

*South Asia Regional Conference on
Cross Border Electricity Trade*

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**CROSS BORDER ELECTRICITY
TRADE**

Issues and Challenges

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South Asia-- A Region Of Contrasts



- Population of over 1.5 billion, largest in the world's regions
- Endowed with varied energy resources
- One of the fastest growing regions in the world: more than 5% average annual GDP growth rate
- High growth in energy consumption
- Lowest per capita energy consumption in the world

Generation Mix



		Thermal	Hydro	Other
1	Bangladesh	95%	5%	-
2	Bhutan	-	100%	-
3	India	71%	25%	4%
4	Nepal	7%	93%	-
5	Pakistan	71%	27%	2%
6	Sri Lanka	56%	44%	-

Overview of Nepal Power System



- Total installed capacity 757 MW
- Hydro dominated— hydro accounts for 93% of the total installed capacity
- Demand increasing annually at 10%
- Population having access to grid electricity about 63%
- Peak Load in FY 2012/13= 1100 MW
- Capacity shortage in FY 2012/13= 600 MW

Existing Power Exchange Arrangement



- Nepal and India has been exchanging power for many years. Power is being exchanged and traded mainly through 8 points along the Indo-Nepal border.
- Power exchange on commercial mode between two countries is increasing each year.
- Present level of exchange is 50 MW, trading is 80 MW.
- Power exchanges are being done through mainly 33kV and 132kV links.
- Nepal is facing critical power shortage and is becoming net importer.
- PTC, India is the nodal body for trade.

Institutional Arrangement



- **Power Exchange Committee(PEC)**
 - Constituted in 1992- oversees the exchange and other issues, supposed to meet once a year
- **Joint Committee on Water Resources (JCWR):** constituted as per agreement of August 3, 2000 and headed by secretaries of concerned ministries of both the countries

Potential for Power Trade from Nepal



- Total theoretical potential: Over 83,000 MW
- Economically feasible: 43,000 MW
- Storage capacity plants: 21,400 MW
- Existing capacity: 757 MW
- Projects under construction:
 - NEA/subsidiary companies = 726.3 MW
 - IPPs = 201.52 MW
 - IPP projects at various stage = 673.5 MW

Potential for Power Trade from Nepal



- The above figure does not include hydropower projects to be developed by Indian Companies: Arun-3 (900 MW), Upper Karnali (900 MW), Marsyangdi (600 MW)
- Applications for PPA = 3000 MW
- Survey license issued = 8909 MW
- Generation license issued = 1990 MW

Capacity Balance



Year	Dry Season, MW			Wet Season, MW			
	Gen	Peak	Shortage	Peak	Gen	Shortage	Surplus
2013/14	641	1242	602	1217	849	368	8
2014/15	665	1357	693	1309	902	407	69
2015/16	940	1480	541	1379	1139	239	261
2016/17	1001	1612	611	1555	1363	191	404
2017/18	1694	1742	48	1680	1987	0	306
2018/19	1807	1880	73	1814	2217	0	403
2019/20	1922	2027	105	1888	2492	0	604
2020/21	2016	2183	168	2106	2501	0	395

Energy Balance



Year	Energy, GWh			
	Demand	Generation	Surplus	Deficit
2013/14	5,861.89	5,479.84	72.82	454.86
2014/15	6,405.64	5,765.72	37.25	677.18
2015/16	6,966.79	7,414.93	626.39	178.25
2016/17	7,606.09	8,474.95	1,054.82	185.95
2017/18	8,221.40	12,936.49	4,716.66	1.56
2018/19	8,872.97	14,419.04	5,549.09	3.01
2019/20	9,539.29	16,160.37	6,626.04	4.96
2020/21	10,303.59	16,486.79	6,192.56	9.36

Legal Provisions of the Acts



- Internally, Electricity Act of Nepal 1992 governs and guides all issues related to power sector of Nepal including Cross Border Power Trade.
- The Nepal Electricity Act 1985 provides with the mandate to sell electricity to foreign countries or to buy electricity from foreign countries after taking prior approval from Government of Nepal.

Hydropower Development Policy, 2001



- One of the key objectives of Hydropower Development Policy, 2001 (HDP 2001) of Government of Nepal is to develop hydropower as an exportable commodity.
- The policy focuses on Implementation of hydropower projects based on the concept Build, Operate, Own and Transfer.

