/13 (Economy Survey 2015).

Few studies have been done so far to study the energy consumption pattern. Bhandari and Nakarmi (2014) have analyzed the scenario of residential energy consumption. Shrestha and Malla (1996) have examined sectorial energy-use patterns. Shrestha and Rajbhandari (2010) have analyzed the sectorial energy consumption.

Malla (2013) has examined the household energy consumption patterns. Adhikari (2012) has studied in urban Kathmandu households under different separate income growth scenario for each economic stratum but after the earthquake 2015 and India's undeclared economic blockade the researchers had given few focus on residential energy consumption studies. So this study has made an attempt to fulfill the gap and presented the energy consumption pattern of Kathmandu Metropolitan City (KMC). The results can be integrated with long-term urban planning toward a sustainable development.

Materials and Methods

Study Area

Kathmandu Metropolitan city, the capital of Nepal, is the fastest growing city of Nepal with 35 wards; 60% of the Kathmandu district's population resides here (CBS 2011). It has population density of 20288.8/km^2, area 49.5 km^2, approximately GDP 550 billion and HDI (CBS 2011).

Sampling and Sample size

Random sampling was used for selecting the sample respondents. Four sample area were selected namely Kalimati, Kalanki, Anamnagar and Teku and total 80 households were taken for

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interview 40 households were taken from rented and 40 households from owned.

Data collection

Both primary and secondary data sources were used in this study. Primary data were collected by interviewing people of owned and rented households. The secondary data were collected from related articles, journals, literature, documents, published reports and books.

Data analysis

Both qualitative and quantitative data of the study were analyzed by using Microsoft excel. Quantitative data were tabulated column wise and entered in an excel sheet whereas, qualitative data were interpreted based on the information collected from field study through interview and observation.

Results

Overall energy consumption pattern by fuel type for cooking

The study showed that 29% depend on FLE (fuelwood, LPG and electricity) as shown in figure 1.

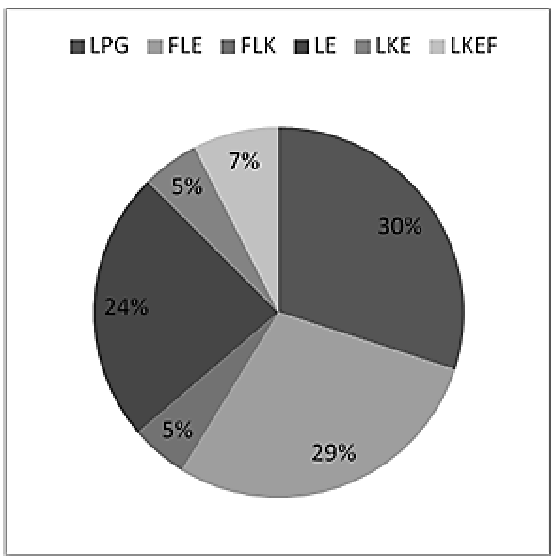

Figure 1. Overall energy consumption pattern by fuel type for cooking.

The 30% depend on LPG 24% depend on LE (LPG and electricity), 7% depend on LKEF (LPG, Kerosene, electricity and fuel wood), 5% depend on FLK (fuel wood, LPG and Kerosene) and 5% LKE (LPG, Kerosene and electricity) which is shown in figure 1.

Overall energy consumption pattern by fuel type for lighting

0f the total households, 80% depend on electricity, 15% households depend on solar and electricity and 5% households depend on electricity and others for lighting which is shown in figure 2.

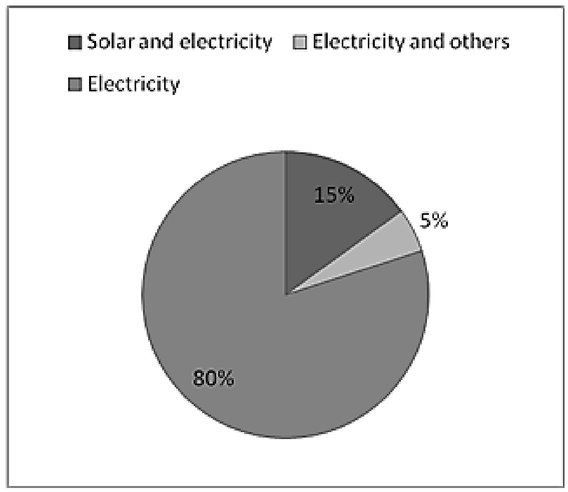

Figure 2. Overall energy consumption patterns by fuel type for lighting.

