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Role of Trading Companies in Cross Border Power Trade

By

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Outline of the Presentation

- Regional Co-operation worldwide
- Cross Border Exchange of Power in Indian Subcontinent – PTC's Experience
- Opportunities of Cross border exchange of power : Issues and Challenges
- Role of Power Trading companies in cross border exchange of power
- Summary

Regional Co-operation Worldwide

Regional Co-operation

Entity	
ENTSO-E	• Created in year 2011 • 41 Transmission System Operators (TSOs) from 34 countries of Europe.428,161 GWh traded in 2012.
GCC	• Created in year 2001 • United Arab Emirates, Bahrain, Saudi Arabia, Oman, Qatar and Kuwait. Intermittent exchange of power
GMS	• Created in year 1995 (Electric power forum) • Cambodia, PRC (Yunnan Province and Guangxi Zhuang Autonomous Region), Lao PDR, Myanmar, Thailand and Vietnam. 34,139 GWh traded in 2010
SAPP	• Created in year 1995 • Botswana, Democratic Republic of Congo, Lesotho, Mozambique, Namibia, South Africa, Swaziland, Zambia, Zimbabwe, Angola, Malawi and Tanzania. • 10,409 MWh exchanged in 2011-12 • 55000 MW of combined electricity production between the countries. • Countries like Mozambique ,Botswana etc. have huge reserve of Coal, very less local demand and major Infrastructure bottleneck for coal transportation

Regional Co-operation

Entity	
US – Mexico	• Import and Export of power during emergencies up to 1.5 BUs in a year. • A total of 9 interconnections between Texas state and Mexico
Turkey - Azerbaijan – Iran - Bulgaria	• Azerbaijan has excess generating capacity & Georgia has seasonal surplus capacity which matches Turkey's power requirement. • At an average, Turkey imports 400 MW from Iran and 500 MW from Bulgaria. In exchange, Turkey exports 150 MW to Greece.
UK – France	• Power mainly traded in European Power Exchanges. • 2000 MW of HVDC interconnectivity between UK and France.
India-Bhutan	• Bhutan mainly exports Hydro power to India • India may supply power to Bhutan under swap arrangement for upcoming power projects
India – Nepal	• India mainly supplies power to Nepal during dry season • With the construction of new power projects, Nepal can supply Hydro power to India
India – Bangladesh	• India currently supplying 500 MW power to Bangladesh

Cross Border Exchange of Power in Indian Subcontinent – PTC's Experience

Opportunities in South Asia

- South Asian countries among the most rapidly developing countries in the world
- High rate of GDP growth
- Large and growing population but low per capita consumption of electricity
- Huge demand for energy against limited domestic supply
- Energy mix different for different countries
- Challenge – How to meet respective requirements?
  - Regional integration or trade – High potential but currently low

PTC- Nodal Role in Cross-Border Trade

A Successful Track Record!

- Identified by Government of India for x-border trade a decade back
- A track record of successfully managing import of entire surplus power of Bhutan since year 2002
- Nodal agency for Nepal appointed by MEA, Govt. of India
- Meeting NEA power requirements on commercial basis through bi-lateral contracts
- Co-promoter of the most preferred PX in India –IEX
- PTC enters into contracts with the concerned organizations in the neighboring countries on commercial basis
- A 'Single Window Service'- to sell power to state power utilities, the bulk customers .

PTC is supportive of cooperation in regional energy trade in terms of optimizing the installed capacity by way of utilizing the diversity in peak demand, sharing the spinning reserve, optimizing the overall generation mix so as to address the energy security issues.

