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South Asia Regional Initiative For Energy Integration

Regional Studies to support an enabling environment for Cross Border Electricity Trade (CBET) in South Asia

Rajiv Ratna Panda
HEAD-TECHNICAL, SARI/EI/IRADe

Meeting with Ambassador Alaina B. Teplitz, U.S. Ambassador to Nepal
Sep 9th,2016,USAID/India, New Delhi

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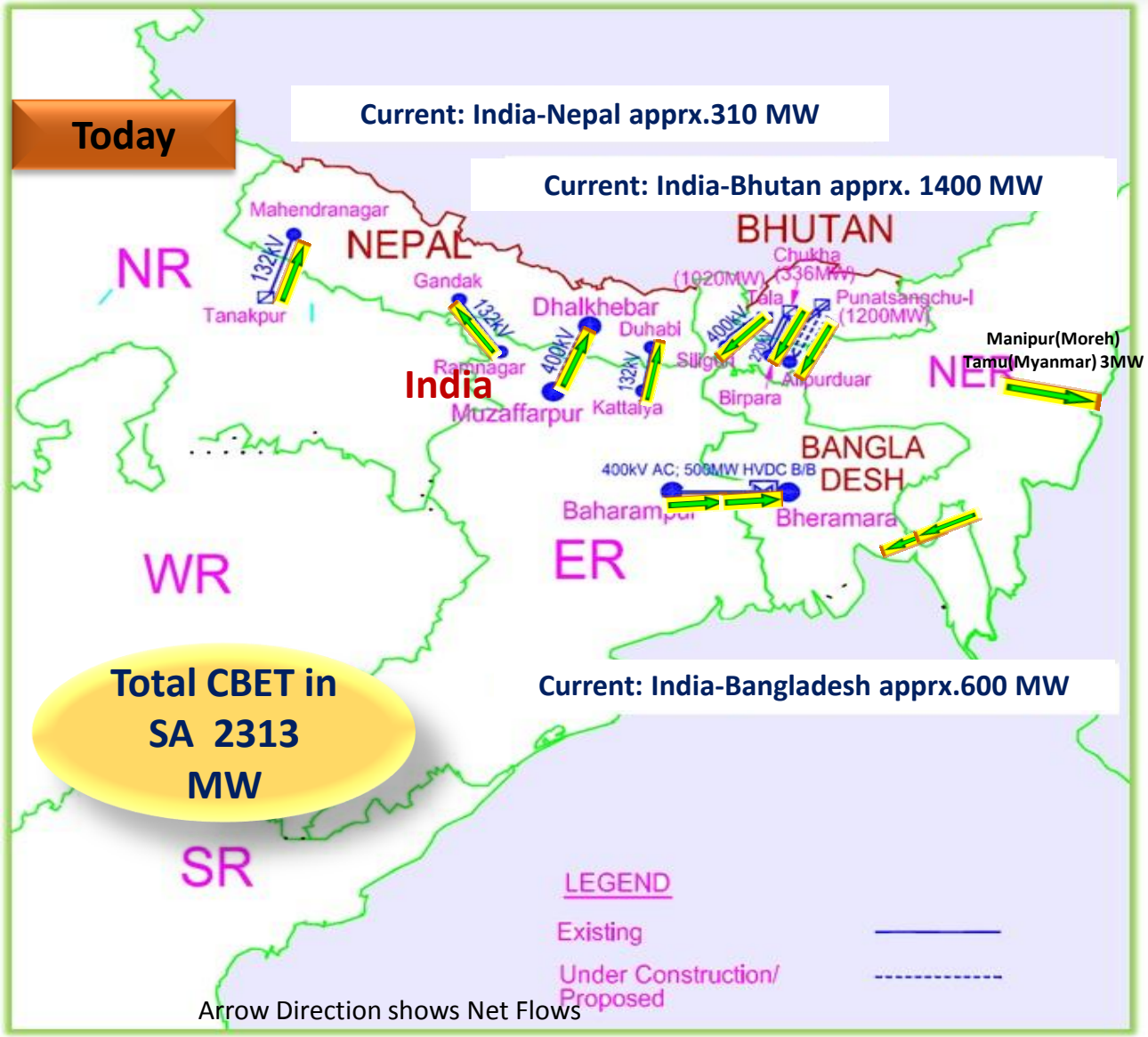
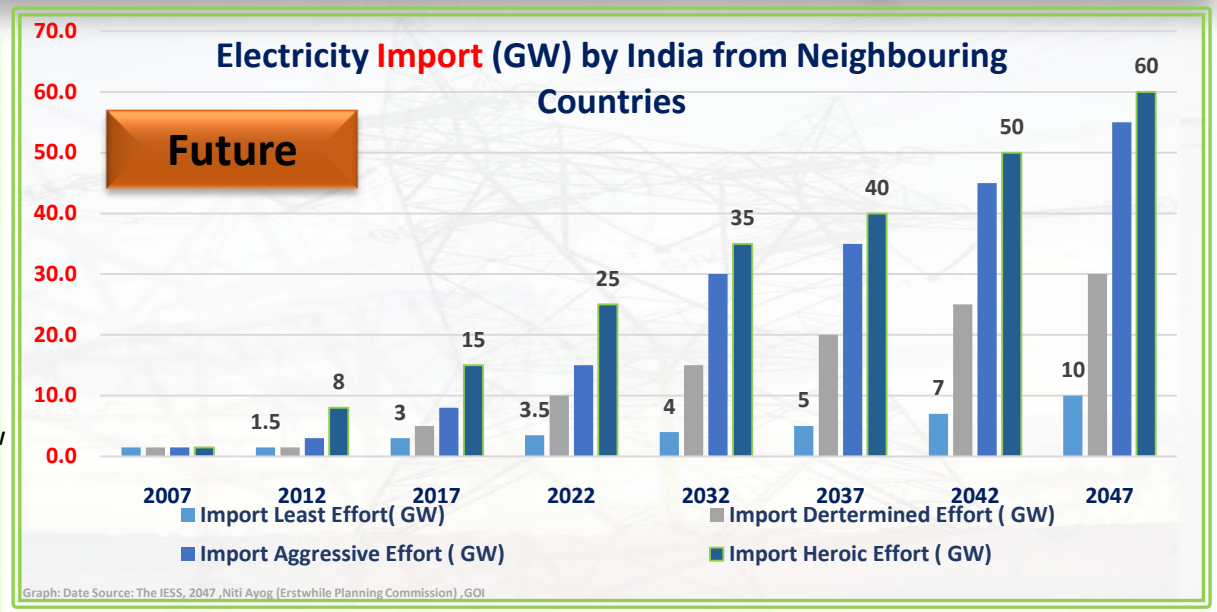
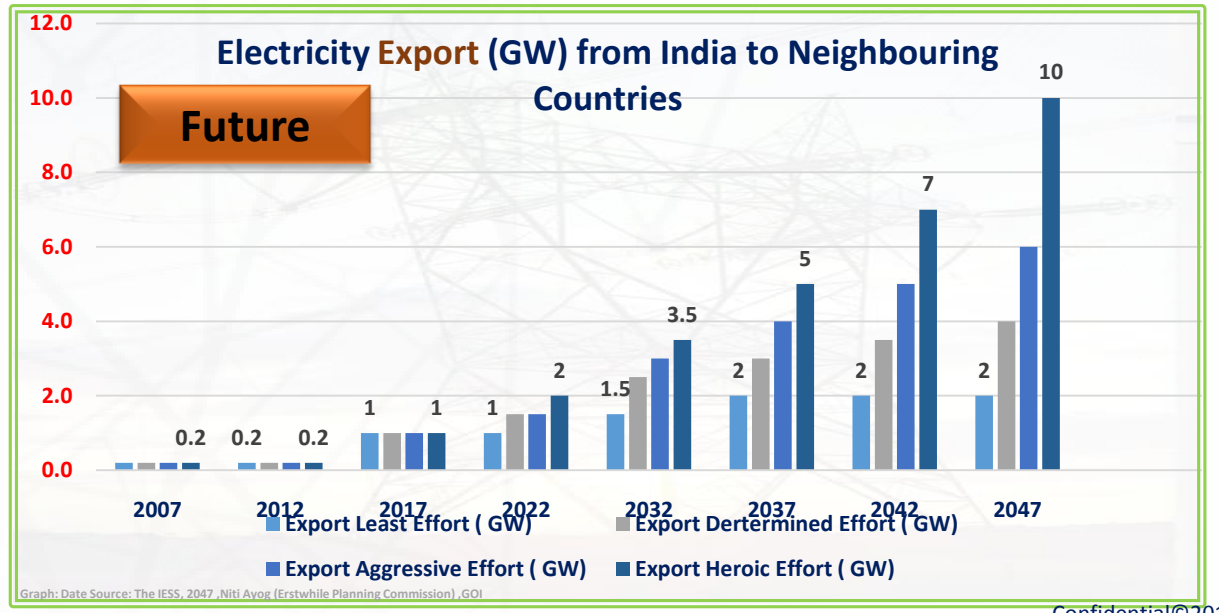
Content

- *Cross Border Electricity Trade in South Asia*
- *Demand Driven Regional Task Force Studies to achieve the Deliverables of Task Forces*
- *Key finding of some of the Demand Driven Regional Task Force Studies*
- *SARI/EI Achievements/Impacts*
- *Way Forward*

Current Status of Cross Border Electricity Trade (CBET) and Future Trading Scenarios







