



SAARC SEMINAR on Role of Private Sector in Regional Power Trade

**Ministry
of
Energy,
Nepal**

Nepal's perspective

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Organized by:
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CROSSBORDER TRANSACTION OF POWER

- Nepal has cross border transaction with India only.
- This transaction in asynchronous radial mode.
- Phase wise development of Indo – Nepal cross border transaction
 - Phase 1:River treaties and electrification of bordering towns
 - Phase 2: Addressing the demand growth in Nepal
 - Phase 3:Relief from power crisis in Nepal in short term
 - Phase 4:Market accessibility of Nepal's hydropower

CROSS BORDER POWER TRANSACTION

- **River Treaty Phase**

- Outcome of Koshi and Gandak treaty
- Electrification in project neighborhood
- Interconnections to other bordering towns later
- No separate agreement for power transaction
- Issues related to Transaction in project neighborhood and at other bordering towns both discussed in committee for river project.
- Effective: around 1965

- **Growth address Phase:**

- High demand growth after restoration of democracy in '89
- PEC formed and entered into PEA in 1992
- Present limit: 50 MW
- Tariff fixed by PEC now
- First time an agreement specifically about power exchange
- Currently 50 MW transaction under this arrangement

CROSS BORDER POWER TRANSACTION

- **Crisis Relief Phase:**
 - Supply deficit apparent after 2006 political change.
 - It was perceived to continue few years
 - 8th PEC meeting in June 2007.
 - Requirement beyond exchange limit of 50 MW was agreed to transact in trading mode.
 - More medium voltage links being talked for immediate effect
- **Resource Optimization and Market Accessibility Phase:**
 - Future resort
 - Will mean system interfacing with India
 - High capacity cross border lines required
 - To enable access to various Indian markets, South Asian Market and Central Asian Market

CROSS BORDER TRANSACTION

- Current Modes:
 - River Treaty
 - Mahakali Treaty 70 Million Units/year
 - Koshi Treaty 10 MW
 - Power Exchange
 - 50 MW
 - Power Trading
 - No limit
 - Limited by transmission capacity
- Existing Links:
 - 132 k V: 3 numbers
 - 11 and 33 k V: 11 links

DOMESTIC MARKET

- *Type and nature*
- *Current status & Future projection*
- *Conclusion*

DOMESTIC MARKET: Type and Nature

- Domestic market is largely a single buyer market.
- Vertically integrated state owned utility “Nepal Electricity Authority” (NEA) remains as single buyer.
- No market driven pricing mechanism
- No competition (even at wholesale level)
- No short term, intra-day or balancing market
- No independent regulator for the sector
- All independent power producers must conclude PPA with NEA for generation license unless it is specifically export oriented project.



CURRENT SCENARIO

Status	NEA	IPP
Under Operation (718.48 MW)	<ul style="list-style-type: none">• 477.93MW• 66%	<ul style="list-style-type: none">• 240.55 MW• 34%• 35 Projects
Under Construction	<ul style="list-style-type: none">• 862.0 MW• 9 projects	<ul style="list-style-type: none">• 357.84MW• 37 projects
PPA Concluded	IPP – 502. MW (67 projects)	
Issued survey license : 9043 MW (326 nos)		
Large Projects in Pipeline	3,900 MW (including Arun III, Upper Karnali, Lower Arun, Tamakoshi III, Upper Tamor, Upper Marshyangdi, etc.	
Other Large projects :	Karnali chisapani; pancheshor; koshi etc	



Large Hydro Projects in Nepal (>300 MW)

Project	Capacity (MW)	River	Promoter	Remarks
Upper Karnali	900	Karnali	GMR	Indian Developer
Arun III	900	Arun	Satluj Jal Vidyut Nigam	Indian Developer
West Seti	750	Seti	Three Gorges Company	Chinese Dev
Tamakoshi-3 TA-3	660	Tama Koshi	S. N. Power Holding	Singapore co
Upper Marsyangdi -2	600	Marsyangdi	Himtal Hydropower	Indian Developer
Budhi Gandaki Storage	600	Budhi Gandaki	Nepal Electricity Authority	Nepal Govt
Upper Tamakoshi	456	Tama Koshi	Nepal Electricity Authority	Nepal Govt
Chainpur Seti HEP	454	Seti	Jindal Power Limited	Indian Developer
Bheri-1 HPP	440	Beheri	KSK energy Venture P Ltd	Indian Developer
Tila-1 HPP	440	Tila	S C Power Company P Ltd	Indian Developer
Tila-2 HPP	420	Tila	S C Power Company P Ltd	Indian Developer
Nalsyaugad Reservoir	400	Nalsyaugad	NEA	Nepal Government
Lower Arun	400	Arun	Brass Power Brazil	Brazilian Dev
Dudhkoshi-4 HPP	350	Dudh Koshi	KVR India Infra	Indian Developer
Karnali-7	330	Karnali	LANCO Infratech Limited	Indian Developer
Namlan	303	Namlan	LANCO Infratech Limited	Indian Developer



