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SARI/EI

IRADe Integrated Research and Action for Development

Conference Proceedings
South Asia Regional Inaugural Conference

Cross-Border Electricity Trade

October 4-5, 2013
New Delhi, India

Programme Schedule

for the South Asia Regional Inaugural Conference

Day 1

Friday, October 4, 2013

8:30 am to 9:30 am: Registration

9:30 am to 10:30 am: Inaugural Session

- Welcome by Dr. Kirit S. Parikh, Chairman, IRADe
- Address by Mr. Devendra Chaudhry, Additional Secretary Ministry of Power, Government of India
- Inaugural Address by Dr. Montek Singh Ahluwalia
  Deputy Chairman, Planning Commission, Government of India
- Vote of Thanks by Dr. Jyoti Parikh, Executive Director, IRADe

10:30 am to 10:45 am: Tea Break and Group Photograph

10:45 am to 12:15 pm

Session I: Cross-Border Electricity Trade: A New Energy Renaissance for the Growth and Development of the South Asia Region

Session Chair: Ms. Sripriya Ranganathan, Joint Secretary (SAARC), Ministry of External Affairs, Government of India
Co-Chair: Mr. Farooq Sobhan, President, Bangladesh Enterprise Institute (BEI), Bangladesh

- SARI/EI's Approach and Progress: Dr. Jyoti Parikh, Executive Director, IRADe
- Dr. Priyantha Wijaytunga, Unit Head, Portfolio Management Unit, Nepal Resident Mission, ADB
- Mr. Hilal A. Raza, Director, SAARC Energy Center, Islamabad
- Mr. Michael A. Toman, Lead Economist & Manager, Development Research Group, The World Bank, USA

12:15 pm to 1:30 pm

Session II: Learning and Experience from Legal, Policy, and Technical Aspects of Regional Electricity Exchange/Trade in South Asia

Session Chair: Mr. Ravinder, Chairperson, Central Electricity Authority (CEA), India
Co-Chair: Mr. Keshab Dhoj Adhikari, Joint Secretary, Ministry of Energy, Government of Nepal

- Task Force-1 on Critical Areas Needing Policy, Legal, and Regulatory Harmonization for Cross-Border Electricity Exchange/Trade:
  Dr. Salim Mahmud, Member, Bangladesh Electricity Regulatory Commission, Bangladesh
- Experience of India-Nepal 400kV AC Interconnection Cross-Border Line:
  Mr. Rajan Dhakal, Nepal Electricity Authority, Nepal
- Task Force-2 on Critical Areas Needing Synchronization of Codes and Practices for Cross-Border Electricity Exchange/Trade: Dr. Radhe Shyam Saha, Director, CEA, India

1:30 pm to 2:30 pm: Lunch Break

2:30 pm to 5:00 pm

Session III: International Experiences in the Regional Power Market: Learning from Emerging Economies and International Best Practices in Cross-Border Energy Trade

Session Chair: Dr. Kirit S. Parikh, Chairman, IRADe, New Delhi
Co-Chair: Mr. S.K. Chaturvedi, Acting Chairman, Joint Electricity Regulatory Commission (JERC), India

- South East European Experience: Mr. Simon Uzunov, Head, Electricity Unit, Energy Community, Austria
- GMS Experience: Dr. Yongping Zhai, ADB , seconded by Dr. P.N. Frenando, Former Manager (Energy), Infrastructure, Energy and Finance Department (East), ADB
- Mr. Dinesh Chaturvedi, Chief Engineer, CEA, Northern Power Grid, India
- Strategy for Developing a Regional Power Market in South Asia: Learning from International Experience: Dr. Anoop Singh, Associate Professor, Indian Institute of Technology (IIT), Kanpur, India

Day 2

Saturday, October 5, 2013

9:30 am to 11:00 am

Session IV: Role of Private Sector for Cross-Border Energy Trade in South Asia

Session Chair: Dr. Pramod Deo, Ex-Chairperson, Central Electricity Regulatory Commission (CERC), India
Co-Chair: Mr. Salman Zaheer, Acting Country Director, Bangladesh, The World Bank

- Mr. Mukunda Paudyal, Joint Secretary, Investment Board, Government of Nepal
- Mr. Manzur Ahmed, Adviser, Federation of Bangladesh Chambers of Commerce and Industry (FBCCI)
- Mr. Sanjeev Mehra, TATA Power
- Mr. A.K. Asthana, Reliance Power Transmission Limited
- Mr. Rajib Mishra, GMR, Ahmedabad

11:00 am to 11:30 am: Tea Break

11:30 am to 1:00 pm

Session V: Road Map for Cross-Border Power Trading and Development of Exchanges: Country Perspective

Session Chair: Ms. Meera Shankar, Former India's Ambassador to the United States of America
Co-Chair: Mr. Upali Daranagama, Additional Secretary (Planning & Development), Ministry of Power & Energy (MPE), Government of Sri Lanka

- Mr. Shekeeb Ahmad Nessar, Chief Operating Officer, De Afghanistan Breshna Sherkat (DABS)
- Mr. Vaqar Zakaria, Managing Director, Hagler Bailly Pakistan Private Limited, Pakistan
- Mr. Karma P. Dorji, Chief Engineer/Head, Planning & Coordination Division, Ministry of External Affairs, Government of Bhutan
- Mohd. Latheef, STELCO, The Maldives
- Ms. Kamani Jayasekera, Deputy General Manager (Transmission and Generation Planning), Ceylon Electricity Board, Sri Lanka
- Mr. Surendra Rajbhandari, Director, Nepal Electricity Authority, Nepal
- Mr. Mohammad Hossain, Director General, Power Cell, Power Division, Ministry of Power, Energy and Mineral Resources (MPEMR), Government of Bangladesh

1:00 pm to 2:00 pm: Lunch Break

2:00 pm to 3:30 pm

Session VI: Power Trading and Development of Exchanges

Session Chair: Mr. R.V. Shahi, Ex-Secretary, Ministry of Power, Government of India
Co-Chair: Mr. Nagesh Kumar, Director, UN ESCAP, South and South West Asia

- Mr. Rajiv Mishra, Executive Director, PTC India Limited
- Mr. Rajesh Kumar Mediratta, Director (Business Development), IEX
- Mr. S.C. Saxena, Power System Operation Corporation Limited (POSOCO)
- Mr. Sher Singh Bhat, Director, Power Trade Department, Nepal Electricity Authority Nepal

3:30 pm to 4:00 pm: Tea Break

4:00 pm to 5:30 pm

Panel Discussion and Valedictory Session: High Level Discussion on the Outcome of the Conference and a Road Map on South Asia Electricity Market

Session Chair: Mr. B.K. Chaturvedi, Member, Planning Commission, Government of India
Co-Chair: Dr. Jyoti Parikh, Executive Director, IRADe

- India: Mr. Ashok Lavasa, Additional Secretary, Ministry of Power, Government of India
- Sri Lanka: Mr. Upali Daranagama, Additional Secretary (Planning & Development), Ministry of Power & Energy, Government of Sri Lanka
- Bangladesh: Mr. Tapos Kumar Roy, Additional Secretary, MPEMR, Government of Bangladesh
- Afghanistan: Md. Shekeeb Ahmad Nessar, COO, DABS, Islamic Republic of Afghanistan, Kabul
- Nepal: Mr. Keshab Dhoj Adhikari, Joint Secretary, Ministry of Energy, Government of Nepal
- Bhutan: Mr. Bharat Tamang Yonzen, Managing Director, Bhutan Power Corporation Limited

Contents

Foreword

South Asia is one of the fastest growing regions in the world. However the energy sector, which plays a crucial role in sustaining economic growth and prosperity, has faced daunting challenges. Greater cross-border electricity trade is essential for the South Asia region to achieve energy security.

Since the year 2000, The United States, through the U.S. Agency for International Development (USAID) and its South Asia Regional Initiative for Energy Integration (SARI) program, has strived to promote regional energy security. SARI has made significant contributions in the areas of cross-border energy trade, energy market formation, and clean energy development. In its fourth and current phase (2012-2017), SARI has focused on improving conditions for regional energy integration.

To this end, SARI has made significant headway to support multi-stakeholder task forces on (1) policy, legal and regulatory issues; (2) transmission infrastructure; and (3) regional electricity markets. Senior-level representatives of member South Asian governments and other stakeholders are members of the Steering Committee.

I would like to commend IRADe, USAID's implementing partner for SARI, for organizing the regional inaugural conference on October 4-5, 2013 and drafting the following conference notes. The regional conference in New Delhi followed the SARI process of consensus-building among country governments of South Asia on how to support regional electricity trade. The conference showcased the 'win-win' benefits of cross-border energy trade for all countries and was useful in building an essential foundation and understanding needed to develop a roadmap for a regional electricity market.

The conference attendees confirmed the commitment and interest of participating regional stakeholders to cross-border electricity trade. The views expressed by various regional stakeholders on cross-border electricity trade issues showcase their suggestions to facilitate regional growth through increased energy integration. Thus, this document not only chronicles the records of various sessions of the conference but also offers valuable inputs for mapping out the way forward for regional cross-border electricity trade. USAID will factor in the recommendations received during the conference to plan future SARI activities.

Mr. Jeremy Gustafson
Director, India Clean Energy and Environment Office, USAID

Preface

We are happy to present these proceedings for the South Asia Regional Inaugural Conference of SARI/EI on 'Cross-Border Electricity Trade'. It is a major milestone in our five year journey for the SARI phase IV done through co operative agreement between USAID and IRADe, of which one year is completed. During this one year, we held bilateral meetings, power regulatory workshop, Project Steering Committee meeting and formed two task forces and even held one meeting each. During this period, we developed a common understanding about the issues among our other members within the South Asian countries. Therefore, we felt ready to launch this conference to showcase to others and get their feedback on our approach and get their suggestions.

This successful event had painstaking efforts behind it in for shaping the sessions, getting appropriate speakers and most of all, bringing on the representatives from decision-making bodies, such as the Planning Commission, Ministry of External Affairs, Ministry of Power of the Government of India and representatives from senior management from the regulatory authorities, private sector, multilateral organisations and most of all, from all countries of the South Asia. We realised that SARI family extends beyond USAID and IRADe in seven other countries. We were also able to organize a session on best practices from other regions, where participants came from across the regions. Thus, the conference brought perspectives of diverse stakeholders on a common platform.

We are most grateful to Dr. Montek Singh Ahluwalia, Deputy Chairman, Planning Commission, Government of India for raising the bar of the conference by his presence, Mr. B.K. Chaturvedi, Member, Planning Commission, Mr. Devendra Chaudhry, Additional Secretary, Ministry of Power, Government of India and Ms. Sripriya Ranganathan, Joint Secretary (SAARC), Ministry of External Affairs, Government of India.

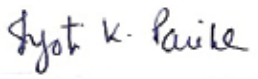
We felt that this conference succeeded in its objective of consensus building, knowledge sharing, exchange of best practices and sharing concerns of individuals. The fact that the inauguration of Bangladesh- India transmission line in the presence of the two respective Prime Ministers coincided with the conference, helped in assuring us that the Cross border Power trade in South Asia will continue to increase and thrive.

We are grateful to dignitaries, delegates, representatives from governments, ministries/departments of power and energy, regulatory commissions, planning authorities, load dispatch centres, power exchanges, power generation companies, transmission and distribution utilities, trade and industry associations, civil societies, regional forums and network associations, public and private sector players, research and development organizations, financial institutions and Multilateral organisations such as SAARC energy centre, ADB and the World Bank, energy professionals, researchers, and consultants affiliated to the power sector for being an integral part of the conference and for helping the program meet its objectives.

Such a huge undertaking is possible only with dedicated team efforts and close cooperation with USAID, in particular Mr. Amol Bhutad and Mr. Jeremy Gustafson. We are most grateful to Shri K.K. Agrawal for his

tireless efforts and leadership. Thanks are due to the members of SARI Secretariat viz. Dipti Khare, Rajiv Panda and Pallavi Mohla. The administrative and finance divisions of IRADe lent their full support, particularly, Rohit Magotra, B.K. Sarkar, Nikhil Mehta, Sumit Kishor and Yogeeta Sharma.

This conference provides us guidance for the future course of action.