Cross Border Power Trading through PTC

Bhutan

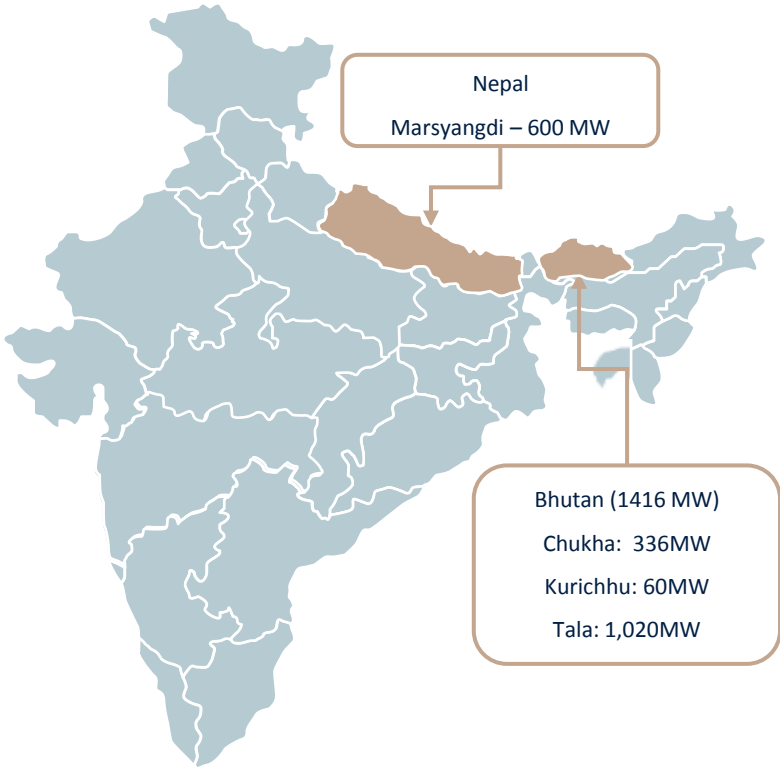
- Long term agreements in place for purchase of power from Tala (1020 MW), Chhukha (336 MW) and Kurichhu (60 MW) Hydro Electric projects in Bhutan.
- From the above projects, PTC purchases around 5000 Mus every year.
- PTC is in advanced stage of discussions for Banking of energy to meet the construction power requirement of 10000 MW Hydro power capacity under development in Bhutan.

Nepal

- Long term (25 Years) PSA signed with NEA for export of 150 MW coal-based thermal power on long-term basis. The power may start flowing in next 2-3 years
- Active engagement in the up-gradation of Indo – Nepal transmission interconnections for enhancement of power trade
- PTC is a member of Indo-Nepal Power Exchange Committee

Bangladesh

- PTC is supplying 250 MW power to Bangladesh for a period of three years since December 2013 through 400kV Baharampur (India)- Bheramara (Bangladesh) double circuit line



Capacities available to PTC for cross border trades

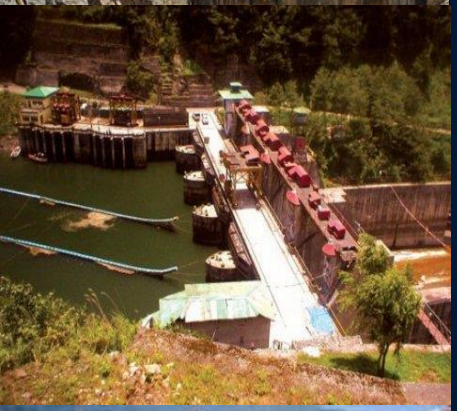
Indo-Bhutan Power Exchange

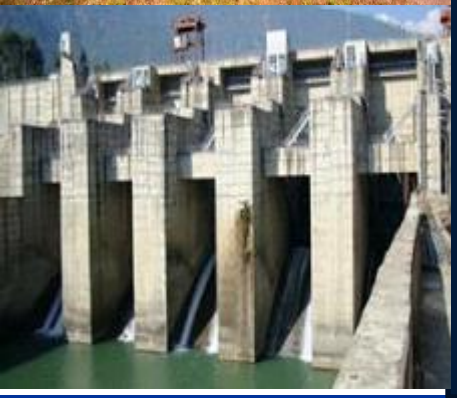
- India has signed umbrella agreement with Bhutan under which India provides Project investigation, design and engineering services, constructional supervision and highly concessional finance for the upcoming hydro projects.
- In return, India is entitled to import all the surplus power, after meeting the needs of Bhutan.
- Currently, PTC is purchasing surplus power from the following projects in Bhutan
  - Chukha (336 MW)
  - Tala (1020 MW)
  - Kurichhu (60 MW)
- Power export receipts constitute more than half of the Bhutan Governments revenue and 12% of Bhutan's GDP.