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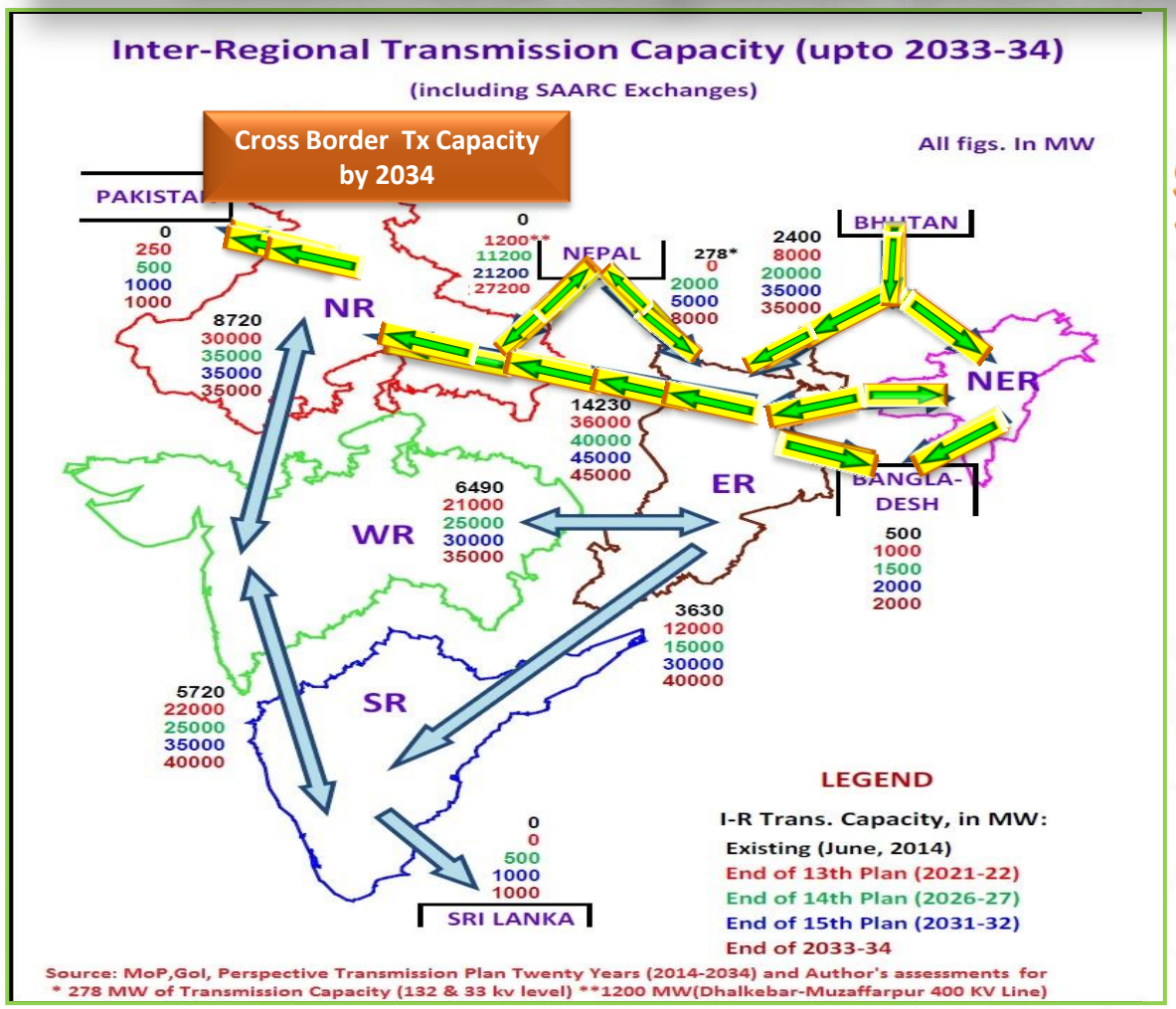
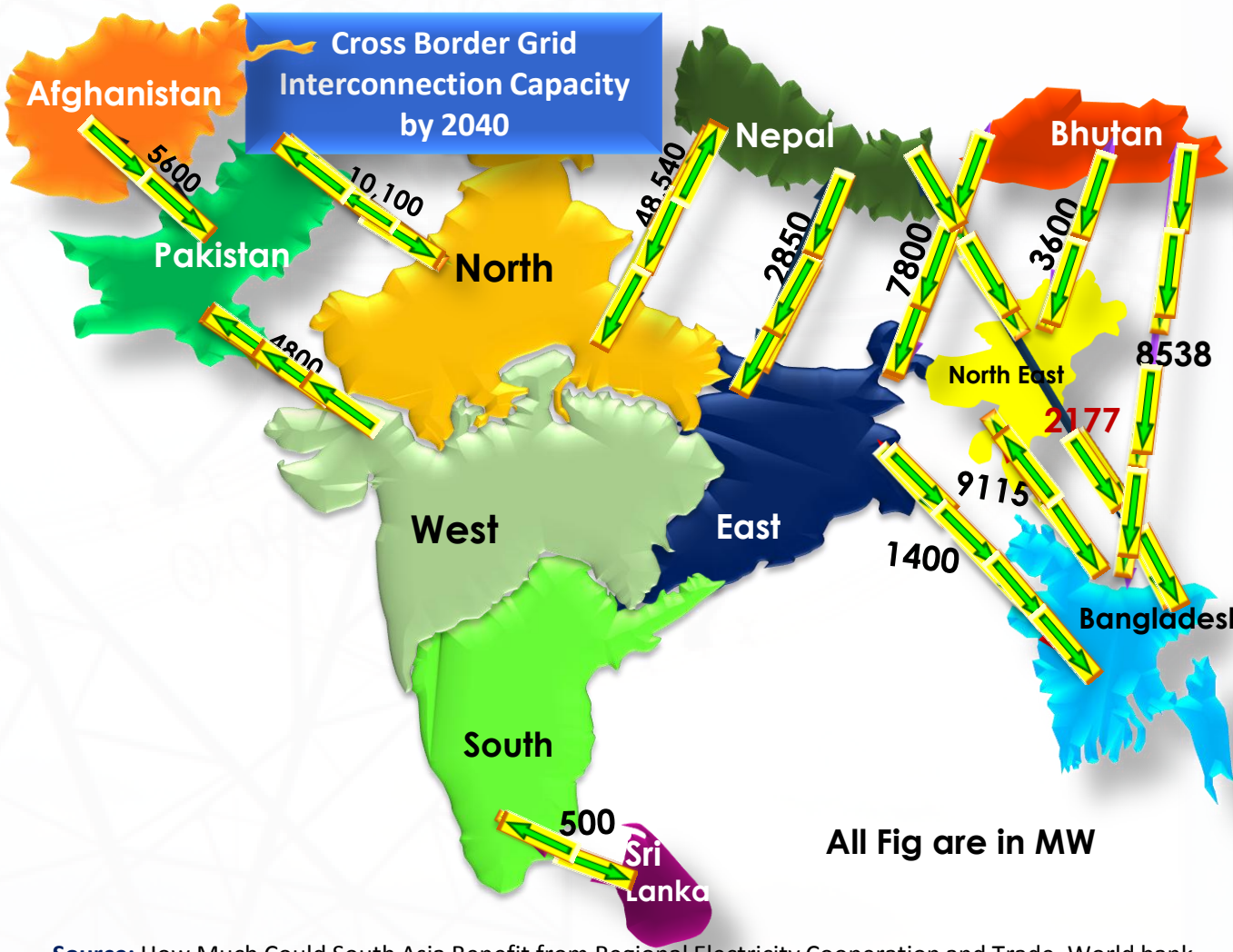
South Asia Regional Grid: Transmission Capacity by 2034/2040





Significant Transmission System Interconnection (Both AC and DC) are being Planned and Proposed. Bangladesh is in the process of Planning to Import around Apprx. 6000 MW by 2034 (PMSP 2015-JICA Presentation,4th June,2015)

Source: How Much Could South Asia Benefit from Regional Electricity Cooperation and Trade, World bank

Task Force Analysis : Key Ingredients for an Enabling Environment for CBET

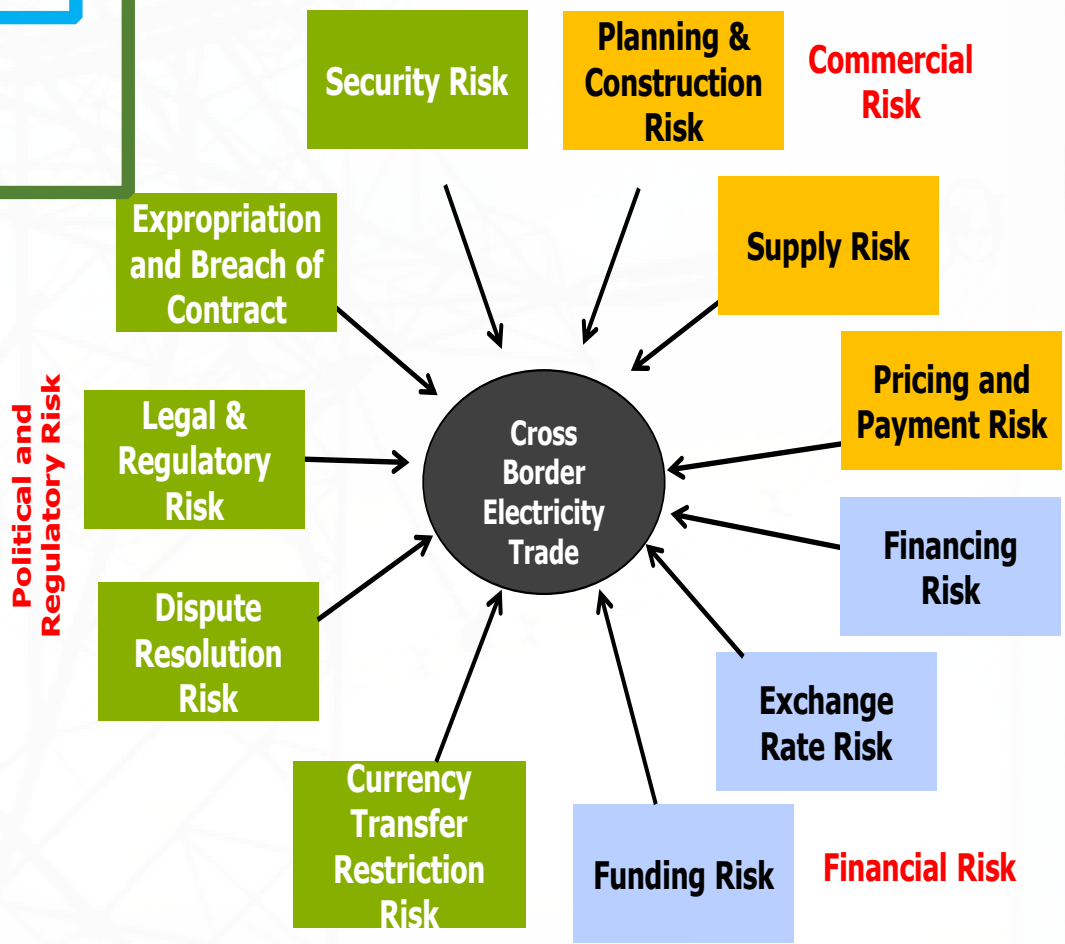
Key Ingredients

1. Political Consensus: Regional Cooperation and Recognition of CBET/Trade in the National Policy, Law
2. Government Commitment & Policy Coordination
3. Investment , Financial Viability, Instruments for Mobilizing Finance
4. Mechanism of Inter-connection
5. Market form of Trade
6. Regional Cooperation on Regulatory and Contractual Aspects
7. Open Access in Transmission
8. Transmission Charges/Pricing
9. Transmission Plan
10. Commercial Mechanisms to Settle Imbalances
11. Dispute Resolution

Motivation behind these challenge is to address the typical Risks in Cross-Border Projects. What are the Risk?