Professor Jyoti Parikh

Executive Director

Outcomes

IRADe, the implementing partner of USAID for the Program of South Asia Regional initiative for Energy integration (SARI/EI) organised the South Asia Regional Inaugural Conference of SARI/EI on Cross Border Electricity Trade(CBET) at New Delhi on 4th and 5th Oct'2013. The main objective was to launch the SARI/EI program and gain acceptance for its objectives among the South Asian countries. It aims to create right enabling environment to help the establishment of South Asia Energy Markets (SAEM) and gain consensus and support from the key decision makers and stakeholders.

The conference was inaugurated by Dr. Montek Singh Ahluwalia, Deputy Chairman, Planning Commission, Government of India (GoI). Conference witnessed active participation from the high level representatives/ delegations from the governments of all the eight participating nations of the region namely Afghanistan, Bangladesh, Bhutan, India, the Maldives, Nepal, Pakistan and Sri Lanka. Speakers and delegates were from both the public and private sector, multilateral development banks like the Asian Development Bank (ADB), World Bank and regional SAARC Energy Centre etc.

The objective of the conference was to initiate a concrete and constructive discussion on the vision and road map for the South Asian Electricity Market (SAEM) and to build consensus among the decision-makers of the region. The intent was to develop an improved understanding of the current and future prospects of CBET. Another objective of the event was to identify key areas for policy, regulatory, and technical interventions required in the SA countries for the creation of the SAEM and to highlight best practices and experiences from Regional Power System Integration such as Europe, Southern African Power Pool (SAAP), and Greater Mekong Sub-region (GMS).

Participants and Delegates acknowledged and appreciated the work done by USAID through the SARI/EI program for regional cooperation in electricity trade and offered their full support for the program. It was concluded that the concept of CBET has found acceptance in all the participating nations. There is past as well as current experience of cross-border bilateral interconnections between India and its neighbors—Bangladesh, Bhutan, and Nepal—that has proved economically beneficial. Electricity trading in the South Asia region has a lot of potential and offers a win-win proposition to all.

Based on the extensive deliberations, the summary of the proceedings is given below:-

Policy and Regulations:

- Electricity to be recognized as trading commodity and policies related to pricing and subsidies need to be aligned in the context of CBET.
- Different countries follow different regulatory practices, which leads to difference in electricity pricing in the region. This calls for need for harmonization/coordination.
- Review of respective electricity import and export policies by the participating nations for facilitating CBET.

- Distorted prices due to subsidies to sizable population of poor in the SA region can be a constraint for investments in power sector which impacts the scope of CBET, therefore needs to be reviewed.
- Need for advancing policy reforms at national level with special focus on taxation and duties.
- To establish guidelines for trade and dispute resolution mechanism as pre requisite for establishing energy market.

Investment in power sector:

- Requirement of investors to take up large projects in hydro sector for sustainable cash flows which can be done by investment friendly policies in the region.
- Identifying geographical locations in the region for possible interconnection points to facilitate cross border electricity exchange.
- Coordinated and shared investment in generation and multi-country owned cross-border transmission connections to be explored for CBET.
- Greater role envisaged for private sector including Public Private Partnerships as the governments alone will not be able to bridge the demand-supply gap. Some basic policy reforms are needed to achieve this.
- Stress on cooperation of the concerned states within the countries to address issues related to energy transit and security of supply. This also translates to requirement of adequate transmission infrastructure.

Economic benefits:

- Harnessing complementarities of resources of the region and diversity in demand and supply (seasonal, peak load variation) makes the scope for CBET which can bring economic benefits to the SA region.
- India's experience of interconnecting its five regions over three decades can provide some lessons and pointers for economic development of regional grid in South Asia.

Regional power Grid and development of power exchanges:

- The grid codes and technical standards need to be coordinated to ensure reliable regional power system operation.
- Requirement of South Asia regional power grid and establishments of power exchange.
- Learning from the best practices from established international energy markets for establishment of SAEM.
- Formulating market rules for cross-country power transmission.

Executive Summary

Energy is one of the key inputs to socio-economic progress in developing societies. South Asian nations, namely Afghanistan, Bangladesh, Bhutan, India, the Maldives, Nepal, Pakistan, and Sri Lanka, are far behind their counterparts in terms of access to clean, reliable, and affordable energy, especially electricity. Power shortages and the growing import of fossil fuels impose a heavy cost of energy insecurity. The energy endowments of South Asia (SA) are limited and dispersed across the region, with large, unexploited hydro-electric potential in some parts and growing dependence on fossil fuels in others. There is a need to plug the increasing gap between demand and supply through the development of additional resources. This is possible by utilizing the available energy resources efficiently, creating a level playing field, assuring returns to investors, and providing affordable electricity to consumers. This will make the region energy secured and self-sustainable.

Against this backdrop, the US Agency for International Development (USAID) initiated the South Asia Regional Initiative for Energy (SARI/E) program, which covers eight countries of the region: Afghanistan, Bangladesh, Bhutan, India, the Maldives, Nepal, Pakistan, and Sri Lanka. Started in 2000, the program has consistently strived for the promotion of energy security in the South Asian nations by working in three focus areas—cross-border electricity trade (CBET); energy market formation; and regional clean energy development. The SARI/E program of USAID has now entered its fourth and final phase, South Asia Regional Initiative/Energy Integration (SARI/EI), which aims to advance regional energy integration as well as increase CBET.

Integrated Research and Action for Development (IRADe) has been selected by USAID for the implementation of this phase of the SARI/EI program. SARI/EI will work towards promoting the integration of energy systems and enhancing CBET among the participating South Asian countries during the five-year program period.

IRADe, in cooperation with USAID, organized the South Asia Regional Inaugural Conference of SARI/EI on 'Cross-Border Electricity Trade' from October 4-5,, 2013, in New Delhi, India, to launch the SARI/EI program and gain acceptance for its objectives among the South Asian countries. The conference was inaugurated by Dr. Montek Singh Ahluwalia, Deputy Chairman, Planning Commission, Government of India (GoI).

Dr. Kirit S. Parikh, Chairman, IRADe, delivered the welcome address; Mr. Devendra Chaudhry, Additional Secretary, Ministry of Power, Government of India, spoke to the delegates during the inaugural session. Dr. Jyoti Parikh, Executive Director, IRADe, gave the vote of thanks. The valedictory session was chaired by Mr. B.K. Chaturvedi, Member, Planning Commission, Government of India. Senior representatives from the Ministry of External Affairs and Ministry of Power of the Indian government and others from South Asian governments, distinguished experts, and speakers shared insights with the delegates.

The objective of the conference was to initiate a concrete and constructive discussion on the vision and road map for the South Asian Electricity Market (SAEM) and to build consensus among the decision-makers of the region. The intent was to develop an improved understanding of the current and future aspects of CBET. Another objective of the event was to identify key areas for policy, regulatory, and technical interventions required in the SA countries for the creation of the SAEM and to highlight best practices and experiences

from Regional Power System Integration such as Europe, Southern African Power Pool (SAAP), and the Greater Mekong Sub-region (GMS).

The two-day conference comprised an inaugural session, six working sessions, followed by a panel discussion and the valedictory session. The second day witnessed live telecast of the inauguration of the 500MW India-Bangladesh link by the Prime Minister of India, Dr. Manmohan Singh and Sheikh Hasina Wajed, Prime Minister of Bangladesh. This is a major milestone towards the establishment of CBET in the region.

Session I, 'Cross-Border Electricity Trade: A New Energy Renaissance for the Growth and Development of the South Asia Region,' highlighted the approach and the work done towards CBET by various organizations and institutions in the past and also the ongoing efforts. There were presentations by IRADe, the Asian Development Bank (ADB), SAARC Energy Center, and the World Bank. The emphasis was on understanding the impediments and common woes of the region and moving ahead by advancing the policy reforms and investment in the infrastructure, which could fast track CBET and provide benefit to all.

As an introductory step towards the formation of the SAEM, current legal, policy, and technical structures in various countries were revisited in Session II, 'Learning and Experience from Legal, Policy, and Technical Aspects of Regional Electricity Exchange/Trade in South Asia'in the context of the prevailing energy scenario. The session also deliberated on critical bottlenecks, challenges, and learning. The speakers included the nominated members of the Task Forces.

The establishment of regional power markets in other parts of the world such as in South East Europe (SEE) and the GMS, challenges faced, scope, priorities, energy security, pricing, guidelines for trading and dispute settlement, among other relevant topics, were presented in Session III, 'International Experiences in the Regional Power Market: Learning from Emerging Economies and International Best Practices in Cross-Border Energy Trade.' It was suggested that the experience gained by interconnecting five power regions within India can be utilized for the development of a regional power grid in SA where India plays an important role owing to its strategic location.

The private sector will play an important role in the formation of CBET in SA. The scope for this sector lies in the field of development of generation and associated cross-border power transmission infrastructure. Session IV, 'Role of Private Sector for Cross-Border Energy Trade in South Asia', had presentations from the Investment Board, Nepal; the Federation of Bangladesh Chambers of Commerce and Industry (FBCCI), Bangladesh; and private sector power investors and developers in India such as TATA Power, GMR, and Reliance Energy. The audience was briefed about the challenges met during the setting up of power plants in other countries, how these challenges were overcome, the lessons learnt, and the way forward. For Session V, 'Road Map for Cross-Border Power Trading and Development of Exchanges: Country Perspective,' all the eight participating SAARC countries presented their road map for moving towards CBET. In order to assure its long-term development, the South Asian regional electricity market will have to explore a full range of options, both for bilateral and multilateral trading. The representatives from the countries were of the common view that even though they face electricity shortage, they will all gain significantly from CBET. The emphasis was on renewables, with a major focus on the untapped hydro potential of the region. It was also felt that the participating countries have to revisit their regulatory and legal framework to facilitate smooth and transparent electricity trade.

The relative absence of a national energy trading market in the South Asian countries could be a key development challenge to the integration of energy. The value of regional power exchanges and other transparent market mechanisms in the enhancement of bilateral and multilateral trading among the countries has to be recognized. Session VI, 'Power Trading and Development of Exchanges', had speakers from the Indian power exchanges and the Power Trading Department, Nepal, who shared their experience.

The proceedings of the conference revealed that the concept of CBET has found acceptance in all the participating nations. There is past as well as current experience of cross-border bilateral interconnections between India and its neighbors—Bangladesh, Bhutan, and Nepal—that has proved economically beneficial. Encouraged by this success, similar possibilities are being explored for inter-connecting India with Pakistan and Sri Lanka.

Other challenges include a need for the formation of harmonized legal and regulatory guidelines and framework, as well as import and export policies, which could prove to be a major driver in facilitating the process of electricity trade. Further, electricity has to be recognized as a trading commodity, like any other commodity, without any constraints of special duties or prevailing pricing mechanisms that distort its price. Apart from India which has power exchanges, other nations have to develop their respective exchanges as a move towards the formation of the SAEM. The private sector will be playing an important role in CBET to meet the demand-supply gap and for setting up the infrastructure for regional power plants. The business climate in SA, in turn, has to become more conducive to enable greater private sector investment in addition to forming public private partnerships (PPPs). Electricity trading in the South Asian region has a lot of potential and offers a win-win proposition to all.

Introduction

Over the last two decades, SA has been one of the fastest growing regions in the world, with an average annual GDP growth rate of six per cent. It has a variety of energy resources with major potential for hydropower; its combined hydro potential is approximately 350GW. This offers a huge scope for tapping clean energy and meeting the region's energy needs. Yet, despite the potential and the impressive macroeconomic growth, the power sector has not been able to keep pace with the demand. The region continues to experience chronic problems of shortage of electricity supply and its quality, even though it possesses rich resources that can be exploited through regional cooperation to make the area energy secure. There has, however, been limited energy cooperation in the past. Cross-border transmission interconnections and cross-border trading transactions are taking place only between Bhutan and India and, to a lesser extent, between India and Nepal.

The SARI/EI program has consistently worked for the promotion of energy security in SA. In this phase of the program, the objective is to advance regional energy integration and increase CBET through the harmonization of policy and regulatory issues, and advancement of transmission system interconnections. SARI/EI aims to create the right 'enabling' environment to help the establishment of the SAEM and gain support from the key decision-makers and stakeholders. The target is to achieve a consensus and build awareness among the government departments, ministries, businesses, and other organizations/agencies for regional energy integration.

