MINUTES OF THE 22nd EXECUTIVE COMMITTEE MEETING (ECM) OF SOUTH ASIA FORUM FOR INFRASTRUCTURE REGULATION (SAFIR)

Date: 18th November 2021; Thursday

Virtual Meeting conducted through MS Teams

The meeting was chaired by Mr. Samdrup K. Thinley, Chairperson, South Asia Forum for Infrastructure Regulation (SAFIR) & CEO, Bhutan Electricity Authority, Bhutan. List of participants is enclosed at **Annexure-I.**

In his opening remarks and welcome address, Mr. Thinley, Chairperson, SAFIR welcomed all dignitaries to the meeting. It was informed by SAFIR secretariat that Dr. Irfan Yousuf, Advisor (RE), NEPRA, Pakistan is representing NEPRA, Pakistan, Mr. Gamini Herath, DG, PUCSL, Sri Lanka is representing Sri Lanka

The Forum thereafter took each of the agenda items for consideration.

AGENDA NO. 1: CONFIRMATION OF MINUTES OF THE 21ST EXECUTIVE COMMITTEE MEETING AND ACTION TAKEN REPORT

Placing the Minutes of the 21st ECM for approval, Dy Chief (Regulatory Affairs) CERC, informed the EC members that SAFIR Secretariat finalised the Chartered Accountant firm for filing FCRA, GST and IT returns and the work has been awarded. The EC members were also informed that Assam ERC had conveyed their acceptance to remain a member in SAFIR, while there has been no response from Sikkim. As regards membership of Electricity Regulatory Commission of Nepal (ERCN), Chairperson of ERCN informed that the formal approval for ERCN to join SAFIR is still awaited from the concerned Ministry in Nepal. On the SAFIR study on “Regulatory Practice on innovation” awarded to IICA, EC members were informed that IICA has requested for extension of time till mid of January 2022 as they were waiting for more data collection. After discussion, the EC members unanimously approved the minutes of the 21st ECM.

AGENDA NO. 2: SAFIR WORKING GROUP & SARI-EI STUDY ON "REGULATORY INTERVENTIONS ON GRID DISCIPLINE AND GRID RELIABILITY IN THE SOUTH ASIAN REGION"

Dy Chief (RA), CERC informed the SAFIR members that the SAFIR Working Group had taken up a study on "Regulatory Interventions on Grid Discipline and Grid Reliability in the South Asian Region" where IRADe was providing technical assistance in line with the mandate of the Working Group. The objective of the study was to review and analyse all the existing relevant electricity regulations, mechanisms and technical framework w.r.t. grid discipline and grid reliability of each South Asian country from the perspective of integration/ unification of regional grids of domestic power systems of a country, as well as cross border power grid interconnection and come up with suggested regulatory measures/ interventions needed for ensuring grid discipline and grid reliability in South Asian region.

Dy Chief (RA), CERC further informed the members that IRADe has submitted the report of the study which was circulated to all the member countries for their suggestions/ comments. They had also updated the report based on the comments/ suggestions received from the member countries. She requested representative of IRADe to present the findings of the study.

Project Director, IRADe alongwith their consultant, Price Waterhouse Coopers, presented the findings of the study (**Annexure-II)**, Highlighting the suggestions/ comments received from each of the member countries on the report, IRADe informed the Executive Committee members that all the comments/ suggestions received have been addressed. Chairperson, CERC, India stated that IRADe may submit the final report to SAFIR secretariat for further circulation to the members countries for vetting of the report and its approval. It was also decided that once all the member countries provided their approval, the report may be placed on the website of SAFIR. The EC Members agreed to this proposal.

AGENDA NO. 3: ACCOUNTS RELATED ISSUES

A) AUDITED ACCOUNTS OF SAFIR FOR FY 2020-21

B) RE-APPROPRIATION OF BUDGET HEAD FOR PROCUREMENT OF FIXED ASSETS (DESKTOPS)

a) Dy Chief (Regulatory Affairs) CERC placed the annual accounts of SAFIR for the FY 2020-21 for approval. The representative from NEPRA, Pakistan suggested to explore the possibility of obtaining income tax exemption for SAFIR from the Secretariat host country. To this, Chairperson CERC informed that efforts were made in the past for the cause. However, as SAFIR is not an adjudicatory body, it does not qualify for exemption as per Indian Law and hence, the exemption was not accorded. Thereafter, the EC members unanimously approved the annual account for the FY 2020-21.

b) The EC members also unanimously approved the appropriation of budget head for fixed assets for the FY 2021-22 by INR 2,40,000 towards purchase of 3 computer systems for officers/staff of SAFIR secretariat approving the appropriation of the differential amount of Rs 1.2 lacs from the reserves of SAFIR.

AGENDA NO. 4: SAFIR CORE COURSE FOR FY 2021-22

Dy Chief (Regulatory Affairs), CERC placed the quotations and details received from IIM-A, CIRC and IICA for conduct of 3 days (online and off line) Core Course. In view of the prevailing pandemic situation, ECM decided to continue with the online option. Further, taking a view of the topics offered for the course by the institutions, it was decided that the topics offered by IIM-A is most pertinent. Therefore, it was decided to engage IIM-A for conducting the Core Course this year. SAFIR Secretariat was directed to award the assignment and conduct the Course before the close of this financial year.

AGENDA NO. 5: SAFIR WORKING GROUP STUDY AND SARI/EI – NEW STUDY TOR ON "ASSESSING THE POTENTIAL BENEFITS OF CROSS BORDER ELECTRICITY TRADE FOR AFFORDABLE SUPPLY OF ELECTRICITY, FACILITATING GRID BALANCING OF RENEWABLE ENERGY INTEGRATION, AND SUGGESTING A FRAMEWORK FOR ANCILLARY SERVICE MARKET IN THE SOUTH ASIA REGION".

