India-Pakistan
Energy Cooperation:
Rethinking Opportunities
and Newer Approaches

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Energy Security: Critical issue in India-Pakistan sub-region

Energy demand is steadily growing. Per capita electricity consumption remains rather low. Recorded low electrification coverage in entire sub-region.

Concentration of energy resources in this sub-region has been very high and could in fact be a major instrument of development.

Disruption of power and other energy supplies: affected both human (food, livelihood, employment and economy) and national security.

Adversely affected their productive activities, social development and investment climate. Massive reforms in electricity, gas and petroleum and coal sectors.

Energy security: dominant driver of regional geopolitics.
**Electricity Demand**

<table>
<thead>
<tr>
<th>Countries</th>
<th>Present Fuel dominance</th>
<th>Additional power requirement by 2020 (MW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bangladesh</td>
<td>Gas (85%)</td>
<td>15000</td>
</tr>
<tr>
<td>India</td>
<td>Coal (50%)</td>
<td>100000</td>
</tr>
<tr>
<td>Pakistan</td>
<td>Gas, Hydro, Oil (equal)</td>
<td>20000</td>
</tr>
<tr>
<td>Rest</td>
<td>Hydro, Oil</td>
<td>15000</td>
</tr>
</tbody>
</table>

Except Bangladesh, all SAARC countries have more than 50% of their hydro potential unutilized (100,000 – 150,000 MW).
Consumer Mix of Electricity Consumption

![Bar chart showing the consumer mix of electricity consumption for different countries, including Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, and Sri Lanka. The chart indicates the percentage breakdown of consumption for domestic, commercial, industrial, agricultural, and other sectors.](Image)
Why does Energy Security matter?
Access to Energy Results in Economic Growth
Energy Exchange and Trading: Rationale and Benefits

Economic gains based on regional cooperation in the energy sector has become a firmly established practice across regional groupings.

Cross border energy trade could lead to effective utilisation of natural resources, increase in supply reliability, economy in operation & mutual support during contingencies, bring about large scale transformation in sectors contributing to economic growth,
It will act as the single most effective confidence building measure (CBM) through the participation of multiple stakeholders and substantially promote market integration in energy related goods and services.

Savings in Capital & Operating Costs
Optimal Use of Available Generating Capacity

Feasibility of marginal power plants which are not viable on a national level but feasible in the regional context (i.e. large scale hydro & coal)

Seasonality factor in both generation and demand is highly noticeable.
Five reinforcing factors that are likely to promote power trading

I High potentials yet huge deficit
Huge power crisis leading to long hours of load shedding
Affect: social and economic and commercial activities.

Tremendous public pressures on the respective govts to act upon. This could even lead to political instability.

Pakistan imports petroleum - $6 billion /yr,
Value of its total export is $12 billion

In India the cost of unserved energy (55 Twh) in 2007 was valued at $12.1 billion

People are willing to pay for the electricity.
II    Increasing realizations among leadership to Expedite process of energy exchange.

For instance: Declarations in various SAARC Summits.

*Islamabad Declaration 2004:* Concept of Energy Ring discussed.

*Dhaka Declaration 2005:* Establishment of the SAARC Energy Centre to promote development of energy resources and energy trade in the region;

*Colombo Summit 2008:* Concept of Regional Inter-governmental Framework

*Colombo Meeting of Energy Ministers 2009:* Pursuing Energy Ring and Formation of Sectoral Expert Groups (e.g. gas, electricity, renewable energy etc.)
Thimphu Summit - April 2010: Authorized the SAARC Energy Centre in Islamabad to prepare an Action Plan on Energy Conservation. Noted India’s proposal to prepare a Roadmap for developing the SAARC Market for Electricity (SAME) on a regional basis.

Male Summit – 2011: It directed the conclusion of the Inter-governmental Framework Agreement for Energy Cooperation and the Study on the Regional Power Exchange Concept as also the work related to SAARC Market for Electricity.

ASEAN: Far ahead – with ASEAN Grid in place.
Energy Cooperation : SAARC Institutional Mechanism

- Ministerial Level Energy Forum
- Working Group on Energy
- Expert Groups for different energy commodities
- SAARC Energy Centre

Four Expert Groups preparing way forward in:
- Oil and Gas
- Electricity
- Renewable Energy
- Technology Transfer (including Coal and Energy Efficiency)
III Various levels of sensitisations and preparations for energy trading.

A number of organizations (regional and outside) engaged.

Technical and professional public and private sector organizations are often meeting and seriously deliberating.