Volume of electricity trading with Bhutan

Year	Energy export to India (MUs)
2003-04	1751
2004-05	1735
2005-06	1762
2006-07	2963
2007-08	5234
2008-09	5883
2009-10	5334
2010-11	5569
2011-12	5274
2012-13	4791

Projects under operation





- Tala Hydro Electric Project
  - Installed Capacity – 1020 MW
  - Present Tariff – Rs. 1.98 / kWh
  - PPA between PTC & RGoB since September 2006
- Chhukha Hydro Electric Project
  - Installed Capacity – 336 MW
  - Present Tariff – Rs. 2.25 / kWh
  - PPA between PTC & RGoB since August 2002
- Kurichhu Hydro Electric Project
  - Installed Capacity – 60 MW
  - Present Tariff – Rs. 1.98 /kWh
  - PPA between PTC & RGoB since August 2002

Indo-Bhutan Power Exchange- Illustration

- **Tala Hydro Electric Project**
  - Installed capacity : 1020 MW (6 x 170 MW)
  - Run of the river scheme
  - Peaking power ability: 4 Hrs
  - Transmission Interconnection:400 kV, two double circuit

Allocation of Power

Tala HEP (85%)	
West Bengal	45%
Bihar	30%
Jharkhand	13.48%
DVC	6.52%
Orissa	5%
NR states	15%

- Agreement signed between the two Governments on 5th March 1996
- The Agreement provides for:
  - Surplus power i.e. all the power over & above that is required for use in Bhutan shall be sold to Government of India (GOI) and GOI is committed to purchase all the surplus power
  - Initial tariff determined at Government level
  - The tariff to be reviewed every 5 year period as per an agreed formulae

Indo-Bhutan Power Exchange

- PTC manages entire Co-ordination with various agencies involved in the transactions on Indian Side such as Scheduling, Energy Accounting and other system compliance/approvals etc.

- Responsible for Liasioning, Replacement of Energy meters, etc. on the Indian Side required for smooth functioning of the transactions.

- Has made payments timely without any dispute/default till date.

PTC value proposition to Bhutan

- Marketing of power from upcoming projects in Bhutan to prospective buyers in India for sale under long term/ medium term to provide most competitive tariff.
- Sale of Short term surplus power at market determined tariff
- Supply of Base load thermal power under long term contract to address the challenge of energy security
- Development of small hydro/Renewable projects by way of Equity participation/Debt syndication through PTC's subsidiary PTC Financial Services
- Assistance in development of large number of potential Renewable sites in Bhutan which can be substantial revenue generators
- Assistance in development of Solar power which would be the energy of future

Indo-Nepal Power Exchange

- Power Trading Agreement between India and Nepal commenced in 1966.
- Initial Exchange of 5 MW in 1971
- Quantum of Exchange : Moderate up to 150 MW
- River Treaties:
  - Koshi River Treaty: 50 MW export to Nepal from Katiya in Bihar for electrification of border areas.
  - Gandak River Treaty: 15 MW from Bihar through Gandak-Ramnagar132 kV transmission line.
  - Mahakali River Treaty: 70 MUs free energy from Tanakpur Hydro Electric Plant of NHPC at 132 kV level.
- Present interconnections at 132 kV level:
  - 132 KV Transmission links: Katiya-Duhabi, Raxaul – Parwanipur, Balmikinagar – Gandak, Tanakpur - Mahendranagar
  - May not support higher exchange
  - Up gradation of existing Transmission links is under progress

Volume of electricity trading with Nepal

Year	Energy export to Nepal (MUs)
2008-09	50
2009-10	69
2010-11	46
2011-12	69
2012-13	78

PTC's value proposition Indo-Nepal Exchange of Power

- Pursuing opportunities for short term and long term trade in electricity for mutual benefits
- Acting as facilitator for transmission inter-connection between the two countries- Investment in transmission capacity
- PTC perennially supplies Power to Nepal during winters to replenish shortfalls
- PTC has Signed PPA with Nepal for supply of 150 MW power for 25 years through the proposed new transmission link.
- Proposing to facilitate formation and partner in a company in Nepal for accelerating Hydro power development.

