Concept Note

Workshop

on

"Prospects of Clean Energy Transformation and Role of Coordinated Generation and Transmission Planning for Optimal and Sustainable Cross Border Energy Trade in South Asia"

17-19 June 2023
Le Meridien, New Delhi, India

Jointly Organised
by
Research and Information System for Developing Countries (RIS), South Asia Group on Energy (SAGE)-RIS
&
USAID's South Asia Regional Energy Partnership (SAREP)

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A. Background and Context:

01. South Asia (SA) region is one of the most vibrant and diverse regions in the world. It comprises 3% of the world's area, 21% of the world's population and 5.21% (US$ 4.47 trillion) of the global economy, as of 202[1]. Access to reliable, affordable, clean, and sustainable energy is a high priority not only to support rapid economic growth and improved welfare of more than 1.8 billion population[2] of the SA region but also to ensure energy and climate security in the region.

02. SA region (SAR) is highly vulnerable to the adverse impact of climate change and decarbonising power/energy sector is crucial in fight against climate change. Increasing population, rising energy demand, growth in the manufacturing sector, extreme weather / climate conditions such as heatwaves in India and Pakistan, climate change vulnerabilities, regional geopolitics, and global geopolitical events have intensified regional energy problems[3].

03. As per climate risk index, five SA countries– Bangladesh, Pakistan, Nepal, India, and Sri Lanka come within the initial 30 rankings out of 180, indicating a higher incidence of extreme climate related incidents in these countries[4]. Increase in climate related incidents puts added pressure on the need for energy secure and climate resilient sustainable energy Infrastructure[5]. The SAR is experiencing a "new climatic normal" in which the capacity of the government, industry, and populace to adapt, is being put to the test by cyclones, droughts, floods, and heat waves that are getting stronger. More than half of all South Asians, or 750 million people in the 8 countries— Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, and Sri Lanka- were affected by one or more climate-related disasters in the last two decades. The changing climate could sharply diminish living conditions for up to 800 million people in a region that already has some of the world's poorest and most vulnerable populations[6].

04. Adequate supply of energy is pre- requisite for all human pursuits ranging from economic progress of scientific research endeavours, education, healthcare, and recreational activities. Approximately two-thirds of the energy use in SA is imported. As a result, the volatility of oil and gas prices particularly affects the countries that rely heavily on imported fuel for power generation. This leads to higher cost recovery requirements for electricity. Region heavily dependent on fossil fuels, 63.6 per cent of electricity capacity in SA is based on fossil fuels[7] and power industry is a major contributor to greenhouse gas (GHG) emissions[8] in most of the SA countries. Power sector accounts for 45% of total Fossil CO2 Emissions in South Asia[9].

05. Recognizing energy security challenges and climate change vulnerabilities, SA country governments are ratcheting up their clean energy targets to minimize emissions and have come up with net zero gaols. India, Maldives, Nepal, and Sri Lanka (carbon neutrality) have embarked on clean energy transformation journey and have announced net zero target year of 2070, 2030, 2045 and 2060 respectively[10]. Bhutan has

1 https://en.wikipedia.org/wiki/South_Asian_Association_for_Regional_Cooperation#:~:text=The%20South%20Asian%20Association%20for,%2C%20Pakistan%2C%20and%20Sri%20Lanka.
2 https://www.adb.org/news/op-ed/how-south-asia-can-continue-world-s-fastest-growing-subregion-lei-lei-song
3 https://www.downtoearth.org.in/blog/renewable-energy/improvising-power-trade-in-south-asia-can-ease-renewable-energy-access-in-the-region-86944
4 https://sarepenergy.net/wp-content/uploads/2022/12/Presentation-on-Prospects-of-Sustainable-Energy-Infra-CBET-SAFIR-News-Letter-by-Rajiv-Ratna-Panda-Associate-Director-SARI-EI-IRADe.pdf
5 Ibid
6 https://www.worldbank.org/en/region/sar/brief/integrating-climate-and-development-in-south-asia/integrating-climate-and-development-in-south-asia-region#:~:text=More%20than%20half%20of%20all,in%20the%20last%20two%20decades.
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9 https://sarepenergy.net/wp-content/uploads/2023/02/1.-Regional-Update-CBET-Emerging-Outlook-for-CBET-in-South-Asia-Rajiv-Ratna-Panda11th-TF-2-Meeting-SAREP-KathmanduNepal.pdf
10 https://sarepenergy.net/wp-content/uploads/2023/03/Envisioning-Trans-Regional-Energy-Connectivity-between-the-South-Asia-Region%E2%80%93Southeast-Asia-Region%E2%80%93Gulf-Region-Prospects-and-Opportunities-by-Rajiv-Ratna-Panda-Power-Market-Speci.pdf

committed to remain carbon neutral[11]. Massive electricity demand growth is expected in SA countries. The peak demand of South Asia is around 264 GW, and it is expected to increase to 741 GW by 2041[12].

