



Country Report Presentation: Overview of Energy sector in Nepal

Presented by:

Nar Bahadur Budha

Officer, GoN

Ministry of Energy, Water Resources and Irrigation, Nepal



Outlines

- Overview of Nepal
- Hydro Electricity in Nepal
- Acts/Policy/Guidelines
- Authorities for Hydropower Development
- Guideline and Action Plan
- Energy Status
- Opportunities
- Challenges
- Conclusion



Overview of Nepal



Land Lock Country surrounded by India on three side and by China on one Side.

Land Area: 147,181 sq.km

Population: Around 29 million

Religion: **Secular State**

Hindu (81.3%), Buddhist (9%), Muslim (4.4%), Christian (1.42%), etc.

Language: Around 123 Spoken language, Nepali as official language

Climate: **5 Climatic Zone** (Tropical & Sub-Tropical, Temperate, Cold, Subarctic and Arctic)

Cold climate in Mountain and Tropical in Tarai Region

Temperature: -30 degree Celsius in the Mountain to 45 degree Celsius in Terai

Political System: Federal Democratic Republic

Capital: Kathmandu



Energy Sector of Nepal

Authorities for Hydropower Development

- Ministry of Energy, Water Resources and Irrigation (MoEWRI)
- Department of Electricity Development (DoED)
- Investment Board Nepal (IBN)
- Hydropower Investment Development Company Limited (HIDCL)
- Nepal Electricity Authority (NEA)
- Rashtriya Prasaran Grid Company Limited (RPGCL)
- Vidhyut Utpadan Company Limited (VUCL)

Other Regulating Authorities:

- Ministry of Forests and Environment
- Ministry of Federal Affairs and General Administration



Hydro Electricity in Nepal



- First Hydropower in Nepal: **1911 AD, Pharping HEP**
- Capacity: **500 kW**)
- To feed electricity to Singhadurbar (Royal Rana Palace).

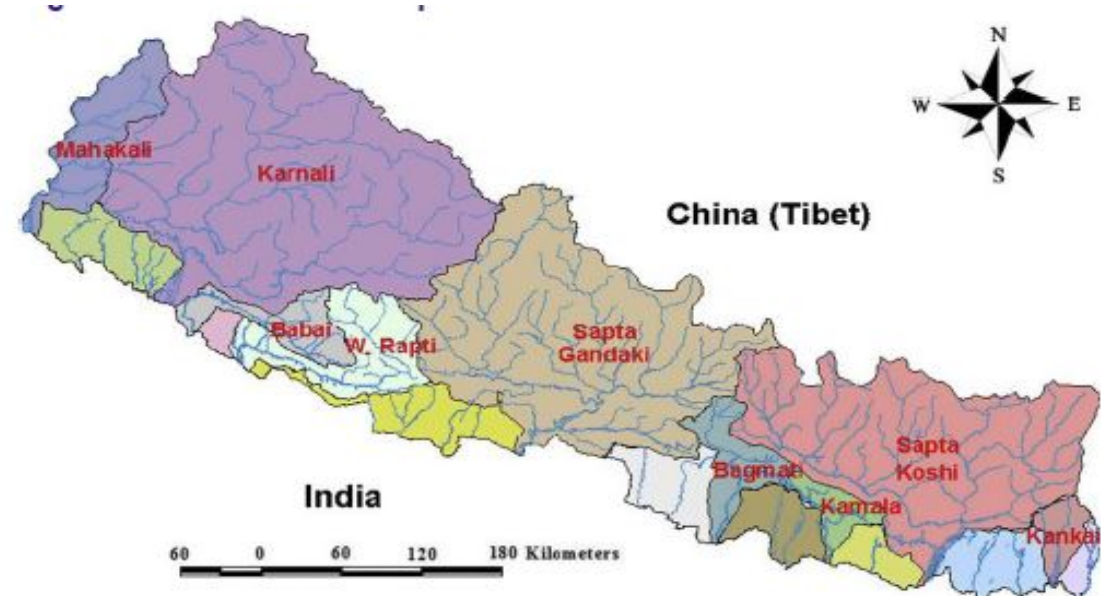




Hydro Electricity in Nepal

- Theoretical Potential: **83,000 MW**
- Technically Feasible: 43,000 MW
- Economically Feasible: **42,000 MW**
- Electrification Ratio: 90% (NEA 72% +AEPC18%)