Dy Chief (Regulatory Affairs), CERC briefed the EC members on the objective of the study "Assessing the potential benefit of cross border electricity trade for affordable supply of electricity, facilitating grid balancing of Renewable Energy Integration, and suggesting the framework for Ancillary Service Market for South Asian Region" proposed by the SAFIR Working Group assisted by IRADe. The details of the objective of the study and the scope of work have been provided at **Annexure – III**.

Chief (RA), CERC pointed that the World Bank is also assisting the Joint Working Group (JWG) of SAFIR on a study related to development of Power Market for South Asian countries. Thus, the scope of work provided under section E8 of the ToR proposed by IRADe "Review and analyse the existing market mechanism related to grid balancing in each country and the region and its associated policy, regulatory, legal and technical frameworks" appears to be overlapping with the scope of work of World Bank study.

It was also pointed out by the member from Nepal that under point E1 of the ToR, it has been suggested project demand and supply position (including renewable) for 15 years only. He suggested that the projection may be made for 25 years also.

EC members deliberated on the issue and suggested that both World Bank and IRADe can carry the work in coordinated way. This would help in cross leanings and result in development of a holistic document for reference and future use.

The EC members approved the TOR of the study. However, they suggested that scenarios suggested for development under point E1 of the scope shall be developed for both 15 and 25 years . SAFIR Secretariat was directed to convey the same to IRADe

AGENDA NO. 6: ICER PROPOSAL FOR PARTICIPATION IN REGULATORY ACCELERATOR FOR ENERGY TRANSITION BY OFGEM

Dy Chief (RA), CERC briefed the EC members that as SAFIR is a member of International Confederation of Energy Regulators (ICER), the Secretariat had received a proposal from ICER for participation in "Regulatory Acceleration for Easy Transition". The document shared by OFGEM with ICER was placed for the perusal of the EC members. The members were also informed of the joint statement which SAFIR needs to accord approval so that ICER can sign the statement with OFGEM. The joint statement detailed issues on peer to peer knowledge sharing on decarbonization of the sector and other initiatives on capacity building

Chief (RA), CERC informed the members of EC that CERC had received a similar statement directly from OFGEM and that, as per protocol, CERC has requested Government of India for necessary approval, which is still awaited.

The EC, after perusal of the said document, directed SAFIR Secretariat to share the same with the EC members so that the individual countries can seek approval from their respective Government. They added that once the proposal is approved by the member countries, the accord of approval would be communicated to SAFIR secretariat who in turn can communicate the same to ICER for further action. At this stage, a communication about the decision of SAFIR may also be sent to ICER.

AGENDA NO. 7: REFERENCE FROM ERRA FOR AN MOU WITH SAFIR

Dy Chief (Regulatory Affairs), CERC briefed the EC members about the proposal received from the Energy Regulators Regional Association (ERRA) to have MoU with SAFIR. She informed that ERRA is an inter-institutional non-profit organisation unified by the shared goal of its regulatory members to improve energy regulation. ERRA's focus is to bring together effective energy regulators with the necessary autonomy and authority to make positive change; and it covers Europe, Asia, Africa, Middle East, North and South America. Further, she also elaborated on the scope and activities under the MoU.Chief (Regulatory Affairs), CERC added that ERRA is an authorized agency of the World Bank to conduct capacity building programs. The EC members observed that the objectives of ERRA and SAFIR are similar in nature.

Thereafter, the MoU submitted by ERRA was discussed by the EC members and they unanimously agreed to sign the MoU as per the terms specified in the MoU. SAFIR secretariat was directed to convey the acceptance of the terms of the MOU to ERRA so that the further process for signing the MOU can be arranged

AGENDA NO. 8: STATUS UPDATE ON:

a) SAFIR INFRASTRUCTURE CONFERENCE FOR 2021-22

b) NEXT MEETING OF ECM

a) The EC members were updated that the SAFIR Infrastructure Conference for the FY 2021-22 would be conducted by SARI/EI on February 15th, 2022. As regards whether the conference will be held virtually or physically, the EC members directed that SARI/ EI may review the travel situation during the month of December, 2021 and inform about holding the conference in physical mode as also the venue for the same. In case the assessment of SARI/ EI is that the physical conduct of the conference may not be possible, the conference may be organized virtually.

b) As regards the next ECM, the EC members decided that SAFIR secretariat may get in touch with the Chairman office of all the SAFIR members during February, 2022 to review the travel situation and to assess whether the next ECM may be conducted off line, online or hybrid mode in April 2022 or thereafter

The meeting ended with a vote of thanks to the Chair.

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ANNEXURE-I

LIST OF PARTICIPANTS IN THE 22ND EXECUTIVE COMMITTEE MEETING (VIRTUAL) HELD ON 18TH NOVEMBER, 2021 VIA MS TEAMS

MEMBERS

Sr. No.	NAME	Organisation.
1	Mr. Samdrup K. Thinley, Chairman, SAFIR and Chairman, CEO	Bhutan Electricity Authority, Bhutan
2	Shri P.K. Pujari, Chairman	Central Electricity Regulatory Commission (CERC), India
3	Mr. Md. Abdul Jalil, Chairman	Bangladesh Energy Regulatory Commission, Bangladesh
4	Mr. Dilli Bahadur Singh, Chairman	Electricity Regulatory Commission of Nepal, Nepal
5	Dr. Sushanta K. Chatterjee, Chief (Regulatory Affairs),	Central Electricity Regulatory Commission (CERC)
SPECIAL INVITEES		
6	Mr. Gamini Herath, Deputy DG	Public Utilities Commission of Sri Lanka, Sri Lanka
7	Dr. Irfan Yousuf , Advisor (RE)	National Electric Power Regulatory Authority , Pakistan
8	Ms. Shilpa Agarwal Joint Chief (Engineering)	CERC
9	Mr. Firoz Zaman, Deputy Director	Bangladesh Electricity Regulatory Commission, Bangladesh
10	Mr. Pankaj Batra, Project Director	SARI/EI - Integrated Research and Action for Development

