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South Asia Regional Initiatives for Energy Integration (SARI/EI)

Preparing Nepal to Access Sub- Regional Electricity Markets

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**SARI/EI Project Steering Committee
Meeting, Dhaka, Bangladesh
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A Snapshot

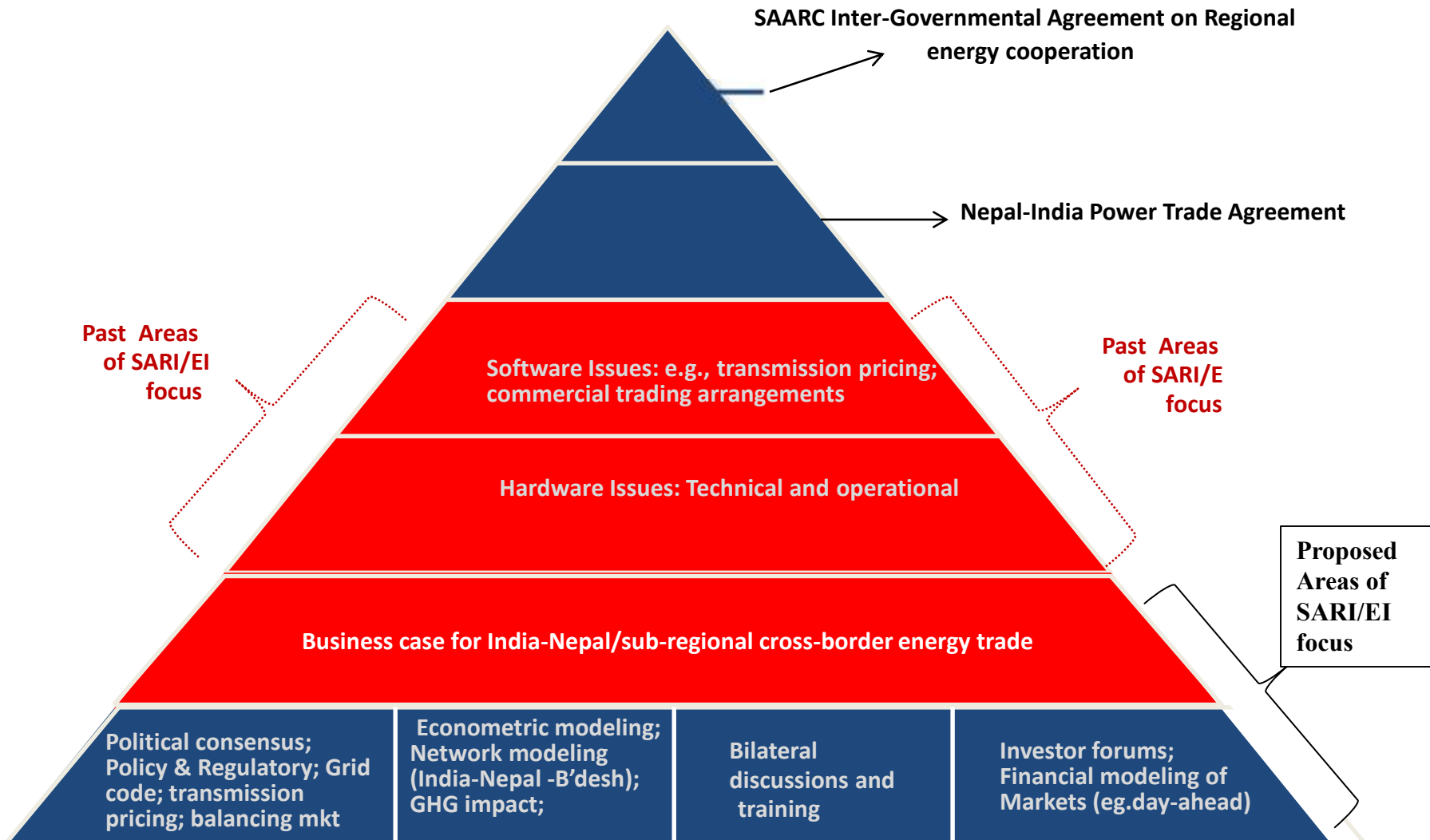
- SAARC Energy Cooperation Agreement signed on Nov 27
- Power Trade Agreement signed between India-Nepal on Sep 4, 2014.
- GMR-NEA Power Development Agreement signed; others under negotiation
- Modi announced \$1 billion line of credit for construction of roads and transmission lines.
- GoN undergoing change in perspective



