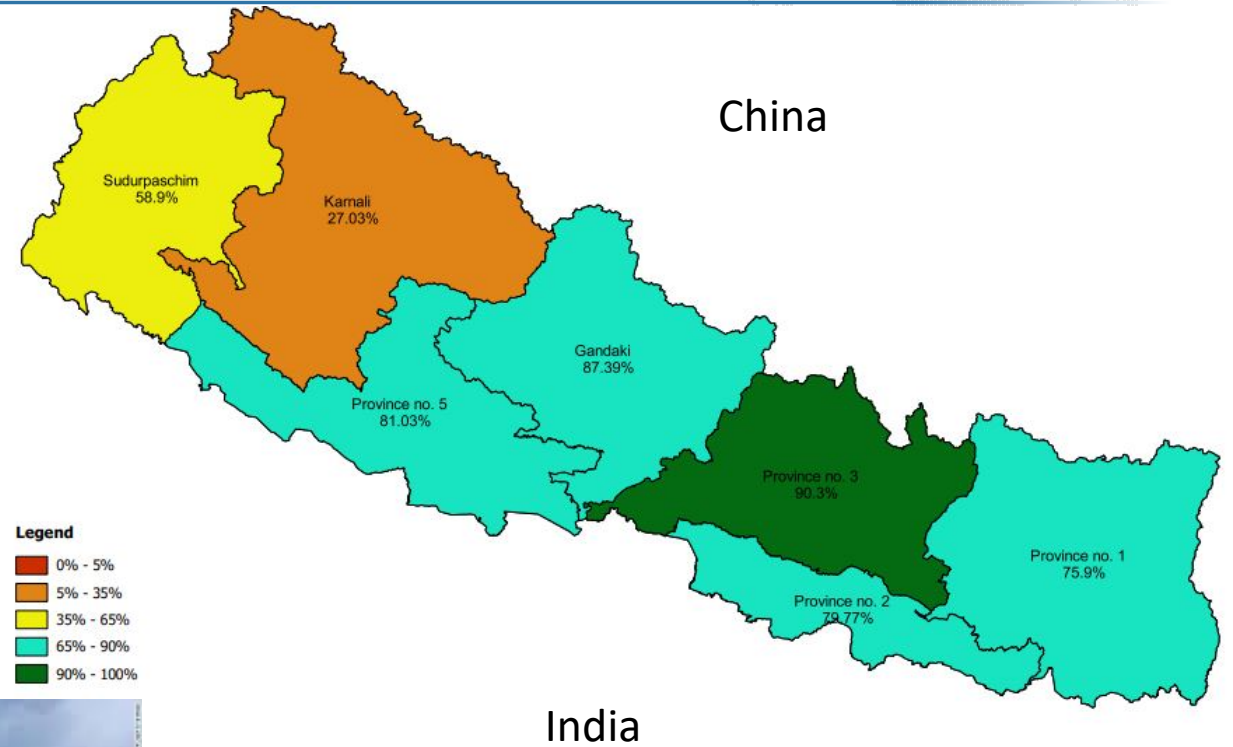


ENERGY SITUATION IN NEPAL



INTRODUCTION-NEPAL

- Capital : Kathmandu
- Location : $28^{\circ}10' \text{ N}$, $84^{\circ}15' \text{ E}$
- Area : $147,181 \text{ km}^2$
- Water : 2.8%