11	Ms. Anuradha Das, Program Coordinator	SARI/EI - Integrated Research and Action for Development
12	Ms. Maitreyi Karthik	IRADe
13	Mr. Hitesh Chaniyara, ED	Price Waterhouse Coopers
14	Mr. Tushar Kothavale, Manager	Price Waterhouse Coopers
SAFIR SECRETARIAT		
15	Ms. Rashmi Nair, Dy. Chief (Regulatory Affairs)	CERC
16	Mr Sanjeev Tinjan Assistant Chief (Regulatory Affairs),	CERC
17	Mr Rajiv Kumar, Assistant Secretary (P&A)	SAFIR
18	Shri Ravindra Kadam, Advisor (RE)	CERC
19	Mr Saurabh, Principal Research Officer	CERC
20	Mr Manvendra Pratap, Research Officer	CERC
21	Mr. M.M. Prasad, Sr. Accounts Officer	SAFIR
22	Mr. Nilesh Diwan, Accounts Officer	SAFIR

Annexure-II

Study on Regulatory Interventions for Grid Discipline and Grid reliability in the South Asian Region

Presentation for SAFIR Working Group

November 2021

Agenda

Background

Background of the study

SARI/ EI/ IRADe is providing the Technical Knowledge support/ assistance to the SAFIR Working Group On “Regulatory Cooperation to Facilitate Knowledge sharing, addressing Cross Cutting Energy/ Electricity Regulatory Issues and Capacity Building in South Asia”.

The study on regulatory interventions for grid discipline and grid reliability in the South Asian Region (SAR) is being conducted by SARI/EI/IRADe for the SAFIR Working Group. PwC was selected to conduct this study.

The objective of the study is to review and analyze all the existing relevant electricity regulations, mechanisms and technical frameworks with respects to Grid discipline and Grid reliability of each South Asian Countries both from the perspective of integration/unification of regional grids of domestic power system of a country, as well as cross border power grid interconnection and come up with suggested Regulatory measures/Intervention needed for ensuring Grid discipline and Grid reliability in SA region.

Approach and Methodology

1

Review and analyse sector framework and institutions/ stakeholders (Legislative, Policy, Regulatory, Others)

2a

Identify key indicators defining grid discipline and grid reliability

2b

Identify key measures to achieve grid discipline and grid reliability

3

Assess level of implementation and compliance of identified measures

4

International experiences on regulatory interventions for improving grid discipline and grid reliability

5

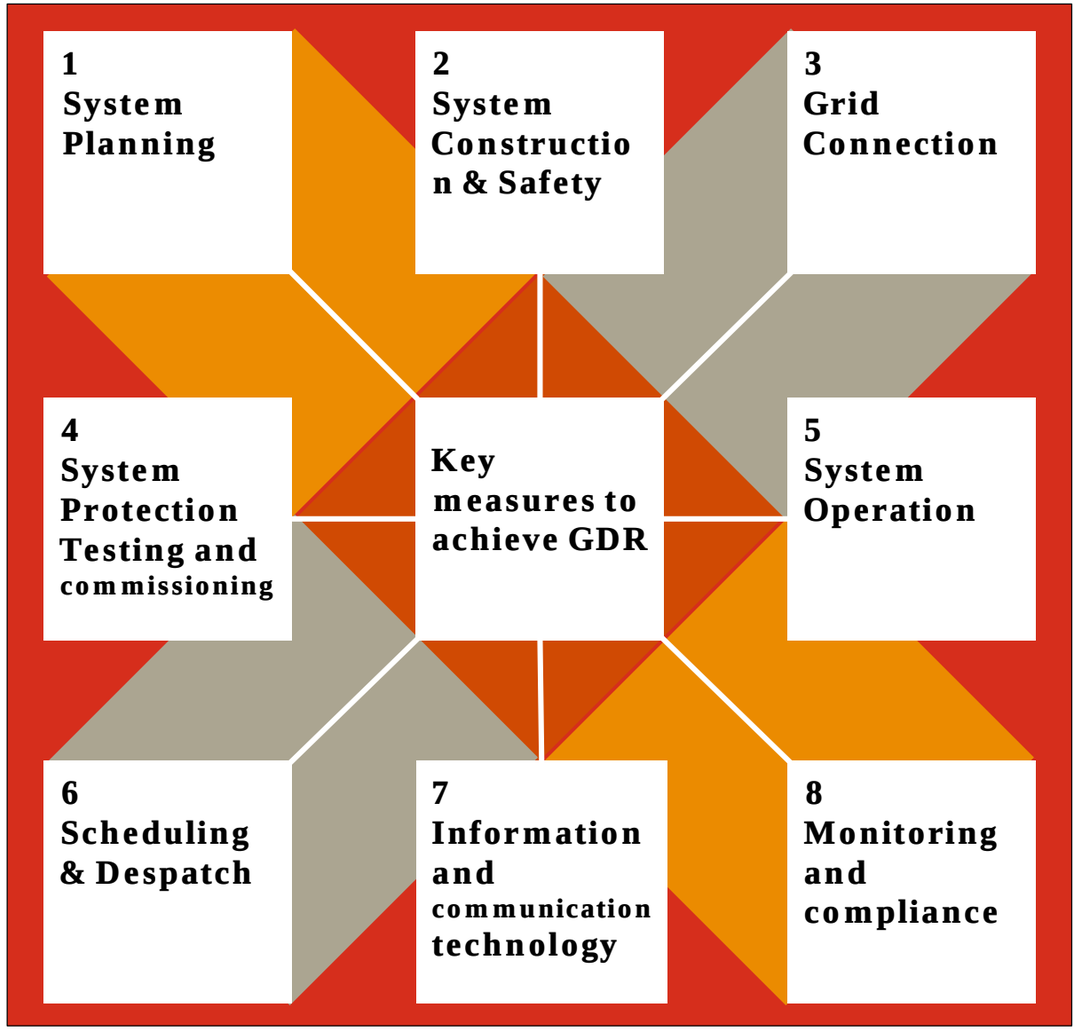
Identify gaps in (i) Sector framework and institutions/ stakeholders and (ii) Implementation and compliance of identified measures

6

(a) Regulatory measures/ interventions needed to improve grid discipline and grid reliability in SAR countries along with the roadmap

(b) Suggest capacity building measures

Key measures to achieve grid discipline and grid reliability



All the South Asian Region countries (Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka) have been evaluated against these key measures.