Overview of SARI/EI Assistance: Past & Present

SARI/Energy

Innovation for Our EnergyFuture



Nepal Power Scenario

Project



Background

- Nepal: Demand for electricity will reach 2000MW in 2020 and around 4000 MW by 2030
- Dependable supply is 340MW in dry season and 600MW in wet season. Large power shortage in dry season
- High dependence on hydro resources
- New generation projects constrained by limited evacuation capacity

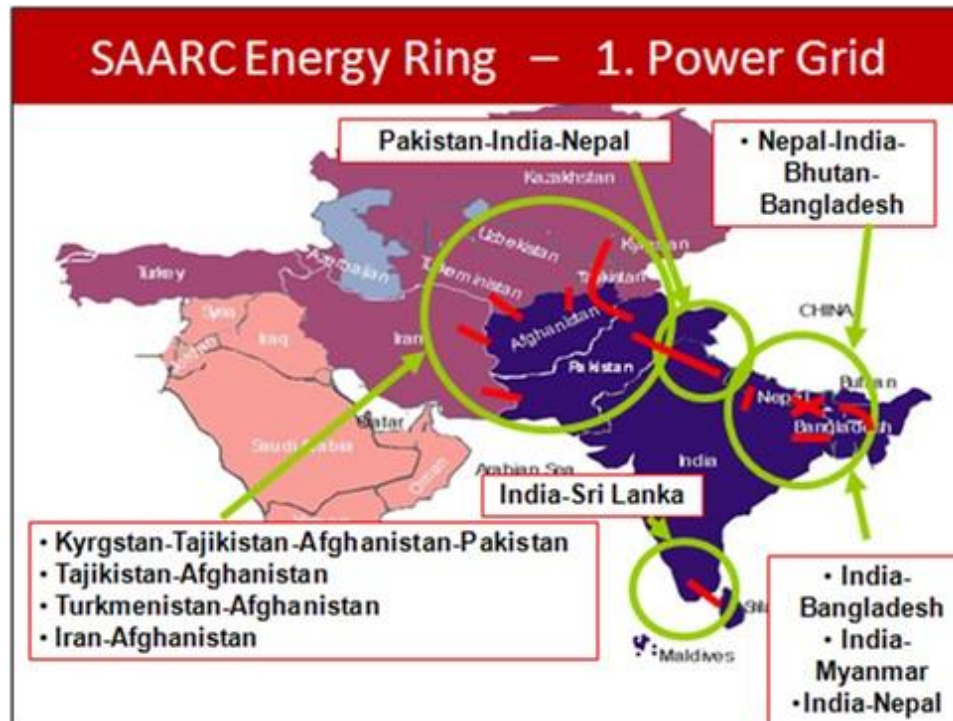
Nepal Power Statistics

- Hydropower potential 83,000 MW
- Commercially Viable 42,000 MW
- Net importer of electricity 780 MW developed.
- Highest Peak Load 1200 MW (Nov, 2013)
- Highest energy demand 4258 GWh (2013)
- Under construction generation 1044 MW
- Planned and Proposed 1852 MW
- Big Gap between energy demand and supply



Key Drivers for India-Nepal (& B'desh Trade)