Regional Power System at Initial Stages

Regional Power System in Transition phase and at Mature Stages



Demand Driven Task Force Studies for an Enabling Environment for CBET in South Asia

TF-1 :

- **Study -1: Study on Review & Analysis of Electricity Policies, Laws, and regulations.** *(1st Report on Regional Regulatory Guidelines; 2nd Report on Suggested Changes/Amendments in Electricity Laws, Regulation & Policies* Published
  - → Regional Regulatory Framework
  - → Changes/Amendements & Road Maps
- **Study-2: Study on Regional Investment policies/guidelines and Framework for CBET SA countries** *(Draft Report Prepared-Ongoing)*
  - → Regional Investment Framework
  - → Policy Instruments for Promoting Investment
- **Study-3: White Paper on South Asia Forum of Electricity Regulators (SAFER)** *(Draft Report - Regulators Consultation is Ongoing)*
  - → Structure, function, Role and Institutional Fitment

TF-2 :

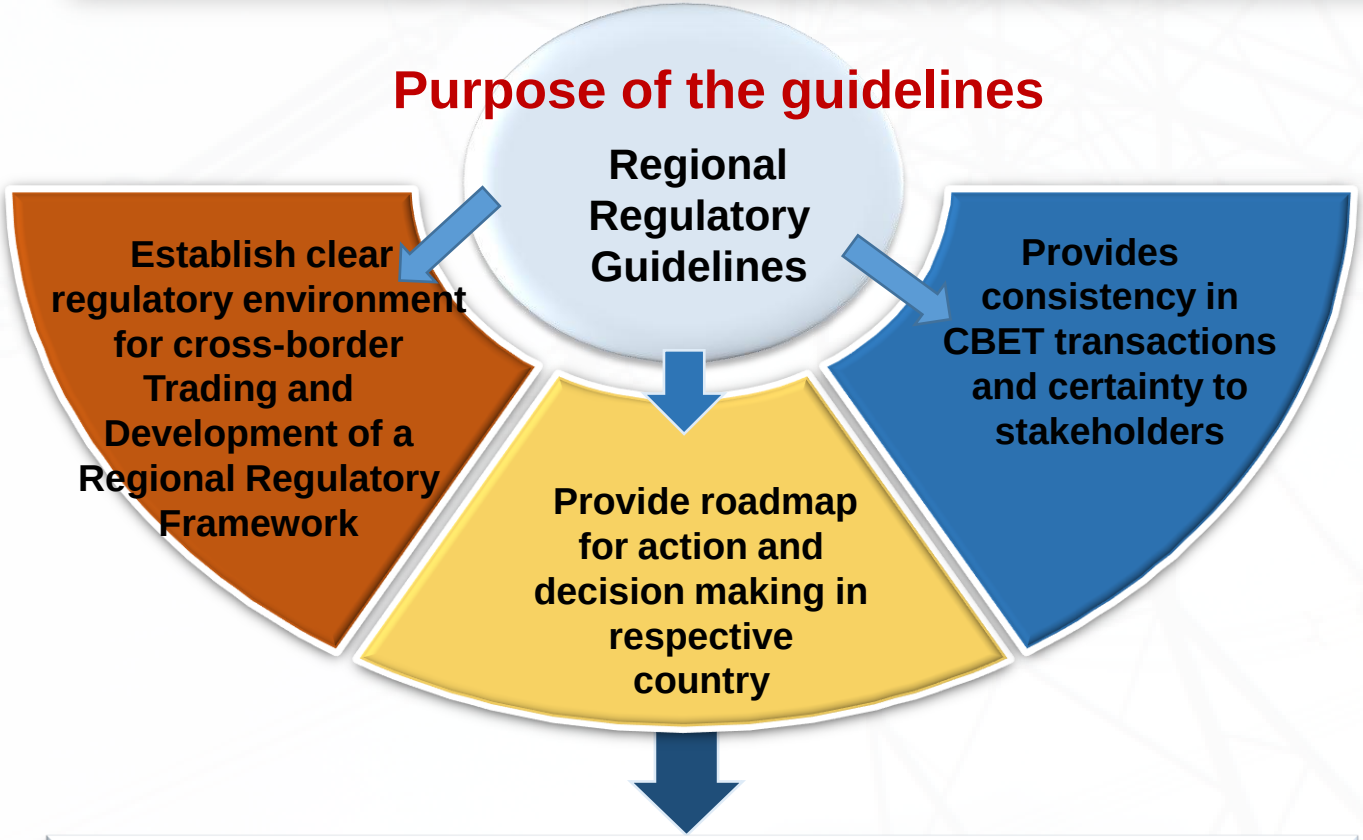
- **Study 1: Study to find out the Trading Potential of South Asian Countries** *(Draft Final Report prepared-Ongoing)*
  - → Trading Potential-by 2034
- **Study 2: Harmonization of Grid Codes, Operating Procedures, Standards** *(Final Report-To be Published soon)*
  - → Grid Code Guidelines
  - → Planning ,Operation, Connection, Metering, Scheduling & Dispatch Codes

TF-3 :

- **Study 1: "Assessment and recommendation of commercial terms & conditions for CBET and suggesting a model of Power Exchange in South Asian region"** *(Draft Report Prepared – Ongoing)*
  - → Commercial Terms & Condition
  - → Model PPAs & TSAs
  - → Transmission Pricings Rule
- **Study 2: Implementation of Pilot Market -Mock Exercise for SARPEX** *(Work Initiated -On-going)*
  - → Feasibility of Regional Power Exchange
  - → Market design and rules for Regional Power Exchange
  - → Capacity Building on Power Exchange

Regional Regulatory Guidelines: What is Achieves

Purpose of the guidelines

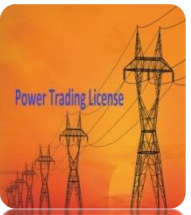


The flexible nature of the guidelines and focus on specific aspects of CBET, would permit both the guidelines and the national regulatory framework to co-exist for a reasonable period of time.

Regional Regulatory Guidelines Covers

1. *Licensing for cross border trading*
2. *Open access to Tx network*
3. *Transmission pricing regime*
4. *Transmission planning*
5. *Imbalance settlement mechanism*
6. *Harmonization of Codes*
7. *Dispute Resolution*
8. *Duties and tax regimes*

Regional Regulatory Guidelines: Summary



Regional Regulatory Guidelines

1. **Licensing for CBET: (***Important Regulatory Tool for Trading)*
   - *Recognition of Trading as a **separate licensed business activity,** Grant of license for CBET **through a well defined process.***

2. **Open Access (OA) to transmission system:** *(Competitive Market)*
   - ***Setting of fair rules and procedures** for non-discriminatory open access*
   - *Defining **application process, eligibility criteria, priority order** and nodal agency for OA*

3. **Transmission Pricing:** (*cost reflective & efficient)*
   - *Setting up **principles and mechanism for determination of economically efficient transmission pricing regime** and gradually adopting methods based on the concept of location specific pricing.*

4. **Transmission Planning:** *(coordinated Regional Planning)*
   ***National Transmission Plans** to also **include cross border transmission lines** (specifically for CBET) & associated infrastructure*

5. **Imbalance Settlement:** *(transparent common procedure)*
   - ***Develop a common set of procedures for Imbalance Settlement for** CBET transactions*

6. **Harmonization of codes:** *(safe and reliable regional integrated system operation)*
   - ***Harmonization** through **formulation of guidelines on technical standards for interconnection of power systems** on aspects related to voltage standards, frequency tolerance, thermal limits etc.*

Taxes & Duties: *(for fostering investment and removing trade barriers)*
- *Countries to **gradually move towards a zero tax regime for CBET.***

Regional Regulatory Guidelines: Key Findings

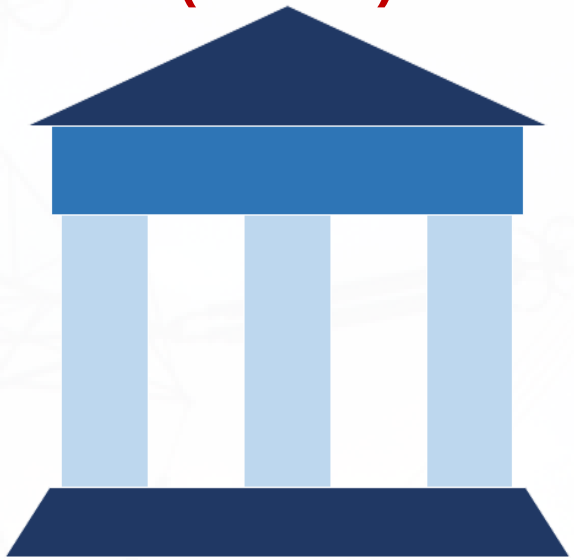
Institutionalize the Process

For Implementation of Regional Regulatory Guidelines, Study Recommended to create a Regional Regulatory Institutional Mechanism i.e. South Asia Forum of Electricity Regulators (SAFER)

- **To act as a platform for cross-cutting deliberations across the set of policy, regulatory and legal issues** that advance CBET in South Asia;

- To facilitate coordination and harmonization of regulatory issues that have a bearing on CBET. This would involve the **preparation of model regulations, specific regulatory guidelines, regulatory opinions, monitoring of implementation and provision of technical assistance**

South Asia Forum of Electricity Regulators (SAFER)



The white paper on SAFER will provide Structure, function, Role and Institutional Fitment.