Summary of Stakeholder Comments on Report

Key milestones

Sr. No.	Event	Date of submission
1	Contract signing between IRADe and PwC	6 January 2020
2	Submission of final draft report by PwC to IRADe	28 November 2020
3	IRADe circulated draft report to SAFIR WG members	1 December 2020
4	Comments from Bhutan Electricity Authority (BEA) - Bhutan	25 January 2021
5	Comments from Bangladesh Electricity Regulatory Commission (BERC) – Bangladesh	27 January 2021
6	Comment from Nepal Electricity Authority (NEA) – Nepal	10 February 2021
7	Comments from National Electric Power Regulatory Authority (NEPRA) – Pakistan	8 March 2021 & 6 July 2021
8	Comments from Power System Operation Corporation (POSOCO) – India	16 April 2021
9	Comments from Central Electricity Regulatory Commission (CERC) – India	12 November 2021

Summary of key comments from Stakeholders

Comment from BEA - Bhutan	Action taken
Now due to operationalization of Mangdechhu, the 400kV tra. Line also covers the central and Southern part of Bhutan	Made appropriate changes in the draft report to reflect the actual situation.
Alternative Renewable Energy Policy, 2013 (AREP) missing from key Regulations	Inserted reference of the Policy
Distribution Code 2008 was amended in 2020	Corrected it to the Distribution Code 2020
DHMS is now called the National Center for Hydrology and Meteorology (NCHM) an autonomous government agency	Made appropriate correction in the Prevailing Institutional Structure of Bhutan's electricity sector
We have Alternative Renewable Energy Policy 2013 and accordingly will come up with Renewable Energy Master Plan is near future.	Inserted the correct reference.
A Standard Procedures (in line with the Grid Code 2008) for integration of new network elements into the grid a certificate is issued by Bhutan Power System Operator (BPSO) for successful operation with existing power system elements.one of the main criteria is submission of Test report(s) for the elements (ex: Meggar values for transmission lines). This too is in Public domain	Inserted the correct reference.
We would suggest the need for capacity development for amendment of the existing grid code to incorporate the issues flagged in this study report.	Accepted the suggestion for including capacity development for BERC.

Comment from BERC - Bangladesh	Action taken
Bangladesh Energy Regulatory Commission Act, 2003 was amended in 2005, 2010 and **2020**	Inserted the correct reference.

Summary of key comments from Stakeholders

Comment from NEA - Nepal	Action taken
Total electricity generation from variable RE sources, electricity exported to other countries to be updated from NEA Annual Report 2019-20	Updated as per comment.
The power grid of Nepal is divided into five zones from West to East, with at least one interconnection point with India and China. Insert appropriate reference.	Reference included - Transmission System Development Plan, July 2018 by RPGCL
The Nepal Electricity Authority Act, 1984, not the Electricity Act, 1992 was the one which provided for Nepal Electricity Authority to make arrangements for power supply by generating, transmitting, and distributing electricity in an efficient, reliable and convenient manner.	Updated as per comment.
Although not the apex legislation, NEA Act, 1984 is still a very important act in Nepali power sector.	Updated as per comment.
A. Corrections in Name Requires to be done: 1. Nepal Electricity Regulatory Commission should be changed to Electricity Regulatory Commission, 2.NEA Energy Company Ltd. Should be converted to NEA Engineering Company Ltd. However, it is to be noted that, like other companies alongside it in the chart, it is not a generation company. B. Structure of WECS and ERC to be reviewed C. Vertical link between the ministry and DoED, AEPC & NEA should be drawn	Made appropriate correction in the Prevailing Institutional Structure of Nepal's electricity sector
"There is no clause in the Grid Code to manage events related to mis-declaration of generation availability by generating stations."	The NEA grid code is not available in public domain. Therefore, regulatory intervention is suggested.
There are 3 different scenarios in demand forecast report (available on Water and Energy Commission Secretariate website)	Included the 3 scenarios.

Summary of key comments from Stakeholders

Comment from NEA - Nepal	Action taken
For co-ordination of CBET Nepal Power Trading Company Ltd. (NPTCL) is mandated to buy and sell power generated and sold by domestic / foreign generators and Suppliers	Removed the recommendation.
Penalty for mis-declaration by gen cos. is still in practice through provisions in PPA.	Penalty mechanism is absent in grid code and the grid code is not available in the Public domain, Penalty clause for misdeclaration by generators is in the PPAs this has two shortcomings (i) The clauses may / may not be uniform, (ii) The clauses may be removed/ added easily by amending the PPAs. Clauses in the grid code/ regulation will be uniformly applicable to the generators and any change in the clauses would require due process to be followed by the Regulator (not as easy as amending PPAs). There are no penalty mechanism for inaccurate demand forecasting by distribution companies. Therefore, retained the suggested intervention to include clause on penalty for misdeclaration in the Grid code/ Regulations.

