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Experiences in Asia and the Pacific

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Papers and Presentations

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South Asia Regional Energy Cooperation

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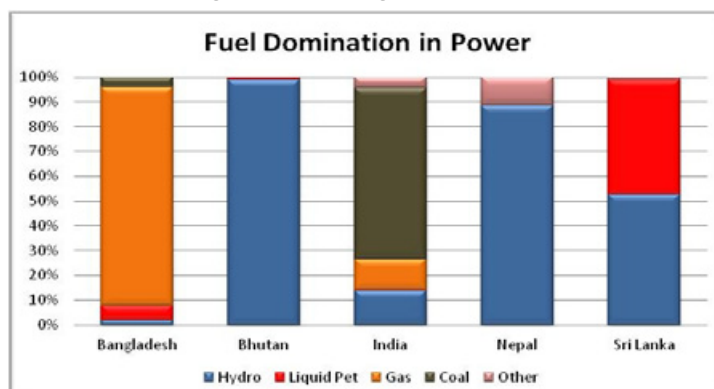


Presentation Outline

1. South Asia Energy Context
2. Need for regional cooperation
3. Regional Energy Vision
4. Regional Energy Players
5. Regional Energy Trade Study
6. Investments and Technical Assistance
7. Bhutan's Experience
8. Concluding remarks

South Asia Energy Context

- ✓ Sub-region has over 1.3 billion (21% of the total world population)
- ✓ Wide variation in abundant resource endowments in form of hydropower, coal, natural gas and other renewable energy resources
- ✓ Dominance of single fuel in energy mix



Energy Demand & Supply

Energy Reserves of SASEC Member States					
Countries	Bangladesh	Bhutan	India	Nepal	Sri-Lanka
Coal (Million Tonnes)	884	2	90085	NA	NA
Gas (Trillion Cubic Feet)	20.5	NA	39	NA	NA
Oil (Million Barrels)	12	NA	5700	NA	150
Hydro (MW)	330	30000	150000	42000	2000
Biomass (Million Tonnes)	0.08	26.6	139	27.04	12
Installed Capacity (MW)					
Countries	Bangladesh	Bhutan	India	Nepal	Sri-Lanka
Fuel Type					
Thermal	5841	17	123,759	53	1390
Coal	200	0	105,437		
Gas	4651	0	18,093		
Oil	990	17	1,200		
Hydro	220	1488	38,848	652	1382
Nuclear	0	0	4,780	0	0
Renewable Energy Sources	NA	0.5	22,233	NA	45
Total	6,061.00	1,505.50	189,620	705.00	2,817.00
<ul style="list-style-type: none"> ✓ Clean Energy Resource Potential yet to be exploited - countries either remain energy deficient or are not able to optimally harness & utilize their resources ✓ Rising fossil fuel import dependence and need for diversification 					

Energy Demand & Supply cont.-

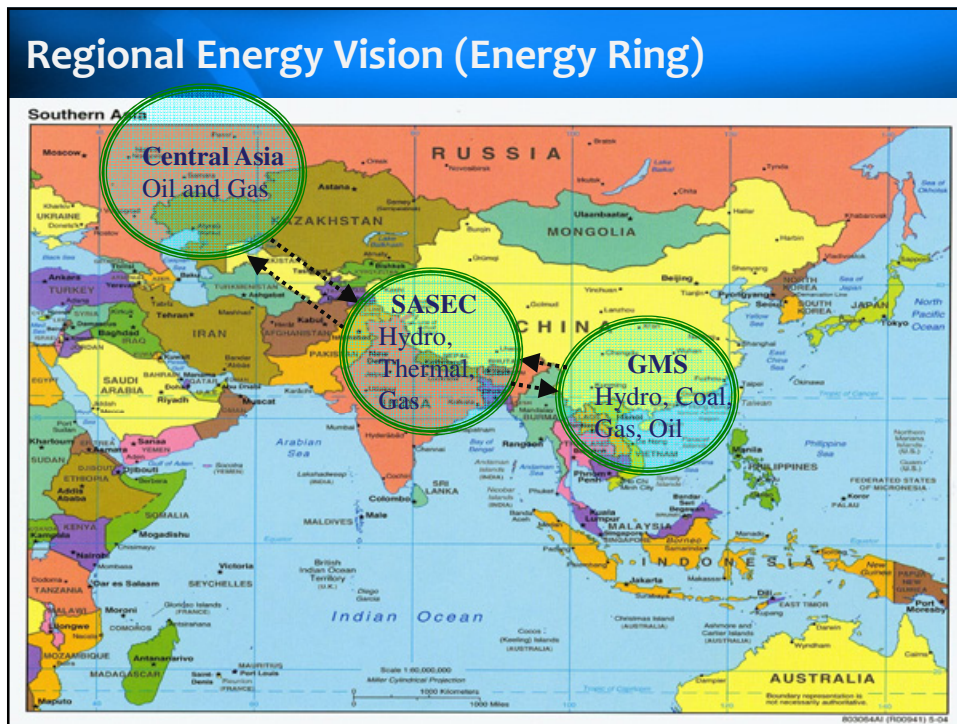
Energy Demand					
	Bangladesh	Bhutan	India*	Nepal	Sri-Lanka
% of Population with Electricity Access	42%	85%	56%	25%	88%
Annual Generation (MU)	29,247	7,046	788,355	3,711	10,715
Electricity Demand (MU)		1,684	861,591	4,693	
Surplus/Deficit	-25%	+76%	-8.5%	-20.33%	-37%
Future Demand (GWh)	71,990	2,500	2,550,000	8,990	22,040