SARI/EI successfully advocated in the 2nd the Second meeting of SAARC Energy Regulators on the need to create Regional Regulatory Institutional Mechanism such as SAFER. SAARC Regulators agreed to create a SAARC forum of Regulators as well as a SAARC Council of Experts of Energy Regulators (Electricity)

Suggested Changes/Amendments in Electricity Laws, Regulation & Policies

Recommended Road Map for Nepal

Short Term-(1-2 years)

1) **Empowered ministry (Ministry of Commerce) to establish provisions facilitating zero tax regime (through modification of relevant trade policy or commerce law)**
2) **In the interim period, till the regulator is not established, functioning of the ETFC needs to be strengthened to enable it to determine transmission charges**
3) **Modification of the national transmission plan to include Transmission. System/external interconnections for possible trade scenarios with member countries.**

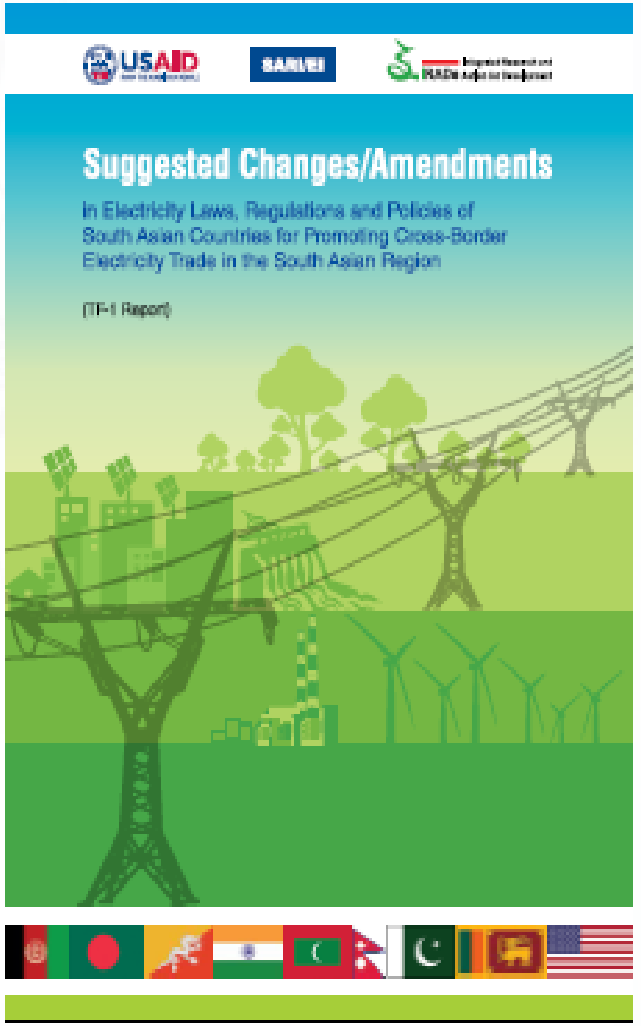
Medium term -(2-4 years)

1) **Hydro development policy 2001 to be amended** with adequate provisions on licensing CBET
2) **Electricity Rules 2050 to include procedure for obtaining license for import & export of electricity**
3) Till the time a Regulator is not established, **NEA with expert consultation shall frame guidelines** on following
   - Non-discriminatory third party access
   - Imbalance Settlement mechanism
   - Determination of transmission/transit charges

Long term -(>4 years)

1) Suitable amendment in the Electricity Act 2049 (1992) to recognize the critical aspects of CBET viz**. a) Trading a distinct licensed activity b) Provisions on non-discriminatory OA c)Imbalance settlement d) Transmission/transit charges**
2) **Enactment of the new Electricity Law*** Possibly the new law already recognizes the critical aspects of CBET
3) **Under the new Law, establish a fully functional Electricity Regulator**
4) **Under the new law, setting up an Independent System Operator** to undertake system operation and control activities currently undertaken by NEA

*it is understood that this is being been planned by Nepalese Government)



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SARI/EI Task Force-2 Study on Harmonization of grid codes, operating procedures and standards to facilitate/promote cross border electricity trade : Key Findings

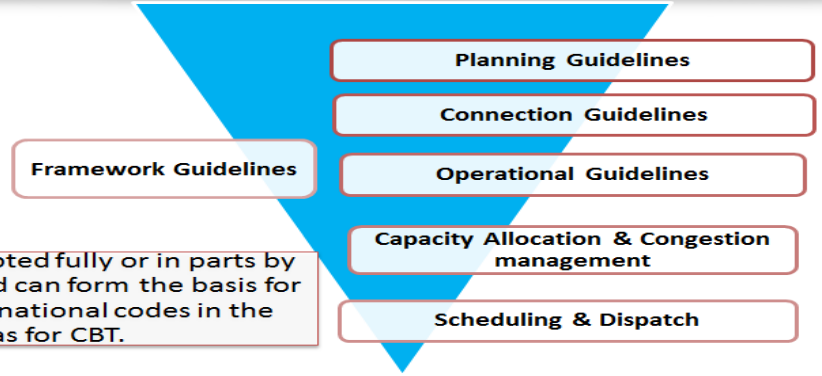
✓ Study has Come out with comprehensive framework grid code guidelines along with Draft Grid Codes.

✓ Recommended an Institutional Mechanism , i.e. **South Asian Forum of Transmission Utility (SAFTU)** for Coordination of Regional Power System Operation, Planning and for Implementation of framework grid code guidelines

The Framework Grid Code Guidelines are Comprehensive in Nature and Contains

Impact analysis	Explanatory statement	Implementation Provisions	Draft code

The proposed framework shall not be intended to replace the existing national grid codes for non-cross border issues but to harmonise/Coordinate the critical issues concerning cross border trade.



The draft code can be adopted fully or in parts by the relevant authorities and can form the basis for harmonising the existing national codes in the identified areas for CBT.

Framework grid code guidelines

Planning Guidelines

- It provides information and stipulates the various criteria to be adopted, for planning and development studies

Connection Guidelines

- It specifies a minimum of technical, design and operational plant criteria to be compiled with by the existing and prospective users.
- It includes the meter placement, compliance of meters according to standards in terms of accuracy levels, accessibility of the meters, maintenance responsibility of meters etc.,
- It covers the general protection guidelines to be followed for the generator, transmission licensees.

Operation Guidelines

- It contains details for high level operational procedures for example demand control, operational planning and data provision

Schedule and despatch Guidelines

- It describes the procedures to be adopted for Scheduling and despatch of generation and allocation of power drawl

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South Asian Regional Power Exchange- SARPEX (Mock Trade)

Why Regional Power Exchange

- Daily demand variation is substantial in South Asian region .
- This provides a sizable opportunity for regional day ahead market.
- Need to explore the short term Market Opportunities.
- To extract the full benefit of regional power trade through a Short term market trade, a Regional Power Exchange is an credible Option.
- Mock exercise will run as a Day Ahead Market

Expected Outcome of SARPEX Exercise

- Ascertain the feasibility of SARPEX.
- Drafting the market design and rules for the South Asian Regional Power Exchange
- Enhance/capacity Building of participants from South Asian countries on the function of Power Exchange.

Parties are Involved in the Execution of SARPEX

Market Advisory Committee

Key Expert of Power Market and Exchange

Nominated government officials from respective country governments for SARPEX.

Core Team

SARI/EI & Consultant Team

SARI/EI: Some Key Achievements/Impacts

First time in SAC, Regional Regulatory Guidelines (RRGs) for CBET Launched.

First time in SAC ,Suggested Changes/Amendments in Electricity Laws, Policies, Regulation for CBET Launched.

CBET trade increased by 720 MW since the Program Started.

NEPAL-India Power Trade Agreement Signed.

SAARC Intergovernmental Framework Agreement on Energy (Electricity) Cooperation signed by SAARC Member States.

CBET is recognised/being recognised in National Electricity Laws, Regulations, Policies.

Government of India initiated the Process of Preparation of Cross Border Electricity Trade Policy and Development of Regulatory Framework for CBET.

National Transmission Plans are Updated/being updated with Cross Border Transmission Planning.

SARI/EI: Some Key Achievements/Impacts :Strategic Engagement with SAARC

a) For the First time, SARI/EI was invited to the 2nd SAARC Energy Regulators meeting; Regional Regulatory Guidelines and findings of Harmonization of Grid Codes were presented.

b) SARI/EI successfully advocated the need to create Regional Regulatory Institutional Mechanism such as SAFER. SAARC Regulators agreed to create a SAARC forum of Regulators as well as a SAARC Council of Experts of Energy Regulators (Electricity);

SARI/EI is identified as a International Partner of SAARC: To provide technical advice to SAARC Council of Experts of Energy Regulators (Electricity) starting from its formation;

SARI/EI Drafted the Terms of Reference of the SAARC Council of Experts of Energy Regulators (Electricity);

SARI-EI Study on Harmonization of Grid Codes recognised by SAARC and officially Circulated by SAARC to SAARC Member States;

SAARC regulators identified SARI/EI to assist SAARC Energy Centre in Preparation of Regulatory Compendium of SAARC Countries.

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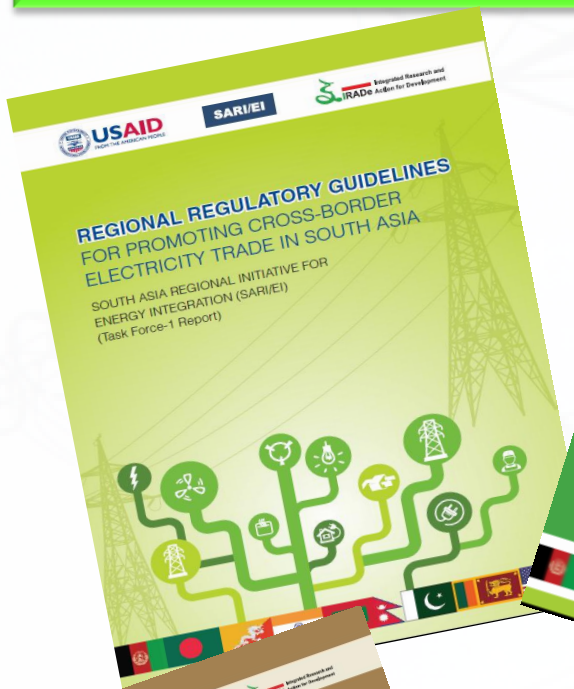
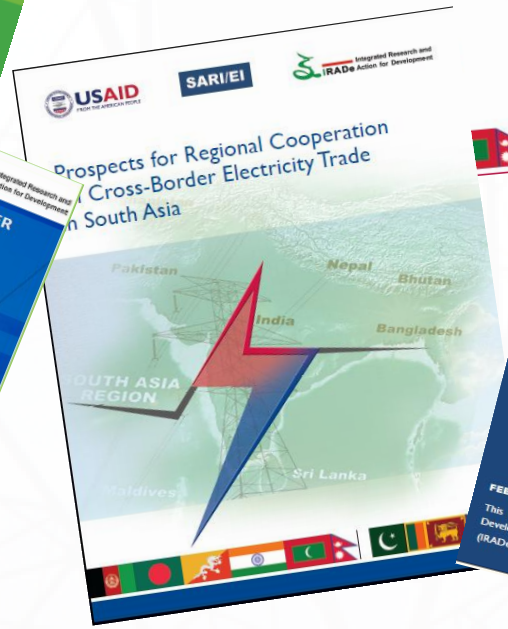
Major Publications





Regional ... enabling environment for Cross Border Electricity Trade (CBET) in South Asia/Meeting with U.S. Ambassador to Nepal/9th September/hau...