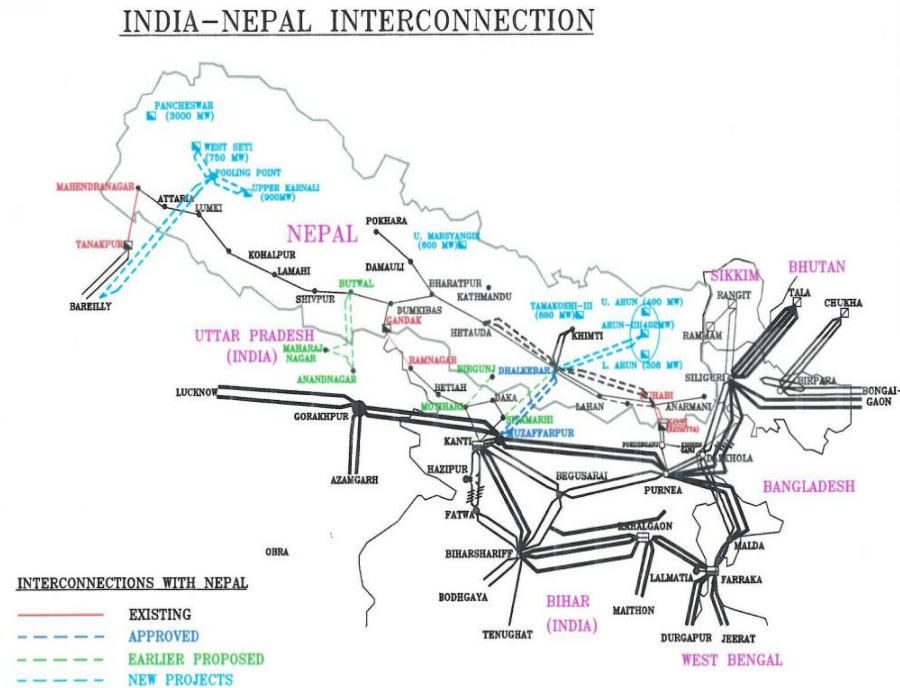
- Synergies in Power System Development and Operation between India, Nepal and Bangladesh
- Nepal
 - Lowest per capita electrical energy consumption among SAARC countries: 65 kwh in 1990, 68 kwh in 2003; More than 50% population without access
 - 87 per cent of energy needs met by traditional fuels (fuel wood, animal dung, and agricultural wastes).
- India
 - Meeting peak demand requirement
 - Advances renewable power development in India by enhancing ramping and balancing capability
 - Will trigger investments in India in creating power corridors between Nepal-India and reducing congestion within the country
- Bangladesh
 - Current peak demand: 7350 MW; Future peak demand: 19,000 MW(2021)
 - India-Nepal power interconnection will provide relief to existing power corridors and supply power to B'desh through displacement mechanism