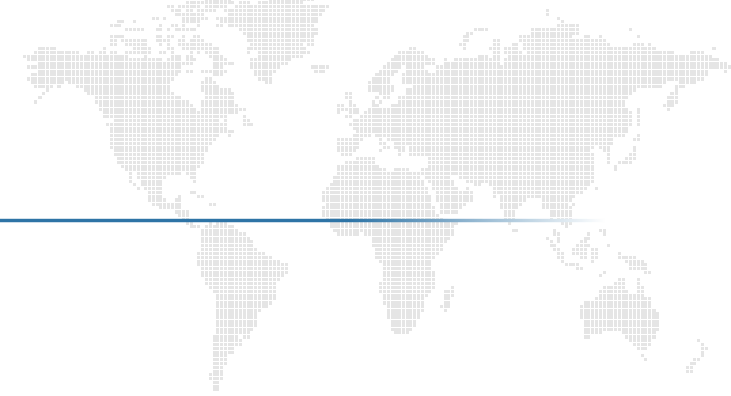
Top of the World
Mount Everest: 8848m



INTRODUCTION

- The major energy resource base in Nepal consists of biomass, hydroelectricity, petroleum products, natural gas, and coal.
- The country does not have its own reserves of gas or oil.
- Country has huge potential of hydropower, but less than two percent of the potential 83,000 MW of hydropower is currently harnessed.
- 42,000MW is feasible with no environmental hazards.
- First hydropower was built in 1911. Current generation around 1300 MW.
- 78% of people have access to grid connected energy
- However, 82% of the population use solid fuels such as coal, dung and wood as cooking energy.

INTRODUCTION



- Peak load is 1,160 MW as on July 2019.
- Per capita energy consumption 245 kWh and expected to be 1500 kWh in next 5 years.
- Economic Growth is expected to reach 6.5 per cent in FY 2018/19
- Last year Nepal spent almost 20 billion importing electricity from India, on top of the Rs 90 billion in petroleum.
- Nepal's economic and social development is being hampered by its inadequate energy supply.

ACCESS TO ENERGY IN NEPAL

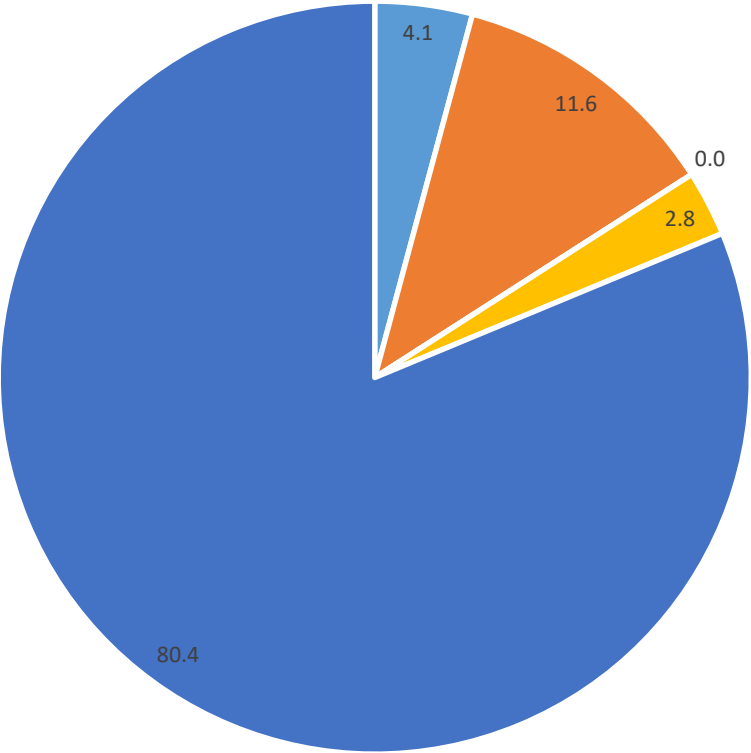
LOAD-SHEDDING

- Nepalese endured a crippling power shortage for a decade (2006-2016). In 2014 winter, Nepalese were enduring 14 hours of power outage every day.
- However, NEA has officially announced elimination of Load shedding in Nepal from May, 2018.