IRADe, in cooperation with USAID, organised this regional conference to launch the SARI/EI program and gain acceptance for its objectives among the South Asian countries. The Central Board of Irrigation and Power, a premier institution that has been rendering dedicated services to professional organizations, engineers, and individuals in the country and abroad for the last 85 years for the dissemination of knowledge in the fields of power, renewable energy, and water resources, was chosen as the conference coordinator.

The aim of the conference was to:

- Launch the SARI/EI program and gain acceptance for its goals among the South Asian countries;
- Showcase the 'win-win' benefits offered by bilateral and multilateral electricity trade;
- Discuss the vision and road map for the SAEM;
- Discuss the opportunities and challenges to increase regional electricity cooperation in SA through CBET;
- Identify potential steps towards the integration of power systems in South Asia;
- Deliberate on the development of coordination procedures from the perspective of the legal, policy, and technical aspects of regional CBET;
- Release the SARI/EI background paper, titled 'Cross-Border Electricity Trade in South Asia: Prospects for Regional Cooperation';
- Discuss the role and strategic engagement of the private sector in CBET; and
- Deliberate on international best practices on the regional power markets.

Day 1

October 4

Inaugural Session

- **Welcome by Dr. Kirit S. Parikh, Chairman, IRADe**
- **Address by Mr. Devendra Chaudhry, Additional Secretary, Ministry of Power, Government of India**
- **Inaugural Address by Dr. Montek Singh Ahluwalia, Deputy Chairman, Planning Commission, Government of India**
- **Vote of Thanks by Dr. Jyoti Parikh, Executive Director, IRADe**

Welcome Address

Dr. Kirit S. Parikh, Chairman, IRADe, New Delhi

Dr. Kirit S. Parikh welcomed the dignitaries and participants and gave a brief introduction on IRADe. He started with a positive note about CBET in the South Asian region and observed that it is not just a possibility in the distant future, but is already taking place, although in a small scale. Dr. Parikh highlighted the win-win proposition of CBET and how the dynamics in the region are working towards the SARI objective. He noted that there is a unanimous agreement among the technocrats of the region about the viability of CBET that will further lead to political consensus.

Dr. Parikh addressed the need to build consensus and to setup a roadmap to integrate the national grids of the SAARC countries, with a transparent trading system being an important pre-requisite. The integration of electricity in the SA region is in the interest of all the stakeholders including the respective country governments, people, and power producers. He emphasized that there is tremendous opportunity for power exchange in the region and there exists a huge potential to derive benefits for both, the exporter and the importer. He cited the national grid in India as an example of inter-state integration that can be a reference model for inter-country integration. For a regional grid, technical issues and operating procedures have to be addressed—for example, the power system compatibility needs to be established. He also referred to the Bangladesh-India 500MW High Voltage Direct Current (HVDC) transmission line as a major landmark in CBET that was to be inaugurated on October 5, 2013, by the Prime Ministers of both the nations.

Complementarities of resources in different countries of the region need to be harnessed for the economic gain as a whole. If 50 per cent of the 300 to 400GW of untapped hydro potential of the region is realized, Dr. Parikh pointed out, it would increase the per capita income of Bhutan and Nepal by approximately $500, in addition to reducing the carbon footprint. This would result in not only meeting the climate commitment but also reducing the price of electricity in the region.

Address

Mr. Devendra Chaudhry,
Additional Secretary,
Ministry of Power, Government of India

Mr. Devendra Chaudhry, Additional Secretary, Ministry of Power, Government of India, highlighted the issue of low per capita consumption and poor access to electricity in the region. He quoted that 50per cent of the total electricity consumed in Afghanistan is from its capital, Kabul. He also emphasized the importance of electricity trade between nations for the economic growth of the region. He stressed on the imperatives in this connection, and gave examples of Afghanistan, Bangladesh, and other SAARC countries.

The SA region is going through a period of rapid economic growth, hence the existing scenario of low per capita electricity demand and poor electricity access will undergo a tremendous change in the immediate future. This will lead to an increased demand for electricity and a perceived need for electricity trade. He observed that there is a direct relation between demand and electricity trade. Mr. Chaudhry referred to several CBET initiatives that are taking place and mentioned the negotiation between India and Pakistan for CBET that is moving in a positive direction; the India-Nepal projects that are at various stages of competition; and the India-Bangladesh transmission link.

There is huge untapped hydropower potential in the region, especially in Bhutan and Nepal and wind power in Sri Lanka; this power needs to be harnessed. Mr. Chaudhry pointed out that hydropower is volatile in nature when it has significant geological, environmental, and social implications. Since the generation and transmission of electricity require huge investments and a longer gestation period, he emphasized the need for enhanced public sector investment to create a level playing field for private sector participation.

In conclusion, Mr. Chaudhry suggested three action points for CBET, keeping a target of 50GW by 2020 in mind—increasing per capita electricity consumption in the region by five times, thus ensuring electricity access to the entire population; the harmonization of regulatory mechanisms; and the setting up of distribution networks.

Inaugural Address

Dr. Montek Singh Ahluwalia, Deputy Chairman, Planning Commission, Government of India

Dr. Montek Singh Ahluwalia began by noting that trade of anything is a good proposition for everyone. Electricity trade is also equally important and is not unlike trade in other goods and commodities. SA as a region is least integrated and the volume of intra-regional trade here is much less than in any other intra-regional trade group in the world. This is despite the fact that the countries in the region have historic trade ties. He also highlighted the importance of electricity trade between nations for the economic growth of the region; he cited the example of the India-Bangladesh and India-Nepal links that are a move in the right direction.

He stated that owing to various electricity regulatory mechanisms in different countries, there is a variation in price of electricity within the nations. Power as a commodity is highly regulated, leading to low pricing. He felt that there would be a lot more trading if the pricing was more realistic. According to him, the biggest impediment to the trade is the distorted electricity price in each country. Price is regulated to an extent to keep it at as low as possible. This creates a situation where electricity demand is not calibrated to the marginal or average cost of supply. He said that we need to find out whether electricity should be sold at a marginal or average cost and there is also a need to understand how price distortion is affecting energy cooperation in SA. He pointed outthat a lot of trading possibilities that normally exist get chopped off because of distorted prices.

Dr. Ahluwalia expressed concern that trading could lead to the bypassing of the regulatory bodies. He talked about the India Electricity Act 2003 that introduced open access in India. A mandatory open access to electricity proposes that a consumer with an electricity demand of more than 1MW will have the flexibility to negotiate the price with the supplier rather than the price being regulated. However, in terms of the implementation of open access, the process has been derailed owing to the reluctance of various state electricity utilities because of the fear of losing their consumer base. He suggested that similar arrangements can be done for CBET but cautioned that the interface between regulation and trade needs to be thought out judiciously.

He also stressed on the importance of CBET with regards to the geographies of the region, citing that the hydropower potential in the north eastern part of India can be supplied to Bangladesh and the southern part of India can benefit from the wind energy potential of Sri Lanka. Trade of this nature will provide two-way benefits and will be viewed as a balance opportunity rather than an imbalance opportunity of the region as a whole. India will gain enormously by increasing its option for electricity and, at the same time, provide means to its neighbor. He emphasized that India, being central to most of the South Asian countries, should play a constructive role in this area.

Dr. Ahluwalia concluded by saying that he is in favor of going ahead with electricity trade, even if some clarity is lacking. He mentioned that the regulatory framework, legal structure, and regulatory culture in each country need to be looked at carefully. He also encouraged studying the emerging energy scenario in each of the South Asian countries and reiterated that an introduction of open access policy in each country will further enhance the possibilities of CBET. The pricing mechanism is another area that should be studied carefully to ensure the economic viability of electricity trade.

Vote of Thanks

Dr. Jyoti Parikh, Executive Director, IRADe, New Delhi

Dr. Jyoti Parikh welcomed the gathering on behalf of USAID and IRADe. She thanked all the honorable dignitaries, esteemed delegates, distinguished speakers, and learned guests for sparing their valuable time in order to launch the SARI/EI program and meet the objectives of the two-day conference.

She stated that 'Cross-Border Electricity Trade' is an idea that is fully formed and understood now among the SA nations. She quoted that no force in the world can stop an idea whose time has come. CBET is such an idea which shall transform the power sector of the entire South Asian region. Moreover, given the severity and the inevitability of the looming energy supply crunch, the only conceivable long-term solution to the region's dire energy security predicament is to be found in increased opportunities for electricity trade within the region.

Dr. Parikh articulated her concern that the region experiences chronic problems of poor access to electricity, low income levels, inability to achieve the millennium development goals, and least tapped energy resources despite having one of the world's largest hydropower potential and an impressive macroeconomic growth. According to her, SA's energy security is a significant development challenge that is critical to the future of one of the world's most volatile regions. It can be exploited through sustained increase in regional energy cooperation among the nations since the absence of power trade and investments results in hampered growth and proves to be an impediment to the development of the entire region. Regional sharing and diversifying the use of available energy resources would address many of the growing energy security concerns, advance geopolitical interests, and accelerate economic development in the region.

She observed that USAID's march over the past decade in advocating energy cooperation in the region has transited to the next phase of advancing regional energy integration. Dr. Parikh said that the organization's generous funding during this five-year program, with the support of the SARI/EI Project Steering Committee and Task Force members, will help promote the integration of energy systems and enhance CBET among the participating South Asian countries. She also thanked Dr. Montek Singh Ahluwalia for his gracious presence and Mr. Devendra Chaudhry for guiding the SARI/EI program as well as the bilateral energy partnership.

On behalf of the SARI/EI program, Dr. Parikh conveyed gratitude to the dignitaries, delegates, representatives from governments, ministries/departments of power and energy, regulatory commissions, planning authorities, load dispatch centers, power exchanges, power generation companies, transmission and distribution utilities, trade and industry associations, SAARC, civil societies, regional forums and network associations, public and private sector players, research and development organizations, financial institutions and Multilateral Development Banks (MDBs) such as ADB and the World Bank, energy professionals, researchers, and consultants affiliated to the power sector for being an integral part of the conference and for helping the program meet its objectives.

Dr. Jyoti Parikh also gave a vote of thanks on behalf of Mr. John A. Beed, Mission Director, USAID and said that it is clear that CBET is a long term, sustainable solution to the issue of regional energy security. She was confident that the event will gain the acceptance of all stakeholders for the SARI/EI program objective by showcasing the 'win-win' nature of CBET.

She also thanked Dr. Ahluwalia for inaugurating the conference. She highlighted that his presence as well as the participation of the representatives of the Ministry of Power and the Ministry of External Affairs reiterates the support of the Government of India to CBET, which is the cause championed by SARI/EI. She expressed gratitude to Mr. Devendra Chaudhary and Dr. Kirit Parikh for sharing their views. Dr. Parikh concluded by thanking USAID and IRADe for its cooperation in making the event a success.

Session I: Cross-Border Electricity Trade: A New Energy Renaissance for the Growth and Development of the South Asia Region

CBET among the participating South Asian countries will help to promote the integration of energy systems, thus leading to faster economic growth and development. The possibility of power trade across this region can also lead to optimal investment in the generation, transmission, and utilization of capacity. This would further lead to a reduction in carbon footprint, better availability of power supply in times of need, increased reach of power, and empowerment of women. This session presented approaches towards a new energy renaissance in SA and the benefits arising out of the formation of the SAEM.

Session Chair: Ms. Sripriya Ranganathan, Joint Secretary (SAARC), Ministry of External Affairs, Government of India

Co-Chair: Mr. Farooq Sobhan, President, Bangladesh Enterprise Institute (BEI), Bangladesh

Speakers

- SARI/EI's Approach and Progress: Dr. Jyoti Parikh, Executive Director, IRADe
- Dr. Priyantha Wijaytunga, Unit Head, Portfolio Management Unit, Nepal Resident Mission, ADB
- Mr. Hilal A. Raza, Director, SAARC Energy Center, Islamabad
- Mr. Michael A. Toman, Lead Economist & Manager, Development Research Group, The World Bank, USA

Ms. Sripriya Ranganathan, Joint Secretary (SAARC), Ministry of External Affairs, Government of India

In the opening remark of the session, Ms. Sripriya Ranganathan said that South Asian energy integration provides a tremendous opportunity. She elaborated that the Ministry of External Affairs also recognizes that energy integration in the region is the future. It is an area of immense promise that provides an opportunity for the nations in the region to optimize their capacity to create energy security. She also observed that though the progress made in this area so far has not been too significant, political consensus is the key for moving ahead towards energy market integration in SA. She dwelled upon the larger goal of economic integration and its relation to energy integration in the South Asian context.