Indo-Bangladesh Power Exchange

- A memorandum of understanding (MoU) was signed in January 2010 between Government of India and Government of Bangladesh for bilateral Co-operation in the areas of Power Generation, Transmission, energy efficiency, Renewable energy, Consultancy services, Training & Development , Constitution of Steering Committee on Working Group and establishment of grid connectivity between India and Bangladesh etc.

- For exchange of power between the two countries,400 kV D/C transmission link Baharampur(India) - Bheramara (Bangladesh) is now operational.

- The Indian portion of line has been executed by Power Grid Corporation of India Ltd. (PGCIL) and Bangladesh portion by Power Grid Company of Bangladesh Limited (PGCB) .

Indo-Bangladesh Power Exchange

- Bangladesh Power Development Board (BPDB) issued RFP in February 2013 for purchase of 250 MW power from eligible Indian Sponsor(s) (Government/Government controlled utility) at the delivery point being 400 KV level Bohrampur Substation, Murshidabad, West Bengal for a period of 3 years.
- PTC submitted bid for entire quantum of 250 MW power to be sourced from West Bengal State Utility.
- Subsequently, PTC was declared as Successful Bidder and LOI was placed on PTC for supply of 250 MW power to Bangladesh.
- PPA was signed between PTC and BPDB in November 2013 and Power supply to BPDB started w.e.f. 3rd December 2013 at a levelized tariff of Rs. 4.45/kWh.

PTC's value proposition for Indo-Bangladesh Exchange of Power

- Bangladesh is facing a peak deficit of 1000-1500 MW (about 25% of peak demand).The country is heavily dependent on gas resources.
- PTC may supply power to Bangladesh to meet their base load requirement on Short term/Long term basis once adequate connectivity is in place.
- As further exploration (both onshore and off shore) is being carried out in Bangladesh, in the event of further gas find, gas based generation from Bangladesh can be supplied to India (Mainly during peak times).
- PTC can manage entire portfolio of Bangladesh including contract management for export-import of power, co-ordination with various agencies involved for the transactions such as Open Access, Scheduling, Energy Accounting and other system compliance/approvals etc.

Opportunities of Cross border exchange of power :Issues and Challenges

Opportunities of Regional Power Exchange

- Electricity commerce can run on transmission interconnections
- A Strong India- Bhutan transmission inter-connection now
- Weak/Inadequate India-Nepal inter-connections . Work on new transmission interconnection in progress
- A strong Indo-Bangladesh Transmission exists now. But the line is still inadequate to cater to entire potential of Indo-Bangladesh power exchange.
- For bulk transfer of power between India and Nepal,400 kV Dhalkebar (Nepal)-Muzaffarpur (India) is under construction
- India – Sri Lanka submarine link is under active consideration
- Proposal aimed at setting up Transmission infrastructure (Amritsar-Lahore Interconnection) on a joint ownership basis being considered which will facilitate transfer of around 500 MW Power between India & Pakistan

Issues and Challenges in Cross border exchange of power

Issues/Challenges	
Political, Regulatory and Security considerations	▪ Political instability ▪ Diversity in policy, legal, and regulatory mechanisms ▪ Risk of change in Sector structure and Regulatory framework in the countries. ▪ Prevailing/Changing Diplomatic relationships
Infrastructural/ Technical Constraints	▪ Transmission interconnection capacities. ▪ Diversity of electricity codes and balancing mechanisms ▪ Reliability of power supply ▪ Maintaining Cross border power flow within the prescribed limits of each country for the system stability.
Financial Constraints	▪ Financial Viability for setting up Generation/Transmission Infrastructure ▪ Creditworthiness of utilities ▪ Lack of Financial resources for putting up Infrastructure ▪ Currency risk
Contract risk	▪ Equitable Principal obligations ▪ Risk sharing ▪ Financial /Payment Issues ▪ Commercial/Legal Issues ▪ Dispute Resolution/Arbitration

What is driving the Cross-border energy trade?