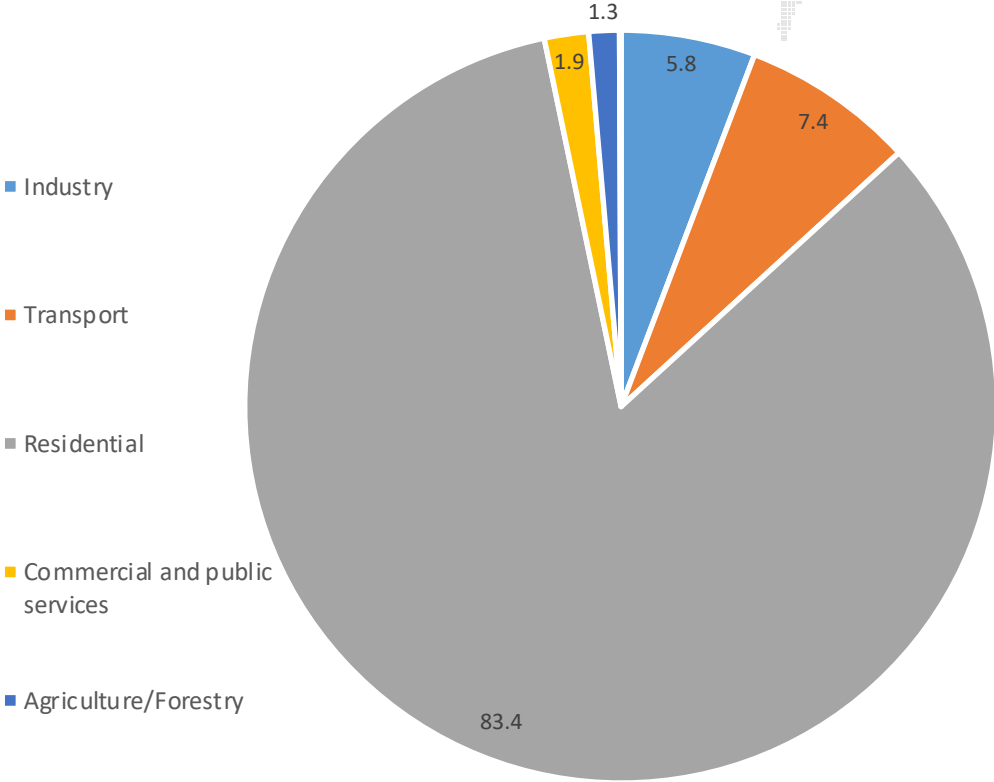
ENERGY MIX IN NEPAL

Primary Energy Supply Mix



■ Coal ■ Oil products ■ Natural Gas ■ Hydro ■ Biomass

Final Energy Consumption Mix



■ Industry
■ Transport
■ Residential
■ Commercial and public services
■ Agriculture/Forestry

Source: Nepal Energy Sector Assessment, Strategy and Road Map, ADB, 2017

STATUS OF RENEWABLE ENERGY



1.Solar

- Nepal has 300 days of sunshine annually.
- 0.10 MW energy is joined in the Main Grid of NEA
- Nepal has largest market of solar heaters for house hold consumption.
- DoED has approved survey licenses for 21 locations with combined capacity of 317.14 MW.

2.Biogas

- Biomass comprises wood, agricultural residues and dung
- 95 % of the biomass is predominantly and traditionally used for households purpose.
- The estimated wood consumption is about 17 million tons per year
- 40 % of the firewood comes from the sustainable supply

3.Fossil Fuel

- Petroleum is the second largest energy fuel in Nepal after firewood.
- It is 8% of primary energy consumption in Nepal.
- All the fossil fuels are imported from India and no any production in Nepal.
- Coal stands for 2 % of the total energy consumption.
- Mainly coal is used by industries for heating & boiling process.

STATUS OF RENEWABLE ENERGY IN NEPAL

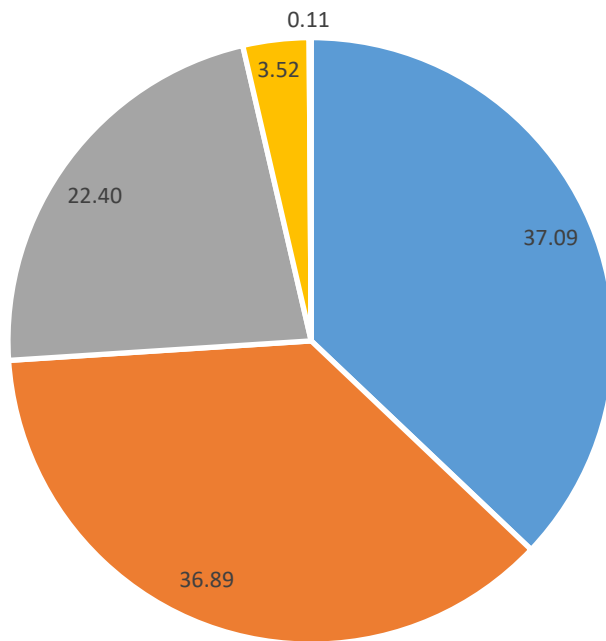
4. Hydropower

S. No.	Particular	Capacity (MW)
1.	Major Hydro(NEA)-Grid Connected	559.50
2.	Total Small Hydro(NEA)-Isolated	4.50
	Total Hydro (NEA) (A)	564.0
3.	Total Hydro(IPP)(B)	560.0
	Total Hydro Installed Capacity (A+B)	1,123.92
4.	Under Construction Hydropower	1,017.10
5.	Planned and Proposed	2,920.20

Note: Except for 92MW Kulekhani Reservoir Project all other are ROR.