06. South Asia Countries (SACs) is uniquely placed to achieve its clean energy transformation goals. The region has tremendous hydro potential (~350 GW) and significant solar (>1000 GW) and wind (1289 GW) energy potential[13]. While SA is endowed with large (> 350 gigawatts) hydropower potential, only around 20 percent has been exploited so far[14].

07. Without a regional resource development approach, most of these renewable energy resources will remain unutilised. The development of hydropower, a sustainable form of energy in the region would increase by 2.7 times over the next two decades if the region could facilitate an unconstrained flow of electricity across the borders in South Asia[15]. The region will save almost a 100 billion dollars from its electricity supply costs over the next two decades through the substitution of fossil fuels with hydropower.

08. This calls for the need for Coordinated , Complementary Regional Generation and Transmission Planning for Optimal and Sustainable Cross Border Energy Trade (CBET) in South Asia. Coordination of national generation and transmission planning and developing regionally optimal generation and transmission infrastructure shall intensify Regional Energy Cooperation (REC) can bring economies of scale, strengthen electricity/energy sector financing capability, enhance competition and market development and greening the South Asia Power Grid (SAPG) on a sustained basis among countries there by fostering rapid decarbonising of power/energy sector and fostering energy and climate security in SA.

09. While CBET started as early as the 1950s in SAR, it is only in the last ten years that the region has witnessed a manyfold increase in CBET, from 1,400 MW in 2012 to 3,900 MW in 2022[16]. The importance and potential benefits of REC and CBET is recognized by SA countries. Various CBET projects at bilateral, trilateral, and regional level are under discussion and construction stage.

10. CBET is gaining momentum with a greater number of cross-border power projects & transmission interconnections being planned and proposed, in particular in Bhutan, Bangladesh, India, Nepal, and Sri Lanka sub-region, which will enable greater integration of power systems of SA countries. With an upsurge in cross-border transmission and interconnection, power trade is expected to increase to about 43.8 GW by 2040[17]. With the One Sun, One World, One Grid (OSOWOG) initiative pioneered by the Government of India, the region will get interconnected beyond SA. With OSOWOG taking shape, the need for multi-country transmission interconnection and integration of regional electricity markets will take place across the globe. An interconnected Asian grid spanning from the western end of the Gulf region (GCC – Gulf Cooperation Council) to the eastern parts of Southeast Asian (ASEAN) grid will allow for leveraging the 5-hour time zone difference regarding solar power generation and utilization[18]. A board Pan Asia Regional Transmission interconnection plan[19] would be needed in future to optimal plan and capture the above complementarity.

11. Energy system is undergoing rapid transformation across the globe due to various socio, economic, technological and environmental factors and SAR is also impacted by this change. Future of CBET and REC have to navigate the global and regional context. Smart grid , innovative energy storage technologies, and innovation in electricity market play an important role in deepening clean energy transformation. With predicated rise in RE and the renewed prospect of hydropower, hydrogen generation through electrolysis

11 https://www.saarcenergy.org/wp-content/uploads/2021/12/SEC-MI1.pdf
12 https://sarepenergy.net/wp-content/uploads/2023/02/1.-Regional-Update-CBET-Emerging-Outlook-for-CBET-in-South-Asia-Rajiv-Ratna-Panda11th-TF-2-Meeting-SAREP-KathmanduNepal.pdf
13 Ibid
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using electricity generated from such green energy sources would help in development of green Hydrogen economy in SA region[20]. The above scenarios will impact the Generation and Transmission Planning.

12. India has drawn up a very ambitious plan to develop large scale sustainable energy infrastructure, to reach a target of 500 GW of Renewable energy (RE) by 2030, arguably the most ambitious plan in the world. Other SA countries also have plans for increased RE in the energy basket. Because of resource diversity between countries, to manage the RE intermittency and grid balancing, hydro resources of Bhutan and Nepal can supplement the sustainable grid integration of RE in India and other countries.

13. Factoring the above dynamics in optimal manner, regional coordination and complementary planning of power generation and transmission among SA countries will be crucial to come up with optimal generation and transmission infrastructure development for sustainable CBET in South Asia. This will lead to promotion of economic growth and improve the quality of life for all the nations and shall balance the diversity of primary energy sources and differences in seasonal patterns of supply and demand.