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Activities/Studies to Implement the Task Force Recommendations and Articles of SAARC Framework Agreement on Energy (Electricity) Cooperation

Development of Model Framework/Standard set of procedures, T&C for grant of Open Access in Transmission (Implementation of Recommendations of RRGs) (Bids under Evaluation)

Development of Model Framework/Standard set of procedures, T&C for grant of trading license (Implementation of Recommendations of RRGs) (Bids under Evaluation)

Model Power Market Regulation for domestics power Market Development (Implementation of Recommendations of RRGs) (To be initiated)

Technical Support to Regional Regulatory Institution Mechanism under SAARC (To take forward the Implementation of RRGs) (Initial work is going on)

White paper on creation of institutional mechanism on South Asia forum of Transmission System Utilities (Implementation of Recommendations Framework grid code Guidelines) (To be initiated)

Design of an appropriate regional dispute settlement mechanism for promoting CBET (To be initiated)

Way Forward

Way forward

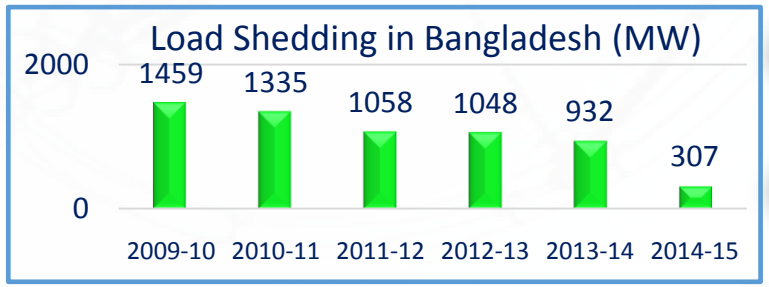
- *Implementation of task force recommendations.*
- *Working with SAARC and SAARC Energy Centre.*
- *Consensus building and Outreach for buy in task force recommendations.*
- *Institutionalizing the Process such as SAFER/SAARC Council of Energy Regulators (Electricity) .*
- *Think Tank Partnership: For Country specific action.*
- *Model Power Market Regulation framework for developing Power Market/Trading.*
- *Facilitating the creation of regional power market.*

Thank You

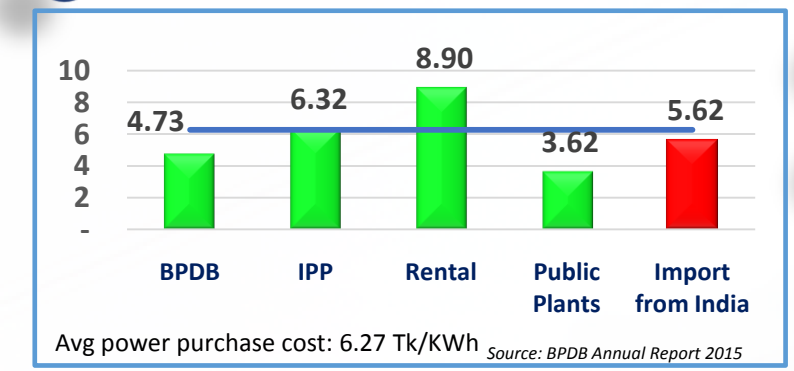
Recent Success Building More Confidence for Cross Border Electricity Trade

India-Bangladesh Interconnection

- Reduction in load shedding with round the clock availability of power from India (500 MW: 5th October, 2013)(100 MW: March 23, 2016)



- Access to Cheaper source of Electricity



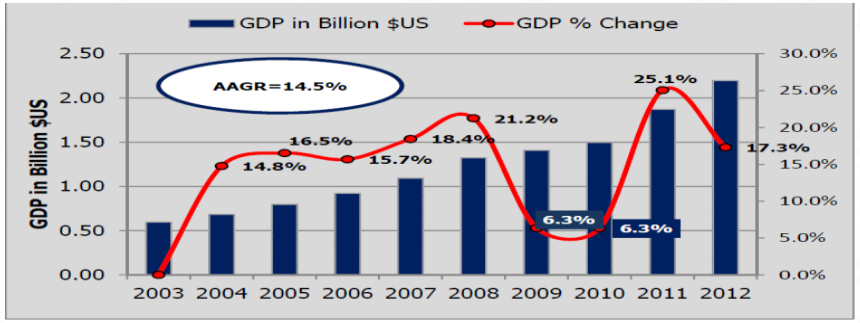
Avg power purchase cost: 6.27 Tk/KWh *Source: BPDB Annual Report 2015*

- The estimated Annual savings would be around Taka 40 billion (US$500 million approx.) (Shahi 2014).

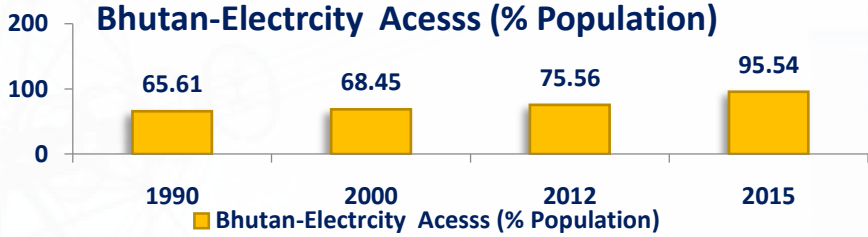
Source: http://www.ideasforindia.in/article.aspx?article_id=1589

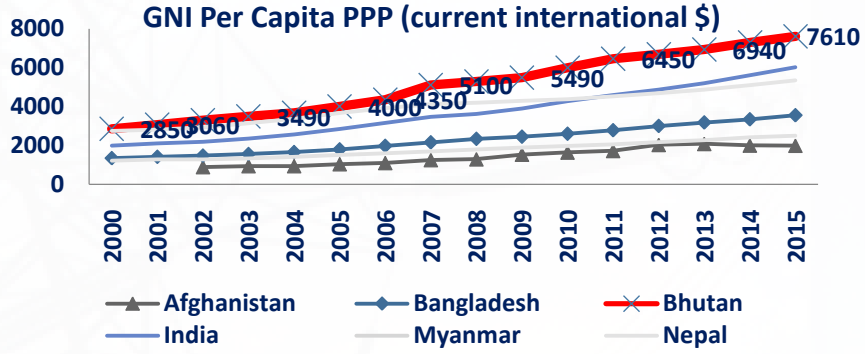
India-Bhutan Interconnection

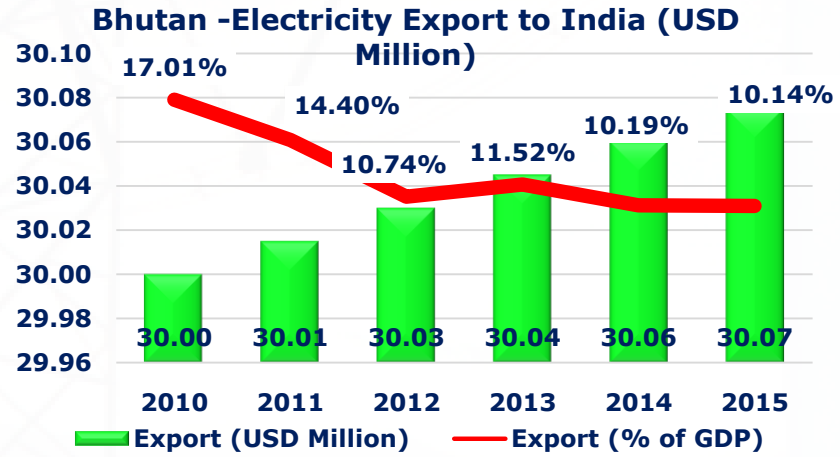
- Bhutan envisages the development of at least 10,000 MW by 2020.
- 95% of Population Electrified.
- Close to 75% of all electricity generated is exported to India.
- Hydropower exports (only surplus) provided more than 40% of Bhutan's revenues, and constitute 25% of its GDP *. Now it is around average 12.28% Since 2010.
- Helps in Sustaining High GDP Growth Rate, Modernization of power infrastructure.
- Emergency Support -During the 2012 blackout in India**



Nominal GDP Growth Rate, Bhutan. Source: World Economic Outlook, IMF







** http://thediplomat.com/2016/06/india-and-bhutan-cross-country-power-connectivity/

* http://www.oecd.org/countries/bhutan/48651659.pdf

Suggested Changes/Amendments in Electricity Laws, Regulation & Policies

Recommended Road Map for Nepal

Short Term-(1-2 years)

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Medium term -(2-4 years)

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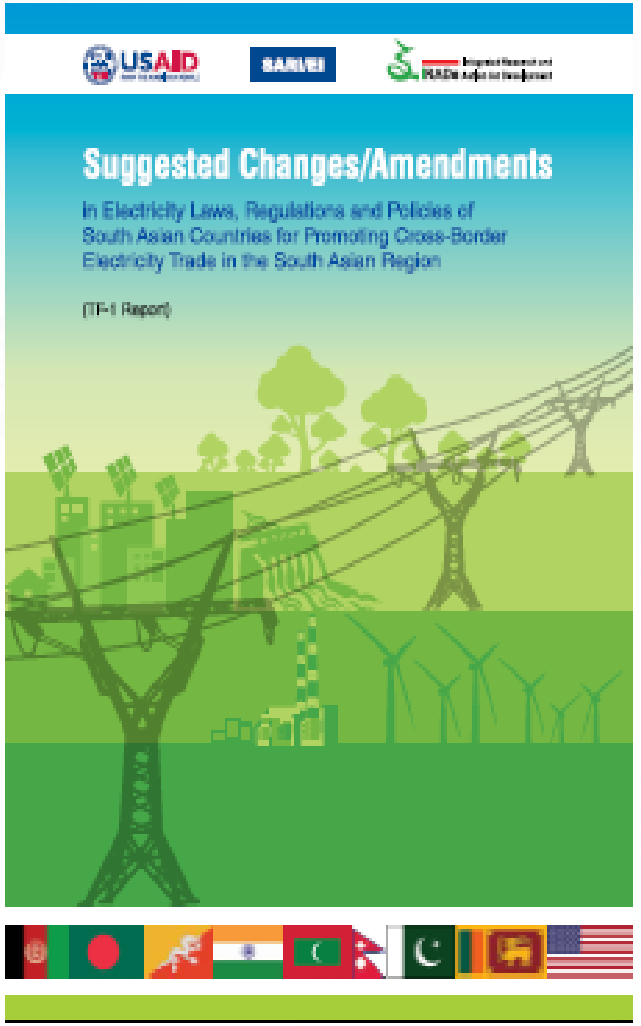

SARI/EI: Some Key Achievements/Impacts

SAARC Energy Centre (SEC) and SARI/EI are closely working with each other (Sharing of Studies and planning to organising Joint Workshop);

SARI/EI Participated as Resource Persons in a) "SAARC Workshop on the Past, Present and Future of High Voltage DC Power Transmission b) SAARC Regional Hydro Workshop.