SECTORIAL CONTRIBUTION IN NATIONAL ELECTRICITY GRID IN NEPAL

Present Energy Status 2019

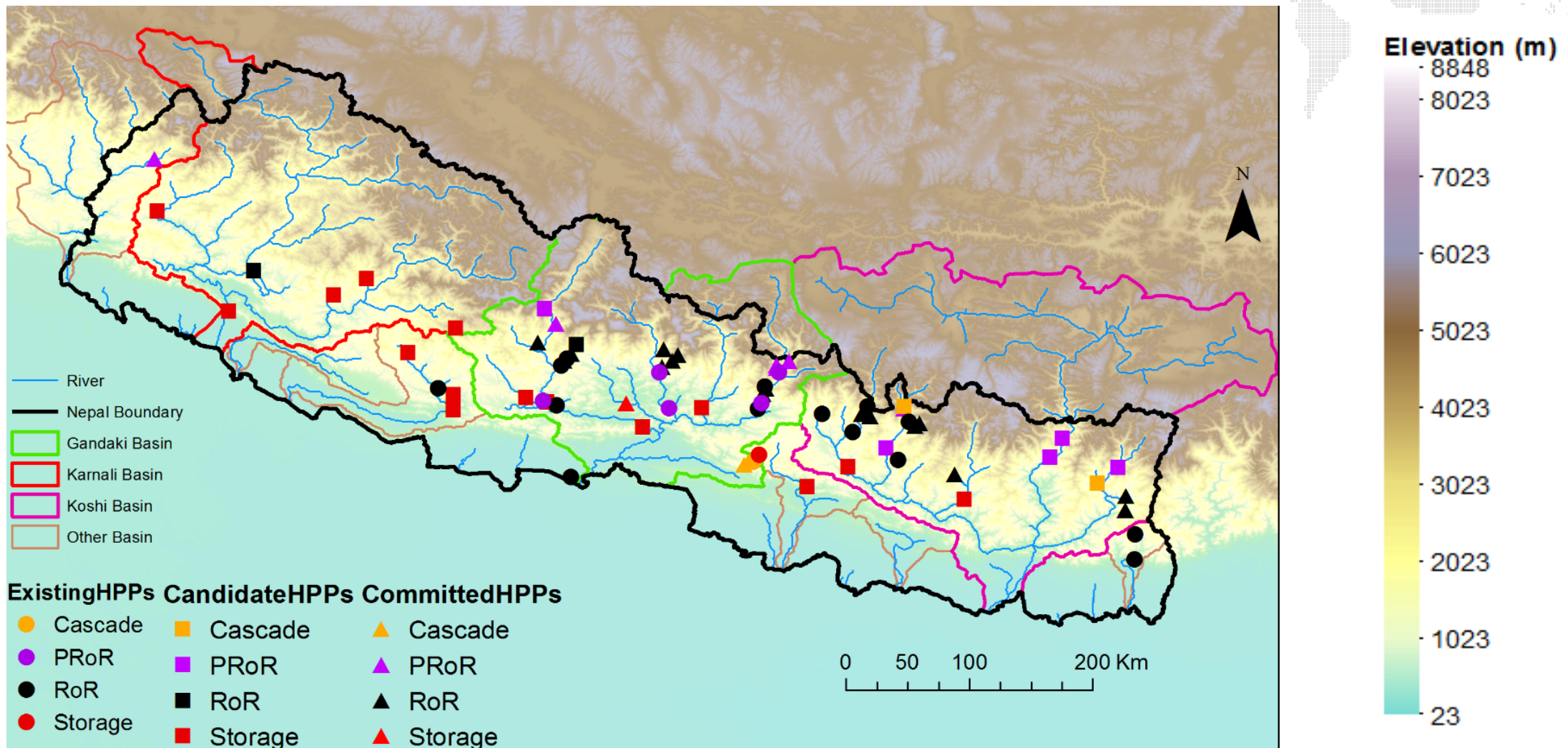


■ Hydro (NEA) ■ Hydro (IPP) ■ Hydro (import) ■ Diesel ■ Solar

Source	No. of Projects	Capacity (MW)
Hydro NEA	16	563
Hydro IPP	62	560
Diesel	2	53.4
Solar	2	1.68
Import from India		340