Summary of key comments from Stakeholders

Comment from NEPRA - Pakistan	Action taken
Correction in figures of Power Sector Snapshot of Pakistan	Updated based on latest available information.
Against identified gap that – there is no mechanism to ensure compliance to system planning standards NEPRA commented: NEPRA monitors and enforce the Grid Code in true letter and spirit and there exists also the penalty provision for non-compliance with any of the provisions of the Grid Code. For ease of reference the relevant clause of the Grid Code is reproduced hereunder. Besides grid code has the Planning Code (PC) is sub-code of NEPRA approved Grid Code 2005 which covers the details of the Indicative Generation Capacity Expansion Plan (IGCEP) and Transmission System Expansion Plan (TSEP) to be prepared by National Transmission and Despatch Company (NTDC) and approved by NEPRA.	Accepted the suggestion and incorporated leading to removal of identified gap – No mechanism to ensure compliance to system planning standards.
Against identified gap that- absence of regular monitoring of compliance to system construction and safety in Pakistan NEPR commented: NEPRA in consultation with the stakeholders had developed and approved a Power Safety Code (the "Code") for Transmission & Distribution Licensees in 2015 keeping in view the safety requirements as prescribed in the NEPRA Act, Rules, Grid Code, Distribution Code and other applicable documents to ensure that the licensee's networks are planned developed, operated and maintained in a reliable, efficient and a safe way without compromising on safety of any kind related to the systems, personnel and others.	Accepted the suggestion and incorporated leading to removal of identified gap – Absence of regular monitoring of compliance to system construction and safety.

Summary of key comments from Stakeholders

Comment from POSOCO - India	Action taken
Against the details of July 2012 Disturbance POSOCO commented: The Reasons for outage/root case of outage appear to be modified from the ones actually laid down by the MOP Enquiry Committee report on 30/31 July, 2021 disturbance. The reasons for outage/ root cause may be taken as mentioned in the report.	Modification made as suggested by POSOCO
Against details of level of implementation and compliance on Generation reserves POSOCO commented: There are ongoing initiatives such as Primary Control testing for over 240 generating units pan-India since 2020, Secondary Control through Automatic Generation Control in over 80 GW generation pan-India by FY 21 and Tertiary Frequency Response through RRAS implemented since 2016.	Included at Section 3.4.5 of the draft report (Tertiary control and Active power management; Ancillary services heads)
Against gap analysis for Transmission System Planning POSOCO commented: The updation of transmission system planning manual and criteria is under progress with probabilistic system planning techniques. CERC (Planning, Coordination and Development of Economic and Efficient Inter-State Transmission System by Central Transmission Utility and other related matters) Regulations were notified in 23rd July, 2018	Modification made at Section 5.5 Sl. No. 1.1 based on the comment.
Against suggested regulatory intervention for system protection, testing and commissioning POSOCO commented: Although Regional power committee conducts system protection studies and lays down regional system protection standards, draft Grid Code, 2020 proposed by Expert Group has provided for new Protection, Testing & Commissioning Code.	Included at Section 6.3.4 of the draft report under India (2.1).

Summary of key comments from Stakeholders

Comment from POSOCO - India	Action taken
Against gap analysis for System Operation POSOCO commented: Operating procedure has sufficient definitions of short horizon for operational planning and determining relevance of assets for outage coordination. However, the forecasting of demand and RE is under rapid evolution with Advanced Models using Artificial Neural Networks and other statistical tools.	Modification made at Section 5.5 Sl. No. 3.1 based on the comment.
Against gap analysis for Scheduling and Despatch POSOCO commented: Post-despatch analysis is conducted at POSOCO. There is a regulatory framework to compensate regulated generators to go down up to 55% technical minimum levels. There are discussions for further reducing the technical minimum with adequate compensation.	Modification made at Section 5.5 Sl. No. 4.1 based on the comment.

Summary of key comments from Stakeholders

Comment from CERC - India	Action taken
Against Regulatory measures/ interventions undertaken by CERC CERC commented: "*Central Electricity Regulatory Commission (Communication System for inter-State transmission of electricity) Regulations, 2017 provides that Communication infrastructure shall be planned, ……. The audits shall be conducted by CERT-In certified third-party auditors"* The above may be included as a point under the heading "Regulatory Measures/ Interventions undertaken by CERC"	Accepted the suggestion and incorporated at appropriate place in the report.
Against detailed procedure and timelines for Scheduling and Despatch (Section 2.3.6.1) CERC commented: "*By 6 AM every day, the ISGS shall advise the concerned RLDC, the station-wise ex-power plant MW and MWh capabilities foreseen for the next day. ……The day-ahead generation schedules shall be informed to respective generators by 6 PM."* provided at page no 114 of the report was revised through amendment. The section may be modified accordingly.	Accepted the suggestion and section is modified accordingly.
Against details of communication facilities for data and voice (Section 2.3.7.1) CERC commented: "*Central Electricity Regulatory Commission (Communication System for inter-State transmission of electricity) Regulations, 2017 provides for availability of reliable data and voice communication"* may be included at page number 121 under India section	Accepted the suggestion and incorporated at appropriate place in the report.
Few suggestions from expert group have been taken as this report's suggestions which should ideally be cross referred to the Expert group report.	The cross referring is done at appropriate place in the report.
Everywhere in the suggestions "Regulator shall do " has been used which should be corrected. The report cannot be worded that Regulators should do so and so . It can be converted into a recommendatory language.	As suggested, recommendatory language is used in the report.