Basin	Theoretical Potential (GW)			Economic Potential (GW)
	Major rivers	Small rivers	Total	
Koshi	19	4	23	11
Gandaki	18	3	21	5
Karnali and Mahakali	32	3	35	25
Others	3	1	4	1
Total	72	11	83	42





Acts/Policies/Guidelines

- **Main Legislation Governing Hydropower**

- Water Resources Act 1992 & Regulation 1993

- Use of water for hydropower shall have priority over the use of water for cottage industries, navigation and recreation but not over the use of water for drinking and domestic use, irrigation or agriculture

- Electricity Act 1992 & Regulation 1993

- Deal with management of electricity in Nepal, including the survey, generation and distribution of electricity
- Regulates the electricity sector by a system of licensing



Acts/Policies/Guidelines

- Hydropower Development Policy 2001
 - Objectives of HP-2001
 - Generate electricity at low cost;
 - Provide reliable and quality electricity at a reasonable price;
 - Combine electrification with the economic activities;
 - Extend rural electrification; and
 - Develop hydropower as an export commodity
 - Key Policy Provisions (HP-2001)
 - BOOT model
 - In case of multipurpose projects, GoN may participate
 - Environment- **10% d/s release (min)**
 - Facilitate property acquisition



Acts/Policies/Guidelines

- Hydropower Development Policy 2001
 - Terms of License
 - **Survey License for 5 years**
 - Generation License
 - **Internal consumption 35 years**
 - **Export Oriented 30 years**
 - In case of reservoir 5 years extension on the basis of construction period
- Other Important aspects of policy
 - Transfer of Projects
 - *Every hydropower project has to be transferred to the government, free of costs, after the completion of license period*



Other Relevant Legislation

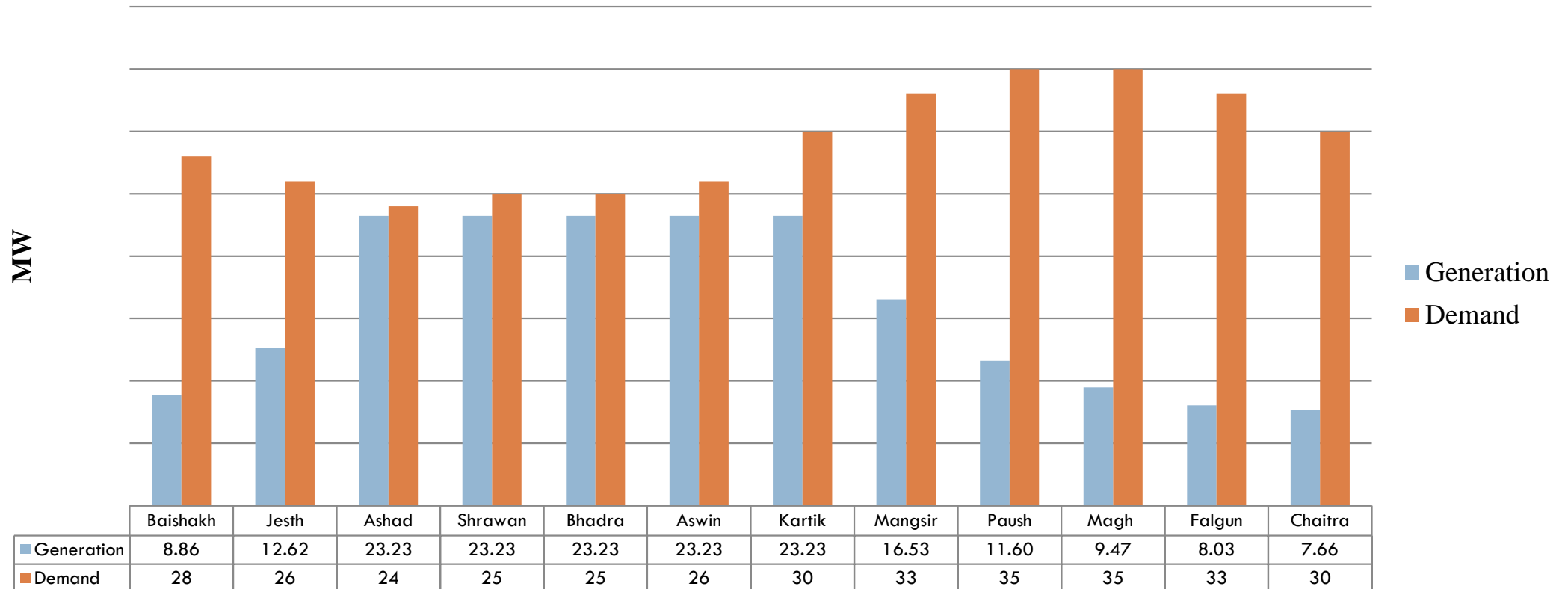
- Environment Protection Act, 1996 (2053 B.S.)
- Forest Act, 1993 (2049 B.S.)
- National Parks and Wildlife Conservation Act, 1973 (2029 B.S.)
- Foreign Investment and Technology Transfer Act, 1992 (2049 B.S.)
- Local Self-Governance Act, 1999 (2055 B.S.)
- Industrial Enterprises Act, 1992 (2049 B.S.)
- Land Acquisition Act, 1977 (2034 B.S.)