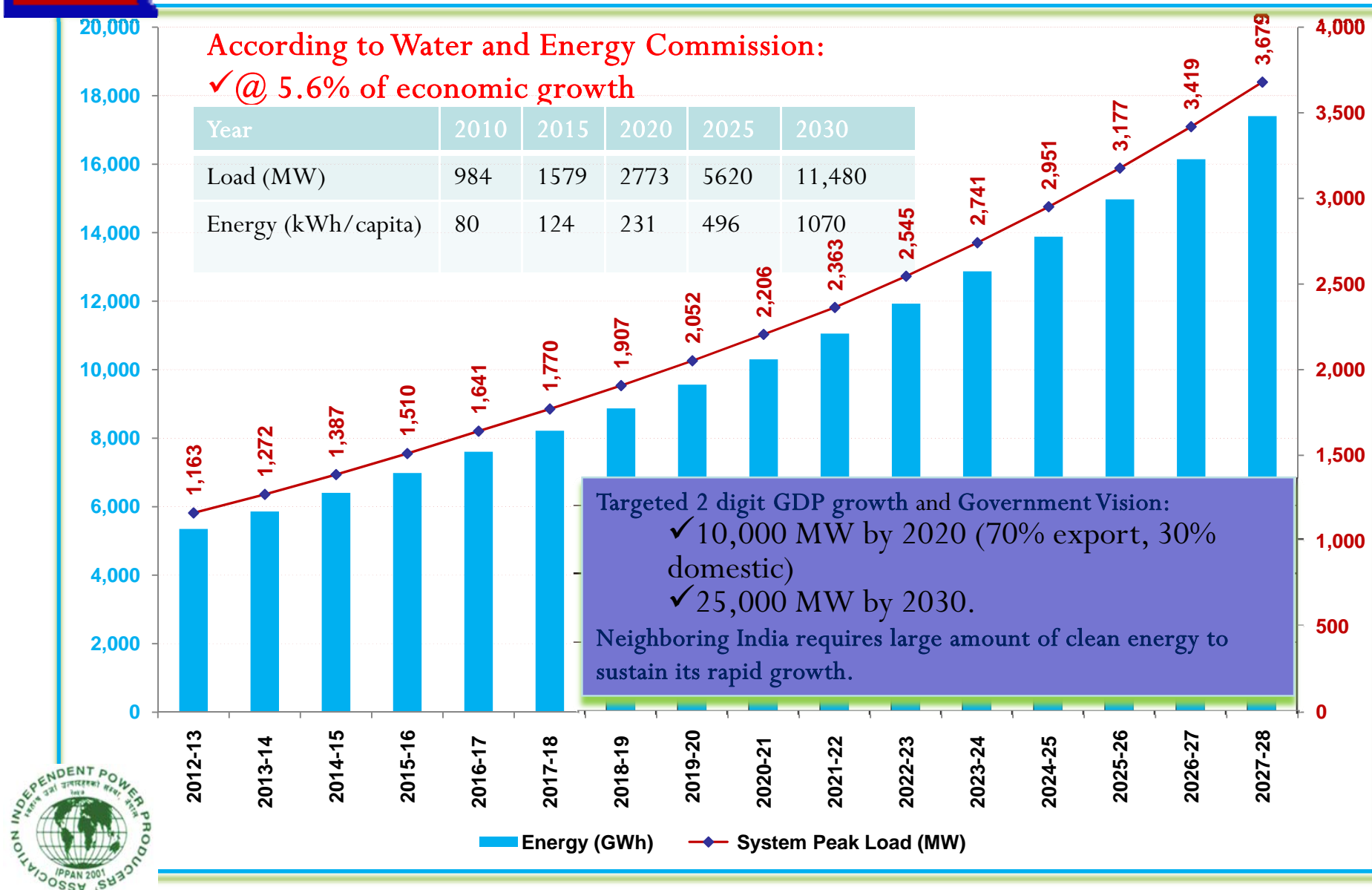


Load Forecast (supressed)

According to Water and Energy Commission:

✓ @ 5.6% of economic growth

Year	2010	2015	2020	2025	2030
Load (MW)	984	1579	2773	5620	11,480
Energy (kWh/capita)	80	124	231	496	1070



