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SAARC Energy Centre Newsletter

Fostering South Asian Energy Cooperation

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South Asia Loses a Vibrant Energy Activist

Hial A. Raza, who has been leading the SAARC Energy Centre since its inception in 2007 and had reserved his energies for materializing the idea of SAARC Energy Ring, passed away on 14 May 2014 in Istanbul; he was 64.

Mr. Raza was a widely known energy expert of South Asia, specializing in sustainable energy development through regional cooperation.

He was the key person promoting energy cooperation among SAARC Member States. He has been closely associated with energy import projects of Pakistan as Advisor on Energy Imports to the Ministry of Water and Power, Government of Pakistan, the Chairman of Pakistan Working Group for CASA-1000 Project and Managing Director & CEO of Inter State Gas Company responsible for Iran-Pakistan and TAPI natural gas import projects.

Mr. Raza was educated at the Punjab University, Lahore, Pakistan getting the Bachelor's with Honors and Master's degrees in Geology, both with Gold Medals, and at the Imperial College, London University, obtaining a Master's degree in Petroleum Geology with distinction.

He had to his credit two books including the first ever flagship book *"Geology of Pakistan"* published from Germany in 1995 and more than 70 papers on the subjects of petroleum geology, oil and gas prospects, regional cooperation, energy, environment and technology.

Mr. Raza is survived by his wife, two daughters and a son.

The entire members of the SEC team, highly shocked and saddened since receiving the news of his death from Istanbul, wish to condole with the family of Late Mr. Raza of this great loss. The SEC team believes that the best way to acknowledge the efforts of Mr. Raza for South Asia is to continue working, on sustainable energy development and energy security in South Asia, from where late Mr. Raza has left.

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Role of Afghanistan in Energy Security of Pakistan

By Mr. Hilal A Raza (Late), Former Director, SAARC Energy Centre

1. Energy is the prime mover for economic growth across the globe and Pakistan is no exception. Fossil fuels (gas, oil, coal) meet 87% of Pakistan's current commercial energy needs; the remaining is contributed by hydro and nuclear electricity (Fig-1).

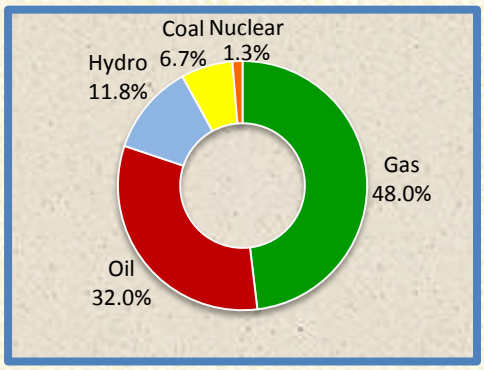


Fig-1: Pakistan Mix of Commercial Energy

2. Pakistan's per capita energy use is currently only 0.36 tonne of oil equivalent (TOE) per year as compared to 1.7 for China and 2.4 for Malaysia. Pakistan's population has been increasing and is now reported at 180 million whereas the growth in energy supplies has not been commensurate. For the last three years, energy supplies have been hovering around 65 million TOE annually in contrast to a growth rate of energy consumption of 6% to 9% during the years 2006-8. Assuming an upturn in the growth of energy consumption at an average of 5% during 2015-25 and 6.5% during 2025-35, the projected energy requirements of Pakistan can be seen in above Figure-2.