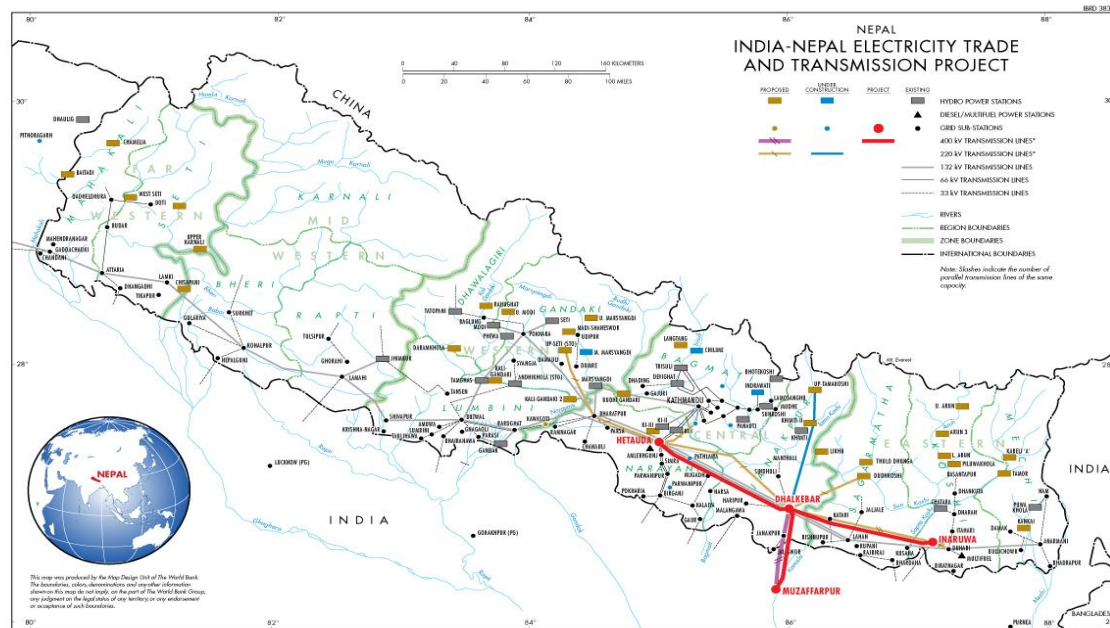
India-Nepal Power Trade

- **Existing 132 kV radial connections**
 - Kusaha(Nepal) - Kataiya (Bihar)
 - Gandak(Nepal)-Ramnagar (Bihar)
 - Mahendranagar (Nepal) - Tanakpur (Uttaranchal)
- **Around 14 nos. of 33 kV radial conn.**
Only power exchange not commercial transactions
- **Proposed 400 kV double circuit interconnections:**
 - Anarmani (Nepal) - Silguri (West Bengal)
 - Duhabi (Nepal) - Purnea (Bihar)
 - Dhalkebar (Nepal) - Muzzafarpur (Bihar)
 - Butwal/Bhiarahawa(Nepal) - Anandanagar/Gorkhapur (UP)



First Cross Border Transmission Link

- Dhalkebar - Muzzafarpur line 400 kV Transmission Line prioritized (Dec.2015); Power Sale Agreement signed between NEA and PTC for 150 MW for long term.
- Transmission line being developed by JV companies in India & Nepal





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First Cross Border Transmission Link

Dhalkebar - Muzzafarpur line.

- 140 km D-M transmission line initiated in Nepal side by Tata Project Ltd India (40 tower bases constructed).
- The power interconnection will be held hostage to congestion problems between Eastern Region to Northern Region of India
- Need to identify separate corridor to transfer power to load centers in India

