

# Energy Crisis and Nepal's Potentiality

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## Abstract

*Energy that is not popularly used and is usually environmentally sound like wind, solar, geothermal is simply regarded as renewable energy. The renewable energy made available through established sources and technology is considered as non-conventional one, if otherwise, conventional. Speaking strictly the forms of alternative energy or renewable energy are environmentally favorable and no negative impacts and economically viable. Alternative energy sources are necessary to explored in context to solve the present problem of energy crisis in Nepal. Being rich in natural resources Nepal posses' high potential of development of energy generation station.*

**Key Words:** Energy crisis, Hydropower, Alternate energy, Consumption

## Interpretation

- It is the daily routine of Nepali to see the long endless line on roadside for the petroleum products. The consumption of energy is increasing day by day. The ratio of consumption and supply of energy had very big gap between them. The consumption rate is increasing rapidly. The consumption of petroleum products in FY 2006/07 had increased by 0-7 percent to reach 947,784 Kiloliters while LP gas had increased 15-5percent to 93,562 metric ton. The consumption of LP gas had increased by 29.8 percent in the first eight months of FY 2007/08.
- The NOC was at loss in FY 2006/07 and FY 2007/08 for not reviewing the rate of petroleum products as per the price hikes in the international market.
- Well established countries are fighting with each other for ownership of petroleum products. Many country people had lost their life in battle of fuel ownership. Iraq is the victim of so called fuel war.

Above are the some examples of facts caused by the energy. Our modern society takes energy for granted. No longer do we have to toil for hours to produce our food, clothing, warmth and even entertainment. At the flick of a switch we command machines to provide for us. Electricity is ever ready, ever available ... BUT, what if that changed? What will happen if aeroplane stop due to shortage of aero fuel? What will happen if hospital rejects to do operation of victim due to lack of electricity?

The present study shows that after 50 years there will be very big shortage of petroleum products in world. The prosperous country will face the problem what now poor country are facing and those poor countries will have no access to petroleum products.

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As we know the major portion of the world's energy consumption comes from the petroleum products like petrol, diesel, coal, etc. The present rate of consumption of these fuels is so high that everyone is worried about it. It is suggested that if the present rate of consumption of the petroleum products continues, it may exhausted in few decades. On the other hand, it takes millions of years to form the fossils fuel. This clearly indicates a probable energy scarcity called energy crisis in near future if we are not careful in using these fuels. To avoid such situation, we have to search for alternate sources of energy.

## Introduction

Biomass and hydropower are two indigenous energy sources in Nepal. Fuel wood supplies almost 80 percent of total energy demand and is extracted beyond the sustainable supply capability of the forests indicating a growth in deforestation. Whereas, electricity supplies only one percent of total energy consumption and only about 280 MW of 83,000 MW theoretical potential have been developed.

So far today, Nepal has not been advanced in the technology related to alternative energy is not satisfactory however the trend in this area is quite appreciable. Technically biogas digesters, small hydropower, solar water heaters, etc are the most proven alternative energy sources.

## Indicative Potential Energy in Nepal

Compared to other countries in the world, Nepal has made significant progress in developing and using water resources for producing power. Mostly Nepal is investing on micro hydropower over the past three decades. Currently there are over 900 micro-hydro installations in the private sector in about 59 of the 75 districts of the country.

S.N.	Energy type	Potential
1.	Solar Energy	26000 MW
2.	Wind energy	200 MW
3.	Hydropower	Theoretically 83GW, Practically 25000 MW
4.	Fuelwood	7 metric ton
5.	Biogas	About 200000 plants of 10 cu.m size at existing livestock population

## Potential Energy Sources in Nepal

### *Fuel wood*

Forest covers almost 5.6 million hectares of Nepal's land forms i.e. around 29% of the country area. 75% of the country's fuel requirement has been fulfilled by the forest. Almost all nation people's livelihood is run by the energy from forest. Fuel wood is the most prominent energy sources which are drawn from this forest. More than 7.5 million metric ton fuel wood is

accessible for use. The study shows that in high mountain area the fuel wood consumption is 640kg/person/year while that in terai is 479kg/person/year. It is all because of temperature. The temperature of high mountain is very low which needs high energy consumption for sustaining life and in terai people can easily adjust to low fuel wood consumption.

Fuel wood consumption in Nepal cannot be replaced in the near future and, therefore, the sustainability of the forestry sector would remain a question until that time. The support of developed countries becomes important in managing forests and supplying alternative forms of energy sources.

### ***Hydropower***

Hydroelectricity comes from the damming of rivers and utilizing the potential energy stored in the water. As the water stored behind a dam is released at high pressure, its kinetic energy is transferred onto turbine blades and used to generate electricity. This system has enormous costs up front, but has relatively low maintenance costs and provides power quite cheaply. In Nepal approximately 83,000 MW of hydroelectric power potential is available, and about 280 MW of that have been developed.

Nepal is famous for hydro potential. In the world ranking Nepal lies in second position after Brazil.

### ***Basin-wise hydropower potential in Nepal***

The first hydropower generation was commissioned in 1911 in Phurping near Kathmandu. To date, the country has about 280 MW of installed hydropower capacity and about 55 MW of petroleum fuel based generating capacity to supply electricity. On the other hand 12 MW small hydropower has been installed mainly to supply electricity to rural areas.