* India's demand is expected to rise by 7.4% and has peak shortage of 9% in 2011

Data Source: www.bpdb.gov.bd, www.cea.gov.in, SRETS, 2010, MoEA-Bhutan, Ceylon Electricity Board, energypedia.info-Nepal

Need for regional cooperation

- Energy resource diversification and energy security
- Sharing of low cost energy resources
- Economic opportunities for energy exporting countries
- Enhanced opportunities for climate change mitigation



SAARC Energy Centre (13th SAARC Summit declaration 2005)

Established in 2006 in Islamabad, Pakistan with following Objectives:

- To strengthen South Asia's capacity to collectively address global and regional energy issues.
- To facilitate energy trade within the SAARC region, through the establishment of a regional electricity grid and natural gas pipelines.
- To promote more efficient use of energy within the SAARC region.
- To enhance cooperation in the use of new and renewable energy sources in the region, thereby contributing towards more sustainable development in the SAARC member countries.
- To serve as a focal point for providing reliable energy data for the individual member countries and the South Asian region.
- To enhance SAARC expertise in energy development and management.
- To promote private sector investment and participation in energy activities in the region.

Programmes of SAARC Energy Centre

Programmes are demand driven, based on a holistic approach drawn from:

- Decisions and declarations of the Summit.
- Directions of the Energy Ministers.
- Guidelines given by the Working Group on Energy and the Governing Board of the Centre.
- Approved 5-year Strategic and Operational Plan of the SAARC Energy Centre.
- Participatory design with Member States.

SAARC Regional Energy Trade Study

- ✓ Assisted by ADB (RETA 6368: *Preparing the Energy Sector Dialogue and SAARC Energy Center Capacity Development Project* (December 2006))
- ✓ Identified trade options and opportunities for cooperation
- ✓ Proposed trade options and Opportunities:
 - i. Establishment of regional power market (*Expanding the Indian power market to include neighboring countries through power interconnections between India-Nepal, India-Bhutan, India –Bangladesh, India-Sri Lanka*)
 - ii. Establishment of regional crude oil refining facility
 - iii. Establishment of regional LNG terminal
 - iv. Establishment of regional power generation facility

Initiatives and Outcome of SAARC towards fostering Regional Energy Trade

1. SAARC Expert Groups on i) Electricity ii) Oil and Gas iii) Renewable Energy and iv) Technology Transfer / Knowledge sharing formed to take forward the recommendations of SAARC Regional Energy Trade Study (SRETS).
(5th Energy Working Group Meeting, 29th-30th April, 2009)
2. Approval accorded to conduct the study on Regional Power Exchange for establishing a regional power market for enhancing regional energy trade in the SAARC region .
(37th SAARC Standing Committee, April, 2010)
3. The draft common template on technical and commercial aspects of electricity grid interconnections and draft concept paper on the Road Map for developing SAARC market for electricity finalized. (2nd Expert Group Meeting on Electricity, 18th Jan, 2011)

Initiatives fostering Regional Energy Trade

4. Adoption of the SRETS Report by the SAARC Energy Ministers. (4th SAARC Energy Ministers Meeting, 15th Sept, 2011)
5. To fast track finalization of the Draft SAARC Inter - Governmental Framework Agreement for Energy (Electricity) cooperation. (4th SAARC Energy Ministers Meeting, 15th Sept, 2011)
6. Decided to conclude the Inter-governmental Framework Agreement for Energy (Electricity) Cooperation and the Study on the Regional Power Exchange (17th SAARC Summit Declaration, 11th Nov, 2011)

Ongoing ADB assisted projects

- ✓ Bhutan 126 MW Dagachhu hydropower project (a CDM Project)
 - Over \$220 million Public-Private Partnership (DGPC/NPPF/Tata Power) Project
 - 126 MW RoR (515 MU annually)
 - Export power to India (Tata Power Trading Comp. Ltd. is the off-taker)
 - First cross-border CDM Project (displace 502,000 tons annually of CO₂e)
 - Scheduled to be commissioned by 2013