Dr. Jyoti Parikh, Executive Director, IRADe, New Delhi

Dr. Jyoti Parikh started with an introduction of IRADe and the SARI/EI program and informed that IRADe is the implementation partner for the current fourth and the final phase of the SARI program. SARI/EI's objective is to promote energy security with the four activity areas being Cross Border Energy Trade, Energy Markets Formulation, Clean Energy Access, and Afghanistan Power Sector Capacity Building. Dr. Parikh also mentioned the past work done by SARI under the previous three phases. She listed the common woes of the region, including low income, diverse goals, low energy consumption, and so on. She delved on the question of power transfer, in the face of power shortage in all the countries of this region and mentioned that the SA region has an untapped hydro potential of 350GW. She said that even if all the countries in the region are energy deficit, there is still a possibility of trade. The opportunity is in diversity of demand; for example, differing time zones, differing seasons and their intensities, and diverse holidays as well as supply diversity such as different energy sources—coal, hydro, oil, and gas—among the South Asian countries. The prevalence of these differences leads to variations in the daily load curve of electricity in different countries and hence opens a possibility of trade in the region, even in the current situation.

Dr. Parikh explained the role of SARI/EI and IRADe in the co-operative agreement. She elaborated on the setting up of the Task Forces, their organizational details, the tasks assigned to each Task Force and the Project Steering Committee along with their deliverables and the development of a common data base. She then went on to discuss the methodology of the study and the way forward, involving the government, public sector and private sector participation. She stressed that the exercise is based on cooperation and includes the active participation of all SA countries at every step.

Dr. Priyantha Wijaytunga, Unit Head, Portfolio Management Unit, Nepal Resident Mission, ADB

Dr. Priyantha Wijaytungaspoke onthe ADB approach, which supports soft initiatives (research studies through the SAARC framework) as well asa mix of soft and hard initiatives (studies and investment support through the South Asia Sub-regional Economic Cooperation [SASEC] framework).While elaborating on the SAARC study on'South Asia Regional Power Trade Study (SRETS)' he said that this study, conducted through the SAARC secretariat, had endorsements from the governments of all the SAARC countries. He also briefly explained the SASEC initiativesendorsed by its member countries.This includes the proposedfeasibility study of a large power plant in Nepal to meet its power demand and also for CBET. The feasibility study of the second cross-border line is another proposed intervention.

According to Dr.Wijaytunga, there is need to export surplus power in Nepal during certain periods of the year when river flows are high; investors can then take up largeprojects to ensure sustainable cash flow. He also presentedother successful interventions through SASEC in the region with a specific mention of the Dagachhuhydropower project in Bhutan, which won the US Treasury Department's Development Impact Honors.The Bhutan power project is a PPP in the Bhutan hydropower sectorwith power exports to India. He noted that ADB believed that supportingspecifichard initiatives agreed among countries (through the SASEC or SAARC framework) in the region would eventually drive regional cooperation and lead to CBET. He explained that, in order to support suchhard initiatives,ADB also financessoft initiativesin parallel.

Mr. Hilal Raza, Director, SAARC Energy Center, Islamabad

Mr. Hilal Raza began by sharing that the SAARC Energy Center and SARI/E are negotiating an MoU for cooperation on a long-term basis. The SAARC Energy Ring, a vision presented by SAARC leaders at the 2004 Islamabad Summit, constitutes four inter-governmental expert groups that give advice on how to proceed.These four expert groups are Oil and Gas, led by Bangladesh and Sri Lanka jointly; Electricity, led by India; Renewable Energy, led by Pakistan; and Technology Transfer (including Coal and Energy Efficiency), led by India.The SAARC Energy Ring comprises two components—power grid and gas grid.

He also spoke about the study supported by ADB to identify the potential power grid interconnection in the region.This study estimates a possibility of 5,600MW electricity; the estimated cost of the project is $2.5 billion.The annual estimated benefits from the projects is almost $3.9 billion.To give an example of CBET, he mentioned the CASA project where power is flowing from Kyrgyzstan to Pakistan via Afghanistan. Mr. Raza said that for ensuring SAARC energy security, the SAARC inter-governmental framework agreement (IGFA) for energy cooperation, formulated by energy ministers of the SAARC countries in Dhaka on September 15, 2011, is under consideration of SAARC member states.A 20-year perspective plan for the power sector of the SAARC region is being contemplated and a SAARC electricity transmission master plan is also

to be prepared. IGFA allows for unrestricted cross-border trade, commercial negotiation of PPAs, non-discriminatory open access, private sector trading, and participation in power exchanges. He concluded his presentation by observing that SAARC energy cooperation will help in mitigating energy poverty in the region.

Mr. Michael Toman, Lead Economist & Manager, Development Research Group, The World Bank, USA

Mr. Michael Toman started his presentation by saying that regional power sector integration is not only a subject of interest in the South Asian region but in other regions of the world as well. Developing countries are increasingly pursuing regional power sector integration (RPSI). While political and other challenges have slowed the development of some RPSI schemes, none of these schemes have been abandoned. He said that a larger and integrated market enhances the capacity for competition and more efficient pricing, and lowers the cost of system operation. More efficient pricing enhances the prospect for needed investment.

According to Mr. Toman, advancing policy reforms at the national level enhances the credibility of a country as a partner in regional cooperation, which helps them overcome policy commitment problems and technical capacity constraints. He noted that several factors such as political and security problems, lack of physical infrastructure, including inadequate power transmission lines, weak regional institutional and regulatory framework for planning and investment, challenges related to financing, investment protection, contract enforcement, and managing commercial risk, incongruent pricing policies and access regulations, and distortive subsidization and taxation policies inhibit regional electricity cooperation in the region.

He also talked about electricity consumption growth, electricity supply deficit (peak load), current supply structure (capacity mix and generation mix), and future demand for electricity in the region. Mr. Toman pointed out that complementarities of resources, timing of demands, and the geographical position of the countries set the stage for CBET in the region. He gave the example of India, noting that the country could well be a supplier of electricity during the dry season when hydro is not available and can import cheap hydro-electricity when it is available.

Session Summary

This session highlighted the approach as well as the work done towards CBET by various organizations and institutions in the past and also the ongoing efforts by presentations from IRADe, ADB, SAARC Energy Center, and the World Bank. There has been a lot of effort in terms of soft initiatives and capacity building. The successful example of trade in the CASA region was cited, which is based fundamentally on economic benefits, as a strong case for CBET. The benefits of CBET were presented, which were supported by studies undertaken in the past by ADB, the World Bank and the SAARC Energy Center. The stress was on understanding the impediments and common woes of the region and moving ahead by advancing the policy reforms and investment in the infrastructure. This would fast track CBET and prove advantageous for all.

Session II: Learning and Experience from Legal, Policy, and Technical Aspects of Regional Electricity Exchange/Trade in South Asia

In the South Asian regional context, the risks associated with intra-regional, cross-border energy projects would be greatly minimized if each participating country adopts a complementary energy policy, with interconnections forming an integral part of it. The development of harmonized/coordinated policies to facilitate competitive cross-border trading in electricity is a key 'building block' towards meeting the larger goal of capturing the efficiencies and synergies associated with the resources and customer demands of the neighboring nations. As an introductory step towards the formation of the SAEM, current legal, policy, and technical structures in various countries were revisited in the context of the prevailing energy scenario. The session also deliberated on critical bottlenecks, challenges, and learning.

Session Chair: Mr. Ravinder, Chairperson, Central Electricity Authority (CEA), India

Co-Chair: Mr. Keshab Dhoj Adhikari, Joint Secretary, Ministry of Energy, Government of Nepal

Speakers

- Task Force-1 on Critical Areas Needing Policy, Legal, and Regulatory Harmonization for Cross-Border Electricity Exchange/Trade: Dr. Salim Mahmud, Member, Bangladesh Electricity Regulatory Commission, Bangladesh
- Experience of India-Nepal 400kV AC Interconnection Cross-Border Line: Mr. Rajan Dhakal, Nepal Electricity Authority, Nepal
- Task Force-2 on Critical Areas Needing Synchronization of Codes and Practices for Cross-Border Electricity Exchange/Trade: Dr. Radhe Shyam Saha, Director, CEA, India

Mr. Ravinder, Chairperson, CEA, India

Mr. Ravinder started the session by remarking that electricity trade is already taking place between four countries in SA. These reveal a proven, viable, and win-win situation for the countries involved. He said there is a need to start CBET in the region. He highlighted the example of electricity trade between Bangladesh and India and observed that when the nitty-gritty of trade, balancing, coordination, settlements of count, licensing procedure, and tax regime are sorted out and there is a proper written protocol in place, procedures, payment schedules, and other matters become transparent and smooth. He added that the electricity trade between the two countries can be a role model for the region to follow. Mr. Ravinder observed that it is ironical that India is selling power to Nepal whereas India should be buying power from Nepal, if the available hydropower potential of Nepal is harnessed appropriately.

Dr. Salim Mahmud, Member, Bangladesh Electricity Regulatory Commission, Bangladesh

Dr. Salim Mahmud gave a brief account of some interconnections and their history, such as those between USA-Canada and Germany-Austria. While talking about cross-border interconnection in Europe, he said there are broadly three models in play, namely, the British model that promotes non-discriminate competition in every segment of the energy sector; the French model that advocates public sector dominance in energy; and the German model, which supports private monopoly in the energy sector. He said that the European Union and the USA are moving towards a common electricity market framework. There has been a recent move towards the establishment of a common electricity market between the USA and Canada as well.

Dr. Mahmud also emphasized on the need to have long-term contracts in the early days of CBET in the South Asian region, which can graduate to short-term ones. He gave the example of the evolution of CBET in the EU region where long-term contracts were preferred in the early days and, post-liberalization, short-term contracts were started. Talking about challenges to CBET in the region, he felt that geopolitics is the biggest hurdle. SA is the most politically volatile region in the world. He noted that there are three issues—security of supply, transit problems, and inter-state cooperation—that need to be addressed for better prospects of CBET.

He also pointed out that there are three prominent legal issues, namely, Inter Governmental Treaty (IGT), Host Government Agreement, and Comprehensive Legal Regime committed to a secure and stable framework for investment, which need to be addressed on a priority basis. He stressed on the need for separating regulatory and policy issues.

Mr. Rajan Dhakal, Nepal Electricity Authority, Nepal

Mr. Rajan Dhakal began with a short description of the history of the India and Nepal power exchange relations, which commenced in 1954 with the signing of the Koshi river treaty. It was, however, in 1971 that Indo-Nepal power exchange began, with just 5MW exchange in the initial years. Currently, there are three cross-border power exchange river treaties between India and Nepal, namely, the Koshi treaty, Gandak treaty, and Mahakali treaty. India and Nepal also have contiguous border town power, a 33kV radial exchange program, and commercial power trading with PTC India during the dry season.

While talking about the Dhalkebar-Muzaffarpur400kV power transmission line, he pointed out that, unlike the India-Bhutan and India-Bangladesh power exchange, which is a G2G (government to government) commercial mode of interconnection, the India-Nepal one is a PPP model commercial interconnection. It was developed by IL&FS India and NEA with support from the then Ministry of Water Resource and Ministry of Finance, Nepal and the Embassy of India. He highlighted the fact that the Government of India and the Government of Nepal have not yet signed the power transmission agreement.

Dr. Radhe Shyam Saha, Director, CEA, India

Dr. Radhe Shyam Saha started his presentation by observing that since the per capita consumption is low in the region, there is ample scope for a growth in demand. There are many things that are common in the grids in the South Asian countries, such as all have a frequency of 50Hz and a voltage level of transmission. This makes cross-border transmission easy and synchronous.

Quoting the statistics of the existing CBET and the potential between India-Bangladesh, India-Bhutan, India-Nepal, and India-Sri Lanka, he said that the SAARC grid is on the horizon and is evolving. He also emphasized the need for several studies such as on operations and extensive dynamics of the SAARC grid, to be conducted before the synchronization of the grid.

Dr. Saha noted that for electricity, unlike any other commodity, a small disturbance on the power transmission line can affect the entire system, which could eventually result in a complete blackout. Hence it is of paramount importance that effective measures should be taken to ensure a reliable and stable system operation. He also spoke about the various technical issues involved in cross-border transmission and pointed out that these issues are such that the role of the government becomes pertinent. Institutional infrastructures and the demarcation of responsibilities are very important for CBET, he concluded.