And UNDP, ADB, World Bank, USAID are active agencies.

Large number of studies and policy suggestion:

South Asia Network of Econ Research Institutes (SANEI),

Coalition for Action on South Asian Cooperation (CASAC),

BCIM Forum
Several Training programmes and capacity building projects: including by USAID’s SARIE project
IV Massive power sector reforms taken place

- India - Electricity Act 2003
  - to develop power market through increased competition, more players and protect consumer interests
  - Recognized *Trading as a distinct activity*
  - Adequate and progressive provisions governing open access both:
    - to transmission networks (inter-state and intra-state) and
    - to distribution networks
National Electricity Policy, 2005

Identifies hydro generation as a thrust area for development, being clean and renewable source of energy

Integrated Energy Policy 2006

recognizes that energy security can be increased not only by diversifying sources of import of a particular fuel but also by diversifying the energy mix by using different types of fuel

Use of coal, oil, gas, nuclear, hydro and renewables of various kinds: less vulnerable to supply disruptions of either domestic or imported energy sources

Enhancing inter-regional energy trade, particularly electricity trade seems to be an attractive option
recognizes that substantial scope exists for import of hydro power from Bhutan, Nepal (and Myanmar)

notes that import of hydro power through Bhutan and Nepal could enhance energy security

recommends Nepal and Bhutan may be given the right to sell power to any one in market

Licensed Activity, more than 40 inter-state trading licensees

- Power Market Size > 30 Billion Units per Annum – about 3% of total generation

Cross-Border Trade ~ 20% of power trade
Generation de-licensed – merchant generation encouraged

Non-discriminatory Open Access in Transmission

The wholesale market for electricity in India is completely voluntary by design

This is because the buyer is free to choose from various options:

- Long/Medium term PPA based mechanisms
- Short term bilateral trades
- Day ahead market (through the power exchange)
- Real time mechanisms (UI)

Provides tremendous flexibility to market participants

Further, the rules regarding standards of supply are more liberal, permitting greater flexibility to utilities on demand side response
A NEW INITIATIVE: Indian Energy Exchange (IEX)

- In last 18 months, PX has attracted more than 200 participants including 25 States, 4 Union Territories, Captive Power Plant and direct consumers
- Facilitated trading of more than 6.7 Billion units, Rs. 45 Billion
  - Hourly Prices
    - Low: 13 p/kWh
    - High: Rs. 16/kWh
    - Average Rs. 7/kWh
- Buyers and Sellers are exercising their choice
  - Buyers procuring prudently, keeping in mind “affordability” and “prudence-checks”
  - Sellers supplying to credible buyers with a view to maximize revenue and minimize risks
- Prices are reflective of what market can absorb: an interplay of demand and supply
Pakistan - Commercial Framework for IPPs & Fiscal Concessions

- **Multi-year / long-term tariff** – Approved by Regulator
- **100% foreign ownership** allowed
- **Maximum 80% equity contribution**
- **5% concessionary Import Duty** on plant and equipment not manufactured locally
- **No levy of sales tax** on such plant, machinery and equipment
- **Exemption from income tax** (including turnover rate tax and withholding tax on import)
- **Specified tariff adjustments** for variation in exchange rates
- **Government ensures conversion of Pak Rupee & remittance of foreign exchange** for project-related payments
Private Power & Infrastructure Board (PPIB)

- Created in 1994 to promote private investments in power sector
- Successfully implemented 1994 Power Policy
- Successfully negotiated, executed and administered long term concession agreements such as IA, PPA and FSAs
- Total 14 projects have been commissioned with the cumulative capacity of 4,300 MW
- Attracted world-leading energy players to Pakistan’s Private Power Sector – US$ 3.8 Billion of FDI
- Successfully handled post commissioning issues of IPPs
- Bulk of financing was foreign through multi-lateral lending agencies
An “Investor-Friendly” Policy
IV Significant level of Transmission Systems are in place

India: two varieties of exchanges viz. Inter-state and Inter-regional

- Present installed capacity - 294000 ckm
  - 220kV Transmission Line - 150000 ckm
  - 400kV Transmission Line - 125000 ckm
  - HVDC 800/600kV Line - 3600 ckm
  - HVDC 500kV Line - 7400 ckm
  - 765kV Transmission Line - 7600 ckm

- Present Inter regional Capacity - 38650 MW
  - Expected by 2017 - 75000 MW

- Estimated Additions of Transmission Network in 12th Plan - 155000 to 180000 ckm
India - Transmission System