Comparisons between owned households and rented households energy consumption for cooking by fuel types

The study showed that 22.5% more owned households were found to be depended on FLE (fuelwood, LPG and electricity) and 5% more on FLK (fuelwood, LPG and Kerosene) in comparison to rented households whereas 17.5% more rented households were found to be depended on LE (LPG and electricity) and 10% more on LPG in comparison to rented households and both the type of households depended were equally on LKE (LPG, Kerosene and electricity) and LKEF (LPG, Kerosene, electricity and fuelwood) for cooking which is shown in figure 3.

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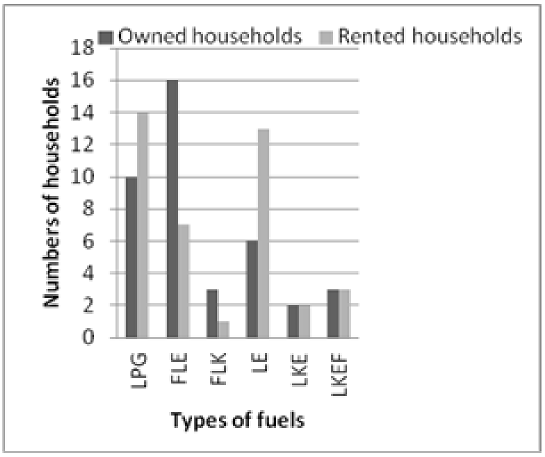

Figure 3. Comparisons between owned households and rented households energy consumption for cooking by fuel types.

Comparison between energy consumption pattern by owned and rented households by fuel type for lighting

Observation had shown that 5% more rented households depend on E (electricity) in comparison to owned households and 10% more owned household depend on SE (Solar and Electricity) in comparison to rented households whereas both type of households depend equally on EO (Electricity and Oil) which is shown in figure 4.

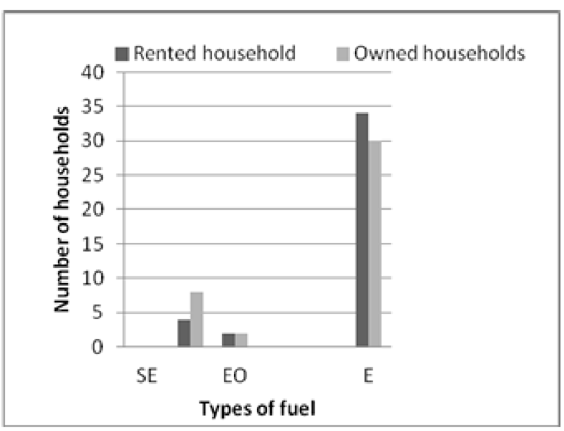

Figure 4. Comparison between energy consumption pattern by owned and rented households by fuel type for lighting.

Discussion

The results had shown 70% of the households were dependent on multiple types of fuel for cooking as well as for lighting 85% of people were depending on electricity only 15% depends on electricity as well as solar panel and other source like candle. The rented households depends more on LPG than the owned households for cooking food as well as for lighting rented households depend more on electricity.

Compared to Shrestha and Nakarmi (2014) this study had brought different results they had reported that major energy resources in the KMC were LPG and Grid Electricity (87%). Cooking had contributions around 60% of the energy consumption share in Kathmandu Metropolitan City. This result may be due to the undeclared blockade of India. Since Nepal depend totally with India for petroleum products.

Different studies had shown that landlocked country and underdeveloped country can be independent in energy use. In Bhutan electricity is the dominant fuel used for lighting, space heating and cooling and water heating (Lhendup *et al*. 2010). Switzerland uses geothermal energy for different residential purpose (STEM 2014). Bangladesh uses maximum waste biomass energy for cooking (Foysal *et. al*. 2012).

Conclusion

The energy consumption pattern of Kathmandu was found to be change after earthquake 2015 as well as due to undeclared economic blockade of India in early 2016. Rented households as well as victims of earthquake were suffering more difficulties of energy crisis than owned households. There was increased use of electricity for cooking purpose as well as increase use of solar for lighting.

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