



Country Update on Coordination of Policies, Legal and Regulatory Frameworks for Cross Border Electricity Trade

Presented by:

Mr. Babu Raj Adhikari

Senior Divisional Engineer

Ministry of Energy, Water Resources and Irrigation, Nepal



Outlines



- Latest Information on policy, plan and projects
- Power Status in Nepal
- Existing and Planned Transmission Lines
- Way Forward



Latest information on policy, plan and project



- Electricity Regulatory Commission (ERC) is functional now after the approval of ERC, Act 2018.
- National Water Resources Policy, 2020 has been approved by the Government of Nepal.
- The new bill of Electricity Act is in the process for the approval.
- The Five Year Periodic Plan has made the target of 100% population will have the access to electricity from national grid till 2023.



Latest information on policy, plan and project....



- JV Company has been formed for the construction of Butwal (Nepal)- Gorakhpur (India) 400 kV Transmission Line (the second Nepal-India cross-border transmission line). Tender for the Indian as well as Nepal Portion is floated and under evaluation.
- Bilateral cooperation with India, China and Bangladesh are in place. Agreements and several meetings are being conducted.
- Ministry of Energy, Water Resources and Irrigation is preparing the Guidelines on Cross Border Electricity Trade.



Initiation of Synchronous operation between Nepal and India Grid



- Dhalkebar (Nepal)-Mujaffarpur (India), the first Nepal-India cross-border transmission line is charged at 400 kV voltage level which will be helpful in connecting with the regional grid of South-Asia.
- For Synchronous Operation of Central Nepal Grid with India Grid, installation of Special Protection Scheme(SPS) in Nepal side has been installed and in the final stage of commissioning and robust communication system would be established .



Transmission Network and Sound Power Trading Mechanism



- Nepal, Bhutan, Bangladesh and India have diverse energy resources. Nepal and Bhutan have hydro resources far in excess of their internal demand while India and Bangladesh have huge power demand.
- Supply and Demand complementarities between the countries in particular when hydro is abundant in Nepal and Bhutan, demand in India and Bangladesh is observed to be high.
- Exists prospects for sharing of energy resources by having interconnections of grid among these countries.



Transmission Network and Sound Power Trading Mechanism....



- Transmission connectivity is vital and minimum requirement for sharing the resources. Some initiatives have already been taken at various levels for the grid connectivity but that is required to be pursued at extended manner in the coming days.
- India- Nepal, India-Bhutan, and India-Bangladesh already connected to some extent and there exists some trading/power exchange mechanism.
- Need to work toward the connectivity beyond the border countries e.g. Nepal-Bangladesh or Nepal-Bhutan or Bhutan-Bangladesh for the effective and optimal utilization of resources.

Power status in Nepal

- ✓ Peak Demand: 1830 MW
- ✓ Installed Capacity: 2800 MW
- ✓ Total Energy demand : 11547 GWh
- ✓ Total Energy Import : 1854 GWh
- ✓ Total Energy Export:1333 GWh
- ✓ Per Capita Electricity Consumption: 360 KWh
- ✓ Access to Electricity: 92.51%
- ✓ System Loss: 14%
- ✓ Economic Hydropower Potential: 42.3 GW



License Status of Generation Projects



License Type	No. of Projects	Capacity (MW)
Survey License	263	17040
Generation License	236	8416
Application for Generation License	33	2837
Operational Projects	98	2773
TOTAL	630	31166



Cross Border Energy Trade: Status



- India and Nepal has principally agreed to export 10, 000 MW in 10 Year
- NEA has signed term agreements with NVVN and PTC on annual basis. Exporting 110 MW
- NEA started to import power up to 350 MW and export up to 522 MW from IEX (DAM).
- Nepal has requested India for tripartite meeting among Nepal, India and Bangladesh for power trade agreement but it has not taken place yet
- Export of 40 MW from Nepal to Bangladesh is in Final stage



Existing Cross Border Links and Quantum of Power



Interconnection Points	Voltage Level (kV)	Import Power Capacity (MW)
Dhalkebar Muzzafarpur	400	800
Kataiya – Kusaha	132	120
Kataiya – Kusaha II	132	85
Raxaul-Parwanipur	132	90
Ramnagar-Gandak	132	65
Tanakpur-Mahendranagar	132	75
33 kV and 11 kV other import	33 & 11	45
	Total	1280