DOMESTIC MARKET: CONCLUSION

- Large volume of unmet demand exists
- High demand growth rate:
 - Resulting in widening gap between demand and supply
 - Asking huge capex in ROR and storage plants
- It will result in:
 - Wet season surplus
- That makes imperative:
 - Increased *cross border* capacity for exchange during surplus and deficit
 - *Competitive internal market* for operational efficiency and market driven pricing



Status: Consumption kWh/Capita 2010

(Key World Energy Statistics, IEA 2012)

2942

Nepal consumption is below
80% of the south Asian average

644

457

445

322

279

100

530

China

India

Pakistan

Bhutan

Nepal

SA Avg.

Sri Lanka

Bangladesh

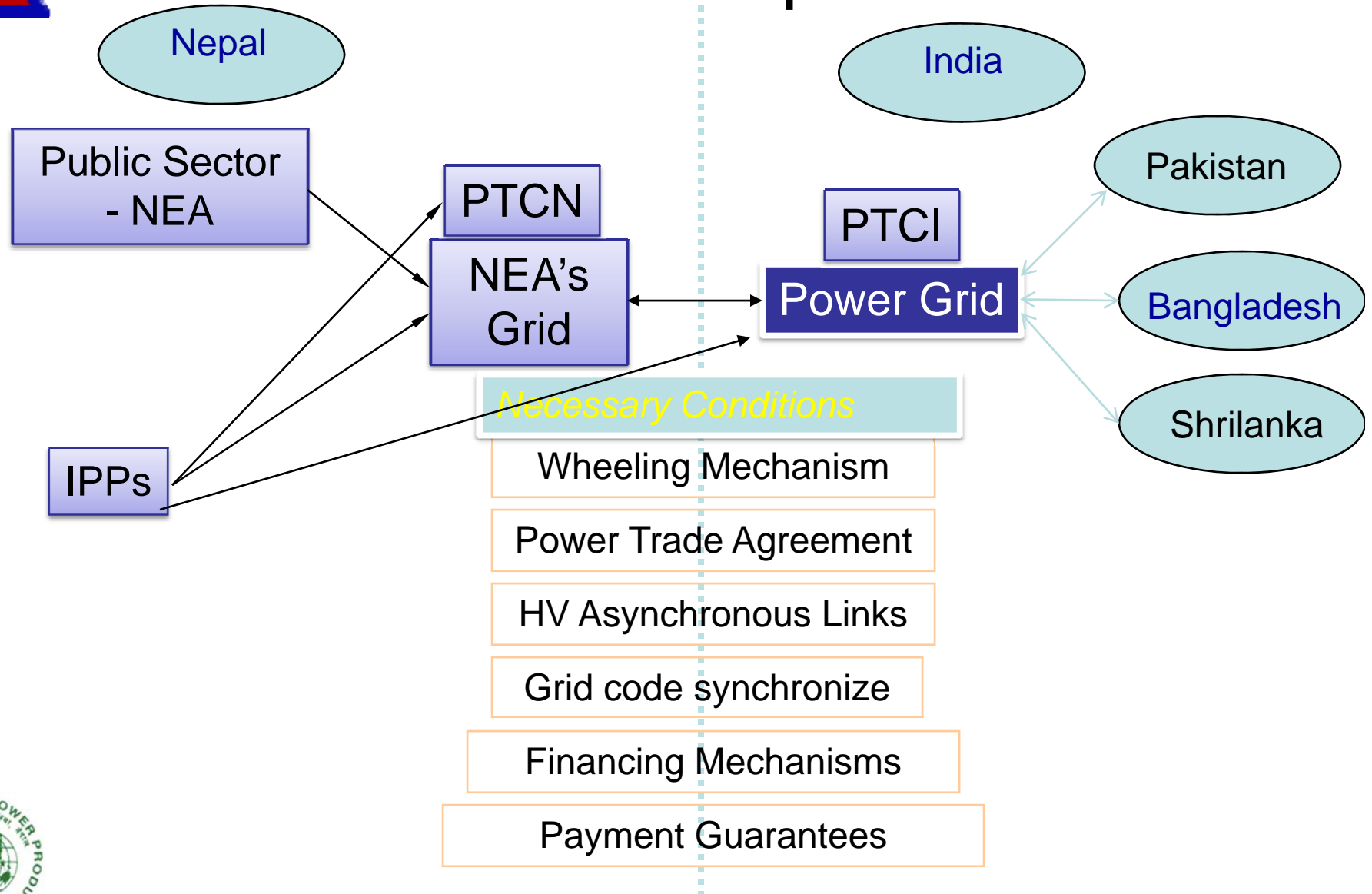


EXPORT MARKET: Identification

- Given the geographic location:
 - India is our export market in first stage.
 - With expansion of South Asia regional grid and enhanced level of cooperation among countries of South Asia, South Asia region is our potential market.
 - In long term when Central Asia South Asia (CASA) interconnection is realized, even CA might be the market.
 - China as our export market is not impossible but difficult.