Summary of key comments from Stakeholders

Comment from CERC - India	Action taken
Against the identified gap – that currently there is no post-despatch analysis conducted and there is no/ inadequate compensation to generators forced to run below normative parameters CERC commented to justify the statement.	More details are added and recommendation is updated recommending SERCs to develop similar compensation mechanism for plants forced to run below technical minimum.
Against the identified gap – that Operating procedure lacks in defining short horizon for operational planning and determining relevance of assets for outage coordination. CERC commented to justify the statement	More details are added to justify the identified gap. International standards are referred to highlight the gaps.
Against the identified gap - Inadequate performance monitoring indicators CERC commented to justify the statement.	The Performance indicators are relooked and assessed w.r.t. existing performance indicators to suggest only relevant performance indicators.
Against the short term roadmap suggestion - “Regulator shall mandate SLDCs to prepare and provide scenario based probabilistic future power demand pattern of the load.” CERC suggested to remove the same.	As suggested by CERC the short term suggestion is removed.
Against the medium term roadmap suggestion - “Regulator shall introduce framework to ensure better utilisation of existing infrastructure by assessing existing interconnector capacity made available to the market in real-time. An efficient use of interconnectors is deemed important in terms of domestic and regional electricity market”. CERC suggested to remove the same.	As suggested by CERC the medium term suggestion is removed.
Against the long term roadmap suggestion - “Provision related to post-despatch analysis shall be introduced in the grid code; it will help in enhancing reliability of the system by removing vulnerabilities. This analysis will be helpful in identifying root cause of disruption in supply CERC suggested to remove the same.	As suggested by CERC the long term suggestion is removed.

Thank you.

Annexure-III

Draft As on 03-02-2021

SAFIR Working Group Study
On
"Assessing the Potential Benefits of Cross Border Electricity Trade for Affordable Supply of Electricity, Facilitating Grid Balancing of Renewable Energy Integration, and Suggesting a Framework for Ancillary Service Market in the South Asia Region".

A. Introduction

South Asia Regional Initiative for Energy (SARI/E) is a long-standing program of USAID started in the year 2000. The program covers eight countries of the region i.e., Afghanistan, Bangladesh, Bhutan, India, the Maldives, Nepal, Pakistan, and Sri Lanka. The program has consistently strived for enhancing energy security of South Asian Countries (SAC). The SARI/E program of USAID entered its fourth phase in 2012, which was titled South Asia Regional Initiative for Energy Integration (SARI/EI) and will continue till 2022. The SARI/EI program aims to promote regional energy integration as well as increase cross border electricity trade in the region. The overall objective of SARI/EI is to create an "enabling" environment to support the establishment of a South Asian electricity market, and gain consensus and support from the key decision makers and stakeholders. The SARI/EI program focuses on three developmental outcomes i.e., coordination of Policy, Legal and Regulatory Framework; advancement of Transmission Systems Interconnection; and establishment of South Asia Regional Electricity Market. The program also works with regional institutions including SAARC, BIMSTEC, and SAFIR to move the regional power trade from bilateral to trilateral and multilateral forms of trade in the South Asian Region. To achieve these outcomes, three dedicated Task Forces (TFs) have been constituted under the program, represented by government nominated members from South Asian Governments (Energy/Power Ministries), Electricity Regulatory Commissions, Planning Authorities, National Power Transmission utilities, Power Market Institutions etc. The program has an oversight body, in the form of a high-level Project Steering Committee, with representation from senior officers from each country. Integrated Research and Action for Development (IRADe) is the implementing partner for the fourth phase (2012-2022) of the SARI/EI program through a cooperative agreement with USAID.

B. Background

The South Asia Forum for Infrastructure Regulation (SAFIR) was established in May 1999. SAFIR aims to provide high quality capacity building and training on infrastructure regulation and related topics in South Asia, and stimulate research on the subject by building a network of regional and international institutions and individuals that are active in the field. It also aims at facilitating effective and efficient regulation of utility and infrastructure industries, initiate beneficial exchange of knowledge and expertise, and set the trend of rapid implementation of global best practices. SAFIR has a Working Group, constituted with the intent to work towards enhancing regulatory cooperation in energy sector by facilitating knowledge sharing, addressing cross cutting energy/electricity regulatory issues and capacity building. SARI/EI is providing technical and knowledge support /assistance to the SAFIR Working Group.

In the second meeting of the SAFIR Working Group on 'Regulatory Cooperation to facilitate Knowledge-sharing, addressing Cross-cutting Energy/ Electricity Regulatory Issues and Capacity Building in South Asia',

held in Dhaka on 4th December 2019, a presentation was made on the "Evolution of Cross-Border Electricity Trade in South Asia and the Future Outlook" by SARI/EI. The role of regional hydropower in renewable integration and grid balancing was also discussed in the meeting. In this meeting, it was decided to take up another study on the requirement of balancing generation[1] on a regional basis and develop a report for the same.

Apart from the above-mentioned subject, it was also decided that SARI/EI will conduct a study[2] on 'Benefits of Cross border Electricity Trade - Potential Optimum Utilisation and Reduction in Cost of Supply', at the behest of SAFIR Working Group, as was mandated at the SAFIR 15th Executive Committee Meeting (ECM)[3] and 24th Steering committee Meeting (SCM)[4]. This study aims to review and analyse the load and generation patterns in all neighbouring countries and study the season-wise trade/ barter of power between the countries to ensure 24x7 supply to all countries and optimum utilisation of generation assets, including quantification of benefits for all countries as per the approved scope of work. During the 18th Executive Committee Meeting of SAFIR held in Dhaka, Bangladesh, on 5th December 2019, Chairman of SAFIR and BERC suggested[5] that the Working Group should also consider working on methods to reduce the cost of supply. This could be added as an objective in the Study on Cross Border Trade in Electricity. It was also suggested[6] that the Working Group could assess as to how balancing costs can be reduced due to the flexibilization of thermal power so that there is no economic loss. This scope of work of the study on "Cross Border Trade of Electricity" is now being incorporated in the proposed comprehensive ToR. Also, in the recent deliberations of the 26th Steering Committee Meeting[7] and 19th Executive Committee meeting[8] of SAFIR held on 28th August 2020, revised TOR is to be shared by SARI/EI with SAFIR Secretariat by revising/expanding scope to make the study holistic, comprehensive, more analytical and taking in to account the renewable energy and grid balancing aspects, ancillary service etc. in an integrated manner.