SEC and SARI/EI planning to jointly organise workshop /events in Pakistan.

SARI/EI Jointly organised workshop with SAARC Chamber of Commerce on South Asia: Shaping the New Paradigm for Growth

SARI-EI submitted Recommendations on "Accelerating CBET and Regional Energy cooperation in SA" to SAARC Chamber of Commerce for further Inputs for the upcoming 19th SAARC Summit in Pakistan.

Joint Events with Government : a) SAFIR-SARI/EI Joint Workshop on Sustainable Development SA power sector & CBET ; b) Power Cell, MPEMR, GoB,-SARI/EI Joint workshop on "Power Market Development in India: Key Lessons Learnt"

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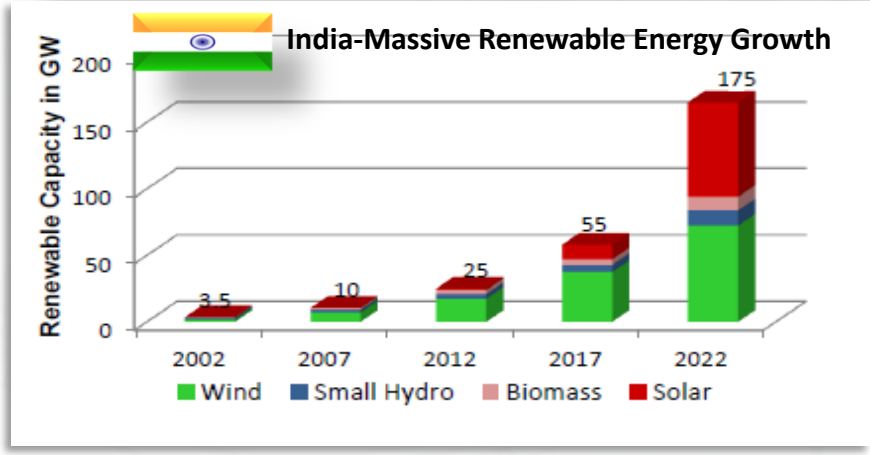
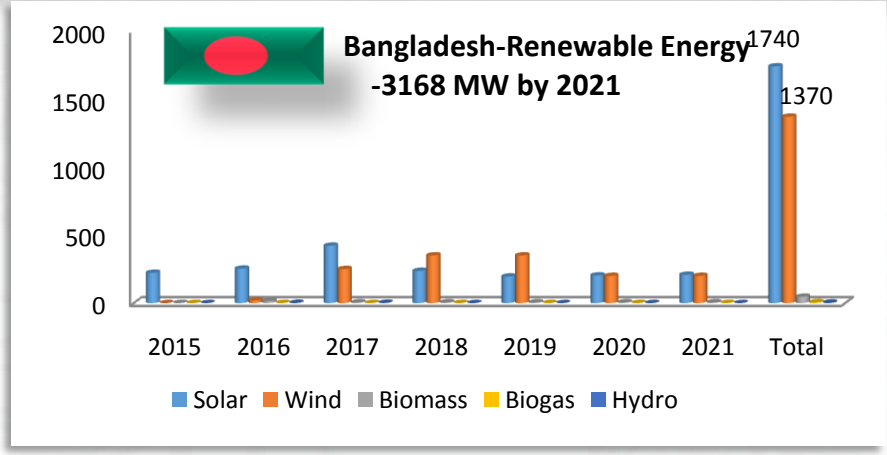
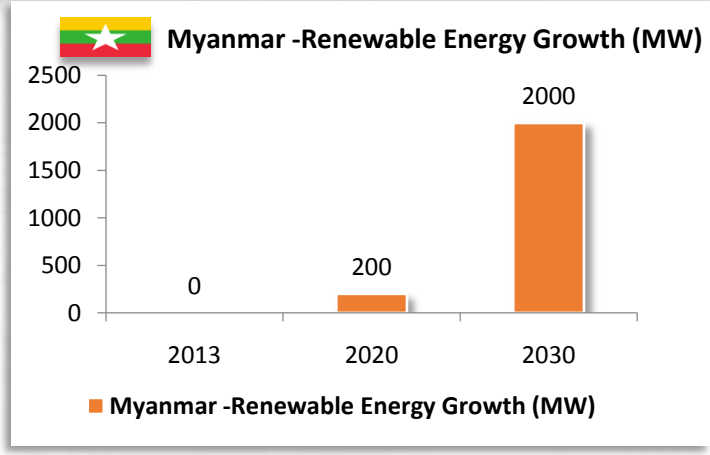
Non Energy Benefits of Hydropower in South Asia : Policy Making Perspective

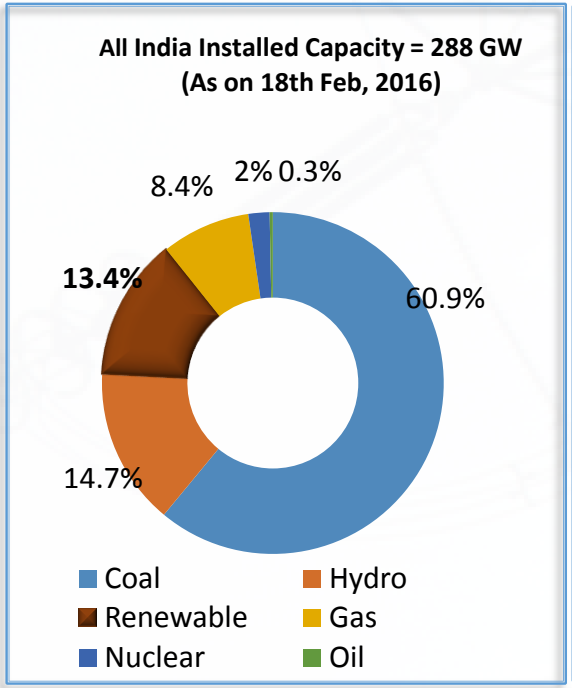


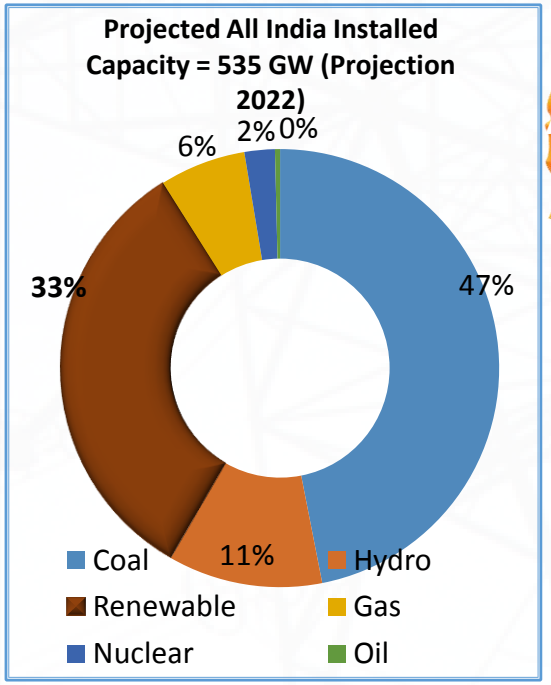


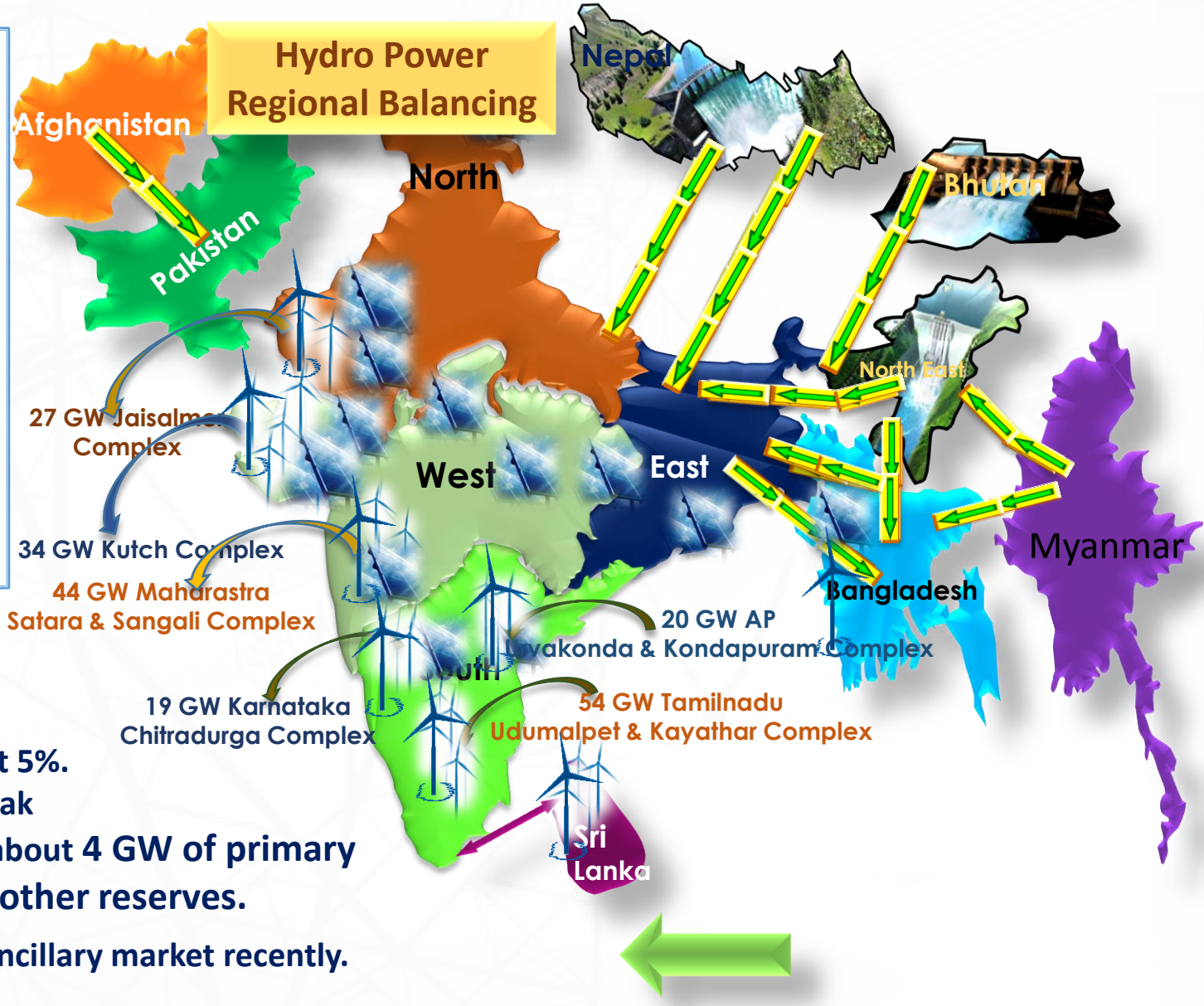


- High Renewable Energy Growth in SA needs a flexible, fast responsive with Demand response power system.
- Both reservoir and pumped storage hydropower and gas are flexible sources of electricity that can help in handle the variability of other renewable energy such as wind power and photovoltaic electricity.
- Storage hydropower (including pumped storage) represents 99% of the world's operational electricity storage.
- Regional Ancillary Market- India has started ancillary market recently.