Source: NEA Annual Report, 2019

MAJOR RIVER AND MAJOR HYDROPOWER PROJECTS IN NEPAL



MAJOR UPCOMING PROJECTS

SNo.	Project	Capacity (MW)	Status
1.	Upper Tamakoshi Hydroelectric Project	456	Expected to be commissioned in FY 2019
2.	Tanahu Hydropower Project	140	Expected to be commissioned by the end of 2024
3.	Upper Arun Hydroelectric Project	1160	Detailed engineering design will be completed by February 2020
4.	Dudhkoshi Storage Hydroelectric Project	635	Detailed engineering design will be completed by November 2019

All together, DoED has approved generation license for 709 projects. And the total capacity is 7952 MW

LEGAL FRAMEWORK

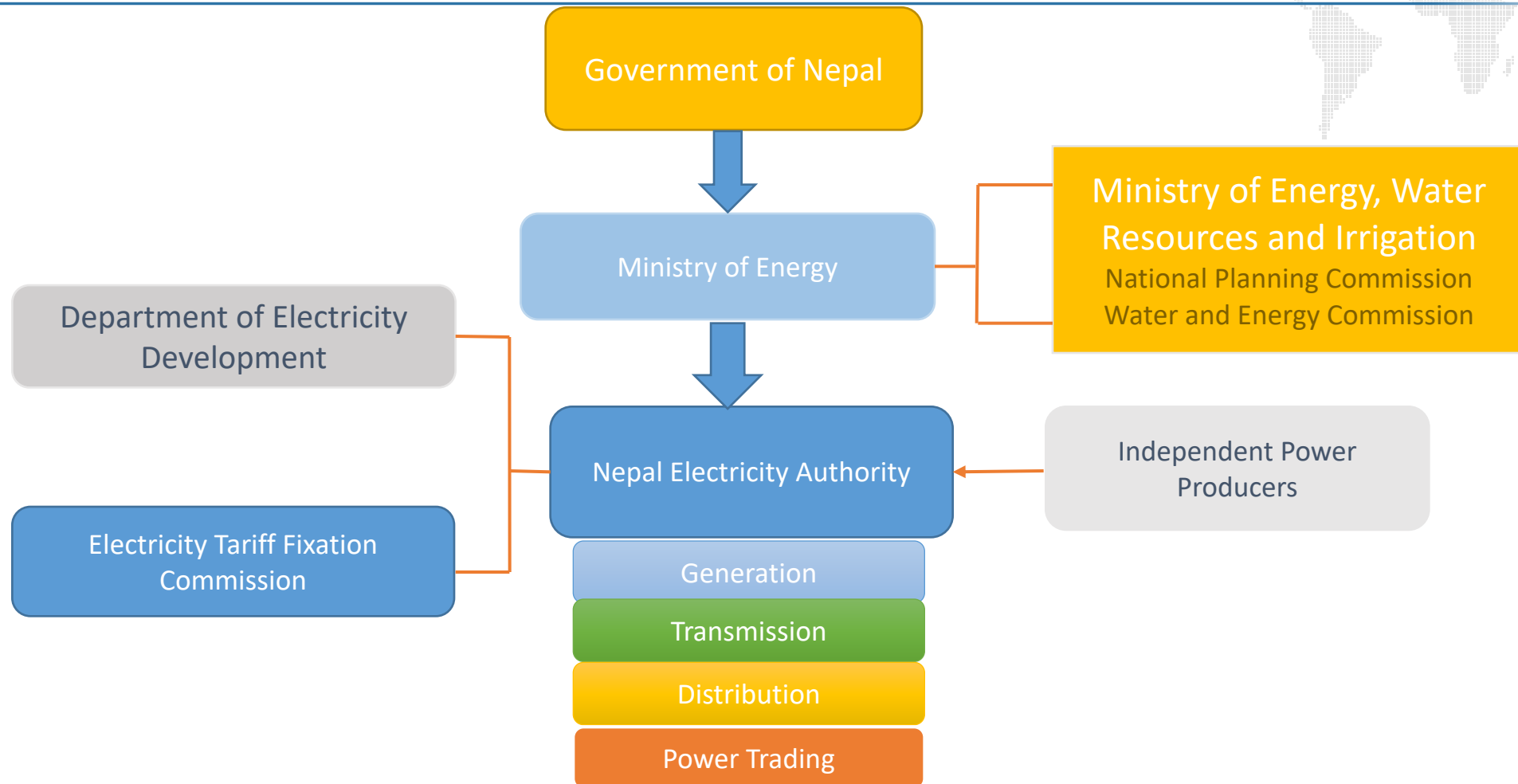
Existing Policy:

- Hydropower Development Policy 2001
- National Water Plan, 2005
- Electricity Act, 1992
- Electricity Regulation, 1993
- Electricity Tariff Fixation Rules, 1994
- Electricity Theft Control Act, 2002
- Electricity Act (New)
- Nepal Electricity Regulator Commission Act

Planning Requirements:

- Basin wise planning and development
- Major focus on reservoir and PRoR
- Market export policy
- Power Purchase module
- Upgrading and strengthening of transmission line, distribution system etc
- Project delivery model (Bid build, Design Build & PPP)

INSTITUTIONAL SETUP IN ENERGY SECTOR



FINANCIAL INCENTIVES FOR HYDROPOWER PROJECTS

- Tax Holiday

Tax Rate	
1-10 Years (to the project commissioned before 2023 AD)	0%
10-15 Years (to the project commissioned before 2023 AD) (50% tax holiday	10%

- Concession (License) Period

The hydropower project are developed under BOOT model and provided the concession period (including construction duration) is 35 years from the date of issuance of generation license.

FINANCIAL INCENTIVE

- Fixed Power Purchase Agreement:
- Wet Season: Rs. 4.80/KW
- Dry Season: Rs 8.40/KW
- Annual Increment of 3% for the first eight years
- Commercial Banks to lend 15% of its loan portfolio into hydropower and Tourism sector
- For the projects commencing during the crisis period, NPR 1.0 mil/ MW to be subsidized by the government on the VAT for the import of construction materials like iron, cement, etc.
- Refinancing facility to be provided by Nepal Rastra Bank in hydropower sector.
- Nepal Investment Board has been set up as one window to handle all big projects and FDIs.

MAJOR CHALLENGES AND PROBLEMS

- Lack of mobilization of credit and high dependence on subsidy is hampering the expected promotion of RETs.
- Lack of reliable hydrology data
- Verification, monitoring and quality assurance, and testing against standards incur large financial costs and delays that needs to be streamlined
- Limited capacity for power evacuation i.e. substations and transmission lines
- Have not been able to attract much FDIs due to political instability, Country Risk and Hedging risk.

ENVIRONMENTAL AND SOCIAL CHALLENGES



Environmental Challenges

- Big hydropower projects like Kaligandaki (144MW) have severe problems of landslides and sedimentation.
- Damages aquatic life: Impoundment, degradation of the flora and fauna, and water logging change in ecosystem
- Deforestation

Social Challenges

- High demand from public
- Deed transfer issues
- Rehabilitation: In some hydropower projects, some population has been displaced, so comprehensive resettlement and rehabilitation plans must be developed and implemented in consultation with the people affected
- Cultural Issues: Adjustment issues, coping with new environment is difficult

CLIMATE CHANGE VULNERABILITY

- Shifting of seasonal calendar (monsoon)
- Flash flood: Sedimentation problems
- Erratic rainfall: high flood, low discharge
- Snowfed River: Run-off the River Projects
- Glacier Lake Outburst Flood



Bhotekoshi Hydropower Dam on June 2016

Source: Urja News

CONCLUSION

- Nepal is blessed with vast natural energy resources however their fruitful utilization for the well being of its growing population is lagging behind due to the economic, geographical and techno political conditions.
- The potential could not be achieved due to political instability, inability to attract FDIs and delay in project execution over the last decade.
- However now with political stability (majority government), adequate experience and FDIs , Reservoir projects being developed and cross border transmission line completed (Dhalkebar-Muzzafarpur line) already connected Nepal can utilize its huge potential in hydropower to propel its economic growth towards a Developing Country (from LDCS) and be a regional player in fulfilling the energy demand in South Asia.

THANK YOU



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