Ongoing ADB assisted projects

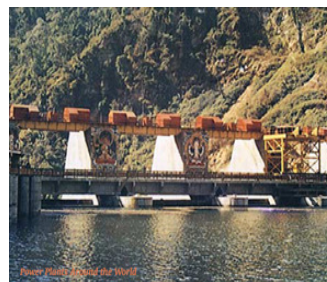
- ✓ Bangladesh-India 500MW, 400kV D/C transmission interconnection
 - Transmission line (115km) and back-to-back HVDC Substation (400kV/230kV)
 - Provides access to the Indian power market
- ✓ Nepal-India 1000MW, 400kV Dhalkebar-Muzaffarpur transmission line
 - Related facilities for power evacuation towards the cross border line
- ✓ Bhutan 210 MW Nikachhu hydropower plant
 - PPP
 - Project Preparation initiated

Future projects

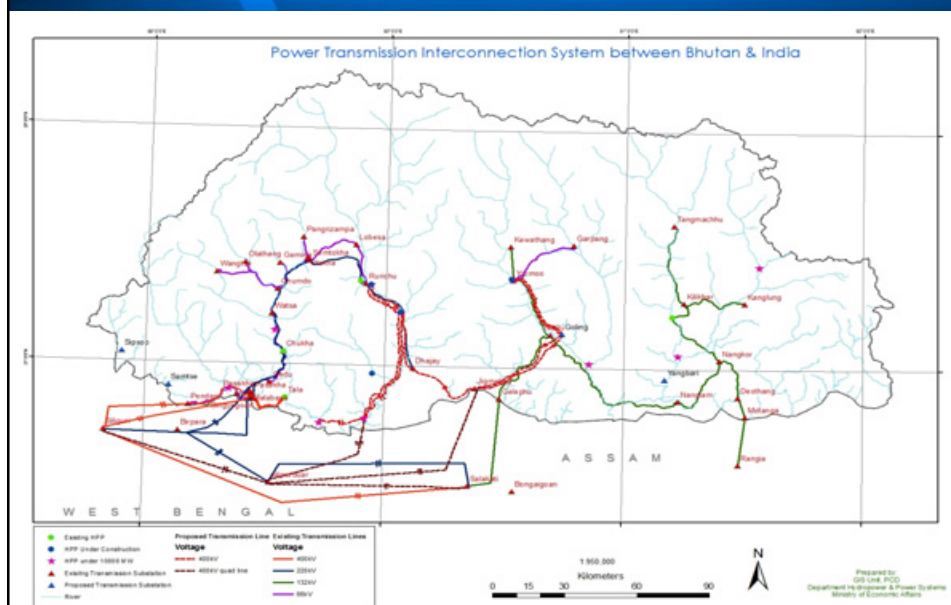
- i. India-Nepal additional interconnections
- ii. Bangladesh-India Eastern border interconnections
- iii. Investments in cross-border power generation and transmission interconnections between India-Bhutan and India-Nepal
- iv. India-Sri Lanka 127km, ± 400 kV HVDC grid interconnection via submarine cables
- v. Support PPP Projects
- vi. ADB's TA support for capacity building and energy sector dialogue
 - Developing sub-regional power generation and transmission Master plan.
 - Establishing South Asia Transmission Utility Forum (sharing experiences)
 - Promoting renewable energy as well as energy efficiency practices.
 - Facilitating establishment of a regional power market.
 - Facilitate harmonization of power system requirement to allow cross-border trading

Bhutan's experience

- Hydropower – rich endowment – 30,000MW potential (24,000 MW techno-economically feasible) and huge demand in the region
 - ~5% harnessed (75% of the generation exported to India)
 - backbone of our economy
- Electricity for all by 2013 (Over 77% of the households have access to grid electricity)
- Development of 10,000 MW (~ 40 GWh annually) hydropower generation by 2020 through bilateral assistance from India underway
- Overall Agreement and protocol with Government of India to develop 10,000 MW and mechanism/modalities of implementation in place.



Power Interconnection with India



Power Interconnection with India

Inter-Connections in future (by 2020) as per National Transmission Grid Master Plan

- 400kV D/C Quad moose line Lhamoizingkha – Alipurduar (India)
- 400kV D/C Quad moose line Jigmeling – Alipurduar (India)
- 400kV D/C Quad moose line Sankosh – Alipurduar (India)
- 400kV D/C Quad moose lines from Yangbari - Baranagar (India)

Challenges for Regional cooperation

- Huge Investment cost
- Political Will.
- Environment.
- Climate change.
- Private participation.
- Affordability.
- Right of Way.

Concluding Remarks

- The critical step towards enabling exchange of power in the region is the establishment of bilateral grid connectivity between member nations. Initiatives underway between India and neighboring countries.
- Harmonization of the studies on Regional Energy cooperation conducted by SAARC/SARIE/BIMSTEC/SASEC etc to achieve synergies and mainstream strategies.
- SRETS recommendations is an important road map for the region to promote energy trade.
- Need to work on policy environment that permits conducive cross-border investment flows – Public-Private Partnership & other investment models.
- Need for strong political commitments of the member states to implement the recommendations of the studies in a time bound manner.
- ADB to continue to play catalytic role and bridge the gap through TAs and investment support.

Tashi Delek