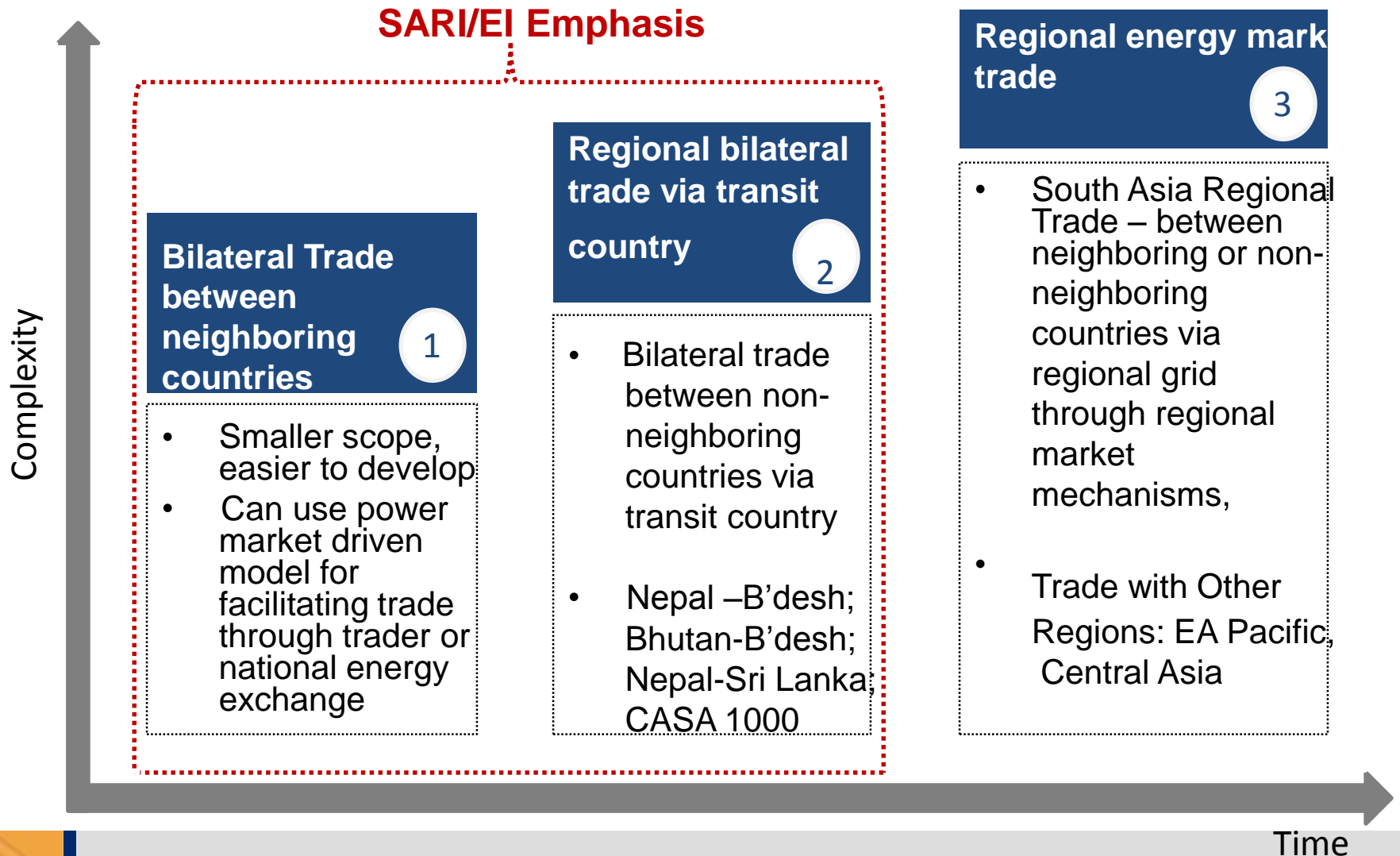




SARI/E's earlier work in Nepal

- Technical assistance to the Nepal Electricity Authority (NEA) on
 - Business and transactional strategies;
 - Legal and regulatory considerations in cross-border Transmission Service Agreements (TSA); and
 - Associated investment and financing issues
- “Minute of Meeting” signed between India and Nepal on power trade cooperation between Dalkebar (Nepal) and Muzaffarpur (India) DC Transmission Line Project on November 8, 2009.
- Regional Center of Excellence in Micro Hydro (RCEMH) established.
- 12 projects supported under Small Grants Program with 3,000 individuals direct beneficiaries.

Three emerging interconnection business models developing





Current Stakeholder Perspectives in Nepal

- **GoN:**
 - PTA is a watershed event
 - Closure to PDAs
 - Socio-economic benefits are paramount
 - Structural reforms are key
 - Building linkages with Indian and other sub-regional partners
- **NEA:**
 - Master Transmission Plan
 - Completion of Existing Interconnections with India
 - Functional Restructuring: PTC N; PG N;
 - Partnerships with sub-regional entities



Current Stakeholder Perspectives in Nepal(Contd)

- **IBN:**
 - PDA negotiations
 - In-house staff capacity
 - Technical & Financial support by external stakeholders
 - Working relationships with sub-regional financing entities
 - Creditworthiness of the main buyer
 - Pvt.Sector participation
- **MDBs:**
 - Bankable portfolio
 - Pre-feasibility and feasibility studies
 - Supporting sector reform
 - Establishing national regulatory commission
- **Developers:**
 - Transparency; Accountability in government dealings
 - Ease of doing business; Simplification of tax laws
 - Legally enforceable contracts



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Nepal: Political, Policy and Institutional Analysis: Some Questions?

- How well does the political system respond to the needs for CBET with India? What forces will govern change?
- How receptive to change are key stakeholders?
- How do existing energy policies advance CBET? Regulatory and Legal framework?
- How closely do existing laws reflect global standards?
- How well do they respond to commercial realities?
- How effective is the existing transmission regulation and operation?
- What is the ability of regulators to discharge their duties in a meaningful and predictable way?



Issues and challenges

- Hardware – Required infrastructure for interconnections to be built and operated.
- Software – Commercial trading arrangements to be developed (enactment of laws, establishment of regulatory and other institutions, etc.).
- Political consensus
- Environmental impacts
- Social impacts (Rehabilitation and Resettlements)
- Huge foreign investment required



Issues and challenges

Software

- Legislations and policies/ practices to permit cross border electricity trade required.
- Private-sector investment and public private partnerships (PPPs) to be engaged.
- Interconnections between India and Nepal to be completed.
- Laws, policies, and practices governing commercial energy trade among countries to be harmonized.
- Need for an independent regulatory regime.
- Restructure the energy-utility sector into competitive and commercially viable business units.
- Ensure that retail energy tariffs are cost reflective in both countries.