Session Summary

This session presented a brief review of various cross-border interconnections around the world and also referred to the current move in Europe and North America towards a common electricity market framework. It was also noted that CBET in SA can follow the trend of EU where long-term contracts give way to short-term contracts upon the development of electricity trading markets. Challenges to CBET were discussed with an emphasis on various legal issues in addition to issues related to energy transit, security of supply, and inter-state cooperation. The technical and commercial aspects of India-Nepal interconnections were also discussed.

Session III: International Experiences in the Regional Power Market: Learning from Emerging Economies and International Best Practices in Cross-Border Energy Trade

This session presented a short overview of the regional power markets in other parts of the world such as South East Europe and the Greater Mekong Sub-region. It highlighted the process of evolution of the regional power market; existing supply, demand, as well as transmission constraints, and trading arrangements; and organization, governance, and enabling polices of the participating countries of the regional power market. Other pertinent topics covered in this session included operational and trading guidelines; power pricing: bidding/auction procedures; transmission system pricing, open access requirements, and congestion management procedures; documentation and settlement system; and market monitoring, the key problems faced, and solutions.

Session Chair: Dr. Kirit S. Parikh, Chairman, IRADe, New Delhi

Co-Chair: Mr. S.K. Chaturvedi, Acting Chairman, Joint Electricity Regulatory Commission (JERC), India

Speakers

- South East European Experience: Mr. Simon Uzunov, Head, Electricity Unit, Energy Community, Austria
- GMS Experience: Dr. Yongping Zhai, ADB, seconded by Dr. P.N. Frenando, Former Director, ADB
- Mr. Dinesh Chaturvedi, Chief Engineer, CEA, Northern Power Grid, India
- Strategy for Developing a Regional Power Market in South Asia: Learning from International Experience: Dr. Anoop Singh, Associate Professor, Indian Institute of Technology (IIT), Kanpur, India

Mr. Simon Uzunov, Head, Electricity Unit, Energy Community, Austria

Mr. Simon Uzunov shared the experiences of nine Southeast European countries, namely, Albania, Bosnia and Herzegovina, Croatia, Kosovo, FYR of Macedonia, Moldova, Montenegro, Serbia, and Ukraine, in the establishment of a common power trade market. Mr. Uzunov did not go into the technical aspects of transmission system interconnection, but instead provided a detailed description of the soft aspects of the development of the power market, the institutional framework. Talking about the evolution of the Southeast European power market, he explained the scope, structure, priorities, and policy drivers. He covered the trading arrangement and the organization of the power market in terms of governance, enabling policies, and enforcement. Operational and trading guidelines, pricing and bidding procedures, protocol and rules for transmission system operation, access, pricing, and congestion management, were also discussed. He concluded by speaking about documentation and settlement procedures, as well as the regulatory and monitoring framework employed.

Dr. P.N. Fernando, Former Manager (Energy), Infrastructure, Energy and Finance Department (East), ADB

Dr. P.N. Fernando seconded for Dr. Yongping Zhao of ADB and made a presentation on 'Greater Mekong Sub-region Cooperation in Energy and Power' on behalf of Dr. Zhao. The focus of Dr. Fernando's presentation was power trade development in this region, extending over Cambodia, Guangxi, Lao PDR, Myanmar, Thailand, Vietnam, and Yunnan. Mentioning energy for all and the optimal use of sub-regional energy resources as the main drivers for the GMS energy cooperation, his presentation highlighted the two-pronged approach being followed for the development of the power market in the GMS—providing the policy and institutional framework for power trading and developing the grid interconnection infrastructure to connect the various GMS power systems.

Discussing the institutional framework, he traced its evolution from the endorsement of the policy statement on power trade by the GMS ministers in 2000, the signing of the Inter-Governmental Agreement (IGA) in 2002, the formation of the Regional Power Trade Coordination Committee (RPTCC) and the Regional Power Trading Operations Agreement (RPTOA). Dr. Fernando also described how, parallel to the development of the institutional framework, efforts were made with funding support from ADB to create and strengthen a medium voltage level interconnection for serving cross-border power trade in areas near the border and high voltage transmission lines to serve Independent Power Producers (IPPs) for power export. He highlighted 'what works' in terms of infrastructure creation and institutional framework.

Mr. Dinesh Chaturvedi, Chief Engineer, CEA, Northern Power Grid, India

The focus of Mr. Dinesh Chaturvedi's presentation was on the way India built its transmission system, which has integrated five different regions of the country and helped India in the optimal use of its energy resources and put in place an intra-country power trading arrangement. He felt that South Asian countries can integrate their respective power systems and reap the benefits of regional power trade as well. He also mentioned India's experience in linking its regions and, in turn, the knowledge and experience gained in resolving issues such as coordinated scheduling and despatch, treatment of imbalances, metering, billing, clearing, and settlement that can help in developing an institutional framework for regional trade.

Dr. Anoop Singh, Associate Professor, IIT Kanpur, India

Dr. Anoop Singh's presentation highlighted the energy access and energy security concerns in SA, and the need for greater power sector cooperation among the nations in the region. He identified key drivers for energy cooperation in the South Asian region. To bring out the feasibility and efficacy of regional power markets, he described some of the existing regional electricity agreements such as GMS, Southern African Power Pool (SAPP), North Pool, Gulf Coast Countries (GCC), SEE, and the Nile Basin Initiative (NBI).

The presentation highlighted the pre-requisites needed to make cross-border power trade in the South Asian region a reality. He presented a number of models for developing a competitive power market in SA, and suggested a feasible alternative that would demand only minimal harmonization in terms of policy and regulatory framework across nations. Dr. Singh discussed the merits and de-merits of a regional power exchange versus the use of the existing Indian power exchanges for effective cross-border power trade.

Talking about the possible approach to develop the South Asian regional power market, he presented some innovative ideas such as socialization of transmission network development costs, coordinated investment in generation, and multi-country owned cross-border transmission connections.

Session Summary

The experiences gained from the establishment of regional power markets across the world, particularly in the SEE and the GMS, highlighted its scope and challenges faced in its implementation. A number of key issues such as energy security, pricing, guidelines for trading and dispute settlement, and so on, were discussed. These successful power trading markets can become a benchmark for establishing the South Asian electricity market by adopting best practices. It was also suggested that the experience gained by interconnecting five power regions within India can be utilized for the development of a regional power grid. The main drivers for CBET were described, highlighting the benefits of power trade in the South Asian region. Alternate market models for the region were discussed, keeping in mind the on-going process of reform and market development here. Some of the innovative suggestions include the socialization of transmission network development costs, coordinated investment in generation, and multi-country owned cross-border transmission connections.

Day 2

October 5

- **Session IV: Role of Private Sector for Cross-Border Energy Trade in South Asia**
- **Session V: Road Map for Cross-Border Power Trading and Development of Exchanges: Country Perspective**
- **Session VI: Power Trading and Development of Exchanges**
- **Panel Discussion and Valedictory Session: High Level Discussion on the Outcome of the Conference and a Road Map on South Asia Electricity Market**

Session IV: Role of Private Sector for Cross-Border Energy Trade in South Asia

The private sector will play an important role in the formation of CBET in the South Asian region. The scope for this sector lies in the field of development of generation and associated cross-border power transmission infrastructure. It will play a vital role in pursuing energy trade options, including the formation of the regional energy market and regional power plants. This session focused on:

- An overview of South Asian investment trends in the power sector, key drivers to investment;
- The role of policy and regulatory environment in promoting private sector investments;
- The role of private sector players and financial institutions in developing cross-border energy projects; and
- The role of market intermediaries in facilitating private sector investment in power generation and transmission assets.

Session Chair: Dr. Pramod Deo, Ex-Chairperson, Central Electricity Regulatory Commission (CERC), India
Co-Chair: Mr. Salman Zaheer, Program Director, Regional Cooperation & Integration, South Asia Region, The World Bank

Speakers

- Mr. Mukunda Paudyal, Joint Secretary, Investment Board, Government of Nepal
- Mr. Manzur Ahmed, Adviser, Federation of Bangladesh Chambers of Commerce and Industry (FBCCI)
- Mr. Sanjeev Mehra, TATA Power
- Mr. A.K. Asthana, Reliance Power Transmission Limited
- Mr. Rajib Mishra, GMR, Ahmedabad

Dr. Pramod Deo, Ex-Chairperson, CERC, India

Dr. Pramod Deo in his opening remarks said that it was a general perception in SA that electricity is a public good. The2003 electricity law in India was a paradigm shift and it focused on the electricity market in the country. He described some milestones in the Indian electricity market scenario such as the formation of the Power Trading Corporation (PTC), with the public sector utilities as the stakeholders. Dr. Deo spoke about the arrival of the two power exchanges in India, namely, Indian Energy Exchange(IEX) and Power Exchange India Limited (PXIL), which heralded the entry of the private sector in the electricity market.

Mr. Mukund Paudyal, Joint Secretary, Investment Board, Government of Nepal

Mr. Mukund Paudyal started his presentation by observing that the South Asian economic investment environment is dismal. He referred to the World Bank and IFCI index on ease of doing business for different South Asian countries. A proper business environment is essential and it needs to be improved in this region, he emphasized.

While talking about the dominance of traditional fuel in energy mix, poor access to electricity, and energy deficit, Mr. Paudyal stressed that the current level of demand sets a stage for an increased role of the private sector in the Nepal energy landscape as the government alone will not be able to bridge this gap. It is believed that by 2023 the private sector will overtake the public sector in Nepal in power production. He mentioned some large mega projects that are being developed in Nepal by Indian private sector power players that will export power to India though he cautioned that electricity is not yet considered a tradable good in Nepal. He underlined the risk involved in the hydropower project in Nepal. He also mentioned that the Government of Nepal has realized that there are a lot of rules and regulations which are contradictory and not congruent and hence it has recently constituted a committee to harmonize and synchronize laws related to hydro electricity in Nepal.

Mr. Paudyal lauded the idea of regional power trade in the region and said it is a win-win proposition. He felt that it should initially be a bilateral trade and then graduate to multilateral trade. There are political, security, legal, and institutional barriers. Power sector growth is very slow and it calls for intervention from the regional governments, he concluded.

Mr. Manzur Ahmed, Adviser, FBCCI

Mr. Manzur Ahmed started his session by highlighting the historic inauguration of the India-Bangladesh power trade link, which took place around the same time as the session on October 5. Bangladesh will be drawing power from both public sector and private sector companies of India through a 103-kilometer High Voltage Direct Current (HVDC) transmission line between Baharampur in West Bengal and Bheramara in Kushtia. Mr. Ahmed also expressed his appreciation to the Honorable Chief Minister of Tripura Mr. Manik Sarkar, for offering "to supply at least 100MW of power to Bangladesh if the central government allows the state government as the northeast Indian state will be power surplus by February 2014".

While talking about the potential of power trading between India and Bangladesh, he mentioned the PDB-NTPC Joint Venture coal-based 1,320MW Rampal power plant. However, he also counted the several challenges involved in the setting up of this plant, particularly environmental concerns that are turning out to be the toughest challenge in the implementation of the project in its current location.

Turning to the subject of SAARC Energy Cooperation, he said that the draft of the 'SAARC Inter-Governmental Framework Agreement for Energy Cooperation (Electricity)', endorsed by the Energy Ministers' meeting in Dhaka (September 15, 2011) should be implemented by the SAARC Member States.

Mr. Ahmed referred to studies that estimate the hydro potential of the region using the steep rivers in the hilly region. He also mentioned that India, in collaboration with Bhutan and Nepal, will commission several hydro-electric projects to generate about 10,000MW. This will prove immensely rewarding for the entire region, including Bangladesh.

Mr. Sanjeev Mehra, TATA Power

Mr. Sanjeev Mehra said that TATA Power is the largest and oldest private power sector utility in India. Its first hydropower plant in the country will complete 100 years in 2015. The company has been involved in many PPP (projects in the generation, transmission, and distribution of electricity. While speaking about the role of the company in transmission, he specifically mentioned the 400kV Tala transmission line for facilitating power transfer from Bhutan to India. He also talked about the 450MW hydropower-based TATA project in Georgia where power will be sold to Turkey; its construction has started without a Power Purchase Agreement (PPA). Bankers there are ready to lend without a PPA. He commented that if this kind of market comes to the South Asian region one can build a plant and the market will follow. Mr. Mehra also spoke about the different projects undertaken by TATA Power in SA.