Existing Transmission Line Length

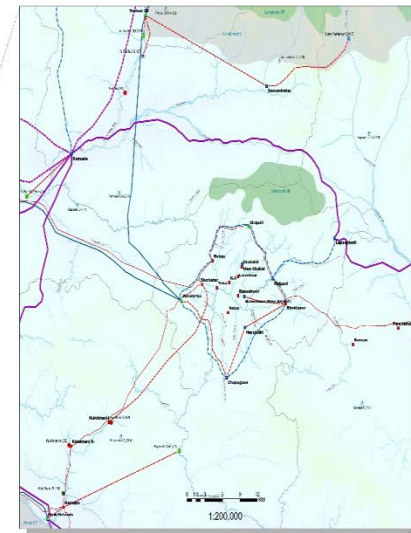
S.N.	FY	Circuit km				Total	Total Increment (ckt. Km)
		66 kV	132 kV	220 kV	400 kV		
1	2071/072	494	2130			2624	
2	2072/073	494	2417			2911	287
3	2073/074	494	2596	75	78	3243	332
4	2074/075	514	2717	75	78	3384	141
5	2075/076	514	3142.5	255	78	3989.50	606
6	2076/077	514	3240	437	78	4269	279.50
7	2077/078	514	3540.54	741.20	78	4874	604.74
8	2078/079	514	3816.54	896.60	102.00	5329	455.40
Total Increment in Eight Years							2705.44

Existing Substation Capacity

S.No	Voltage Rating (kV)	Total Capacity FY 077-78 (MVA)	Total Capacity FY 078-79 (MVA)	Total Increment (MVA)
1	400/220	945	945	0
2	220/132	1150	1350	200
3	132/66	635.40	610.40	-25
4	132/33	2082.00	2487.00	405
5	132/11	462.50	470.00	7.5
6	66/33	42.50	52.50	10
7	66/11	596.50	608.50	12
8	33/11	520.0	625.2	105.2
	Total	6433.90	7148.60	714.7

Nepal Power Transmission Network Map

400 kV Transmission Line Between Nepal and India



Bareilly

Lucknow

Gorakhpur

Muzaffarpur

Purnea

LEGEND

NEPAL HYDROPOWER PLANTS

- CONSTRUCTION LICENSE APPLICATION
- SURVEY LICENSE APPLICATION
- CONSTRUCTION LICENSE
- IN OPERATION
- GOVERNMENT RESERVED PROJECT
- SURVEY LICENSE
- UNDER CONSTRUCTION