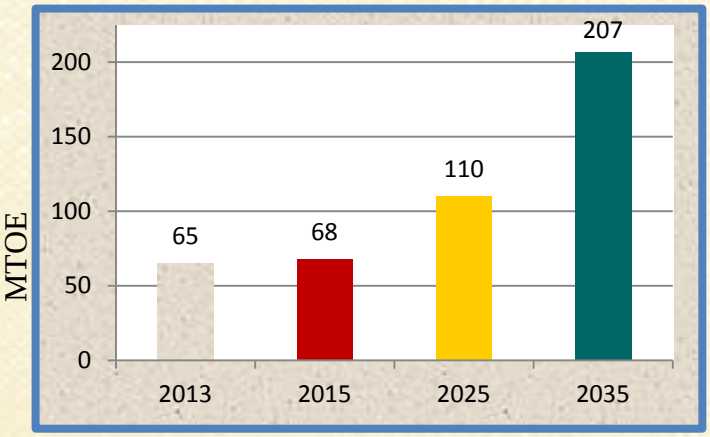


Figure-2: Projected Energy Needs of Pakistan

3. Besides, nearly 20,000 MW of electricity generation with complimentary T&D system will have to be added to meet the growing electricity demand. If 20,000 MW power is to come from thermal generation, it will require every year either 1.5 trillion cubic feet (4 BCFD) gas, or 40 million tonnes oil, or 60 million tonnes coal, or 120 million tonnes lignite. Investment needs for the power generation based on thermal power would be around US $40 billion assuming capital cost of $ 2 million per MW.

4. Due to rising demand, failing power infrastructure and heavy reliance on imported fuel, Pakistan is in the midst of severe energy crisis. Massive energy shortages have paralyzed industry and economy. Domestic production of oil was 76,000 barrels per day (BPD) during the year ending June 2013 whereas the requirement was 434,000 BPD, thus causing import of 358,000 BPD. The demand of natural gas stands at 6 billion cubic feet per day (BCFD) whereas supply was around 4 BCFD reflecting a shortfall of 25%. Existing gas reserves are depleting sharply and new additions are small. With an installed electric power capacity of over 20,000 MW, actual capacity remained at around 13,500 MW causing a massive gap of over 6,000 MW.

5. In addition to the development of its own indigenous energy resources of fossil fuel, hydro-power, renewable and nuclear power, Pakistan is actively pursuing regional cooperation as a means to supplement and enhance its energy supplies, accessing the energy resources of Central Asia being a cardinal point of this policy. Afghanistan would be an essential link for the purpose due to the obvious reason of its location.

6. CASA-1000 project (Figure-3) is designed to transmit 1,300 MW of summer surplus electricity from the existing hydro-power plants in the Central Asian countries, namely, Tajikistan and the Kyrgyz Republic, through Afghanistan to Pakistan: 300 MW will be drawn by Afghanistan while the remaining 1,000 MW will come to Pakistan (Figure-4). This project is an excellent example of synergizing seasonal variations in power supply and demand due to climatic differences; during the summer months there is low demand in the cold climate of Tajikistan and Kyrgyz Republic while there is peak demand in the hot climate of Pakistan. CASA-1000 Project is receiving strong support of the World Bank, IFC, Islamic Development Bank, and many bilateral donor agencies.

Figure-3: Connecting Central Asia with Pakistan via Afghanistan

7. A Ministerial level meeting of the Inter Governmental Council of CASA-1000 Project comprising all four participating countries was held in February 2014 in Washington, DC, USA where the parties agreed, in principle, on the terms and conditions of the Power Purchase Agreement, conducted negotiations on the Master Agreement and at the same time initiated negotiations on electricity pricing. The progress on the bidding for the EPC was also reviewed during the meeting with satisfaction. The negotiations round concluded with the signing of a resolution approving, in principle, the terms and conditions of the power purchase between the parties. Applications for pre-qualification of contractors for construction of HVDC converter stations at Sangtuda, Kabul and Peshawar have been received; pre-qualification process along with the preparation of bidding documents with respect to converter stations are also expected to be finalized shortly.

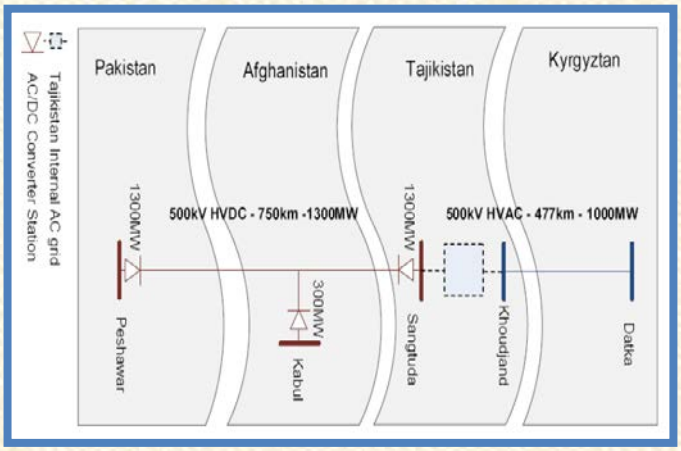


Figure- 4: Schematic Layout of CASA-1000 Project

8. The hydro-power potential of Afghanistan itself could be developed for supply to Pakistan. Afghanistan has a total hydropower potential of 25,000 MW, far more than its requirement. Ministry of Water and Energy, Afghanistan has already identified 15 small to large hydro-power projects with an overall capacity of 7,500 MW.

