Maslow's Hierarchy of Needs

- Maslow's hierarchy of needs is a motivational theory in psychology comprising a five-tier model of human needs, often depicted as hierarchical levels within a pyramid.
- Needs lower down in the hierarchy must be satisfied before individuals can attend to needs higher up.
- From the bottom of the hierarchy upwards, the needs are: physiological, safety, love and belonging, esteem, and self-actualization.

1. Physiological needs - these are biological requirements for human survival, e.g. air, food, drink, shelter, clothing, warmth, sex, sleep.

If these needs are not satisfied the human body cannot function optimally. Maslow considered physiological needs the most important as all the other needs become secondary until these needs are met.

2. Safety needs - protection from elements, security, order, law, stability, freedom from fear.

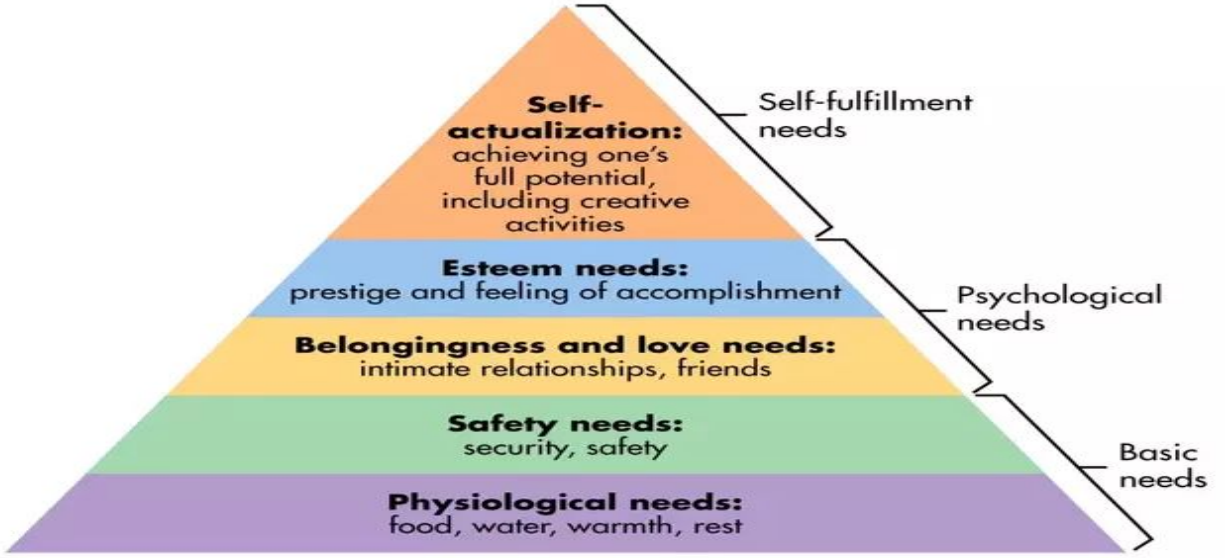
3. Love and belongingness needs - after physiological and safety needs have been fulfilled, the third level of human needs is social and involves feelings of belongingness. The need for interpersonal relationships motivates behaviour

Examples include friendship, intimacy, trust, and acceptance, receiving and giving affection and love. Affiliating, being part of a group (family, friends, work).

4. Esteem needs - which Maslow classified into two categories: (i) esteem for oneself (dignity, achievement, mastery, independence) and (ii) the desire for reputation or respect from others (e.g., status, prestige).

Maslow indicated that the need for respect or reputation is most important for children and adolescents and precedes real self-esteem or dignity.

5. Self-actualization needs - realizing personal potential, self-fulfillment, seeking personal growth and peak experiences. A desire “to become everything one is capable of becoming”



Energy and Needs

- Energy availability is key determinant of how and how much food is grown, how food is cooked, the health impacts of how food is cooked
- How living spaces are heated
- The time required to ‘procure’ household energy
- Due to insufficient energy:
    1. Long time of work to collect fuel wood
    2. Adverse health impacts eye and lungs problem because of the energy choices (indoor pollution)
- Energy is a prerequisite any form of development. The availability of energy ensures that basic human needs, such as food and shelter are fulfilled.
- Energy is deeply implicated in each of the economic, social and environmental dimensions of human development. Energy services provide an essential input to economic activity. They contribute to social development through education and public health, and help meet the basic human need for food and shelter.