He highlighted the challenges a developer faces in setting up a plant in one country with reference to a joint venture project between TATA Power and the Royal Government of Bhutan. Multiple issues that came up at different stages in several other projects of TATA Power were mentioned and Mr. Mehra spoke about how they were eventually sorted. He observed that, if we are of open mind and trust each other, all issues can be settled amicably.

He referred to the energy banking model that is followed by Himachal Pradesh, India, which supplies (bank power) hydropower during the monsoon season and receives (withdraw power) power during the winters. He said similar arrangements can also work in CBET where peak power (value of power is high) can be exported at high price and off peak (value of power is low) can be imported at a low cost. He added that the availability of a transmission line that is not linked to any long-term project will also help in creating a cross-border electricity market.

Mr. A.K. Asthana, Reliance Power Transmission Limited

Mr. A.K. Asthana started by quoting the basic philosophy of trade, that goods are produced at the place where it is cheap to produce and sold across the global market where it fetches a high value. He said that Reliance Power is a transmission company which has steered the competition for transmission development in India. It is a widespread perception that transmission is a service provider for the generator and distributor, and not an independent full-fledged business opportunity. This perception would not work for inter-country transmission where the volume of transmission is high and we have to explore possibilities of trade. For electricity trade to take place, transmission is a requisite infrastructure, he emphasized.

According to Mr. Asthana, the HVDC transmission line has a lot of merit when we think of electricity trade at large volumes, usually CBET. He substantiated his statement by giving some global examples of electricity transmission lines between Mongolia and Poland, Finland and Russia, and also some long distance transmission lines between India and Nepal. He pointed out that so far the total impact of the private sector project in India is limited but in the case of regional electricity trade, the scenario would be different. It should be driven by private players and the same line of trading policies should be followed that exist for other goods and services. He concluded that in international trade, the basic infrastructure is owned by the public sector, which is harnessed by private companies for the facilitation of trade.

Mr. Rajib Mishra, GMR, Ahmedabad

Mr. Rajib Mishra began by referring to the GMR experience in Nepal. He talked about the current status of power in Nepal and also cautioned about the political uncertainties in the country. While talking about the development of the GMR project, he observed that it is in a very good shape with the Detailed Project Report (DPR) submitted, environment and forest clearances already accorded, pre-construction investigations completed, and so on. GMR has also received a 30-year import license from the Government of India for both its Nepal projects. These projects have attracted strong interest from MDBs such as IFC/The World Bank and ADB.

CBET is a field which has just begun to develop, he elaborated, but there are lots of things that are taking place behind the scene so it calls for some amount of patience at this point in time. There is an important role for the private sector in CBET at this juncture; much of it needs government intervention whether it is a policy issue, regulation or transmission link corridor to reduce risk perception. He pointed out that we are at the ice-breaking stage of development where a large amount of investment is required to move to a confidence-building stage. Mr. Mishra conceded that there are some exceptions such as Bhutan where the government has set such a stage and Nepal, where the private sector has been working for many years to create a system.

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It was pointed out that the Electricity Act of 2003 gave a paradigm shift to the electricity market in India. The World Bank and IFCI index were referred to in context to the business environment in the South Asian countries, which have to become more conducive for investments to take place. A greater role for the private sector is foreseen in the region, given the various factors such as dominance of traditional fuel, poor access to electricity, and huge demand-supply gap that governments alone will not be able to bridge. It was proposed that the electricity trade that has started on a bilateral note can be later developed to a multilateral one and, for successful electricity trade in the region, electricity should be treated as a duty-free and quota-free commodity. Private sector power investors and developers in India such as TATA Power, GMR, and Reliance Energy presented their experiences on the setting up of plants in the neighboring countries. The audience was briefed about the challenges met, how they were overcome, lessons learnt, and the way forward as the private sector looks towards greater engagement in CBET.

Session V: Road Map for Cross-Border Power Trading and Development of Exchanges: Country Perspective

In order to assure its long-term development, the South Asian regional electricity market will have to explore a full range of options, both for bilateral and multilateral trading. In this session, representatives from the South Asian countries shared their experiences, along with their vision and road map for cross-border power trade and development of exchanges, leading to the consolidation and formation of the SAEM.

Session Chair: Ms. Meera Shankar, Former India's Ambassador to the United States of America
Co-Chair: Mr. Upali Daranagama, Additional Secretary (Planning & Development), Ministry of Power & Energy (MPE), Government of Sri Lanka

Speakers

- Mr. Shekeeb Ahmad Nessar, Chief Operating Officer, De Afghanistan Breshna Sherkat (DABS)
- Mr. Vaqar Zakaria, Managing Director, Hagler Bailly Pakistan Private Limited, Pakistan
- Mr. Karma P. Dorji, Chief Engineer/Head, Planning & Coordination Division, Ministry of External Affairs, Government of Bhutan
- Mohd. Latheef, STELCO, The Maldives
- Ms. Kamani Jayasekera, Deputy General Manager (Transmission and Generation Planning), Ceylon Electricity Board, Sri Lanka
- Mr. Surendra Rajbhandari, Director, Nepal Electricity Authority, Nepal
- Mr. Mohammad Hossain, Director General, Power Cell, Power Division, Ministry of Power, Energy and Mineral Resources (MPEMR), Government of Bangladesh

Ms. Meera Shankar, Former India's Ambassador to the United States of America

Ms. Meera Shankar noted that the GDP growth of the South Asian region has been high in the last few years and the demand for energy is increasing. She highlighted that trade in energy would be of mutual benefit to all the nations in the regions. Resources need to be married to markets; the resources should be utilized for the benefit of consumers.

She pointed out that the region carries political baggage and it has been divided. There has been a fear in the minds of the political class that trade with neighbors and in the region may dilute sovereign autonomy. Ms. Shankar said that we need to create co-dependence among the countries in the future and also create a coherent geographic sub-region with cooperation among countries. From a practical perspective, different countries are in different stages of development of markets and growth, this should not hold up energy trade between them. She conceded that some development has happened in this direction. Transmission linkage has been established between India and Nepal as well as with Bhutan and is being augmented. In addition, anew transmission link has been established with Bangladesh.

Mr. Shekeeb Ahmed Nessar, DABS

Mr. Shekeeb Ahmed Nessar started by saying that Afghanistan has a generation capacity of about 522MW, which is insufficient to meet its needs and hence it imports between 120MW and350MW of electricity (seasonal variation) from neighboring countries such as the Republic of Uzbekistan, Republic of Tajikistan, Islamic Republic of Iran, and the Republic of Turkmenistan. The Afghanistan Power System operates in several isolated electrical islands due to unsynchronized operations between the interconnected countries.

Mr. Nessar said that Afghanistan has planned to set up an energy-based generation capacity; about 200MW from gas, 800MW from coal, and 1,580MW from hydro. He mentioned the various transmission links that Afghanistan has with its neighboring countries. He revealed that Afghanistan plans to enhance its power trade with these countries and mentioned that the extension of the 500kV line from Turkmenistan to Afghanistan is in the RFF preparation stage And PPA signing was scheduled for November 2013.He also shared that the extension of the 230kV line from Iran to Afghanistan (Farah), the extension of the 500kV line from Tajikistan to Afghanistan and Turkmenistan, and the extension of the 500kV line from Tajikistan to Afghanistan and Iran are in the preliminary stages. The Master Agreement is under negotiation for the extension of the 500kV line (CASA 1000) from Kyrgyzstan-Tajikistan-Afghanistan and Pakistan.

Mr. Vaqar Zakaria, Managing Director, Hagler Bailly Pakistan Private Limited, Pakistan

Mr. Vaqar Zakaria discussed the various demand scenarios in Pakistan and highlighted the seasonality of these demands. He also talked briefly about the future gaps in the demand and supply of electricity and the plans to meet these shortages under different scenarios. He pointed out that the export and import of electricity by Pakistan largely depends upon the economic growth of the country and the investment in the power sector in future. While talking about CBET in the region, he mentioned that the India-Pakistan link feasibility study and, has been completed recently and since it is a simple interconnection from a technical point of view, technology and engineering are not the areas of concern in trading. Politics is the main issue. The question is whether politics drives trade or trade drives politics. He said in Pakistan they are well aware about the impact of CBET as Pakistan has an experience of electricity trade from Iran. He also mentioned the different models which Pakistan is looking at to purchase electricity from India. Once power trading commences between Indian and Pakistan, it will be of immense benefit to both countries.

Mr. Karma Dorji, Chief Engineer/Head, Planning & Coordination Division, Ministry of External Affairs, Government of Bhutan

Mr. Karma Dorji stressed that the SAARC energy cooperation agreement should drive the trade. The critical step towards enabling the exchange of power in the region is the establishment of bilateral grid connectivity between member nations. There are several initiatives underway between India and its neighboring countries and investment in cross-border generation and transmission infrastructure is required. Mr. Dorji elaborated that facilitating the establishment of a regional power market and adopting a multilateral approach require a strong political commitment of the member states to implement the recommendations of the studies in a time-bound manner.

Mr. Mohamed Latheef, Managing Director, State Electric Company Limited, The Maldives

Mr. Mohamed Latheef gave a brief introduction of the Maldives and also talked about the power status in Male. He said that demand continues to grow at a very fast rate of approximately 12to15 per cent per annum and hence there are several challenges in power expansion. At the same time, there is no land available in Male for setting up a

green field power plant. He also said that the focus is towards renewable energy to meet the demand. He mentioned the solar power generation of 1MW in the Maldives for which investment has come from Japan. He perceived that a regional grid will give a lot of advantage to the region as well as to the Maldives; however, there are constraints on grid interconnections due to financial and economic concerns.

Ms. Kamini Jayasekera, Deputy General Manager (Transmission and Generation Planning), Ceylon Electricity Board, Sri Lanka

Ms. Kamini Jayasekera observed that since Sri Lanka does not have any fossil fuel, there is a lot of emphasis on the development of renewable energy. The aggregate load curve for Sri Lanka has a large variation, with off-peak demand being so low that Sri Lanka can export power to India and during peak load can, in turn, import power from India. She added that the share of coal-based generation is going up with imported coal-based generation plants being set up and hence as a long-term trend the share of hydro generation is going down. Expansion with 220kV level from generations to load centers is under development and new 400kV transmission lines are being planned in Sri Lanka.

With reference to CBET, Ms. Jayasekera said the technical feasibility study of the undersea cable connection between India and Sri Lanka has been completed. The route of the cable has to be finalized and awaits political clearance for a go-ahead as it is a G2G project.

Mr. Surendra Rajbhandari, Director, Nepal Electricity Authority, Nepal

Mr. Surendra Rajbhandari remarked that SA is a region of contrast and diversity. It has a population of over 1.5 billion, is largest in the world's regions but has the lowest per capita energy consumption in the world. It is also one of the fastest growing regions with a more than five per cent average annual GDP growth rate and a high growth in energy consumption. SA is endowed with varied energy resources such as coal, natural gas, and hydro resources spread across the countries. He said Nepal has a 600MW deficit with a total demand of 1,100MW. Three 400kV transmission lines, of 1,200MW each, are planned with India.

Mr. Rajbhandari pointed out that there are obstacles with regards to CBET that need to be addressed. The way forward would include issues such as the harmonization of grid codes and standards, greater interaction at both the technical as well as political levels to discuss the issues of power trade, reforming individual country markets to attract greater private sector participation in the power sector, and joint planning of potential power projects.

Mr. Mohammad Hossain, Director General, Power Cell, Power Division, MPEMR, Bangladesh

Mr. Mohammad Hossain began by stating that Bangladesh has seen a stable GDP, an economic growth of six per cent over the last five years. The performance of the power sector has been exceptionally good, with the doubling of generation capacity in the last five years. The demand is growing and there still remains an energy deficit. He elaborated that, in the growth of the power sector, the private sector has been given due importance for power generation and policy and regulatory frameworks have been enacted accordingly. Also, a sustainable fuel mix has been considered in generation planning. As a conscious strategy, Bangladesh is reducing its dependence on natural gas by promoting coal-based generation

Talking about CBET in Bangladesh, he revealed that Bangladesh is planning to import 3,500 MW from cross-border trade with India and other neighboring countries. The way forward for Bangladesh in the short term would be to include developing cross-border interconnection and power import through bilateral trade. In the medium term, Mr. Hossain continued, there needs to be a focus towards developing sub-regional grid interconnection and regional power trade through the SAEM. In the long term, the region should have an integrated SAARC grid interconnection and policy for developing regional hydro projects under joint ventures.