9. The Asian Development Bank has been looking at the potential to develop multiple interconnections and power generation possibilities (thermal-gas and hydro) on the northwestern borders of Afghanistan, calling it the TUTAP project (Turkmenistan-Uzbekistan-Tajikistan-Afghanistan-Pakistan). Afghanistan acts as the anchor country to collect 2,600 MW power from Central Asia for supply

to Afghanistan and Pakistan. Interconnections with Turkmenistan, Uzbekistan and Tajikistan are to be located in Pul-e-Khumri creating a HVDC hub in Afghanistan.

10. In order to meet the natural gas requirement of Pakistan (and India and Afghanistan), the countries are negotiating the TAPI Project (Turkmenistan, Afghanistan, Pakistan, India) to transport 3.2 BCFD natural gas from Yoloten-Osman gas field of Turkmenistan to Afghanistan, Pakistan and India (Figure-5). TAPI gas pipeline is planned along the highway through Heart, Helmand and Kandahar in Afghanistan to Quetta and Multan in Pakistan and onwards to Fazilka in India. This 1,680 kilometer, 56 inch diameter pipeline, is estimated to cost US $ 7.6 billion (2008 estimate). It will have a capacity of 3.2 BCFD to be shared by Pakistan and India, each receiving 1.325 BCFD while Afghanistan will get 0.5 BCFD. The Project is receiving strong active support of the Asian Development Bank (ADB) and is scheduled to be completed by 2017.

Figure-5: TAPI Natural Gas Pipeline

11. The TAPI pipeline offers multiple economic benefits to all four participating countries and would promote cooperation. For Turkmenistan, it would provide revenue and diversification of export routes. For Pakistan and India, it would address energy deficits. For Afghanistan, it would provide revenue for development through transit and gas for industrial enterprises. In order to ensure energy security, Pakistan eagerly looks forward to new supplies for easing its gas shortages that widened to over 2 BCFD during peak hours of winter 2013-14 causing social unrest and shutting factories.
12. TAPI parties have already signed the Heads of Agreement, Inter Governmental Agreement, Gas Pipeline framework Agreements and the respective bilateral Gas Sales and Purchase Agreements (GSPA). Transit fee figure have been agreed between the Parties. Road shows to verify Project Sponsor were conducted with the help of ADB who is also acting as the Transaction Advisor to assist TAPI Parties in the formation of pipeline consortium to finance, design and construct the project. The bidding documents are scheduled to be completed by the second quarter of 2014 for competitive solicitation of the consortium leader.
13. A holistic view of the energy situation of Pakistan and the opportunities like CASA-1000, TUTAP, Afghan hydro-power potential and TAPI, in the perspective of geographical location of Afghanistan and Pakistan clearly shows that regional connectivity and energy trade needs to be prioritized since it would strengthen energy security of Pakistan and maximize the socio-economic benefits for the people of both countries. It is believed that synergy among the two neighboring countries is the key to creating significant opportunities for economic progress through energy security and eventually leading to one of the largest integrated energy market of the world.

SEC Program Activities of FY 2014

Workshops

SAARC Workshop on Experience Sharing of Construction, Operation and Maintenance of LNG Facilities, *India*

Webinar on Concept, Establishment and Operation of a Power Exchange for Regional Power Trading

SAARC Inception Workshop on 20-Year Perspective Plan for the Power Sector of SAARC Region, *Maldives*

SAARC Workshop on Role of Independent Media for Increasing Public Awareness in Energy Conservation, *Bhutan*

SAARC Training Workshop on Power System Studies for Synchronization of Multiple Systems, *Afghanistan*

SAARC Dissemination Workshop on SEC Study on Cogeneration Opportunities in Sugar and Paper Industries in SAARC Member States, *Sri Lanka*

