

Energy first time sdgs  
included a target



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Energy access is the “golden thread” that weaves together economic growth, human development and environmental sustainability. The International Energy Agency (IEA) defines energy access as “a household having reliable and affordable access to both clean cooking facilities and to electricity, which is enough to supply a basic bundle of energy services initially, and then an increasing level of electricity overtime to reach the regional average” (IEA 2017). The United Nations General Assembly in 2012 embraced the Sustainable Energy for All (SEforALL) objectives for 2030, aiming to achieve universal access to modern energy, doubling the historic rate of improvement of energy efficiency and double the share of renewable energy in the global energy mix (IEA 2017). Energy access is a major factor in economic and social development. Energy is a necessary input along with machinery, land, natural resources, human capital in the productive base of the economy (Winkler, Simões et al.

2011). As energy access is the great enabler for development at different levels of the society, it is a vital tool for developing countries to meet the Sustainable Development Goals. In September 2015, 193 countries including developing and developed countries adopted 17 new Sustainable Development Goals as the 2030 agenda for Sustainable Development. With the aim to eradicate poverty, improve health and gender equality, protecting planet and ensuring peace and prosperity for all. Along with that, for the first time SDGs included a target focused specifically on ensuring access to affordable, reliable and modern energy for all by 2030, also considering importance of energy to achieve other development goals (IEA 2017).

The main hurdle to achieve all the sustainable development goals is poverty, not only in the developing countries but as a global perspective.

There is no absolute definition of poverty, but low attainment of social condition for example education, health and nutrition along with economic deprivation can narrow it down to some extent. One way to cope with this multi-dimensional problem, i. e. poverty, is by promoting the access to modern energy such as electricity (Kanagawa and Nakata 2008). Among all the modern forms of energy Electrical Energy is the most advanced form and access to electrical energy can bring significant changes in the standard of living of the people in the developing countries. (Kanagawa and Nakata 2008), in Figure 1 have shown link between energy and some basic parameter of poverty. Education · Lighting appliances enables to study at night.

· Utilization of modern energy results in freeing up from drudgery and creating time for study. · Electricity helps narrow the digital divide through Information Communication technologies (ICT) Health · Using modern forms of energy reduces exposure to hazardous pollutant. · Avoiding drudgery such as collecting fuelwood improves health condition of, in particular women and children. · Access to electricity enables vaccination and medicine storage by a refrigerator. Environment · Reduction in use of fuelwood prevents deforestation.

· Use of efficient electric appliances saves energy consumption. · Appliance of renewable energy promotes climate protection Income ·

Enterprise development through electrification creates job opportunities.

- Mechanization in industry achieves higher productivity.
- Small-scale energy system in rural areas generates local industry

Energy Figure 1 : Links between energy and components of poverty  
Access to modern energy not only provides economic opportunities for income generation but also reduce the drudgery and saves time, which can be utilized for educational or different entertainment activities.

Considering electricity as the pivotal form of modern energy, electricity consumption has significant correlation with Gross Domestic Product (GDP) as well as Human Development Index (HDI). For the countries having high energy consumption level per capita electricity, attain high rank in economic activities like GDP and also in HDI (Kanagawa and Nakata 2008).

Global electrification stands around 85.3% and varies widely across the continents. However Urban areas across the world already have close to universal access at 96%, whereas progress in rural electrification has been more evident since 1990, reaching 73% of the population in 2014, narrowing the gap in access between the urban and rural populations to 20 percentage points, from 35 in 1990. But still 1.06 Billion people do not have access to electricity (IEA 2017).

1.1 Current Situation in Nepal  
Nepal lies between latitude 26°22' N to 30°27' N and Longitude 80° 12' E, with border from India in the South, East and West and China from the North (CBS 2011). According to Central Bureau of Statistics, Nepal has a population of 26.

4 million with 5.4 million households. Nepal is ecologically divided into three regions, the Mountain, the Hill and the Terai (Plains) (CBS 2011).

Mountain region: the region lies in North covered with mountainous areas.

The altitude ranges from 4877 meters to 8848 meters above the sea level.

Because of its geography and climatic condition, it is mostly thinly populated with only 6.73 percent of the total population (CBS 2011).

Hill region: Hill region is between Mountain and Terai regions, ranges from the altitude of 610 meters above the sea level.

This region shares largest share of the land area and it is home to 43.2

percent of total population (CBS 2011).

Terai Region: The low flat land in the southern part of the country is Terai. It accommodates 50.27 percent of the population. The population in this region is increasing faster as compared to other two regions, one of the major reasons is internal migration (CBS 2011).

Nepal with a population of 28 million and GDP per capita (\$US) 730 has 85% access to the electricity with only 26% having access to clean cooking. The urban electrification rate is around 97.7%, similarly rural electrification rate lags around by 16% which is amounted to be 81.70% (IEA 2017). Nepal has achieved considerable progress in rural electrification in last two decades.

According to the reports, Nepal has annual access growth rate above 2 percentage points, which is more encouraging and rapid compared to other developing countries (IEA 2017).

Moreover, the un-electrified areas are the rural hilly and mountainous regions, and one of the main reasons is that they are geographically challenging places. And most importantly, lack of economically viable options

for electricity generation. As mentioned above, access to modern energy as the thread to all other Sustainable Development Goals, it provides opportunities for education, health, employment and helps to minimise the drudgery. Nepal being one of the least developed countries of the world with a vision to reach middle income country category by 2030 (NPC 2016), access to modern energy should be kept on high priority to achieve the target. According to the CBS (2011), more than 80% of the people live in rural area, so it becomes pretty evident from this fact that rural energy access will have major stake in achieving the future SDGs.

Currently, most of the household in rural areas have access to the off-grid technology like micro hydro, solar home system and biomass. Since, the electrical energy from the off-grid source is limited and it is mostly used for lighting, using television and mobile charging, it is very difficult to utilize that power for any further economic activities. In last decade, Nepal showed leapfrogging in terms of poverty alleviation, one of the main reasons is remittance.

Remittance contributes around 30% of the GDP, which is second highest among the countries having population more than 1 million (Cosic 2017). It has resulted growth in consumption and also in purchasing power of the households in the rural areas. Simultaneously, the energy sector has not revived itself according to the needs of the people. The energy needs of the households are increasing every day and limitation to the energy is considered as the barrier to the required standard of living. Therefore, it is urgent to upgrade the energy access and improve the electrical energy

availability, power supply quality and affordability to meet the modern energy demands.

The demand of energy and its access is dependent on various other factors like, household economy, household size, education, income, economic activities, gender etc. Therefore, it is important to know the relationship between these different factors and their effect on the energy demand. This thesis helps to learn about the connections between the different variables effecting energy consumption, estimate the energy need of the rural household, where the national grid is not available. In recent times, most of the research is focused on urban energy utilization, very less research has been done in terms of rural energy demand. With the aim to reach strand of middle income countries it is necessary to do energy planning for the rural households, so that they get access to sufficient modern energy supply.