Regional Hydro Power of South Asia can help in Renewable Integration and Grid Balancing







- Hydro share in India has been declining over the years (45% in 1970 to Apprx 15% in 2015)
- In terms of National Electricity policy, spinning reserves at 5%. with *275 GW generating capacity and nearly 150 GW peak demand, the quantum of reserves has been estimated at about 4 GW of primary reserve, 3.6 GW of secondary reserve and 7 GW of other reserves.
- Developing Regional Ancillary Market- India has started ancillary market recently.

*Technical Committee for "Large Scale Integration of Renewable Energy, need for balancing, Deviation Settlement Mechanism (DSM) and associated issues"

Why CBET -Potential Benefits of Cross Border Electricity Trade and Regional Hydro Power Development in South Asia

Strategic, Technical and Operational

- ✓ **Optimum Utilization of Energy Resources.**
- ✓ **Improved Energy security**
- ✓ Diversified **generation mix**
- ✓ Reduction in **Load Shedding**
- ✓ Reduction in **spinning reserves**
- ✓ Mang. of **peak energy deficit**
- ✓ Ancillary Service & Emergency Support.

Economic and Financial

- ✓ Power availability at **competitive price**
- ✓ **Export income/revenue**
- ✓ Avoided **generation capacity** and **T&D infrastructure**
- ✓ Accelerate economic growth
- ✓ Less exposure to **volatile** international **energy prices**

Environmental Benefits:

- ✓ Reduction in **CO_2 emissions**
- ✓ Less Impact on Local and Global environment
- ✓ Renewable Energy Development
- ✓ Improvement in Social Indicators

Market Dev.

- ✓ Bringing Resources to the Market.
- ✓ Market Development and integration
- ✓ Efficient Pricing

Regional Hydro Power Dev.

- ✓ Flood Control
- ✓ Water Security
- ✓ Multi-purpose use of the resource
- ✓ Strategic Development

Regional Stability

- ✓ Regional Stability

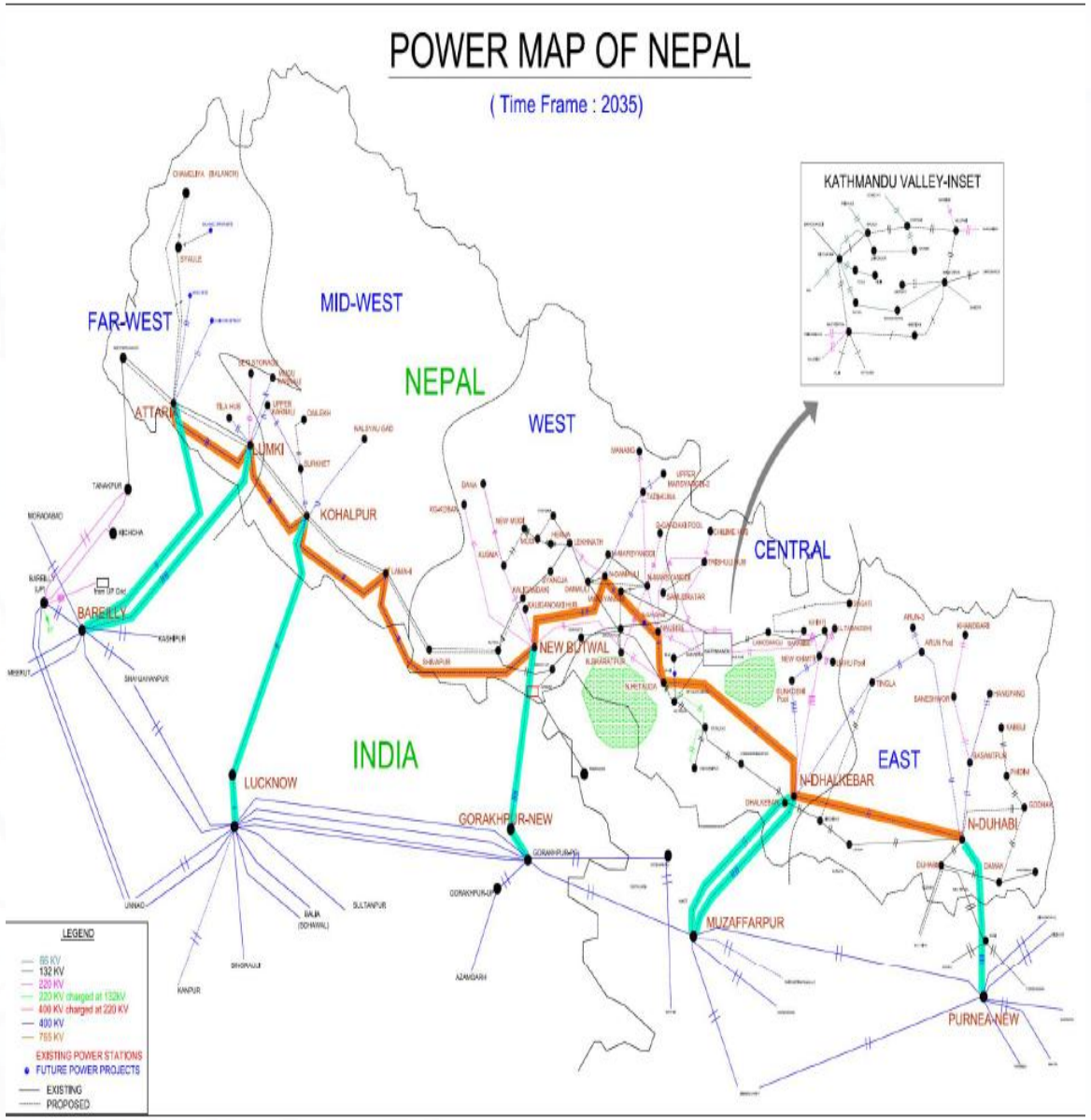
India-Nepal Transmission Interconnection

Lot of hydro generation is expected in Nepal upto 2035 time-frame (282 projects, 45GW)

A Joint Technical Team (JTT) was constituted. In the 1st JWG/JSC meeting to identify the transmission requirements for evacuation of power hydro projects in Nepal corresponding to the time frame of 2021-22, 2025 and 2035.

6 number of Cross Border corridors have been identified progressively till 2035 along with the development of Hydro Projects

	2021-22	2025	2035
Total New Projects	6.9 GW (168 Projects)	14.7 GW (229 Project)	45 GW (282 Projects)
Load Demand (Peak)	2.4 GW	2.9 GW	6.2 GW
Maximum Exportable Power from Nepal to India (During Off-Peak demand)	5.6 GW	12.9 GW	24.4 GW

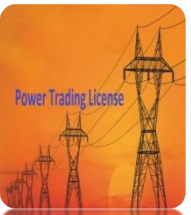


Proposed Roles and responsibilities of SAFER

Objectives (IGTA)	Short Term (up to 2 years)	Medium Term (2-5 years)	Long Term (>5 years)
Licensing	Assist NRAs -trading as a distinct licensing act. Model processes/ requirements for CBET licenses	Suggest modifications as per market evolution	Suggest modifications as per market evolution and possible linkages with other regional pools in Asia
Non-discriminatory Open Access to Transmission Network	Support NRAs in policy amendments Model procedures for open access for multilateral CBET	Assist NRAs in institutionalizing open access	Draft open access policies for integration with inter-regional pools
Transmission pricing	Support NRAs in developing principles and mechanism for pricing & transmission losses	Assist NRAs in moving towards a uniform pricing regime	Suggest pricing models for linkages with other pools
Transmission Planning	Identify transmission constraints for seamless CBET	Facilitate development of regional coordination forum of National Transmission Utilities	Take lead in developing master plan for multi-pool linkages

Objectives (IGTA)	Short Term (up to 2 years)	Medium Term (2-5 years)	Long Term (>5 years)
Imbalance Settlement Mechanism	Suggest standard procedures for imbalance settlement mechanism	Suggest a regional imbalance settlement mechanism	Build consensus with other pools on a common imbalance settlement mechanism
Harmonization of codes	Suggest guidelines on technical standards for regional interconnection	Suggest a regional grid code	Build consensus with other pools for a multi-pool grid code
Dispute Resolution	Recommend guidelines on CBET dispute resolution	Assist NRAs/ utilities to set up a dispute resolution forum	Take lead in dispute resolution aspects for multi-pool integrated scenario
Duties & Taxes	Not under domain	Not under domain	Not under domain

Regional Regulatory Guidelines: Summary



Regional Regulatory Guidelines

1. **Licensing for CBET: (***Important Regulatory Tool for Trading)*
   - *Recognition of Trading as a **separate licensed business activity,** Grant of license for CBET **through a well defined process.***

2. **Open Access (OA) to transmission system:** *(Competitive Market)*
   - ***Setting of fair rules and procedures** for non-discriminatory open access*
   - *Defining **application process, eligibility criteria, priority order** and nodal agency for OA*