Status Contd...

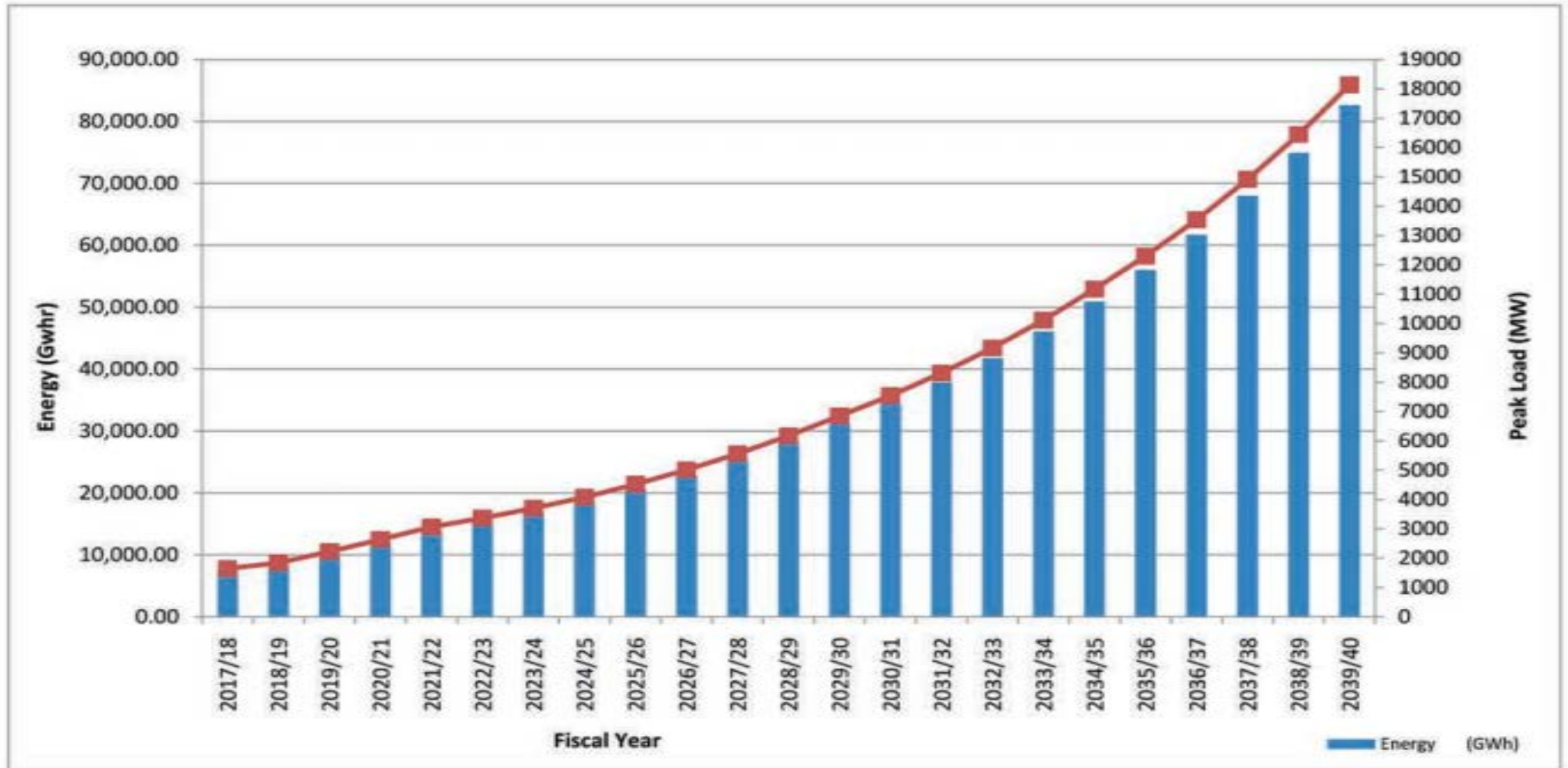
Pattern of Seasonal Variation in Demand (Load) and Generation