14. International experience suggests that it is also prudent to develop institutional mechanism for developing adequately planned optimal cross-border transmission connectivity which is essential for regional electricity market development and integration. Most regional electricity markets, such as in Europe and the South Africa region, have followed a regional planning approach and have regional generation and transmission plan[21]. USAID's SARI/EI Task Force-2 study on harmonization of grid codes, operating procedures, and standards to facilitate and promote cross-border electricity trade in the SA region recommends creating a regional transmission master plan[22]. This plan will provide a long-term outlook for transmission system integration by adopting a regional approach to planning, which will optimize transmission infrastructure requirements and ensure that economical network integration takes place while maintaining satisfactory system reliability and security. Various studies have recommended to create institutional mechanism for facilitating knowledge sharing for coordinated planning[23] and integrated system operation[24].

15. In this backdrop, the South Asia Group on Energy (SAGE) at RIS along with South Asia Regional Energy Partnership (SAREP) Program of USAID aims to organise a Workshop on "Prospects of Clean Energy Transformation and Role of Coordinated Generation and Transmission Planning for Optimal and Sustainable Cross Border Energy Trade in South Asia" This cooperation of SAGE-RIS and USAID plans to promote, initiate and facilitate effective policy dialogue and capacity building on a bilateral, sub-regional and regional basis for energy and related issues, among South Asian countries.

B. Objective of the Conference:

To provide platform for dialogue, discussion, exchange of ideas and deliberation on

- Clean energy transitions goals, vision, and plans of South Asian countries
- Current ecosystem (Policy, Regulatory, Technical, Institutional, Commercials and market frameworks) for Electricity Generation and Transmission Planning of South Asian countries.
- Present the Electricity Generation and Transmission Plans of South Asian countries including planned cross border electricity export and import scenarios and transmission interconnection .
- Role of current Generation and Transmission Plans in meeting the clean energy transitions goals both nationally and regionally (if any) .
- Need for regional, complementary planning approach to meet the clean energy transition plans through Coordinated Electricity Generation and Transmission Planning

20 https://www.downtoearth.org.in/blog/renewable-energy/how-south-asia-s-massive-renewable-energy-potential-can-boost-green-hydrogen-production-87307
21 SAPP Regional Generation and Transmission Expansion Plan -https://sadc-energy.sardc.net/attachments/article/363/The_SAPP_Pool_Plan-Highlight_of_the_2017_Plan.pdf
22 https://sarepenergy.net/wp-content/uploads/2022/07/Harmonisation-of-grid-codes-operating-procedures-and-standards-to-facilitatepromote-cross-border-electricity.pdf
23 https://sarepenergy.net/wp-content/uploads/2022/12/Strategy-paper-on-Building-consensus-and-developing-a-strategy-paper-on-Creating-Regional-Technical-InstitutionBody-for-cross-cutting-deliberations-SAFTU_RRP-VKA-MM-Aug2022P.pdf
24 https://sarepenergy.net/wp-content/uploads/2022/12/Strategy-paper-on-creating-regional-network-for-sharing-best-practices-and-promoting-harmonization-excellence-in-power-system-across-south-Asia-SAFSO_RRP-VKA-MM-Aug2022-35.pdf

- Developing Coordinated, Regional, Complementary Generation and Transmission plan (CRCGTP) and associated system operation requirements for optimal generation and transmission infrastructure development.
- Opportunity and challenges of developing a South Asia Regional Power Grid and Greening the Grid for cross border clean energy trade.
- Developing regional institution mechanism for coordinated, complementary generation, transmission planning and integrated system operation on a sustained basis, sharing international experiences and best practices in regional power system planning in a complementary manner.
- Suggest an institutional framework for regional, complementary planning of power system and monitoring of project implementation and propose possible areas of institutional cooperation among SA countries.
- Come up with recommendations for Enhancing Coordinated, Complementary Generation and Transmission Planning for Optimal and Sustainable CBET and meeting Clean Energy Transformation goals

C. Format of the Workshop :

The workshop will be organized in physical mode with high level participation of Power Secretaries of South Asian countries. On 17 June, 2023 a high-level networking dinner will be organised. On 18 June 2023, the workshop will be inaugurated in the presence of Power Secretaries of South Asian countries. The technical session of the workshop consisting of four technical sessions will be organised with formal presentations by the participating speakers on 18 and 19 June 2023. The workshop is being jointly organized by SAGE-RIS and USAID's SAREP Program.