INTERREGIONAL LINK CAPACITY
11th PLAN (2012)

BY END OF

37,150 MW OF INTERREGIONAL POWER BY 2012

Source: CEA & Planning Commission reports
## Transmission System

<table>
<thead>
<tr>
<th>Voltage</th>
<th>Sub Stations</th>
<th>Transmission Lines</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>WAPDA</td>
<td>KESC</td>
</tr>
<tr>
<td>No.</td>
<td>MVA</td>
<td>No.</td>
</tr>
<tr>
<td>500 kV</td>
<td>11</td>
<td>-</td>
</tr>
<tr>
<td>220 kV</td>
<td>27</td>
<td>6</td>
</tr>
<tr>
<td>132 kV</td>
<td>464</td>
<td>40</td>
</tr>
<tr>
<td>66/33 kV</td>
<td>197</td>
<td>6</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>699</strong></td>
<td><strong>50404</strong></td>
</tr>
</tbody>
</table>
Sasson Stations

1. Peshawar
2. Tarbela
3. Ghazi Brotha
4. Rawal New
5. Lahore
6. Gaddi
7. Rousch (IPP)
8. Yousefwa
9. Mullan
10. Muzaffar Garh
11. Guddu
12. Jamshoro

Legend:
- [Legend Description]

PEPCO

[Map of Pakistan with various power stations and transmission lines marked]
Regional Power Trade
What does it require?

To interconnect the Electricity Grids of Member Countries through High Voltage Transmission Lines to facilitate exchange (import and export) of electrical power across borders.
India-Pakistan Power Exchange

Three Options:

1. Bilateral power trade

2. Pool based exchange and

3. Wheeling Facility
1 Bilateral Options : Success Stories

- India - Bhutan Energy Exchange:
  - Long term PPAs with Department of Energy, Bhutan:
    - Chhukha HEP (336 MW); Kurichu HEP (60 MW)
    - Tala HEP (1020 MW)
  - Run-of-the River Projects: 4 Hrs peaking

Electricity export – over 84% of total generation [1,494 MW]
Internal consumption ~ 1152 MU (Peak load 187.5MW)
Annual export ~ 5922 MU

Electricity Sale revenue US $ 203 million
[47% of national revenue].

- A number of hydro projects under development in Bhutan 10,000 MW by year 2020
India- Bangladesh : Three Far reaching Projects underway

i) 250 MW exports from India likely to start in mid 2013

ii) A grid inter-connection between Bheramara in Bangladesh and Bahrampur (West Bengal) in India is likely to be completed by mid 2013. ADB loan critical role

iii) 1320 MW coal based unit at Rampal (350 kms S-South West of FD=Dhaka by Bangladesh-India Friendship Power Company consisting of BPDB and NTPC costing $1.5 billion by 2017

These three projects are going to be landmark starting projects as they for the first time break a long journey between potential, negotiations and implementations. Could lead to several such exchanges
2 Pool based approach: Sub-regional power Pool

The pool based approach: agent based integrated simulation can possibly provide support to develop a competitive long run market equilibrium in sub-regional power trade.

Involves working together of a set of agents (manufactures), a monitoring, advisory and channelising regional body in close harmony.

Key feature: uses a micro level, bottom-up representation of the market with each generating firm (public and private) represented at the level of its individual plants.
Establishing a Sub-Regional Power Trading Corporation (SRPTC) would be highly beneficial to launch this type of market mechanism in India-Pakistan sub-region also.

This could be called “Indo-Pak-SRPTC” which could provide market feedback to individual power producers (agents) as well as the power consumers.

Indo-Pak-SRPTC can maintain and disseminate information.

To facilitate the process of setting up of Indo-Pak-SRPTC, essential to assess and understand the nature, direction and extent of intra-country power exchange between India and Pakistan.
### Some Successful Power Pools based examples of energy exchange