Demand Vs. Generation Curve





Load Forecast





Major Hydropower station

- Major Hydropower Under Operation

S.No	Power Plants	Capacity(kW)
1	Kaligandaki A	144,000
2	Middle Marsyangdi	70,000
3	Marsyangdi	69,000
4	Trishuli	24,000
5	Sunkoshi	10,050
6	Gandak	15,000
7	Kulekhani I	60,000
8	Devighat	14,100
9	Kulekhani II	32,000
10	Puwa Khola	6,200
11	Modi Khola	14,800
12	Chameliya	30,000
Sub Total		489,150

Other power plant under NEA

S.No	Thermal Power Plants	Capacity(KW)
1	Duhabi Multifuel	39,000
2	Hetauda Diesel	14,410
Total		53,410
Solar Power Plants		
1	Simikot	50
2	Gamgadhi	50
Total		100

*NEA: Nepal Electricity Authority

**Data based on Fiscal year 2015/16



Major Hydropower station

- Generation status

Total Major Hydro(NEA)-Grid Connected	503,394
Total Small Hydro(NEA)-Isolated	4,536
Total Hydro(NEA)	507,930
Total Hydro(IPP)	512695.4
Total Hydro(Nepal)	1,020,625
Total Thermal(NEA)	53,410
Total Sola(NEA)	100
Total Installed Capacity	1,074,135
Total installed Capacity(NEA & IPP)-Grid	1,069,499

*NEA: Nepal Electricity Authority

**Data based on Fiscal year 2015/16



Major Hydropower Under Construction

- Under NEA

Under Construction		Capacity(kW)
1	Upper Tamakoshi Hydropower Project	456,000
2	Tanahu Hydropower Project	140,000
3	Kulekhani III HEP	14,000
4	Upper Trishuli 3A HEP	60,000
5	Rahuganga HEP	40,000
6	Upper Sanjen	14,600
7	Sanjen	42,500
8	Rasuwagadi	111,000
9	Madhya Bhotekoshi	102,000
1	Upper Trishuli 3B	37,000
Total		1,017,100



Major Hydropower Planned

Planned and Proposed		Capacity
1	Upper Arun HEP	335,000
2	Upper Modi A HEP	42,000
3	Upper Modi HEP	18,200
4	DudhKoshi Storage HEP	300,000
5	Tamor Storage HEP	762,000
6	Uttar Ganga Storage HEP	828,000
7	Tamakoshi V HEP	95,000
8	Aadhikhola Storage HEP	180,000
9	Chainpur Seti HEP	210,000
10	Begnas Rupa Pump Storage HEP	150,000
Total		2,920,200