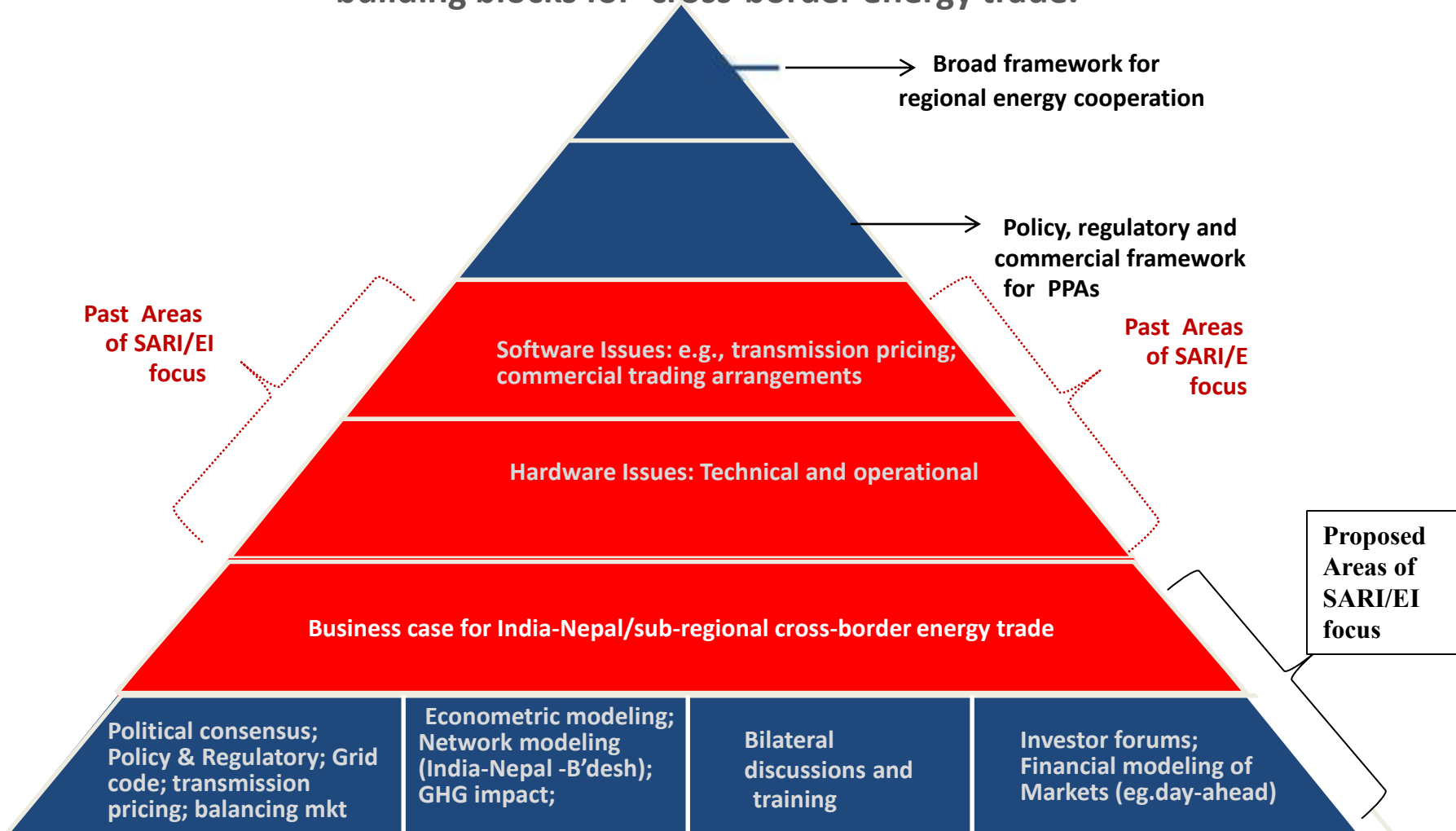
Other Developments in Nepal

- Large technical assistance program by Millennium Challenge Corporation (MCC) in Nepal focused on infrastructure and energy sector - 30 million USD threshold program
- It is expected that 50% of MCC's funds would be spent on the energy sector reforms

Proposed Technical Assistance & Capacity Building Framework

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SARI/EI should focus on targeted assistance that supports project development and key building blocks for cross-border energy trade.