- Optimism/opportunities/energy crisis
- Platforms like USEA/USAID-SARI/E
  - Fostering the spirit of cooperation/networking
- Stakeholders like trading company (ies), transmission utilities and power utilities of the region are expressing keenness
- IPPs – who took leap of faith, particularly in Nepal
- SAARC – as a larger platform
- Technical and financial support by multilateral agencies such as ADB, World Bank
- Enabling policy and regulatory framework
- Some demonstrable examples that could be built on

The question has moved from 'Why?' to 'How?'

- "Even if friendship takes time to crystallize, it is the foundation that lends it the energy"
- The contribution of USAID/SARI/E over the years constitute these foundational elements

Role of Power Trading companies in cross border exchange of power

Role of Power trading companies-in Transition to a Competitive Market

- Critical, sensitive
- Historical experiences from many locations around the world has demonstrated that traders can, and do enrich markets, exponentially
- They do so by:
  - Adding liquidity
  - Skillful arbitrage
  - Finding new ways/opportunities to lay off risks
  - Facilitating attraction of capital to the generation and transmission inter-connections
  - Bringing transparency to previously opaque markets
  - Removing information asymmetry
  - Expanding transactional opportunities and finally
  - By substantially enhancing the overall efficiency of the market

Role of Power trading companies-in Transition to a Competitive Market

- In nascent competitive markets, the role traders play can be central to successful market evolution
- Power trading companies bring to the newly competitive markets a fresh perspective- that is different than the incumbent players
  - New insights to the opportunities for enhancing trade and commerce
- No monopoly mind-set
- Orientation towards transaction on a dynamic basis
  - Seizing opportunities but more importantly creating opportunities
- More entrepreneurship in their willingness to take on risks
- More willing to take on barriers that hereto before constrained market evolution
- Bring to fore the market inefficiencies
- Power trading companies are therefore an essential element in making a successful transition to competition
- As market matures, their role remains a vital one to make certain that market is substantially robust, efficient and open

Indian experience is a case in point.

Role of Power trading companies from Seller's & Buyer's perspective

Seller's perspective	Buyer's perspective
▪ Arrange off-take of power as made available by the seller ▪ Identify buyer for off-take of contracted capacity and enter into requisite commercial agreement on back to back basis ▪ Manage entire transaction such as Open Access, scheduling, Energy accounting & other system compliance/approvals ▪ Co-ordinate with relevant agencies for transfer of power ▪ Facilitate sale of power to third party from alternate sources in case of short off-take by original buyer ▪ Ensure payment security ▪ Facilitate energy settlement ▪ Ensure power for testing & commissioning of Power station/Transmission lines	▪ Arrange power as per requirement of procurer ▪ Identify Seller for supply of contracted capacity and enter into requisite commercial agreement on back to back basis ▪ Manage entire transaction such as Open Access, scheduling, Energy accounting & other system compliance/approvals ▪ Co-ordinate with relevant agencies for transfer of power ▪ Facilitate supply of power from alternate sources in case of generator outages ▪ Ensure supply comfort (Contract performance) ▪ Facilitate energy settlement ▪ Supply of power to Industries/large consumers

Impact of Electricity Trading

- Optimization of existing energy resources
- Encouraging commercial outlook in the sector
- Encouraging cross-border exchange of power
- Catalyzing investment into the Power sector, mainly from the private sector

Summary

Summary

- Power trading companies have played and will be playing catalytic role in cross-border power trade
- Many South Asian power market (like India) are becoming highly competitive and offer immense opportunities for export/import of power in a transparent manner. The sellers however have limited choice : mainly supply to be State power utilities, many of them are not financially credible whereas State utilities have (buyers) have to gain confidence in supplier's credibility
- Sellers/State power utilities would not prefer to directly get into international contracts and associated issues such as Forex risks, Political & legal risks and dispute settlement
- Therefore role of intermediary will be essential to address the above issues and for identifying credible buyers and ensuring timely payment
- Even in Developed markets, Power Trading Companies play intermediaries role for their understanding of market, better value proposition, and risk mitigation
- Hence, role of Power Trading Companies will remain important

Concluding Remarks

Exchange of Power between the Countries to commence on Bilateral basis as a confidence building measure which may subsequently lead to formation SAARC Ring which should be the ultimate goal

Thank You