- Modern energy services can improve the environment, for example by reducing the pollution caused by inefficient equipment and processes and by slowing deforestation. But rising energy use can also worsen pollution, and mismanagement of energy resources can harm ecosystems. The relationships between energy use and human development are extremely complex.
- Energy alone is not sufficient for creating the conditions for economic growth, but it is certainly necessary. It is impossible to operate a factory, run a shop, grow crops or deliver goods to consumers without using some form of energy. Most studies of the relationship between energy use and economic development have focused on how the latter affects the former. Economic growth almost always leads to increased energy use

Energy related to HDI

The Human Development Index (HDI) is a summary measure of average achievement in key dimensions of human development: a long and healthy life, being knowledgeable and have a decent standard of living. The Human Development Index (HDI) is a composite statistic of life expectancy, education, and per capita income indicators, which are used to rank countries into four tiers of human development. A country scores higher HDI when the lifespan is higher, the education level is higher, and the GDP per capita is higher. Energy consumption pattern in the world shows that as the world is more developed, the energy consumption has increased per person. For. Eg. A technological man of today's world uses more energy compared to the primitive man.

The relationship between Energy and HDI can be explained by considering the following factors which effects HDI:

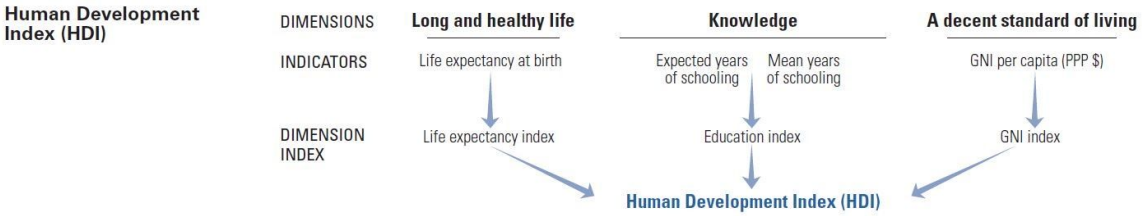
• **Life Expectancy:** High life expectancy means low infant mortality. It also implies high access to food, medicine, shelter, and education, and low levels of disease and violence. With development, people have better access to proper medical facilities, hospitals, medicines, health awareness programs, all of which requires energy. So, with increase in energy consumption directly means improved health facilities which results in greater life expectancy when compared with low energy consumption.

• **Education**: The mean number of years which a person spends in school is considered for calculating HDI. For increasing number of years which a person spends studying, proper educational facilities are required. More advanced educational facilities contributes to high energy consumption when compared to primitive of less advanced educational institutes.

• **Living Standards (Gross National Income)** The HDI is calculated on the basis of the gross national income of a country. High income of a country implies that the natural resources of the country is being properly utilized, the country has technological advancements, the country has

good trade and foreign investments. If a country is developed, it means more industries and facilities for technological advancement, all of which required energy. Also, if a country has surplus energy, it is more likely to attract foreign investments. Hence, energy directly influences the income of a country which indicates the living standards of the people.

- Life Expectancy: better resources available, refrigeration system to conserve medicines, lighting, heating systems, better hygiene
- Education: reduced drudgery (what else??)
- Income: employment opportunity (what else??)



- A long and healthy life: Life expectancy at birth
- Education index: Mean years of schooling and Expected years of schooling
- A decent standard of living: GNI per capita (PPP US$)

Rank		Country/territory	HDI	
2018 data (2019 report) rankings [13]	Change in rank from previous year[13]		2018 data (2019 report) rankings [13]	Change from previous year [13]
1	—	Norway	0.954	▲ 0.001
2	—	Switzerland	0.946	▲ 0.003
3	—	Ireland	0.942	▲ 0.003
4	—	Germany	0.939	▲ 0.001
4	▲ (2)	Hong Kong	0.939	▲ 0.003
6	▲ (1)	Iceland	0.938	▲ 0.003
6	▼ (1)	Australia	0.938	▲ 0.001
8	▼ (1)	Sweden	0.937	▲ 0.001
9	—	Singapore	0.935	▲ 0.001
10	—	Netherlands	0.933	▲ 0.001

Nepal's HDI value for 2018 is 0.579— which put the country in the medium human development category— positioning it at 147 out of 189 countries and territories.