Session Summary

Representatives from the eight participating SAARC countries presented their road map for moving towards CBET. They were of the view that even though they all face electricity shortage, they will gain from this trade. Various sources of generation were discussed such as coal, natural gas, and diesel. As a conscious strategy, Bangladesh said that it was reducing its dependency on natural gas by moving to coal-based generation. The emphasis was on renewables with a major focus on the 350GW of untapped hydro potential of the region, which can help meet the demand-supply gap to a large extent. Also, the participating countries have to revisit their regulatory and legal frameworks to facilitate smooth and transparent electricity trade in the South Asian region.

Session VI: Power Trading and Development of Exchanges

The relative absence of a national energy trading market in all the South Asian countries could be a key development challenge to the integration of energy. The value of regional power exchanges and other transparent market mechanisms in the enhancement of bilateral and multilateral trading among the countries has to be recognized. Such market mechanisms also lead to an efficient exchange of incremental power. Market arrangement and prices provide a level playing field and a useful benchmark for investors, generators, and purchasers. In this session, power traders/exchanges and power producers of the region shared their experiences. They discussed the options from the perspective of power traders, which could be pursued for the formation of a long-term and sustainable energy market in the region.

Session Chair: Mr. R.V. Shahi, Ex-Secretary, Ministry of Power, Government of India
Co-Chair: Mr. Nagesh Kumar, Director, UN ESCAP, South and Southwest Asia

Speakers

- Mr. Rajiv Mishra, Executive Director, PTC India Limited
- Mr. Rajesh Kumar Mediratta, Director (Business Development), IEX
- Mr. S.C. Saxena, Power System Operation Corporation Limited (POSOCO)
- Mr. Sher Singh Bhat, Director, Power Trade Department, Nepal Electricity Authority, Nepal

Mr. R.V. Shahi, Ex-Secretary, Ministry of Power, Government of India

Mr. R.V. Shahi said that the inauguration of the India-Bangladesh 500MW HVDC link earlier in the day was a step towards realizing CBET in the South Asian region. He felt it was a commendable effort of both the countries for the start of power trade. He shared that it was a proud moment for him as he was there from the inception of the India-Bangladesh link project when he was part of the Ministry of Power. He emphasized on G2G understanding, which was reflected in the establishment of this link and observed that regional power trade will address the shortage of power and prove to be beneficial for all.

Mr. Rajiv Mishra, Executive Director, PTC

Mr. Rajiv Mishra started his presentation on 'Way Forward to Enhance Trade through the Exchange' by narrating the experiences of merging five regional grids in India. The synchronization of the regional grids started in October 1991 with the eastern and the northeastern grids. Subsequently, in March 2003, the western grid was synchronized with the eastern and northeastern grid. After the formation of the central grid, comprising the east, west, and northeast grids, the northern grid was synchronized with it in August 2006. Today, India has five regional grids with two frequencies (central and south grids) with an installed capacity of 200GW. He also talked about the various capacity expansion projects underway to alleviate congestion. Mr. Mishra said that PTC has proceeded with the execution of 11 high capacity power transmission corridors and is well funded to carry out its expansion plans.

He also talked about the evolving power industry structure in India and pointed out that the country has evolved from no competition to competition in generation and is presently under the wholesale competition model where distribution companies have the choice to get power from different producers and market operators. This will evolve to a full-fledged retail competition model. He also spoke about market design, the evolution of the power market in India, and the role of power exchanges. IEX is the first national level power exchange in India, followed by PXIL. The size of power exchanges in monetary terms is more than Rs.5,000 crore. Figures for the power market over the last two fiscal years were shown in terms of the growth of different components of short-term market share. Statistics were provided for the bilateral and power exchange prices, along with all-India price forecasts till 2021-22.

Mr. Mishra also mentioned electricity trade between Bangladesh, Bhutan, and India, with prospects for integration with Nepal. He touched upon the regulatory regime in the power market and power trading. He said the need for adequate transmission capacity and clear rules of the game are very important for cross-country power transmission, which is currently lacking in SA. He pointed out that agreement to trade/exchange power among the countries in the region is crucial. He highlighted the significance of regulatory changes to drive tariff revisions; improving the functioning of regulators; future tariff structures to have fuel pass-through; and recent initiatives by the government on fuel supply as the focus points for the way forward.

Mr. Rajesh Kumar Mediratta, Director (Business Development), IEX

Mr. Rajesh Kumar Mediratta began his presentation on 'Augmentation of Exchange to Handle Cross-Border Energy Trade: Way Ahead' with an introduction to the power exchange mechanism. He spoke about the various functions that an exchange handles such as bidding of power, its delivery, money, and the risks involved. Currently there are two kinds of markets in operation—spot trading (intra-day, day ahead) and forward trading (weeks, months). He mentioned three different delivery-based contracts, namely, day-ahead market, term-ahead market, and also the Renewable Energy Certificates. Mr. Mediratta explained in detail the features and trading process of the day-ahead market. IEX has 95per cent of the market share with more than 2,600 participants and 90,000MW of daily trading.

The proposed mechanism for cross-border trade through exchange was also discussed, focusing on the need for exchanges for CBET. Mr. Mediratta proposed a single-market structure for SAARC, highlighting various factors such as system operator, transmission capacity, capacity allocation, trade/bid entry, scheduling, and financial settlement. Describing the necessary conditions for trading through exchange, he said that the regional market evolution will take place in phases starting from the trader as a nodal agency, the cross-border trader as a nodal agency to the local power exchange as a nodal agency. The example of Europe was cited as an international trading experience. He noted that the exchange design in India is modular in nature and South Asian countries can become new bid areas and the existing ones can be expanded. In conclusion, he said that, for a way forward towards SAARC electricity exchange and to enable it, the major issues that need to be addressed are trading, delivery, clearing and settlement, margins, collaterals, legal recourse, and dispute resolution mechanism.

Mr. S.C. Saxena, National Load Despatch Center, Power System Operation Corporation Limited (POSOCO)

In his presentation on 'Evolution of Power Exchange', Mr. S.C. Saxena talked about the market design and explained its four pillars, namely, scheduling and dispatch, congestion management, ancillary services, and imbalances. He went through the evolution of the power market in India from 2004 with an open access to 2012; the sub-hourly market allowing 15-minute bidding in the power exchanges. He also talked about the different milestones during the implementation of power exchange in India. CERC provided guidelines for the establishment of power exchange in India in February 2007and in August2007; an approval was given in principle for the first power exchange in the country. The commencement of operations of the first power exchange, IEX, took place in June 2008 and in October 2008, the second exchange, PXIL, began its operations. Mr. Saxena talked about different elements of the regulatory framework for the market by CERC and the CERC guidelines for the setting up of a power exchange. He also elaborated on power exchange operations in India.

He also spoke about the various ways for transmission losses and charge settlement in the transaction. Charges can either be settled directly between buyer/seller and exchange or through a system operator. While talking about the trade under short-term open access (STOA), both bilateral and collective, he presented a picture of the total volume trade and number of transactions. He gave a snapshot of daily and monthly energy traded through power exchange and the movement of weighted average price for electricity through traders, IEX, PXIL, unscheduled interchange (UI), New Grid and UI, and SR Grid.

Mr. Sher Singh Bhat, Director, Power Trade Department, Nepal Electricity Authority, Nepal

Mr. Sher Singh Bhat spoke about' Evolution of Power Trading/Exchange in South Asia: Nepal-India Power Trading Experiences'. He started with why electricity markets are needed and listed the problems in developing an electricity market. Availability of commodity, price arbitrage in two regions, and complementing attributes of commodity are the basic drivers of trading. Talking about trading of electricity in the SAARC region, he said that in terms of physical connectivity, the Bhutan and India grids are interconnected. India and Nepal are connected with 14radial links of 11kV, 33kV, and 132kV. In terms of the existing level of cross-border power transactions, for Bhutan-India, India is the net importer and in the case of India-Nepal, Nepal is the net importer of power. For the Bangladesh-India link, Bangladesh will soon start importing power from India. Besides India, other countries of SAARC do not have operating domestic markets and exchanges.

Mr. Bhat explained the five different phases of the India-Nepal power exchange from 1960-1970 of Phase I to the present day. It developed from supplying power to Nepalese localities in neighboring project sites in Phase I to trading in an asynchronous radial system in Phase IV. Phase V is about future trading in a synchronous system where the activity for the construction of a 400kV D-M line is initiated. He also talked about their experience of trading in the past six years. With the base tariff of the Indian rupee, 4.54 at delivery point in 2008-09, it has today dropped to 3.75 for the period December2013 to April 2014. He concluded by saying that, in five years, the buyer's market turned to a seller's market and prices in trading markets went down. It is important to keep an eye on price forecasting, he cautioned, and hunt the market in time. He revealed that Nepal wishes to enter the daily-ahead market through IEX.

Session Summary

Speakers from the Indian power exchanges such as PTC and IEX shared their experiences. There was a presentation from POSOCO about the evolution of power exchange in India. The various stages of the development of the power market in India, the experience gained, and learning were shared along with the highlights from today's market status in terms of market share, various trading mechanisms, conflict resolution, and future plans. The way forward for regional interconnection in the South Asian region was presented by the exchanges. The contribution of exchange in the India-Nepal electricity trade was discussed and the learning of six-year trade showed a benefit for the buyer with the cost per unit charge going down over the years.

Panel Discussion and Valedictory Session: High Level Discussion on the Outcome of the Conference and a Road Map on South Asia Electricity Market

In order to assure its long-term development, the South Asian regional electricity market will have to explore a full range of options, both for bilateral and multilateral trading. In this session, representatives from the region shared their experiences, along with their vision and road map for cross-border power trade and development of exchanges, leading to the consolidation and formation of the SAEM.

Session Chair: Mr. B.K. Chaturvedi, Member, Planning Commission, Government of India
Co-Chair: Dr. Jyoti Parikh, Executive Director, IRADe

Speakers

- India: Mr. Ashok Lavasa, Additional Secretary, Ministry of Power, Government of India
- Sri Lanka: Mr. Upali Daranagama, Additional Secretary (Planning & Development), Ministry of Power & Energy, Government of Sri Lanka
- Bangladesh: Mr. Tapos Kumar Roy, Additional Secretary, MPEMR, Government of Bangladesh
- Afghanistan: Md. Shekeeb Ahmad Nessar, COO, DABS, Islamic Republic of Afghanistan, Kabul
- Nepal: Mr. Keshab Dhoj Adhikari, Joint Secretary, Ministry of Energy, Government of Nepal
- Bhutan: Mr. Bharat Tamang Yonzen, Managing Director, Bhutan Power Corporation Limited

Mr. B.K. Chaturvedi, Member, Planning Commission, Government of India

Mr. B.K. Chaturvedi delivered the valedictory address, observing that the focus of this session would be on the issues that have come up during the two-day deliberations. India, along with other SAARC countries, is working on these issues so that they are able to develop the market for power trading. The main concern is the development of transmission infrastructure for connecting various countries through transmission lines. If the whole market gets integrated, it not only provides energy to the region but also makes it more efficient for the power system and the power generation system to meet the demand and, in turn, make the entire energy system much more efficient. As nations try to develop, one has to explore what can be done with the existing infrastructure and work out a program with a defined timeline by the end of which it will be possible to move forward and get the South Asian electricity market well integrated.

Mr. Ashok Lavasa, Additional Secretary, Ministry of Power, Government of India

In his opening remark, Mr. Ashok Lavasa stated that this day is an auspicious one in the history of the SAEM as the India-Bangladesh 500MW interconnection has been inaugurated by the Prime Ministers of both countries. The interconnection would facilitate the export of 250MW of power from India's central power generating station. Bangladesh is also likely to procure an additional 250MW from the Indian market through PTC. He observed that this is a good omen for this conference and complimented everyone on this development. The demand for electricity in SA is growing rapidly and it is expected that the energy needs of this region will increase three times in the next 15 to 20 years. He said that though a tremendous potential exists for power generation, most of the countries are facing shortages and rising demands. The SA countries have been blessed with diversified resources such as coal, hydro, and gas. Regional trade is of benefit to all and requires the development of a power market in neighboring countries by robust transmission interconnections and the harmonization of policies and regulations.