In the above context, since all these aspects are related and it is important to have an integrated and comprehensive approach in the activities of SAFIR Working Group, it is proposed to carry out a combined study aimed at fulfilling all the requirements in letter and spirit. The proposed study is titled "Assessing the Potential Benefits of Cross Border Electricity Trade for Affordable Supply of Electricity, Facilitating Grid Balancing of Renewable Energy Integration and Suggesting a Framework for Ancillary Service Market in the South Asia Region".

C. Motivation

Integrating the electricity grids of neighbouring countries in South Asian region leads to more reliable grid operation. This would lead to a more reliable, affordable electricity supply, and optimal utilization of resources in the region, ultimately resulting in lesser cost for each country.

[1] https://sari-energy.org/wp-content/uploads/2020/01/MOM-Second-Meeting-of-SAFIR-Working-Group_04-12-2019_Dhaka.pdf
[2] Note-Original title of the study was " Cross Border Trade of Electricity Trade" , to bring the true aspects of the study is reflected in its title in line with approved scope of work , the title of the study is modified to " Benefits of Cross Border Electricity Trade - Potential Optimum Utilisation and Reduction in Cost of Supply' for better reflection in the title of the study.
[3] https://www.safirasia.org/sites/default/files/Minutes%20of%2015th%20ECM.pdf
[4] https://www.safirasia.org/sites/default/files/Minutes%20of%2024th%20SCM.pdf
[5] https://www.safirasia.org/sites/default/files/Minutes%20of%2018th%20ECM%20of%20SAFIR.pdf
[6] https://www.safirasia.org/sites/default/files/Minutes%20of%2018th%20ECM%20of%20SAFIR.pdf
[7] Minutes of 26th SCM - revised.pdf (safirasia.org)
[8] Minutes of 19th ECM - revised.pdf (safirasia.org)

The South Asia region faces significant climate change challenges and each country in the region is stepping up their Renewable Energy (RE) targets to address this issue. India recently stepped up its target of 175 GW of RE by 2022 to 450 GW of RE by 2030. Due to the intermittencies in the generation pattern of renewable energy sources such as solar and wind power, the risk of power grid instability increases. In this context, the role of cross-border power trade in renewable energy grid integration and regional grid balancing becomes extremely important. Cross border trade can play an important role in optimal grid balancing in an economical manner. There exist established global experiences/models in similar regional grid balancing for RE integration, such as in the case of Denmark and Norway, where Norway's hydro power plants are utilized to balance Denmark's wind power capacity. South Asian countries have immense potential for regional grid balancing in the context of large-scale renewable energy growth due to diversity in supply sources. For example, the generation resources in Nepal and Bhutan are predominantly hydro. With the rise of power markets due to recent reforms in power markets in India and development of ancillary service markets, a market-based approach to regional grid balancing will become the preferred choice to manage the intermittency in the most economical manner in the South Asia regional context. Therefore, it is worthwhile to explore these subjects comprehensively.

While there are many theoretical studies on the above subjects, not many studies have quantified the economic benefits through a comprehensive modelling exercise, in a transparent and scientific manner, on potential reduction in costs of supply, taking into account the diversity of generation resources and peak demand. Another important aspect that comes out clearly is that since all countries have made policies to shift to renewable energy sources, the majority of which are intermittent in nature, either produced within the country or purchased from outside, balancing of the such intermittency of variable renewable energy resources would become very important in the future. A study of balancing such intermittency on a South Asia basis has hitherto not been done, including determination of the cost of balancing and role of market in the South Asia regional context.

D. Objective of Study

The study aims to address the following issues:

1. The extent of potential reduction in average cost of supply of electricity in South Asian countries due to increased cross border trade of electricity for optimal utilization of generation assets in South Asia, as well as due to reduction of reserves, and quantification of the overall economic benefits to the region over the next fifteen years.
2. The role of Cross Border Electricity Trade in the context of accelerating the Renewable energy integration in South Asian Countries presently and in the future, considering the rapid expansion in renewable energy in the South Asian region for reduction of carbon emissions. Calculation of the cost of balancing for each country on standalone basis and that on a combined South Asia basis and therefore quantification of the benefits of regional grid balancing due to net fluctuations of demand and variable renewable energy.
3. For both point nos. 1&2 above, comprehensive and detailed modelling exercise has to be done for likely capacity addition and different scenarios of capacity addition. Propose the optimal capacity addition in each country, considering regional energy cooperation.

4. Analysis of the various market mechanisms in vogue internationally, for grid balancing and ancillary services, and to propose an appropriate fair, transparent market structure suitable for South Asia, and the broad framework for ancillary service market in the Region.

E. Scope of work

E.1. Review and Analyze the current and future demand – supply positions of each South Asian country, including growth of renewables, for the next 15 years - based on the master plans available in each country, or carrying out comprehensive modeling exercise, if projections are not available.

E.2. Review and analyze the ***current*** load curve and generation patterns (including those of renewable energy) over different seasons in all South Asian countries and calculate the balancing cost per unit on account of intermittency of renewables and average cost of supply per unit in each country separately over the year, considering the existing cross border trade, and the balancing cost per unit on account of intermittency of renewables and average cost of supply per unit for the South Asia Region as a whole. The study will model the hourly load and generation curve for each country for the full year, i.e., 8760 hours, and will take into account the cost of the existing transmission for cross border trade of electricity. This should be done for the last full year in which data is available, preferably 2019-20. Reduction in balancing cost per unit on account of intermittency of renewables and average cost of supply per unit should be calculated for the South Asia Region as a whole.