<table>
<thead>
<tr>
<th>Regional Arrangement</th>
<th>Member Countries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Union for the Coordination of Transmission of Electricity (UCTE)</td>
<td>Spain, Portugal, France, Belgium, Italy, Netherlands, Luxemburg, Austria, Germany, Switzerland and now extended to Poland, Czech Republic, Slovak Republic, Hungary, Slovenia and Croatia.</td>
</tr>
<tr>
<td>Nord Pool</td>
<td>Norway, Sweden, Finland &amp; Denmark</td>
</tr>
<tr>
<td>North American Electric Reliability Council (NERC)</td>
<td>United States and Canada.</td>
</tr>
<tr>
<td>Southern African Power Pool (SAPP),</td>
<td>South Africa, Lesotho, Mozambique, Namibia, Malawi, Zimbabwe, Zambia, Botswana, Angola, Swaziland &amp; Tanzania</td>
</tr>
<tr>
<td>The Commission of Regional Power Integration (CIER)</td>
<td>Jordan, Bahrain, Tunisia, Algeria, Saudi Arabia, Syria, Libya, Egypt, Morocco, Mauritania, Yemen, Iraq, Lebanon, Palestine, Dubai and Qatar</td>
</tr>
<tr>
<td>South America, power trading</td>
<td>Argentina, Paraguay &amp; Uruguay. Central America.</td>
</tr>
<tr>
<td>Regional Arrangement</td>
<td>Member Countries</td>
</tr>
<tr>
<td>---------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>IPS/UPS (Russia and CIS Countries) Interconnected Power System of</td>
<td>(Presently 15 Countries/States are interconnected with IPS/UPS) (Lithuania,</td>
</tr>
<tr>
<td>Russia, Baltic States and CIS Countries</td>
<td>Latvia, Estonia, Belarus, Ukraine, Moldova, Russia, Georgia, Azerbaijan,</td>
</tr>
<tr>
<td></td>
<td>Kazakhstan, Turkmenistan, Uzbekistan, e, Tajikistan, Mongolia)</td>
</tr>
</tbody>
</table>
3 Wheeling Facility

- Distinct advantages for Pakistan to import power from Bhutan and Nepal both because of the lower tariff and supply reliability.

Bhutan: like to diversify the markets from India’s monopsony situation to Regional Market

Other major supplier: Number of hydro plants are under construction in the North East region
Bhutan: Huge Generation Surplus by 2020 & 2030

<table>
<thead>
<tr>
<th>Existing Installed Capacity (IC)</th>
<th>Capacity addition by 2020</th>
<th>I.C. by 2020</th>
<th>Capacity addition by 2030?</th>
<th>I.C. by 2030?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,480</td>
<td>11,864</td>
<td>13,344</td>
<td>14,653</td>
<td>27,997</td>
</tr>
<tr>
<td>5 HEPs</td>
<td>13 HEPs</td>
<td>60 HEPs</td>
<td>78 HEPs</td>
<td></td>
</tr>
</tbody>
</table>

Huge Generation Surplus by 2020 & 2030
In addition, the countries neighboring SAARC Member Countries have abundant natural resources:

- Central Asia (hydropower, gas, coal, oil)
- Iran (gas, oil)

Opportunity exists for Pakistan to import electricity from Central Asia/Iran etc. and provide transit to India and other SAARC countries.
Example CASAREM:
The governments of Afghanistan, Kyrgyz Republic, Pakistan and Tajikistan have entered into MoU for overall development of Central Asia-South Asia Regional Energy Markets (CASAREM)

- Working Groups formed on project sponsors, project finance structuring and supplier and buyer issues

- Developed a ‘working paper’ to outline Pakistan’s position for presentation by MOWP at the working group meeting held on Nov 15, 2011 at Dushanbe
Central to South Asia Electricity Transit

The Emerging Picture

**PHASE 1**
Import of Currently Available Electricity to Afghanistan from Taj, Turk & Uzbek via 220kV

**PHASE 2**
$1 billion project to deliver 1300 MW of power from Tajik and Kyrgyz via HVDC
750 km Transmission line thru Afghanistan to Pakistan. AC to DC substation at Songtuda hydro in Tajik
Kabul DC to AC substation to drop off 300 MW
Peshawar DC to AC substation to drop off 1000 MW
*(CASA 1000 MoU signed, but ADB has stepped out)*

**PHASE 3 (?)**
Import of Available and New HPP & TPP Electricity from Tajikistan, Kyrgyzstan, Turkmenistan & Kazakhstan to India via HVDC
Afghanistan Foundation Laid: North East Power System (NEPS)

- Power Grid in initial stage of construction
- Potential to serve over 15 provinces in Northern and Eastern regions of Afghanistan
- Target completion date: October 2011
- Major Components
  - Power import: up to 300 MW from each of Uzbekistan, Tajikistan, Turkmanistan
  - Sheberghan gas thermal plant: up to 150 MW
NEPS Geographically

The North East Power System
## Energy Reserves and Production of Countries Around South Asia

