Current State of Energy Infrastructure Development and Future Cooperation Prospects in South Asia

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Section 1: Introduction to Entecsol International
Entecsol International is a Consulting firm established on June 1, 2007

Promoted by a group of senior energy sector experts from across South Asia

Currently headed by Durga Raina, former Director and Senior Energy Advisor, global Energy Consulting company, Nexant, Inc., USA (an affiliate of Bechtel Corporation)
OUR MISSION

“To be partners in the progress of our clients by provide innovative advice that helps them in achieving goals in the most efficient and economical manner in the shortest possible time”
Organization

- Twenty professionals of highest standing and reputation in the energy sector

- Experience in formulation and implementation of several the national level policies for the Power and Coal Sector including UMPP Policy and the Coal Sector Reforms

- All the team members have headed respective areas of specialization in earlier organizations

- Most of the team members have over 30 years of experience in their respective fields

- Cumulative experience of our team adds up to over 650 person years
Areas of Specialization

- Conceptualization, implementation, financing, monitoring; erection & commissioning of power project
- Pre-feasibility/feasibility and Residual Life Assessment (RLA) studies
- Environment Impact Assessment (EIA)
- Economic and Social Impacts Assessment studies
- Rehabilitation, Renovation and Modernization (R&M) of power projects
- Technical and financial appraisal of power projects
- Operational and financial management of power utilities
- Energy Efficiency and Distribution reforms
- Strategic planning, institutional/capacity development of energy utilities
- Policy formulation/implementation and reform/restructuring
- Regulation and regulatory reforms
- Power trade and Electricity Markets
- Business environment risk analysis and risk mitigation
- Preparation/review/negotiation of PPAs, FSAs, TSAs, DM and Tolling Agreements
- Regional cooperation including harmonization of policies to promote power trade
- Technology Tie-ups and International Collaborations
- Rural electrification and off-grid electricity systems
**Business Associates**

- **IBM, USA** - application of information technology in power project development/ utility management
- **Consolidated Energy Consultants Ltd.** - development and implementation of Wind Power projects and Wind Mapping
- **Central Power Research Institute** - power project development, Energy Audit/R&M/ RLA Studies
- **National Power Training Institute** – institution building & capacity development of professionals in all areas of power Sector
- **Energy Center of IIT Delhi** - technology development
- **Administrative Staff College of India** - Energy policy advice, institutional development, capacity building/training
- **Hemant Sahai Associates** - legal review of contract documents, contracts including PPAs, FSAs, Dist. Management Agreements etc.
- **Khan & Paricha** - Legal review of contract documents, contracts including PPAs, FSAs, Dist. Management Agreements etc.
Our Clients

- BMZ Germany, through GTZ, Pakistan: - Appraisal of opportunities for supporting Renewable Energy Projects Initiatives of the SAARC Energy Centre
  - Review of the Building Energy code of Pakistan
- Japan Bank for International Cooperation (JBIC) - Review of Tariff Payment Scheme of Utra Mga Pwer Pojects (UMPPS) in India
- Asian Development Bank, Manila (ADB), Manila:
  - Review the Regional Energy Trade Study for South Asia,
  - Support to operationalize SAARC Energy Centre in Pakistan
  - Energy Sector Road Map for South Asia
- Energy Charter Treaty, Brussels (ECT), Belgium - Power Trade in Between Central Asian Republics and with South Asia
- Sumitomo Mitsui Banking Corporation, Japan (SMBC):
  - Evaluation of benefits to Japanese Companies in India, as a result of sale of power from: - Nagarjuna Power Corporation’s 1015 MW Thermal Power Project to Karnataka;  - DVC’s, Mejia-B - 1000 MW Thermal Power Plant to Delhi and Haryana, - Rosa Power Supply Company Ltd. (RPSCL) proposed 600 MW Coal-fired Thermal Power Plant to Noida
Memberships & AFFILIATIONS

World Energy Council (WEC) – Member. Durga Raina is a team member to undertake the study “Meeting the Energy needs of the mega Cities in 2050”

Joint India-Nepal Committee for Development of Hydropower – Member

South Asian Policy Analysis (SAPANA) – Member

South Asia Free Media Association (SAFMA) – Member

Close working relationship with:

- South Asia Centre for Policy Studies (SACEPS)
- Centre for Policy Dialogue (CPD)
- SAARC Energy Centre (SEC)
Section 2: Current State of Energy Infrastructure in and Around South Asia
Commercial Energy Resources Base of SA

Afghanistan: Moderate Gas/hydro power potential, but large Solar and Wind potential
Bangladesh: Large Gas, Coal and Solar resource; Low Hydro power
Bhutan: Large Hydro power, solar and wind potential
India: Large Coal, Hydro, Wind and Solar; but moderate Gas/Oil
Maldives: Moderate Wind but high solar potential
Nepal: Large Hydro potential and solar potential and moderate wind
Pakistan: High Coal, Gas, Hydro, Low oil; but rich solar and wind potential
Sri Lanka: Moderate hydro, but large wind and solar resources
Current State of Energy Infrastructure In/Around SA