E.3. Based on the analysis of E.1. and E.2., carry out comprehensive energy modelling exercise[9] and develop likely scenarios including a scenario of unconstrained trade of power, utilizing various diversities (demand-supply, generation mix on daily/weekly/monthly/seasonal basis, etc., including for balancing), between the countries of South Asia, through bilateral, trilateral, and multilateral contracts, in order to ensure least cost of supply per unit in South Asia as a whole. It would also calculate the reduction in balancing cost per unit on account of intermittency of renewables and average cost of supply of each country and of South Asia combined, and then the total savings in each country and South Asia combined, due to cross border electricity trade among the SACs. The study should take into account the additional cost of transmission system related to cross border trade in electricity.

E.4. Conduct the same exercise with the existing integration and power trade vis-a-vis increased integration with unconstrained trade of power but considering nominal reserves for each country separately[10] and nominal reserves in South Asia combined on account of sharing across the SAC, and calculate the savings in reserves, including balancing reserves, and hence the savings in capital expenditure accruing as a result of increased integration and unconstrained trade of power. This may be equated to reduction in cost of supply per unit in each country and South Asia as a whole.

[9] A very comprehensive, detailed and high-quality modelling exercise is expected to be carried out in this study, it is expected that consultant will use well recognized, industry best and state of the art modeling systems and tools for carrying out this exercise.

[10] According to international norms, a reserve of 15% available capacity is to be kept to take care of outages and unforeseen circumstances.

E.5. Calculate the total reduction in average cost of supply as a result of E3 and E4.

E.6. The study at E5 should be extended over a period of the next 15 years. This part of the study should be done taking into account 24x7 supply to all consumers in all countries. Modelling should be done, considering different scenarios of capacity addition including capacity addition of renewables (whether set up within the country or bought from outside). The model should consider the respective country's targets, as well as enhanced renewable capacity targets. The balancing costs should be brought out clearly, in addition to reduction in capacity costs due to lower reserves and optimum utilization of resources. The study should calculate the year-wise average reduction of cost of supply per unit including balancing costs, and the year-wise total cost of reduction on a country-wise basis and for South Asia compared to the existing trade. The study should propose the optimal capacity addition in each country for cheapest average cost of supply considering regional energy cooperation.

E.7. Based on the analysis and its findings from E.1. to E.6, present the key findings of the study in the SAFIR Working Group meeting and incorporate the comments in the report. In addition to the SAFIR Working Group meeting, stakeholder consultation meetings with the concerned stakeholders in one or more South Asian countries in addition to India, will be required[11]. For all meetings/workshops outside India, SARI/EI, IRADe will bear the logistics cost i.e. international travel and stay charges of the consultant (one member). Monthly meetings are proposed to be held with the consultant at the SARI/EI Project Secretariat. However, any logistic cost for meetings at the SARI/EI Project Secretariat, as well as the meetings of the consultant within India with stakeholders, will be borne by the Consultant.

E.8. Review and analyse the existing market mechanism related to grid balancing in each country and the region and its associated policy, regulatory, legal and technical frameworks. This analysis will take into account recent reforms/new initiatives being undertaken in power markets in India towards market-based ancillary services and bringing flexibility in power market. In addition, the consultant will carry out a comprehensive analysis and comparison of different models of ancillary service markets across the globe including but not limited to Europe, North America, South Africa Power Pool, Gulf Cooperation Council.

E.9. Based on the findings of E.1. to E.8, and recognising the potential benefits regional grid balancing, suggest a draft broad regional framework and business model for regional ancillary services market, giving reasons for the type of framework suggested. This should cover all ancillary services, including load balancing, reactive power services and black start services, etc. Prepare a comprehensive report covering all analyses from E.1. to E.9.

E.10. Based on the findings of E.1. to E.9, suggest a draft roadmap (regional and country wise) as well as an action plan for implementation of the regional framework for ancillary services market in the Region. This will also include a suggested minimum set of changes that may be required in each of the South Asian nation to implement road map and the action plans.

[11] Depending on the travel situation, in person travel will be reviewed. If travel is not possible, the contractor will have to present on a virtual platform.

E.11. Based on the analyses and its findings from E.1. to E.10, present the key findings of the study in the SAFIR Working Group meeting and note the comments obtained out of the meeting.

E.12. Revise and finalise the Report covering all the aspects of E.1. to E.11, based on the comments of the SAFIR Working Group, stakeholders, USAID and SARI/EI, IRADe.

F. Deliverables

i. Submission of inception report covering detailed methodology, approach, analytical framework, detailed description of the model, of integrated modelling framework, modelling strategy and associated steps in detail and overall steps for the entire assignment and acceptance of the same (within 20 days from the date of signing of contract).

ii. Submission of detailed draft interim report covering all the analysis and modelling findings from E.1. to E.6. including a detailed presentation on the draft interim report and acceptance of the same. (within 110 days from the date of signing of contract).

iii. Prepare a detailed Draft Report covering all aspects based on the analyses conducted in E.1. to E.6 and incorporating comments of the SARI/EI team. Submission of the Draft Report to SARI/EI including a detailed presentation on the draft report and acceptance of the same and presentation before SAFIR Working Group members and other stakeholders of the same (within 170 days from the date of signing of contract).

iv. Revise the Report as per the comments received from the SAFIR Working Group and South Asian stakeholders, submit the revised draft report including a detailed presentation on the revised draft report and acceptance of the same (within 200 days from the date of signing of contract).

v. Submission of the enhanced draft final report covering all the analysis conducted in E.1. to E.10,. to SARI/EI including a detailed presentation on the draft final report and acceptance of the same. Submission and acceptance of the Presentation to be made before the SAFIR Working Group and other South Asian stakeholders (within 230 days from the date of signing of contract).

vi. Submission of the final report and including a detailed presentation on the final report after incorporating comments of SAFIR working group members, stakeholders, USAID and SARI/EI and acceptance of the same (within 270 days from the date of sign of contract).

G. Timeline of the study

Nine months