<b>Basin</b>	<b>Theoretical Potential (GW)</b>	<b>Economic Potential (GW)</b>
Koshi	23	11
Gandaki	21	5
Karnali and Mahakali	35	25
Others	4	1
<b>Total</b>	<b>83</b>	<b>42</b>

Source: Shrestha H.M. 1996

### ***Wind energy***

In 1990 the wind turbine of 20 KW was installed to supply light to 80 households in the country. However this unit has not been used in present due to technical reasons. In the Northern belt (region) of Nepal wind energy is available, but the exact potential is yet to be estimated due to lack of technical personnel. Wind power, of course, is a promising unconventional source of power. It is merely air in motion, set up and continually regenerated by small fraction of isolation reaction in the outer atmosphere. It is estimated that nature is generating  $1.67 \times 10^{15}$  KW annually but only a small fraction of this can be harnessed for use in the other forms. It is reported that the potential to generate wind energy in Mustang is reported at about 200 MW. (Rajbhandari et.al)

### ***Solar energy***

Only after seventies the utilization of solar energy was started through the introduction of domestic solar water heaters. In rural area Nepal telecommunication, civil aviation, Nepal electricity authority is using solar energy as source of energy. More than 348 KW of energy from sun is being used by various stakeholders within Nepal.

Solar energy is very suitable for the country like Nepal. Solar energy is the best option for the generation of energy. Photovoltaic, thermal devices should be used to generate the solar energy. In Nepal the total installed photovoltaic capacity is about 350 KW.

### ***Petroleum products***

Though Nepal is not producing petroleum products but is highly depended on it. Import is the only method to meet the demand for petroleum products. The demand and supply both are increasing day by day. Since 1975 the supply had increased by almost 70 folds. The time period between 1987-1997 is regarded as the first time when there was more demand of Liquefied Petroleum Gas (LPG). It is because LPG was introduced as an alternate of kerosene, electricity etc in urban and semi urban area. Due to pressure of high population Nepal Oil Corporation (NOC) is being unable to supply properly. Though it has storage capacity of 70309 kilolitres (KL) it is suffering from problem of shortage.

Recent report of NOC shows that NOC is incurring monthly losses of nearly 3 million dollars due to lower selling prices of petroleum products. The corporation sells LP gas at a price lower by 3.70 dollars per cylinder. Likewise, it has losses of 75 dollars in every kilo-liter of petrol, 60 dollars in diesel, and 10.5 dollars in kerosene. However, it earns 278 dollars profit in sale of every kiloliter of aviation fuel.

The report also showed that NOC maintains very low stock of petroleum products, heightening risks of shortage once supply is disrupted. The current stock cannot last for more than three days of demand in the capital. The report said absence of necessary infrastructure like pipeline from Raxaul to Amlekhgunj, the petroleum depot situated at the Indo-Nepal border some 90 km south of Kathmandu, has greatly affected supply of petroleum products.

### ***Bio-briquette***

Bio-Briquette is fuel briquette that is prepared from natural resources and used as source of alternative fuel. Bio-Briquette is prepared from Charcoal, mud, and water as binding material. It is prepared mainly utilizing weeds *Lantana camara*. The Bio-Briquette is of diameter 12.5cm, and height of about 6cm.

In Nepal Bio-Briquette's history is not so old. Only one decade ago it was commonly adopted in Nepali society. Most of the Community Forest User Group (CFUG) are producing Bio-Briquette as a source of income. Interesting part is that one Bio-Briquette is sufficient for cooking bhat, dal and tarkari for 4 family members.

### ***Other fuels***

Biogas, Coal, livestock manure, crop residues are some other sources of energy in Nepal. While talking about crop residue there is a potential of about 14 million metric tons of crop residue among which terai singly supply 9 metric ton.

Many communities from country are using livestock manure as a good source of heat energy. They are using manure for cooking purpose since long period of time.

### **Opportunities**

As we discuss already that Nepal is rich in water sources, it bears a big opportunity of development of hydropower in Nepal. Nepal can practice the international business of hydropower. Nepal is rich in forest products. Forest being good source of energy it can be good option for Nepal to generate energy from Forest. The recent efforts to mobilize community participation and private investment to increase forest quality should be emphasized here. Communities have, in general, a dedication and enough motivation to manage forests but have very little expertise. The demand for forestry products (fuel wood, fodder, and timber) is immediate to them. Therefore, backing the community forestry projects with forest experts should be intensified. It can be noted that in the long run, these forests would be the main source for fuel wood, timber and revenue collection to meet local needs. Therefore, there is a need for intensive local training on forest management, in which the international agencies could actively play a vital role. Also the Nepali forest can be used as a source of income from Clean Development Mechanism (CDM). The income from CDM can be used in the development of hydropower in Nepal. The unemployment rate of Nepal is increasing day by day. By establishing the hydropower station, energy station, the employment opportunity can be generated.

### **Conclusion**

Forestry sector dominate the Nepal's energy scenario as it supplies more than 80% of total energy demand in country. Fuel wood will remain as the major source of energy but the current use is not sustainable. Therefore, it is necessary to develop alternative means of energy to meet the need rural people. Nepal is rich in water resources and it could be developed to meet the local and regional demand of water for hydropower. If micro hydropower station can be developed then it will be great task for reducing the pressure in consumption of biomass and fuel import. But for the national level benefit large scale projects should be developed with the help of private sector. Hydropower, solar energy, wind energy are renewable source of energy and they have also potential to reduce the emissions of green house gas. So to reduce effect of global warming and maintain sound environment Nepal seeks help from developed countries for a sustainable development of its natural resources and improvement in quality of life citizens.

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विजया दशमी तथा शुभ-दिपावली  
२०६५ को पावन अवसरमा  
समस्त होटल न्यवसायी, संरक्षणप्रेमी  
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