Hydropower Development Policy, 2001



- Some of the strategies outlined in Hydropower Development Policy, 2001 are:
 - To develop hydropower projects by attracting investment from private sector as well as from governmental sector, as necessary, and through joint ventures of government and private sector.
 - To pursue investment friendly, clear, simple and transparent procedures so as to promote private sector participation in the development of hydropower, also taking into account internal consumption and export possibility of hydropower.

Hydropower Development Policy, 2001



- To pursue a strategy of bilateral or regional cooperation in the hydropower development sector taking into consideration the feasibility of hydropower in Nepal and the demands of electric energy in neighbouring countries in view of the fact that development of hydropower in Nepal supports not only the domestic but also the regional economy.

Existing Interconnections with India



<i>Transmission Link</i>	<i>Evacuation Cap. (MW)</i>	<i>Traded, MW</i>	<i>Voltage Level, kV</i>
Kusaha--Kataiya	130	80	132
Gandak-Rampur	50	25	132
Mahendranagar-Tanakpur	50	30	132
Kataiya-Rajbiraqj	10	8	33
Raxual-Birgunj	10	10	33
Sitamadhi-Jaleswor	10	8	33
Nepalgunj-Nanpara	10	8	33
Jayanagar-Siraha	8	8	33

Under Construction and Planned Interconnections with India



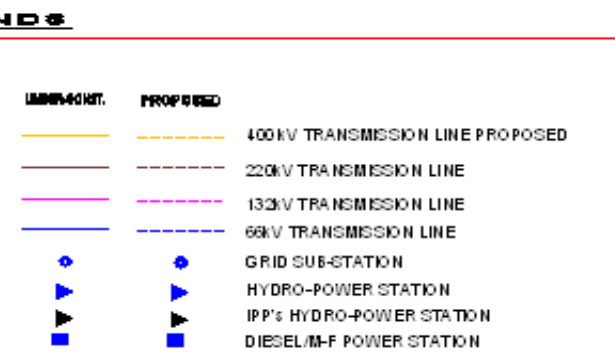
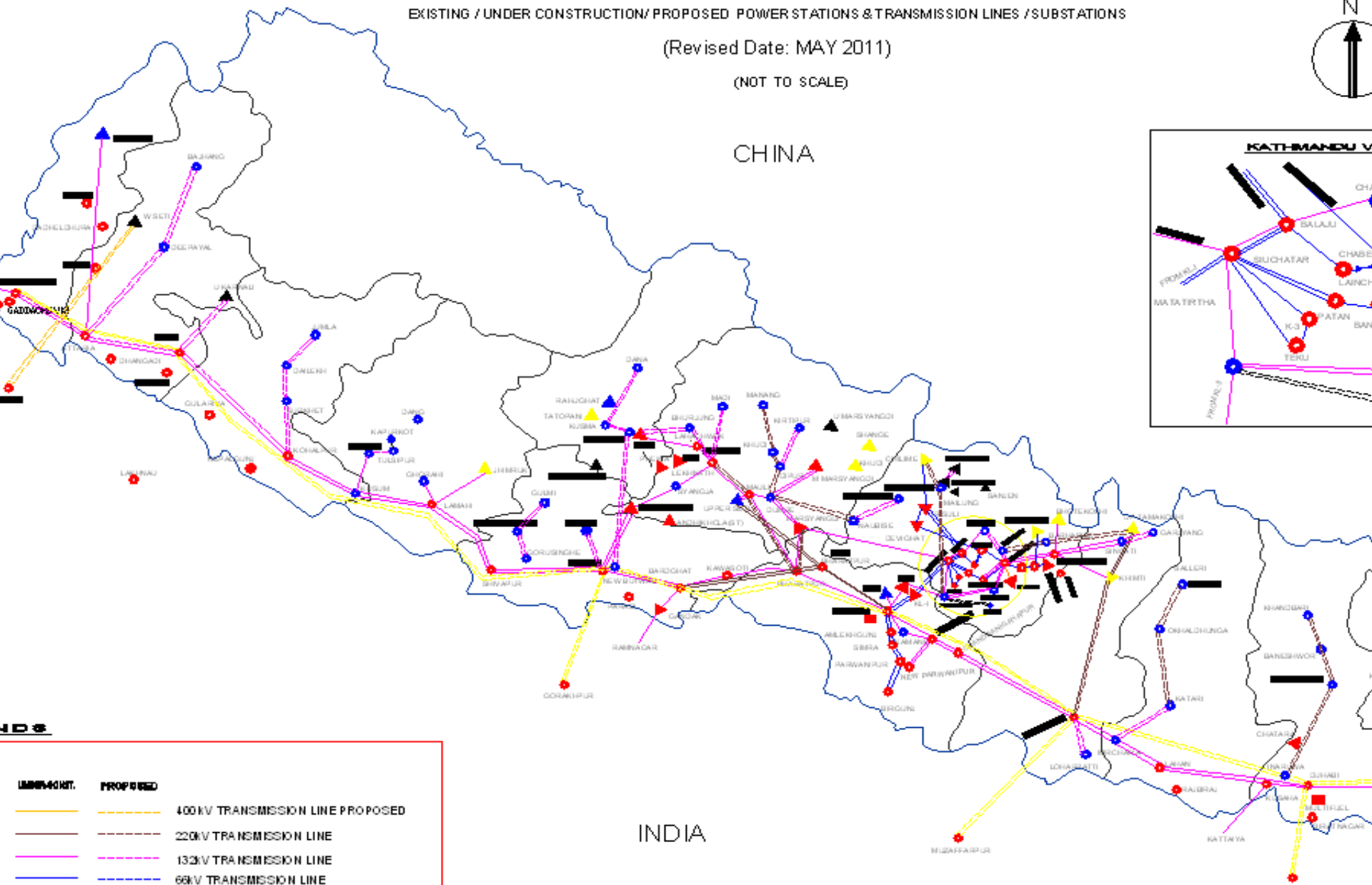
<i>Transmission Link</i>	<i>Transfer Cap. (MW)</i>	<i>Voltage Level, kV</i>	<i>Status</i>
Dhalkebar-Muzzafarpur	1200	400	Under cons.
Bardaghat-Gorakhpur/ Anadnagar	1200	400	Planned
Duhabi- Jogbani	1200	400	Planned