<table>
<thead>
<tr>
<th>Country / Region</th>
<th>Hydro power potential (MW)</th>
<th>HEP Developed (MW)</th>
<th>Oil Reserves (BBl)</th>
<th>Oil Production (MBI)</th>
<th>Gas Reserves (tcf)</th>
<th>Gas Production (bcm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central Asian Republics</td>
<td>52,400</td>
<td>10,719</td>
<td>1,264</td>
<td>NA</td>
<td>5,238</td>
<td>NA</td>
</tr>
<tr>
<td>Iran</td>
<td>42,000</td>
<td>2,000</td>
<td>132</td>
<td>4.2</td>
<td>971</td>
<td>3.5</td>
</tr>
<tr>
<td>Myanmar</td>
<td>39,720</td>
<td>747</td>
<td>3.2</td>
<td>7.3</td>
<td>18</td>
<td>3.62</td>
</tr>
<tr>
<td>Total</td>
<td>134,120</td>
<td>13,466</td>
<td>1,399</td>
<td>11.5</td>
<td>6,227</td>
<td>7.12</td>
</tr>
</tbody>
</table>
India and Pakistan could be integrated in the Future South Asia Energy Ring.
India and Pakistan
Several Bilateral Options

HUGE potentials between India and Pakistan

India’s North East regions are now harnessing the hydel power potentials in a massive way
For Example: Sikkim – 2000 MW by 2015
Domestic Demand is hardly 100 MW

Options: to export power to Pakistan, Bangladesh, Myanmar and China
<table>
<thead>
<tr>
<th>States</th>
<th>Potential (MW)</th>
<th>Capacity developed (MW)</th>
<th>% of the capacity developed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arunachal Pradesh</td>
<td>50328</td>
<td>423.5</td>
<td>0.84</td>
</tr>
<tr>
<td>Assam</td>
<td>680</td>
<td>375.0</td>
<td>55.15</td>
</tr>
<tr>
<td>Manipur</td>
<td>1784</td>
<td>105</td>
<td>5.89</td>
</tr>
<tr>
<td>Meghalaya</td>
<td>2394</td>
<td>185</td>
<td>7.74</td>
</tr>
<tr>
<td>Mizoram</td>
<td>2196</td>
<td>0</td>
<td>0.00</td>
</tr>
<tr>
<td>Nagaland</td>
<td>1574</td>
<td>99</td>
<td>6.29</td>
</tr>
<tr>
<td>Tripura</td>
<td>15</td>
<td>15</td>
<td>100</td>
</tr>
<tr>
<td>Total NE</td>
<td>58971</td>
<td>1202.7</td>
<td>2.04</td>
</tr>
<tr>
<td>All India</td>
<td>148701</td>
<td>332222.5</td>
<td>22.34</td>
</tr>
</tbody>
</table>
India: Installed Power generation capacity

Installed capacity: 209 GW

RES: Renewable Energy Sources

- Hydro: 23%
- Thermal: 64%
- Nuclear: 3%
- RES: 12%

19%
## Pakistan Power Sector – Total Installed Capacity

<table>
<thead>
<tr>
<th>Sector</th>
<th>Capacity (MW)</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Public Sector</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WAPDA</td>
<td>11,297</td>
<td>58</td>
</tr>
<tr>
<td>PAEC</td>
<td>462</td>
<td>2</td>
</tr>
<tr>
<td><strong>Sub-Total</strong></td>
<td>11,759</td>
<td>60</td>
</tr>
<tr>
<td><strong>Private Sector</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IPPs</td>
<td>6,045</td>
<td>31</td>
</tr>
<tr>
<td>KESC - Private</td>
<td>1,756</td>
<td>9</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>19,560</td>
<td>100</td>
</tr>
</tbody>
</table>
Reasons for Current Power Deficit / Load Shedding

Quantum jump in power demand during 2008-2011 due to:

- Increase in load as under:

<table>
<thead>
<tr>
<th>Activity</th>
<th>No.</th>
<th>Increase in Demand (MW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Villages electrified</td>
<td>47,076</td>
<td>188</td>
</tr>
<tr>
<td>Population benefitted: 7 m +</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Connections given (2008-2011) excluding tube-well connections</td>
<td>3,062,215</td>
<td>190</td>
</tr>
<tr>
<td>Agriculture tube-wells Connection</td>
<td>40,577</td>
<td>100</td>
</tr>
<tr>
<td>Load addition due to installation of air-conditioners</td>
<td>1 Million</td>
<td>2,500</td>
</tr>
<tr>
<td>Total</td>
<td>Total</td>
<td>2,978</td>
</tr>
</tbody>
</table>