ENERGY CONSUMPTION IN NEPAL

Electricity access	population without electricity: 3 million (2017) electrification - total population: 90.7% (2016) electrification - urban areas: 94.5% (2016) electrification - rural areas: 85.2% (2016)
Electricity - production	4.244 billion kWh (2016 est.)
Electricity - consumption	4.983 billion kWh (2016 est.)
Electricity - exports	2.69 million kWh (FY 2017 est.)
Electricity - imports	2.175 billion kWh (2016 est.)
Electricity - installed generating capacity	943,100 kW (2016 est.)
Electricity - from fossil fuels	5% of total installed capacity (2016 est.)
Electricity - from nuclear fuels	0% of total installed capacity (2017 est.)
Electricity - from hydroelectric plants	92% of total installed capacity (2017 est.)
Electricity - from other renewable sources	3% of total installed capacity (2017 est.)
Oil - production	0 bbl/day (2018 est.)

Nepal’s economic and social development is being hampered by its inadequate energy supply. The country does not have its own reserves of gas, coal or oil. Although its most significant energy resource is water, less than one percent of the potential 83,000 megawatts of hydropower is currently harnessed.
Firewood is the predominant energy carrier, counting for more than 70 percent of consumption. However, its use is inefficient and poses a threat to the country’s forests. At the same time, the indoor pollution caused by open hearths in homes presents a hazard to health. Mains electricity is generally only available in urban areas and some 30 percent of the population do not have access to it (CBS 2011).

The hydropower resources must be exploited in an environmentally sound manner. The energy generated should benefit small and micro businesses while improving the standard of living and the health of local people. It should contribute to the protection of forested areas and, by being fed into the national grid, should bring new revenue to the region.

In 2010, the electrification rate was only 53% (leaving 12.5 million people without electricity) and 76% depended on wood for cooking. In 2017, primary energy consumption for Nepal was 0.16 quadrillion btu. Nepal installed hydropower capacity is at 1,016 megawatts (MW), providing most of the country's grid-connected electricity generation.[12] The potential for economically viable hydropower in Nepal is estimated at 40,000 MW.

CURRENT ENERGY TREND

World total primary energy consumption by fuel in 2018

Coal (27%)
Natural Gas (24%)
Hydro (renewables) (7%)
Nuclear (4%)
Oil (34%)
Others (renewables) (4%)

Total primary energy supply of 13,972 mega-toe by source in 2017 (IEA, 2019)

Oil (32.0%)
Coal/peat/shale (27.1%)
Natural gas (22.2%)
Biofuels and waste (9.5%)
Hydro electricity (2.5%)
Others (renewables) (1.8%)
Nuclear (4.9%)

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

Forestry sector dominates Nepal's energy scenario as it supplies more than 80% of total energy demand in the 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 needs of rural people.

GLOBAL WARMING

A gradual increase in the overall temperature of the earth's atmosphere generally attributed to the greenhouse effect caused by increased levels of carbon dioxide, CFCs, and other pollutants.

CDM

The CDM allows emission-reduction projects in developing countries to earn certified emission reduction (CER) credits, each equivalent to one tonne of CO2. These CERs can be traded and sold, and used by industrialized countries to a meet a part of their emission reduction targets under the Kyoto Protocol.

The mechanism stimulates sustainable development and emission reductions, while giving industrialized countries some flexibility in how they meet their emission reduction limitation targets.The projects must qualify through a rigorous and public registration and issuance process designed to ensure real, measurable and verifiable emission reductions that are additional to what would have occurred without the projects.

The clean development mechanism (CDM) is a mechanism based on the provisions of Article 12 of the Kyoto Protocol. It is a scheme to support greenhouse gas (GHG) emission reduction through cooperation between developed countries (Annex I Parties to the United Nations Framework Convention on Climate Change (UNFCCC)), which are committed to certain GHG emission reduction targets under the Kyoto Protocol, and developing countries (non-Annex I Parties), which do not have any commitments to reduce GHG emissions.

Kyoto Protocol

The Kyoto Protocol is an international agreement linked to the United Nations Framework Convention on Climate Change. The major feature of the Kyoto Protocol is that it sets binding targets for 37 industrialized countries and the European community for reducing greenhouse gas (GHG) emissions .These amount to an average of five per cent against 1990 levels over the five-year period 2008-2012.