1. **High Level Networking dinner** (Saturday, 17 June 2023)
2. **Inaugural session** (Sunday, 18 June 2023)
3. **Working Session-1:** "Electricity Generation Planning in South Asian Countries and perspectives for clean energy transition and advancing Cross Border Energy Trade in South Asia" (Sunday, 18 June 2023)
4. **Working Session II:** "Electricity Transmission Planning in South Asian Countries and perspectives for clean energy transition and advancing Cross Border Energy Trade in South Asia." (Sunday, 18 June 2023)
5. **Working Session III:** "Need for regional planning approach to meet the clean energy transitions plans through Coordinated, Complementary, Regional Electricity Generation and Transmission Planning" (Monday, 19 June 2023)
6. **Working Session IV:** Recommendations and way forward for accelerating the Clean Energy Transformation through Coordinated, Complementary Generation and Transmission Planning for Optimal and Sustainable Cross Border Energy Trade in South Asia. (Monday, 19 June 2023)

D. Expected Outcomes:

The outcome of the workshop and recommendations for Coordinated Generation and Transmission Planning for Optimal and Sustainable Cross Border Energy Trade and meeting Clean Energy Transformation goals will be placed before next Power Secretaries Meeting (PSM) of SA countries being held under the aegis of the World Bank.

The event will also lead to improved understanding and awareness of i) Clean energy transitions goals, vision, and plans of SA ii) Electricity Generation and Transmission Plans of SA countries iii) need for regional, complementary planning approach to meet the clean energy transitions plans through developing Coordinated, Complementary Electricity Generation and Transmission Plan iv) developing regional institution mechanism for facilitating the coordinated, complementary transmission planning and integrated system operation on a sustained basis through knowledge sharing and V) recommendations for Coordinated, Complementary Generation and Transmission Planning for Optimal and Sustainable Cross Border Energy Trade and meeting Clean Energy Transformation goals.

E. Participants:

Conference participants will include Power Secretaries of South Asian countries, policy makers, power system planner, representative from government, ministries/departments of power, energy, planning authorities, load dispatch centers, power exchanges, power generation companies, transmission, and distribution utilities from South Asian countries.

F. Point of Contacts :

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2. Rajiv Ratna Panda, South Asia Regional Energy Partnership (SAREP), Email: rpanda@sarep-southasia.org

G. Research and Information System for Developing Countries (RIS) :

Research and Information System for Developing Countries (RIS) is a New Delhi–based autonomous policy research institute that specialises in issues related to international economic development, trade, investment, and technology. RIS is envisioned as a forum for fostering effective policy dialogue and capacity-building among developing countries on global and regional economic issues. The focus of the work programme of RIS is to promote South-South Cooperation and collaborate with developing countries in multilateral negotiations in various forums. RIS is engaged across inter-governmental processes of several regional economic cooperation initiatives. Through its intensive network of think tanks, RIS seeks to strengthen policy coherence on international economic issues and the development partnership canvas.

H. South Asia Group on Energy (SAGE) at RIS :

South Asia Group on Energy (SAGE) at RIS aims to achieve a balanced and optimal development of energy infrastructure through mutual understanding and cooperation. The group will have the role of promoting, initiating and facilitating effective policy dialogue and capacity building on a bilateral, sub-regional and regional basis for energy and related issues, among South Asian countries. SAGE aims a) to identify infrastructural constraints in Power Transmission connectivity and suggest an appropriate strategy to address these constraints b) identify potentials in trade and investment, particularly in the energy sector and suggest measures to address gaps in regulatory policies in the sector across the region c) identify regional solutions to technology in the power sector, both in generation and transmission of power, and suggest financing options of the regional project as well as a source of funding for this initiative and d) suggest an institutional framework for planning and monitoring of project implementation and propose possible areas of cooperation between regional economies.

I. US Agency for International Development (USAID):

USAID is the U.S. Government's international development agency and a catalytic actor driving development results. USAID leads international development and humanitarian efforts to save lives, reduce poverty, strengthen democratic governance, and help people progress beyond assistance. USAID objective is to support partners to become self-reliant and capable of leading their own development journeys.

J. South Asia Regional Energy Partnership (SAREP):

The South Asia Regional Energy Partnership (SAREP) is a flagship program of USAID to advance objectives of the U.S. Government's Clean Enhancing Development and Growth through Energy (EDGE) Asia initiative. SAREP is working on developing regional power markets, improving coordination and planning, strengthening national and regional institutions, building consensus on power trade, and institutionalizing supporting frameworks and mechanisms. SAREP activities is accelerating cross-border power trade by supporting stakeholders to participate in trilateral, multilateral, and exchange-based markets.