NEPAL SUBSTATIONS

- EXISTING_66
- UNDER_CONSTRUCTION_66
- FUTURE_66

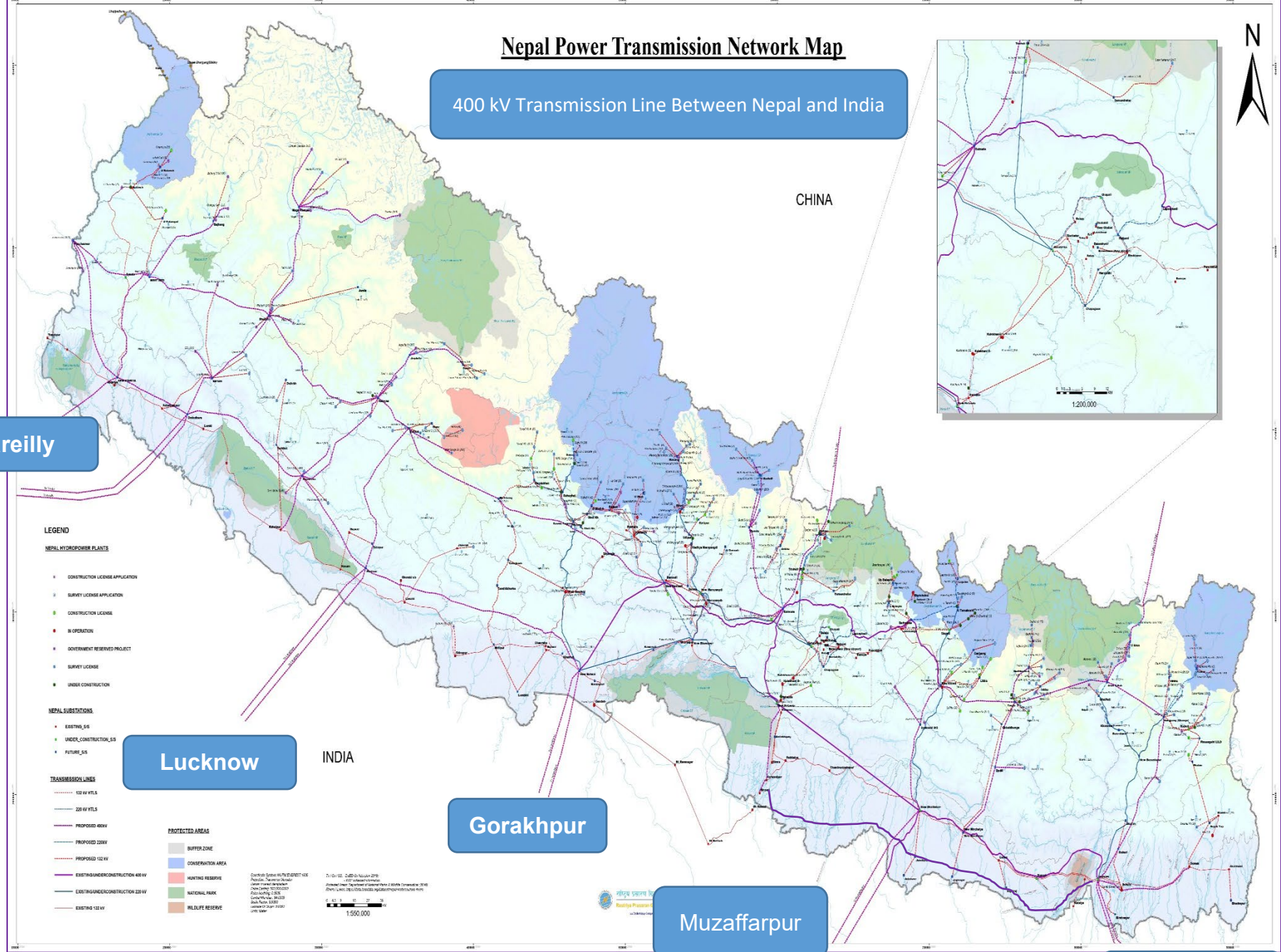
TRANSMISSION LINES

- EXISTING 132 KV
- EXISTING 220KV
- PROPOSED 132 KV
- PROPOSED 220KV
- PROPOSED 400V
- EXISTING/UNDER CONSTRUCTION 400 KV
- EXISTING/UNDER CONSTRUCTION 220 KV
- EXISTING 132 KV

PROTECTED AREAS

- SUPPERZONE
- CONSERVATION AREA
- HANTING RESERVE
- NATIONAL PARK
- WILDLIFE RESERVE

Scale: 1:500,000
Map Date: 2018
Map Author: Nepal Power Corporation





Under construction and Proposed Interconnection With India



A. 400 kV

S.No	400 kV Interconnections	Configurations	Length Ckt Km	Remarks
1	New Butwal-Gorakhpur	Double	130	Tender Published
2	Inaruwa-Purnia	Double	132	DPR Completed
3	Lamki-Bareli	Double	600	DPR Completed
4	Kohalpur-Lucknow	Double	180	Under Study
6	Attariya-Bareilly	Double	260	Under Study

B. 132 kV

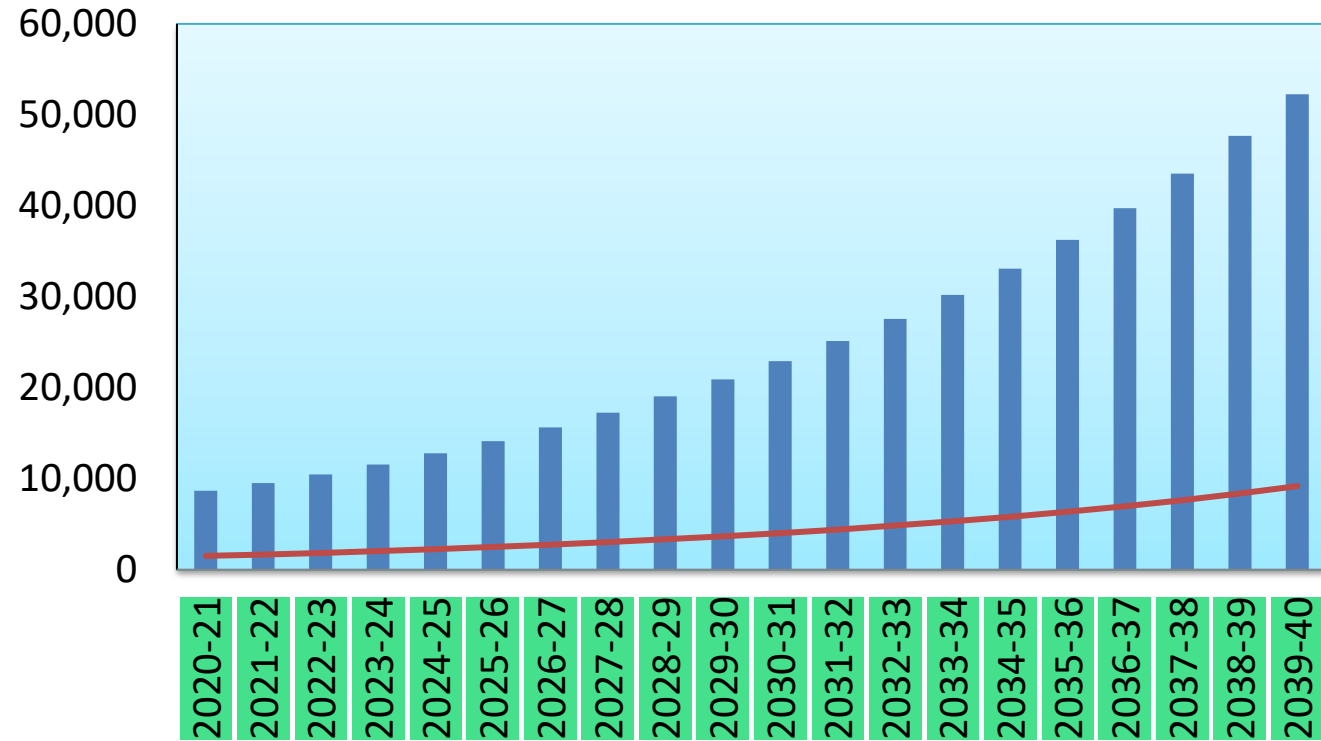
S.No	132 kV Interconnections	Configurations	Length Ckt Km	Remarks
1	Kusaha –Kataiya 2 nd Ckt .	Double	16	Under construction
2	Mainhiya- Sampatiya	Double	56	Under construction
3	Parwanipur- Raxual 2 nd Ckt.	Double	22	Under construction
4	Nepalganj - Nanpara	Double	100	Under Study