CAR Power Grid Map

ASEAN Power Grid Map

Indian Power Grid
Existing Cross Border Electricity Interconnections

Bhutan-India:

Five transmission interconnections; one 440kV (DC), two 220kV and two 132kV levels help India import of about 1260 MW from Bhutan

India-Nepal:

Twenty-one interconnections at 11 kV, 33 kV and 132 kV levels facilitate about 50 MW power exchange between the two countries to be increased to 150 MW

Iran-Pakistan:

Three interconnections exist between Iran-Pakistan for importing small quantities of electricity from Iran to meet the local demand in bordering areas. Additional 100 MW import contemplated to meet the demand in port city of Gawadar
Section 3: Regional Energy Cooperation Initiatives in South Asia
Regional Energy Cooperation Initiatives

Pre-feasibility studies (2001-06):

- 2-Borders Pre-feasibility Study: options for interconnecting Indian power grid with that of Sri Lanka
- 4-Borders Pre-feasibility Study: options for interconnecting power grids of India, Nepal, Bangladesh, and Bhutan
- Possibility of interconnecting the Sub-stations along India-Bangladesh Border
- Indo-Sri Lanka Trade Project (Road/Rail Bridge with Power Transmission & Optical Fiber cables for data transfer for IT and Telecommunication Sectors)

Policy Studies (2006-07):

- Regional Energy Security for South Asia - SARI/Energy
- Power Trade in Between Central Asian Republics and with South Asia - ECT
- SAARC Regional Energy Trade Study – SAARC/ADB

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Regional Energy Cooperation Initiatives

Economic & Social Benefits Analysis (2003-06):
- Power Trade in the South Asia Growth Quadrangle (4-Border Region)
- Power Trade between India and Pakistan
- Indo-Sri Lanka Trade Project

Gas Options (2002-03):
- Gas options study for India
- Gas options study for Sri Lanka

Hydropower Resources (2002):
- Mapping of Regional Hydro-power Resources in South Asia

Power Exports from Bangladesh to India (2000):
- Viability of Power Export from Bangladesh to India study conducted in 2000
  examined 500 MW power export from BD to India
Other Relevant Projects

CASA 1000 Project (Central Asia-Afghanistan-Pakistan):
- Enhance capacity of CASA to help other South Asian countries to import power from the Central Asia Region

Power export Study from Bangladesh to India:
- Study carried out in 2000 was revisited in 2005 to reaffirm the validity of options
- It showed great promise for establishing a 1000 MW gas fired TPS in Bangladesh and export 500 MW to India
- Now with the latest high quality coal finds in Bangladesh, the export oriented power station could even be a coal fired TPS
Transmission charges about US$ 0.0258/unit in Stage-I (500 MW) to $0.0164/unit in Stage-II (1000 MW) – Revised
Transmission charges Stage-I (250 MW) about $0.0174/unit and Stage II (500 MW) about $0.0125/unit - Revised Estimate per new study
Findings of the Study

- 24 substations - 5 to 60 Kms from the border
- 18 sub-stations – 10 to 70 Kms from the Border
- Investment required for each interconnection ranges between US$ 1.32 million to 4.39 million
Potential Route for CASA 1000 Transmission System
Section 4: Future Cooperation Prospects
Gas Import Options Being explored

**Iran-Pakistan-India (IPI):**

Though Iran, Pakistan and India reached an agreement for implementation of this project, but gas pricing is impeding its implementation.

**Turkmenistan-Afghanistan-Pakistan-India (TAPI):**

Re-assessment of gas reserves of Turkmenistan has been submitted to interested parties and the project may be put on fast track for development in near future.

**Myanmar-Bangladesh-India (MBI):**

Options to bring Myanmar gas to India either via Bangladesh or through Northeastern states of India being explored.

**Qatar-Iran-Pakistan-India Gas Pipeline (QIPI):**

High gas prices in the international market may make this project economically viable subject to availability of additional gas supplies.
Section 5: Promoting Regional Energy Trade in South Asia
Steps for Promoting Regional Energy Trade in SA

- Regional Electricity/Natural Gas grids and Regional Power Pool needed to facilitate power trading and gas imports into the region.

- Regional planning to develop hydropower resources to meet regional energy demand and reduce investment requirements.

- Region procurement mechanism for fossil fuel imports and Strategic Hydrocarbon Reserve will insulate the economies from large price fluctuations.

- South Asia Regional Energy fund needed to finance energy projects.

- Need for development of technologies for exploitation of large reserves of hydrates along south Asia’s coastline.

- Development of new technologies such as Hythane, Hydrogen, Bio-diesel, Fuel cells will reduce reliance on energy imports.
Thank you!