Mr. Lavasa spoke about the various regional markets which exist in the world such as the North Pool, the Central American Integrated System Project. The Andean Region in Latin America, comprising Chile, Colombia, Ecuador, and Peru, is also seeking to integrate its power system. He said he has drawn upon these examples to underscore the need and the possibility of similar trade and similar opportunities which can be utilized within the South Asian region.

India has taken a significant initiative towards the development of the electricity market and its short-term market for the unscheduled interchange accounts for about 11per cent of the total energy which is sold in the country. The Central Regulator in India has extended the definition of inter-state trading to recognize electricity imported from any other country for re-sale within India and electricity exported to any other country.

He also mentioned the interconnections India has with Bhutan, Nepal, and now Bangladesh for cross-border exchange of power, which is beneficial to the economies of all these countries. Similarly, with Pakistan and Sri Lanka different possibilities are being explored to provide interconnection facility. As far as the road map is concerned, he felt that the planning process has already begun and the implementation of interconnections with various neighbouring countries are being explored.

As far as the Government of India and the Ministry of Power look at it, electricity trade in the South Asian region has a lot of potential. He pointed out that, with the setting up of the infrastructure facility, one will also have to simultaneously look at harmonizing the regulatory framework for seamless flow of electricity as well as the economic framework through which this transaction takes place.

Mr. Upali Daranagama, Additional Secretary (Planning & Development), Ministry of Power & Energy, Government of Sri Lanka

Mr. Upali Daranagama briefed the audience about the discussions held during the last two days about trading of power including bilateral trade and the benefits it will have on the economies of both the countries. He felt there is a need to strengthen the transmission infrastructure, sub-station capacity, and regulatory mechanism in Sri Lanka. Since India and Sri Lanka are separated from the mainland, he continued, the only feasibility for having a transmission link is through a narrow strip, which is being explored. Initial results show that it is fairly costly, as compared to other interconnections in the region, but talks are going on.

Mr. Tapos Kumar Roy, Additional Secretary, MPEMR, Government of Bangladesh

Mr. Tapos Kumar Roy underlined that the future of the power sector in the region will be based on CBET. He pointed out that there are seasonal variations in the demand of power and diversification of power generation resources in different countries of the region. Untapped energy resources need to be harnessed with combined efforts for the benefit of the region as a whole. Mr. Roy pointed out that big hydropower projects require big investments, which calls for support from the multilateral donors.

Md. Shekeeb Ahmad Nessar, COO, DABS, Islamic Republic of Afghanistan, Kabul

Md. Shekeeb Ahmad Nessar spoke about the rich power potential available in Afghanistan. He stated that the country can play a tremendous role in power trade in Southeast Asia by exploiting the rich available resources. He stressed that this is possible only if security and stability is established in Afghanistan.

Mr. Keshab Dhoj Adhikari, Joint Secretary, Ministry of Energy, Government of Nepal

Mr. Keshab Dhoj Adhikari shared his experiences about power trade with India and the development of transmission infrastructure in Nepal. He commented that India needs to play a pivotal role towards energy integration in the region. He also agreed that, to a large extent, India is playing this role by having different bilateral interconnections with different countries. He was hopeful that bilateral interconnections will gradually evolve into multilateral interconnections and set the path for the integration of the region as a whole.

Unlike other commodities, trade in electricity requires physical infrastructure in the form of transmission links between the trading countries. Mr. Adhikari said that for building transmission infrastructure in the region it is necessary to look beyond the short-term financial viability of the transmission line and see it from a long-term perspective and as a requisite for the facilitation of energy trade in the region. He was of the view that adequate transmission infrastructure will be developed by the government by keeping in view the future flow of power. It is unlikely for the private sector to carry such projects, he underlined.

Mr. Bharat Tamang Yonzen, Managing Director, Bhutan Power Corporation Limited

Mr. Bharat Tamang Yonzen started by reiterating the Government of Bhutan's agenda to provide electricity to its entire rural household population by 2030. He said all the power projects developed in Bhutan are with the support of the Government of India, except one that is being developed under the PPP model by TATA Power as a private partner. He also mentioned the umbrella agreement between the Governments of Bhutan and India. Under this agreement, the two governments will facilitate, encourage, and develop a power system both through the public and private sector. He emphasized that understanding

between the trading partners at all levels is pertinent for the long-term development of bilateral trade. Bhutan has no fossil fuel and is heavily dependent on import. Almost 60to 70 per cent of Bhutan's earnings from the export of electricity is spent on the import of fossil fuel.

Mr. Yonzen also talked about multi-criteria analysis comprising several variables, namely, political, economic, social, technological, legal, ecological, ethical, and demographic. These are used for the assessment of hydro projects that are technically, economically, and socially viable in Bhutan. He stated that the transmission link between Bhutan and India is adequate for the transportation of power from Bhutan to India. He shared the road map for harnessing the hydropower potential of Bhutan upto 2020 and 2030 as well as the integration of power with the northeast and eastern region grids of India.

Dr. Jyoti Parikh, Executive Director, IRADe

Dr. Jyoti Parikh delivered the vote of thanks. She observed that every topic that one could think of, ranging from transmission line to generation program, power exchange, power trade, power pricing, mechanism, and so on, were discussed during the two days of the conference. This, she felt, has made the organizers confident and she sought continued cooperation from all for the next four years of the SARI/EI program. She thanked the Planning Commission, especially Dr. Montek Singh Ahluwalia, Deputy Chairman and Mr. B.K.Chaturvedi, Member (Energy) for their presence. She also thanked Ms. Sripriya Ranganathan, Joint Secretary, Ministry of External Affairs, Government of India, Mr. Devendra Chaudhry, and Mr. Ashok Lavasa, Additional Secretaries, Ministry of Power, Government of India, for taking part in the conference.

Dr. Parikh said that the presence of all these officials provided the encouragement that the government is with them. She expressed gratitude to the Chairpersons, Co-Chairpersons, Speakers, Project Steering Committee members, Task Force members, representatives from the World Bank, ADB and the private sector, and public sector experts from about 12 countries for their contribution and participation in the event. She also thanked the officials of USAID and SARI Program, the team of IRADe officials led by Mr. K.K. Agrawal, CBIP, and other vendors and contractors for making this event a success.

Valedictory Session

It was noted that India has taken significant initiatives towards the development of an electricity market. The Central Regulator in India has extended the definition of inter-state trading to recognize electricity imported from any other country for re-sale within India and also electricity exported to any other country. Interconnections of India with Bangladesh, Bhutan, and Nepal for cross-border exchange of power are beneficial to the economies of all three countries. Similarly, possibilities are being explored to provide an interconnection facility of India with Pakistan and Sri. The planning process has begun to meet the challenges presented by the road map for CBET and the implementation of interconnections with neighboring countries is being explored.

Electricity trading in the SAEM has a lot of potential and with the setting up of the infrastructure facility one will also have to simultaneously look at harmonizing the regulatory framework for a seamless flow of electricity and to ensure that the economic framework during which this transaction takes place is established.

Conclusion

From the proceedings of the conference it was evident that the concept of CBET has found acceptance by all the participating nations. There is past and current experience of cross-border bilateral interconnections between India and its neighbours—Bangladesh, Bhutan, and Nepal—that have proved economically beneficial to these countries. Encouraged by this success, similar possibilities are being explored for interconnections between India, Pakistan, and Sri Lanka. There are also successful energy markets across the world such as the SAPP, GMS, Europe, and North America from where the South Asian energy market can derive benefits by adopting their best practices.

Among the many challenges, in addition to the political will, are the formation of harmonized legal and regulatory guidelines and framework and import-export policies that can be major drivers in facilitating the process of electricity trade. Electricity has to be recognized as a trading commodity, like any other commodity, without the constraints of special duties or prevailing pricing mechanism that distort its price.

Apart from India which has power exchanges, the other countries have to move towards the formation of the SAEM. The private sector will be playing an important role in CBET to meet the demand-supply gap and for the setting up of infrastructure for regional power plants. The business climate in SA, in turn, has to become more conducive to enable greater private sector investment in addition to forming PPPs. Electricity trading in the South Asian region has a lot of potential and offers a win-win proposition to all involved.

List of Participants

Sr.No	Name	Organization	Nationality
1	Mr. Shakeeb Ahmad	De Afghanistan Breshna Sherkat (DABS)	Afghanistan
2	Md. Humayoon Kohistani	Ministry of Energy and Water	Afghanistan
3	Mr. Salim Mehmud	Bangladesh Electricity Regulatory Commission	Bangladesh
4	Mr. Farooq Sobhan	Bangladesh Enterprise Institute (BEI)	Bangladesh
5	Mr. Manzur Ahmed	Federation of Bangladesh Chambers of Commerce and Industries (FBCCI)	Bangladesh
6	Mr. Mohammad Hossain	Ministry of Power, Energy and Mineral Resources (MPEMR)	Bangladesh
7	Mr. Tapas Kumar Roy	Ministry of Power, Energy and Mineral Resources (MPEMR)	Bangladesh
8	Mr. Salman Zaheer	World Bank	Bangladesh
9	Mr. Arun Kumar Saha	Power Grid Company Of Bangladesh Ltd. (Taskforce II Member)	Bangladesh
10	Mr. Bharat Tamang	Bhutan Power Corporation Ltd.	Bhutan
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12	Mr. Passang Dorji	Druk Green Power Corporation Ltd.	Bhutan
13	Mr. Karma P. Dorji	Ministry of External Affairs	Bhutan
14	Dr. Yongping Zhai	Asian Development Bank (ADB)	Phillipines
15	Mr. Michael Wekezer	Embassy of the Federal Republic of Germany	Germany
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17	Mr. M. S. Marwaha	Bhakra Beas Management Board	India
18	Mr. A.K. Ghal	Bhakra Beas Management Board	India
19	Ms. Abha Saini	Bhakra Beas Management Board	India
20	Mr. M. I. Khan	Bharat Heavy Electricals Ltd.	India
21	Mr. V. K. Kanjlia	Central Board of Irrigation and Power	India
22	Mr. P.P. Wahi	Central Board of Irrigation and Power	India
23	Mr. S. C. Nakra	Central Board of Irrigation and Power	India
24	Mr. S.K. Batra	Central Board of Irrigation and Power	India
25	Mr. S.S. Alag	Central Board of Irrigation and Power	India
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28	Mrs. Seema Saxena	Central Electricity Authority	India
29	Mr. Radhe Shyam Saha	Central Electricity Authority	India
30	Mr. Pramod Deo	Central Electricity Regulatory Commission (CERC)	India
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32	Mr. Sharath Rao	Center for Study of Science, Technology and Policy (CSTEP)	India
33	Mr. Ravinder	Central Electricity Authority	India
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37	Mr. Hemant Sharma, IAS	GRIDCO Ltd. and Orissa Power Transmission Corporation	India
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43	Dr. Kirit Parikh	Integrated Research and Action for Development	India
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65	Mr. H. Bharali	North Eastern Electric Power Corporation Limited	India

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67	Mr. Piyush Kumar	National Hydroelectric Power Corporation (NHPC)	India
68	Mr. C.K. Dhanush	National Hydroelectric Power Corporation (NHPC)	India
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78	Mr. S.K. Soonee	Power System Operation Corporation Ltd.	India
79	Mr. V.K. Agrawal	Power System Operation Corporation Ltd.	India
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83	Mr. Varun Sethi	PTC India Ltd.	India
84	Mr. Pravesh Sharma	PTC India Ltd.	India
85	Mr. Rajiv Mishra	PTC India Ltd.	India
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95	Mr. Sanjeev Mehra	Tata Power Trading Co. Ltd.	India
96	Mr. Pramod Singh	The Tata Power Company	India
97	Ms. Meera Shankar	Former India's Ambassador to the United States of America	India
98	Mr. Dinesh Chaturvedi	Central Electricity Authority	India
99	Mr. A. K. Asthana	Reliance Power Transmission Ltd.	India

100	Mr. D.N. Raina	Entecsol International	India
101	Mr. Nagesh Kumar	UN ESCAP (South and South West Asia)	India
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110	Mr. Hilal A. Raza	SAARC Energy Center	Pakistan
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113	Dr. P. N. Frenando	Ex-ADB (Project Steering Committee Member)	Sri Lanka
114	Dr. Priyantha Wijayatunga	Asian Development Bank (ADB)	Sri Lanka
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www.sari-energy.org