- Non-availability of fuel oil for power plants
- Shortage of Gas Supply to Power Sector
India's proposed Power Import from Pakistan

1998 Pakistan’s offer to India to sale surplus power

Discussions: Power Grid Corporation of India Limited (PGCIL) and WAPDA led various independent power producers (IPPs) in Pakistan

Feasibility of export of 300-1000 MW power to India was studied

Delivery points were identified and number of options were explored

System studies were also carried out under various loading conditions
• Technical and commercial aspects were also considered

• 2nd Draft of the Interconnection and Operating Agreement was discussed on 1 February 1999

  • Tariff : major stumbling block
  • WAPDA offered : US 7.2 cents/KWH
  • While Indian side offered : US 2.25 cents
    • Negotiations broke off
Transmission Arrangement : Easy Access

Pre-Partition plans/arrangements also available

Pakistan - 500 KV primary transmission system
Extending from Jamshoro in the south to Tarbela and Peshawar in the north.

Lines run very much near to the adjoining borders of India
May not require complex transmission extensions :

Designated substations
Dinanath (Lahore) in Pakistan and Patti (Punjab) in India.
"There is a complete network on our side and of course on their (India) side as well. What we need are the connections, which would take only a couple of weeks“
- Statement by the Power Minister of Pakistan Gohar Ayub Khan,

**New Negotiations**

- Group of Experts on Energy have met thrice (5\textsuperscript{th} round of Secretary level talks on commercial and economic co-operation between India and Pakistan 27-28 April, 2011, Islamabad)

To negotiate on a cross-border interconnection between India and Pakistan to facilitate exchange and trade in electricity 500 MW power from Indian power market on commercial terms.
Policy Recommendations:

India and Pakistan should have a four-way approach in order to initiate the energy cooperation ventures.

1. To provide the policy and institutional framework for increasing cooperation in power trade. This should include:

   • Inter-Governmental Agreement on Bilateral / Regional Power Trade
   • Regional Power Trade Coordination Committee
   • Setting up of Focal Groups
     • Study: Options for the Future Power Market
     • Study: Regional Power Trade Operating Agreement in the India-Pakistan sub-region
   • Energy Sector Strategy Study
   • Convening the Energy Sector Forum
To develop the grid interconnection infrastructure through a building block approach allowing cross-border dispatch of power.

This should include:

- Essential physical power interconnection
- Harmonization of transmission planning, design, and operational practices (performance standards)
- Power infrastructure database design and implementation

Preparation of Regional Indicative Master Plan on Power Interconnection

Preparation of Regional Master Plan
3  Cross Border Investment : Project based approach

Establish a sub-regional infrastructure investment fund under the guarantee cover or funding from multilateral institutions such as World Bank or ADB.

Establish a Fund for equity investments in electricity and energy infrastructure

Competitive tariff in energy and capacity payment –

Pool price in importing country + Transmission Tariff

Allocation of Risk – Political & Force Majeure

Sales of electricity to other country by importing country
4 Tariff Structure for Regional/bilateral Electricity Trade

Tariff is going to be critical in all the 3 models of Power Exchange between India and Pakistan and between South Asia and Central Asia.

Importing country would purchase power/dispatch based on price of electricity and its priority in the merit order.

Three Tariff Structures could be considered:

- Two Part Tariff – Fixed charge & Commodity Price
- Single tariff on units transmitted basis
- Separate Tariffs for power purchase & transmission/wheeling
## Electricity Tariff in cents/kWh
(Domestic energy rate)

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>0-100</td>
<td>12.5</td>
<td>1.62</td>
<td>3.6</td>
<td>3.5 ave</td>
<td>5.29</td>
<td>3.65</td>
</tr>
<tr>
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Projects having cross-border implications are more often treated on political lines rather than on commercial considerations.

Yet to appreciate new dynamics of global energy politics.

Governments need to only provide enabling agreements covering the project and sector at large.

Depoliticisation of deals though hard to practice, will also do away with unnecessary national prejudices.

One bilateral project like that of India-Bangladesh should be used as a breakthrough project.
Capacity Building

Critical question is to build the capacities of the policy makers in the energy sector across the region by re-skilling and reorienting them to the advantages of cross border energy exchanges.

Large scale transformation the energy sector is undergoing and the varieties of cross border stake holders created therein. Policy makers in the region lack information, sensitization and the alternative options require more of a regional outlook rather than the traditionally followed national or at most bilateral outlook.
thank you