India-Nepal Cross-Border Transmission Lines

Time-frame	India – Nepal Cross-Border Interconnection
Existing	Muzaffarpur – Dhalkebar 400kV line
Apr'23	Sitamarhi – Dhalkebar 400kV line <i>being taken by developer of Arun-3 HEP</i>
2025-26	Gorakhpur – New Butwal 400kV line <i>being taken up by JV of NEA and POWERGRID</i>
2026-27	Purnea (New) – Inaruwa 400kV line
2027-28	Bareilly – Lumki (Dododhara) 400kV line

LOAD FORECAST

Fiscal Years	Total Generation Requirement (GWh)	System Peak Load (MW)
2020-21	8,678.2	1,524.1
2021-22	9,514.4	1,671.0
2022-23	10,476.5	1,839.9
2023-24	11,568.6	2,031.7
2024-25	12,802.2	2,248.4
2025-26	14,132.7	2,482.0
2026-27	15,625.2	2,744.2
2027-28	17,265.4	3,032.2
2028-29	19,070.5	3,349.2
2029-30	20,914.1	3,673.0
2030-31	22,931.6	4,027.3
2031-32	25,139.6	4,415.1
2032-33	27,556.4	4,839.5
2033-34	30,201.7	5,304.1
2034-35	33,097.5	5,812.7
2035-36	36,267.6	6,369.5
2036-37	39,738.4	6,979.0
2037-38	43,538.5	7,646.4
2038-39	47,699.4	8,377.1
2039-40	52,255.8	9,177.4



■ Total Generation Requirement (GWh) — System Peak Load (MW)



Way Forward



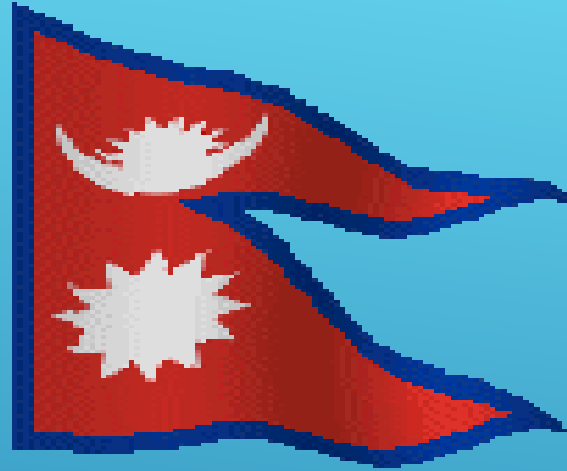
- Building the trust and political consensus among the countries is the prerequisite for energy connectivity.
- The policy and regulatory frameworks for transmission planning and operation system should be harmonized and institutionalized in the coordinated way. The preparation of regional grid master plan and the mapping of the region's existing high voltage transmission network shall be started soon.
- It should be extended the networking of bilateral and trilateral intergovernmental institutions to reach the regional cooperation. The analytical study of gaps in grid policies and standards in each sub-region shall be started soon.



Way Forward.....



- Studies to evaluate the economic, social and environmental aspects of multilateral electricity trade shall be started soon.
- The capacity Building, sharing of information, data, learning and the best practices are also the major issues for the energy connectivity.
- Policy of all the participating countries should treat electricity as trading commodity and should not make restriction based on political issue.



Thank You!!!