Regional Interconnection Concept



EXPORT MARKET: Type and Nature

- Indian electricity markets at wholesale level:
 - Long term PPA
 - Private merchant power
 - Trading in short term mode
 - Day ahead market in Index IEX
- Our access may be at wholesale level where various markets are available.

EXPORT MARKET: Conclusion

- Large volume of unmet demand in Indian market
- High demand growth rate and eventually widening gap between demand and supply
- Various kinds of markets (long term, short term, day ahead etc.) available
- Possibility of accessing South Asian and Central Asian regional markets
- Indian market is a large sink where every unit produced has market.
- Energy can be cashed at real time value.
- ***All what is required is high capacity cross border links.***

CROSS BORDER: Driving Forces

- Large hydro potential as our advantage
- Seasonal export and Import:
 - Seasonal domestic surplus and deficit of supply
 - Time of the day and Seasonal diversities in demand and supply in Nepalese and Indian Market
- Large Size of Indian market
- Various kinds of markets and hence opportunities available
- Ever deficit South Asian Regional Market to be accessed
- Central Asian market is also long term destination.
- These serve as strong driving force for developing high capacity cross border links between Nepal and India.

BENEFITS OF INTERCONNECTIONS

- Power interchange would help overcome power shortages.
- Boost bankability of small & medium hydro power projects in Nepal
- Spurred investment in hydro power sector in Nepal,
- Significantly increase Private players
- Short gestation period of small and medium sized hydro projects would overcome early power shortage situation of Nepal as well earn export revenues after meeting local need of Nepal
- Strategic importance – act as catalyst and facilitate major investments in Power Sector of Nepal

INITIATIVES ON CROSS BORDER LINES

- 4 Common lines identified:
 - Anarmani – Siligurhi 400 k V
 - Duhabi – Purnea 400 k V
 - Dhalkebar - Muzaffarpur 400 k V
 - Butwal – Gorakhpur 400 k V
- 3 project specific cross border lines intended
 - West Seti – Bareilly 400 k V
 - Upper Karnali – Bareilly 400 k V
 - Arun 3 to Suitable Power Grid Substation in India
- Dhalkebar –Muzaffarpur taken up first. For which:
 - Two SPVs one each in India and Nepal formed
 - ITSA Signed
 - Tender in Evaluation process

LONG TERM TRANSMISSION VISION

- Transmission vision for 10, 000 MW
 - Domestic backbone Network
 - East- West trunk line
 - Mid hill trunk line
 - Basin wise North South Interconnections
 - Basin pooling points to serve as export nodes
 - Cross border lines from basin pooling points
all at 400 k V
 - Basin wise development plan
 - Development of transmission lines in BOT or BT mode
 - Massive transmission expansion program already started



Vision for the Future- Role of IPPs

Financial Issues

- Financing of Interconnections
- Financial Institutions
- Currency of Payment
- Guarantees/Counter-Guarantees
- Review Project Financing trends to make Cross-Border Energy Trade feasible

- Role of IPPs

- Develop medium to large-scale power projects for domestic consumption and surplus export
- Project Optimization to be done with export in consideration
- Develop dedicated export oriented projects for supply to India and further
- Coordinate with Indian IPPs for potential joint developments
- Could be possibly involve in managing SAARC grid

SAARC grid creates the market: Nepal's potential could thus be optimally harnessed



SUMMARY

- **Construction of high capacity cross border links**
in progress
- **Synchronization of Nepalese and Indian Grid**
Consultation and System study initiated
- **Establishment of Operational Mechanism**
Yet to start
- **Creation of appropriate legal frame work**
In progress
- **Formation of Regulatory and other entities for new market condition**
will follow after New Act is promulgated
- **Some grey Areas to be studied, debated and decided**

CONCLUSION

- For speedy development of hydropower and take it to Indian, South Asian and Central Asian market:
 - ***We must first develop high capacity cross border lines between Nepal and India***
- For speedy development of hydropower for domestic market and its efficient operation:
 - ***We should make the market competitive***
- Common GRID CODE
- Space for Private players in SAARC grid
- A country to country level Umbrella Agreement between Nepal and India regarding Cross Border Trading is required.

THANKS