The purpose of the clean development mechanism

- to assist Parties not included in Annex I in achieving sustainable development and in contributing to the ultimate objective of the Convention, and
- to assist Parties included in Annex I in achieving compliance with their quantified emission limitation and reduction commitments under Article 3

Under the clean development mechanism:

- Parties not included in Annex I will benefit from project activities resulting in certified emission reductions; and

- Parties included in Annex I may use the certified emission reductions accruing from such project activities to contribute to compliance with part of their quantified emission limitation and reduction commitments under Article 3.
- Emission reductions resulting from each project activity shall be certified by operational entities to be designated by the Conference of the Parties serving as the meeting of the Parties to this Protocol, on the basis of:
    1. Voluntary participation approved by each Party involved;
    2. Real, measurable, and long-term benefits related to the mitigation of climate change; and
    3. Reductions in emissions that are additional to any that would occur in the absence of the certified project activity.
- The Conference of the Parties serving as the meeting of the Parties to this Protocol shall, at its first session, elaborate modalities and procedures with the objective of ensuring transparency, efficiency and accountability through independent auditing and verification of project activities.

Major Feature of Kyoto Protocol

- The major feature of the Kyoto Protocol is that it sets binding targets for 37 industrialized countries and the European community (Annex I Parties) for reducing greenhouse gas (GHG) emissions .
- These amount to an average of five per cent against 1990 levels over the five-year period 2008-2012.
- Committed target for reducing GHG emissions of major countries:
    – EU -8%
    – Japan, Canada -6%
    – Russia 0%

The purpose of the CDM is to assist in accomplishing the GHG reduction targets of Annex I Parties (investing countries) under the Kyoto Protocol, as well as to contribute to the sustainable development of non-Annex I Parties (host countries). Annex I Parties are able to acquire all or part of the credits (certified emission reductions: CERs) resulting from the projects. Non-Annex I Parties will benefit (economically, socially, environmentally, and technologically) from CDM projects.

CONVENTIONAL & NON CONVENTIONAL RESOURCE

Conventional sources of energy:

Conventional sources of energy are the natural energy resources which are present in a limited quantity and are being used for a long time. They are called non-renewable sources as once they are depleted, they cannot be generated at the speed which can sustain its consumption rate. They are formed from decaying matter over hundreds of millions of years.

These resources have been depleted to a great extent due to their continuous exploitation. It is believed that the deposits of petroleum in our country will be exhausted within few decades and

the coal reserves can last for a hundred more years. Some common examples of conventional sources of energy include coal, petroleum, natural gas and electricity.

Non-conventional sources of energy:

Non-conventional sources of energy are the energy sources which are continuously replenished by natural processes. These cannot be exhausted easily, can be generated constantly so can be used again and again, e.g. solar energy, wind energy, tidal energy, biomass energy and geothermal energy etc. The energy obtained from non-conventional sources is known as non-conventional energy. These sources do not pollute the environment and do not require heavy expenditure. They are called renewable resources as they can be replaced through natural processes at a rate equal to or greater than the rate at which they are consumed.

Conventional sources of energy	Non-conventional sources of energy
These sources of energy are not abundant, present in limited quantity, e.g. coal, petroleum, natural gas.	These sources of energy are abundant in nature, e.g. solar energy, wind energy, tidal energy, biogas from biomass etc.
They have been in use for a long time.	They are yet in development phase over the past few years.
They are not replenished continuously. They are formed over a million years.	They are replenished continuously by natural processes.
They are called non-renewable sources of energy.	They are called renewable sources of energy.
They can be exhausted completely due to over-consumption except for hydel power.	They cannot be exhausted completely.
They pollute the environment by emitting harmful gases and also contribute to global warming.	They are environment-friendly, do not pollute the environment.
They are commonly used for industrial and commercial purposes.	They are used commonly used for household purposes.
Heavy expenditure is involved in using and maintaining these sources of energy.	Using these sources is less expensive.
They are used extensively, at a higher rate than the non-conventional sources.	They are not used as extensively as conventional sources.

Fossil fuel, any of a class of hydrocarbon-containing materials of biological origin occurring within Earth’s crust that can be used as a source of energy.Fossil fuels are hydrocarbons,

primarily coal, fuel oil or natural gas, formed from the remains of dead plants and animals. In common dialogue, the term fossil fuel also includes hydrocarbon-containing natural resources that are not derived from animal or plant sources. Fossil fuels include coal, petroleum, natural gas, oil shales, bitumens, tar sands, and heavy oils.

Nuclear energy is energy in the nucleus (core) of an atom. Atoms are tiny particles that make up every object in the universe. There is enormous energy in the bonds that hold atoms together. Nuclear energy can be used to make electricity. But first the energy must be released. It can be released from atoms in two ways: nuclear fusion and nuclear fission. In nuclear fusion, energy is released when atoms are combined or fused together to form a larger atom. This is how the sun produces energy. In nuclear fission, atoms are split apart to form smaller atoms, releasing energy. Nuclear power plants use nuclear fission to produce electricity.