3. **Transmission Pricing:** (*cost reflective & efficient)*
   - *Setting up **principles and mechanism for determination of economically efficient transmission pricing regime** and gradually adopting methods based on the concept of location specific pricing.*

4. **Transmission Planning:** *(coordinated Regional Planning)*
   ***National Transmission Plans** to also **include cross border transmission lines** (specifically for CBET) & associated infrastructure*

5. **Imbalance Settlement:** *(transparent common procedure)*
   - ***Develop a common set of procedures for Imbalance Settlement for** CBET transactions*

6. **Harmonization of codes:** *(safe and reliable regional integrated system operation)*
   - ***Harmonization** through **formulation of guidelines on technical standards for interconnection of power systems** on aspects related to voltage standards, frequency tolerance, thermal limits etc.*

Taxes & Duties: *(for fostering investment and removing trade barriers)*
- *Countries to **gradually move towards a zero tax regime for CBET.***

Regional Regulatory Guidelines: Key Findings

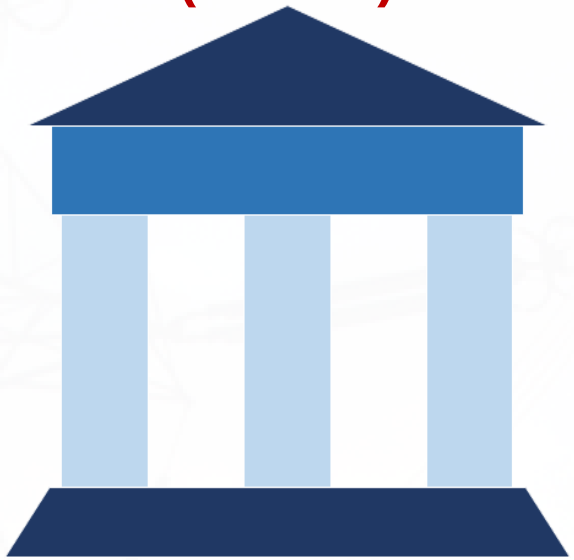
Institutionalize the Process

For Implementation of Regional Regulatory Guidelines, Study Recommended to create a Regional Regulatory Institutional Mechanism i.e. South Asia Forum of Electricity Regulators (SAFER)

- **To act as a platform for cross-cutting deliberations across the set of policy, regulatory and legal issues** that advance CBET in South Asia;

- To facilitate coordination and harmonization of regulatory issues that have a bearing on CBET. This would involve the **preparation of model regulations, specific regulatory guidelines, regulatory opinions, monitoring of implementation and provision of technical assistance**

South Asia Forum of Electricity Regulators (SAFER)



The white paper on SAFER will provide Structure, function, Role and Institutional Fitment.

SARI/EI successfully advocated in the 2nd the Second meeting of SAARC Energy Regulators on the need to create Regional Regulatory Institutional Mechanism such as SAFER. SAARC Regulators agreed to create a SAARC forum of Regulators as well as a SAARC Council of Experts of Energy Regulators (Electricity)

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SARI/EI

Integrated Research and Action for Development

SARI/EI Task Force-2 Study on Harmonization of grid codes, operating procedures and standards to facilitate/promote cross border electricity trade : Key Findings

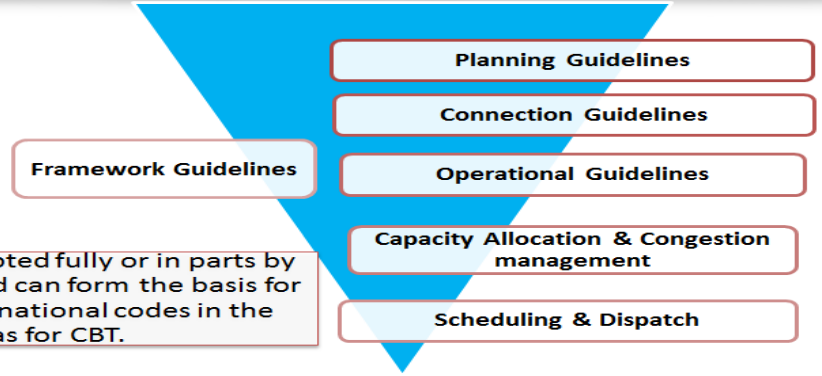
✓ Study has Come out with comprehensive framework grid code guidelines along with Draft Grid Codes.

✓ Recommended an Institutional Mechanism , i.e. **South Asian Forum of Transmission Utility (SAFTU)** for Coordination of Regional Power System Operation, Planning and for Implementation of framework grid code guidelines

The Framework Grid Code Guidelines are Comprehensive in Nature and Contains

Impact analysis	Explanatory statement	Implementation Provisions	Draft code

The proposed framework shall not be intended to replace the existing national grid codes for non-cross border issues but to harmonise/Coordinate the critical issues concerning cross border trade.



The draft code can be adopted fully or in parts by the relevant authorities and can form the basis for harmonising the existing national codes in the identified areas for CBT.

Framework grid code guidelines

Planning Guidelines

- It provides information and stipulates the various criteria to be adopted, for planning and development studies

Connection Guidelines

- It specifies a minimum of technical, design and operational plant criteria to be compiled with by the existing and prospective users.
- It includes the meter placement, compliance of meters according to standards in terms of accuracy levels, accessibility of the meters, maintenance responsibility of meters etc.,
- It covers the general protection guidelines to be followed for the generator, transmission licensees.

Operation Guidelines

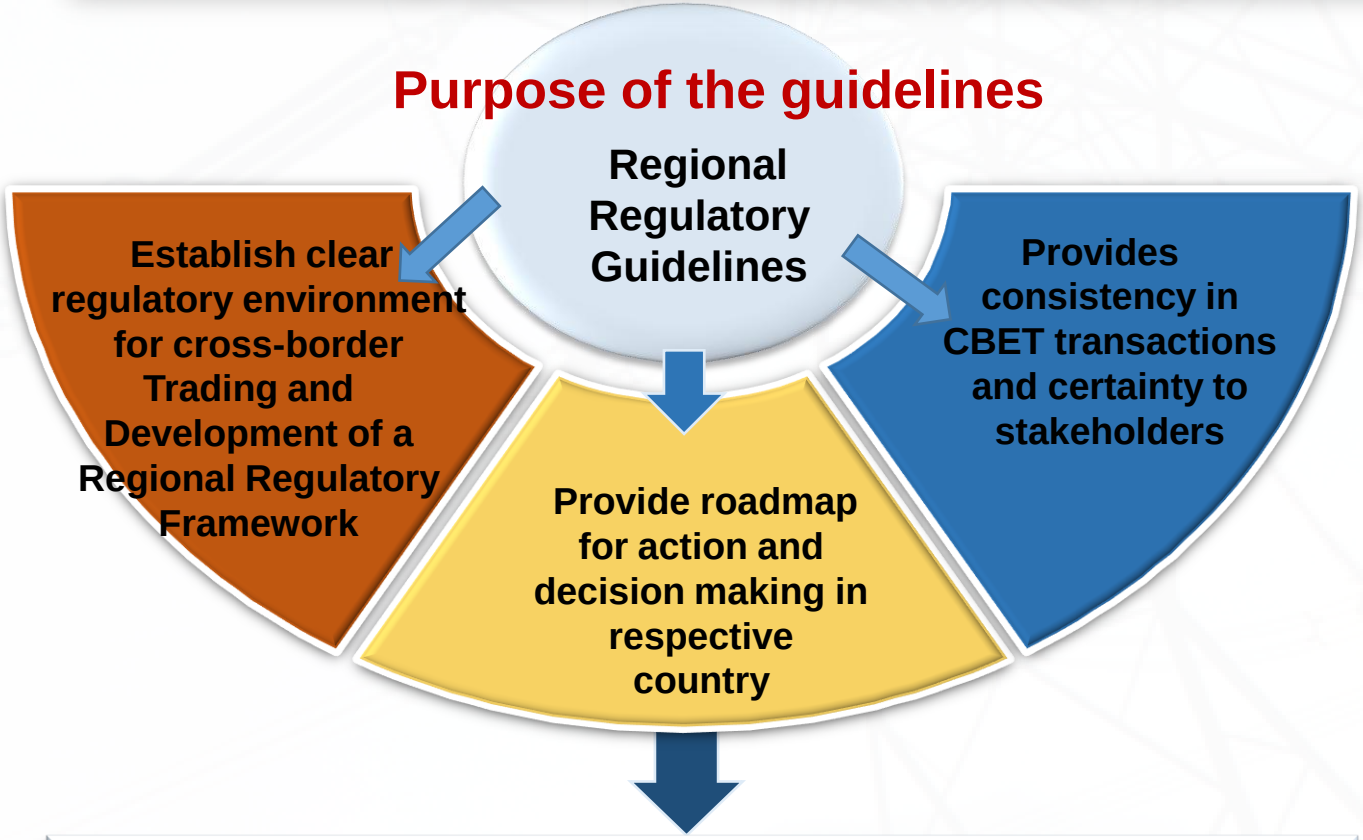
- It contains details for high level operational procedures for example demand control, operational planning and data provision

Schedule and despatch Guidelines

- It describes the procedures to be adopted for Scheduling and despatch of generation and allocation of power drawl

Regional Regulatory Guidelines: What is Achieves

Purpose of the guidelines



The flexible nature of the guidelines and focus on specific aspects of CBET, would permit both the guidelines and the national regulatory framework to co-exist for a reasonable period of time.

Regional Regulatory Guidelines Covers

1. *Licensing for cross border trading*
2. *Open access to Tx network*
3. *Transmission pricing regime*
4. *Transmission planning*
5. *Imbalance settlement mechanism*
6. *Harmonization of Codes*
7. *Dispute Resolution*
8. *Duties and tax regimes*

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South Asian Regional Power Exchange- SARPEX (Mock Trade)

Why Regional Power Exchange

- Daily demand variation is substantial in South Asian region .
- This provides a sizable opportunity for regional day ahead market.
- Need to explore the short term Market Opportunities.
- To extract the full benefit of regional power trade through a Short term market trade, a Regional Power Exchange is an credible Option.
- Mock exercise will run as a Day Ahead Market

Expected Outcome of SARPEX Exercise

- Ascertain the feasibility of SARPEX.
- Drafting the market design and rules for the South Asian Regional Power Exchange
- Enhance/capacity Building of participants from South Asian countries on the function of Power Exchange.

Parties are Involved in the Execution of SARPEX

Market Advisory Committee

Key Expert of Power Market and Exchange

Nominated government officials from respective country governments for SARPEX.

Core Team

SARI/EI & Consultant Team