POWER DEVELOPMENT MAP OF NEPAL

EXISTING / UNDER CONSTRUCTION/ PROPOSED POWER STATIONS & TRANSMISSION LINES / SUBSTATIONS

(Revised Date: MAY 2011)

(NOT TO SCALE)



NEPAL ELECTRICITY AUTHORITY
 GRID DEVELOPMENT
 TRANSMISSION LINE CONSTRUCTION
 Prepared By : By .Ma

Generation and Transmission Expansion Plan



- NEA projects development of 2200 MW of hydropower over the next 7 years.
- NEA plans to develop 3000 km of transmission networks in next 9 years and envisages developing 1000 km of 132 kV, 810 km of 220 kV and 580 km of 400 kV transmission networks by 2017/18.
- The funding for majority of the lines has been arranged.

Rationale for Regional Cooperation



- Technical rationale: Resulting from complimentary in the resource endowment and diversity in load profile facing each country.
- Social development rationale: Rural electrification and other beneficial impacts on health, education and incomes is clear.
- Economic rationale: Regional cooperation would result in
 - Improved reliability of supply
 - Enhanced trade
 - Environmental benefits from reduced level of carbon emissions



Issues



- Optimal utilization of energy resources at the regional level
- Creation of regional power market
- Promotion of private participation in power sectors
- Environmental issues
- Riparian rights



Barriers



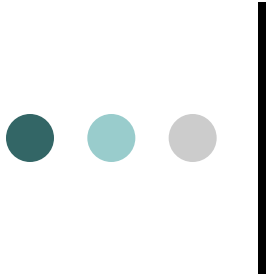
- Political barriers
 - Absence of a G2G Power Trade Agreement between Nepal and India, and electricity already notified as restricted commodity for Import in India
- Pricing policies
- Financial barriers
- Institutional barriers
- Legal barriers



Way Forward



- Data sharing and joint planning of potential power projects,
- Harmonization of Grid Codes and standards,
- Greater interaction at both the technical as well as political level to discuss the issues of power trade,
- Reforming individual country markets to attract greater private sector participation in power sector,



THANK YOU