Hydropower Projects with FDI

- Khimti 60 MW (Operation)
 - Owner: Butwal Power Company Limited
 - Construction period 1996-2000
 - License for generation for 50 years (Electricity Act 1992)

- Upper Bhoite Koshi Hydroelectric Project (45MW) (operation)
 - Owners: Originally majority share of Panda Energy
 - Construction period: 1997-2001
 - 40-year license to build, own, operate and transfer

- Upper Trishuli I (216 MW) (Under construction)
- Kabeli A (37 MW) (Under Construction)
- Upper Marsyangadi-A (50 MW) (Operation)
- Arun III - (900MW) Under Construction
- Upper Karnali- (900MW) Planned
- Sky Solar Power –(600MW) In licencing process
- Dolma Foundatin Solar power –(295MW) Planned.



Guideline and Action Plans

- ❑ Action plan and concept paper for Energy Emergency Eradication decade , 2016 has paved the ways for FDI entrance in Nepal
 - **Government Guarantees for development**
 - **Foreign Currency denominated PPAs (up to Loan Repayment of 10 years)**
 - **PPAs based on Take or Pay basis, etc**
- ❑ Government has announced the period of 2075-2085 (2019-2029) as a energy and water resources decade under which following target has been fixed for HP development
 - ❖ 3000 MW in 3 Years
 - ❖ 5000 MW in 5 Years
 - ❖ 15,000 MW in 10 Years
- ❑ Government has recently launched program “**Janta ko Jalwidhyut Karyakram**” to develop around **3500 MW hydropower projects from people’s investment**
- ❑ Planning for Institutional reform
 - **Functional Unbundling of NEA**



Challenges

- During Planning & Design
 - Posted rates (Feed in tariff)
 - Lack of Technical manpower & resources
 - Lack of hydrological data
 - Lack of one window policy
 - Numbers of protected areas
- During Construction
 - Transmission Lines
 - Land Compensation issue
 - Social and political instability
- During Operation
 - Sediment Related Problems
 - Climate change
 - Project hand over



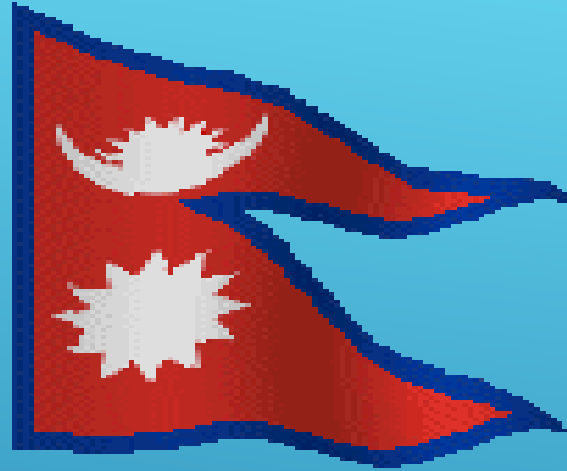
Opportunity

- Snow capped Himalayas are Water Towers
- 6,000 rivers including rivulets and tributaries
- The potential is estimated at 83,000 MW, of which nearly half i.e. 43,000 MW is considered to be technically and economically viable, out of which only 2% of is generated yet.
- Export possibility of power to India, china & Bangladesh
- Lots of projects under FDI Project Finance Modality are coming.
- Hydropower is main potential for Nepal and may be battery storage for SAARC and BIMSTEC.



Conclusion

- Hydropower development can uplift the living standard
- The SHP, which is both environment friendly and easy to construct, operate and maintain, should be developed rapidly
- Hydropower development can help to meet the peak demand within Nepal and India. Thermal plants are suitable to meet the base load.
- Nepalese experience shows that the success of any given project is dependent on the involvement of local community right from the planning stage.
- Development of hydropower can bring industrial growth thereby raising the overall economy of the country.
- Common public should be made aware of the positive impact that hydropower can bring to them.
- Functional un-bundling of NEA



Thank You!!!