SARI/EI's proposed initiatives

Capacity Building Strategy

- Support Investment Board of Nepal (IBN) thru Transactional Advisory Services
- Institutional Capacity Building of proposed PTC Nepal
- Development of Independent Electricity Regulatory Commission of Nepal.
- System Operations and Load Despatch Training
 - *Objective: To learn and obtain documentation on successful power system financing, electricity trading, regulatory practices and transmission system operations through dissemination of best international practices, executive peer exchanges and twinning arrangements.*



SARI/EI's proposed initiatives

Engage PTC, India; IEX

- Customized short-term 1-4 weeks intensive class-room training on power trading;
- Hands-on live working & familiarization of trading system operations and transactions; exposure to short-term, day ahead power exchanges

Engage PFC, India

- Customized short-term 1-4 weeks intensive class-room training on financial intermediation.
- Exposure to documented case examples of financial assessments, techno-economic appraisals and transactions



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**ENERGY UTILITY PARTNERSHIP PROGRAM (EUPP)
JANUARY – DECEMBER 2015 PLANNED ACTIVITIES
FOCUS: INDIA – NEPAL POWER TRADE ASSISTANCE**

- **2015 Focus – SARI/EI** plans to spend the entirety of 2015 focused on activities to support the recently signed India-Nepal Power Trade Agreement (PTA).
- **Definitional Mission – SARI/EI** conducted a definitional mission to Kathmandu, Nepal & New Delhi, India on November 3 – 13 to identify specific capacity building needs for Nepal to support the PTA.
- **PTA Joint Working Group – SARI/EI thru USEA** tentatively plans to organize a visit of the Nepal PTA Joint Working Group members to New Delhi in early January 2015 to meet with their counterparts and provide political support to SARI/EI’s planned Power Trade Assistance activities.
- **Training – USEA** is contracting PTC India Ltd. and Power Finance Corp. (PFC) to develop and implement a series of 4 – 6 “hands-on” trainings in 2015 for Nepal on power trade and power finance.
- **2nd Definitional Mission – USEA** plans to host representatives from PTC & PFC to Kathmandu in late January/early February to finalize the specific training needs and refine expectations.



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Training Details

- USEA plans to deliver training that goes beyond standard workshops, but instead will be a tailored transfer of best practices, reference documents and toolkits for the Nepalese to help them establish the appropriate institutional and operational frameworks for cross-border trade.
- Nepalese participants will be representatives from the Nepal Electricity Authority (NEA), Investment Board Nepal, and other relevant stakeholders. PTC's training will be directed towards the formation of a "Nepal PTC". PFC's training will predominantly be directed at the Investment Board Nepal.
- Specific topics may include: institutional frameworks (organizational structure, staffing, financing, etc.), planning, project approval, trading guidelines, operations, power & transmission system pricing, congestion management, contract negotiation, monitoring, etc.
- Other SARI/EI countries will be invited to attend trainings as appropriate.



SARI/EI's proposed initiatives

Engage Transaction Advisor

- Institutional advisory services provided to IBN leveraged through cross-support from AID/W
- Services provided by local/regional international consultancy firms

Engage Long-term local expert

- Strategize , plan and coordinate SARI/EI assistance
- Liaise with GoN, NEA, etc on TA/training plans



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SARI/EI's proposed initiatives

Studies and Analysis

- Study on limitations in the existing network interconnection between India and Nepal (at the radial, low voltage levels between the border states of UP and Bihar with Nepal).
- Preparation of a grid code for Nepal.
- Detailed system studies to assess technical benefits of the interconnection at higher voltage level to harvest the hydro potential at Nepal and facilitate the bilateral and regional transaction. This would include:
 - Demand supply analysis in the Northern Region,
 - Quantification of technical benefits of injecting the power from Nepal grid and the relief that can happen at the WR-NR and ER-NR corridors in India.
 - Supply of power to Bangladesh through displacement mechanism.



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Thank You!