SAARC Workshop on Harmonizing Regulations for Cross Border Power Trade, Risk Sharing and Financial Settlement Issues, *Nepal*

SEC Program Activities of FY 2014

Studies

Study for Development of a Potential Regional Hydro Power Plant in South Asia

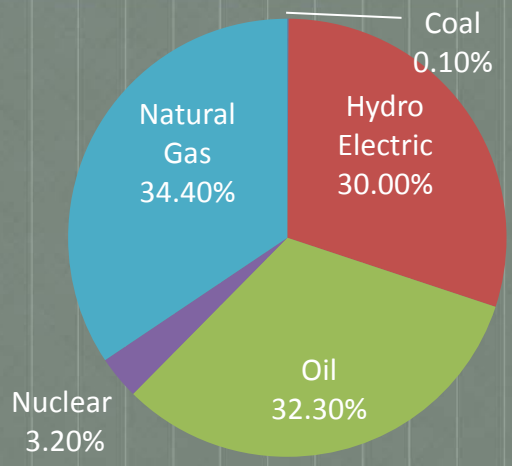
Study on Designing Management and Monitoring Framework for Regulatory Compliance by Power Transmission Utilities in selected SAARC Member States

SAARC Energy Data Bank

Study for Assessment of Energy Efficiency Potential through Energy Audit on Power Transmission and Distribution Grid Stations

Comparative Study on Rural Electrification Policies in SAARC Member States

Thar Coalfield Pakistan, is the 6th largest reservoir of coal in the world, with a resource potential of 175.5 billion tonnes. It is estimated that this reservoir is capable of sustaining an electricity production of 100,000 MW for 30 years.



Electricity Generation Sources – Pakistan
(NTDC Annual Report 2012)

SEC Workshop on LNG Facilities in India

Reported By: Mr. Md. Anwarul Islam, Research Fellow (Technology Transfer) SAARC Energy Centre

The SAARC Workshop on **Experience Sharing of Construction, Operation and Maintenance of LNG Facilities in India** was held in River View Resort, Chiplun, Maharashtra, India on 22-23 April 2014 with the collaboration of GAIL Training Institute, Uttar Pradesh, India. The workshop was inaugurated by Mr. A. K. Jana, Deputy Managing Director, Ratnagiri Gas and Power Private Limited (*RGPPL), India*. On behalf of Director, SAARC Energy Centre, Mr. Md. Anwarul Islam, Research Fellow (Technology Transfer) welcomed the delegates in SAARC workshop.

A total of 15 delegates from the Member States namely Afghanistan, Bangladesh, India, Maldives and Sri Lanka participated in the workshop.

The delegations made their country presentations on the subject, as well as presenting an overview of energy supply and demand situation in their respective countries.

The workshop included various technical sessions on (i) LNG Industry Overview: Issues & Challenges (including LNG Value Chain-Exploration, Liquefaction, Shipping, Storage & Re-gasification); (ii) LNG Terminals: Concept to Commissioning; (iii) Operation & Maintenance of LNG Facility; (iv) Economics of LNG Facility ; and (v) Safety in LNG Facility. The Resource Persons for this workshop were renowned LNG Industry experts from GAIL (India) Limited, Ratnagiri Gas and Power Private Limited (*RGPPL)*, Petronet LNG Limited (PLL), Indian Oil Corporation Limited. Hazira LNG Private Limited and Shell.

A publication by The Independent Power Producers Association of India (IPPAI)

A Tribute to Late Mr Hilal A Raza

Soft copy of the publication is available at:

www.saarcenergy.org/NewsEvents/Newsletters.aspx

Delegates Attending Session of LNG Workshop

A field visit was arranged on 22 April 2014 to LNG Facility at Dabhol of Ratnagiri Gas & Power Private Limited (RGPPL) to give on ground perspective to the workshop participants. The participants visited jetty, control room, storage facility & other facilities at RGPPL's LNG receiving terminal. In the valedictory session, after exhaustive discussion amongst the participants, some recommendations have been made. Mr. Probhat Singh, Director (Marketing), GAIL (India) Limited attended in the Concluding Session as a Chief Guest, and distributed certificates among the participants.

Energy Reserves of South Asia

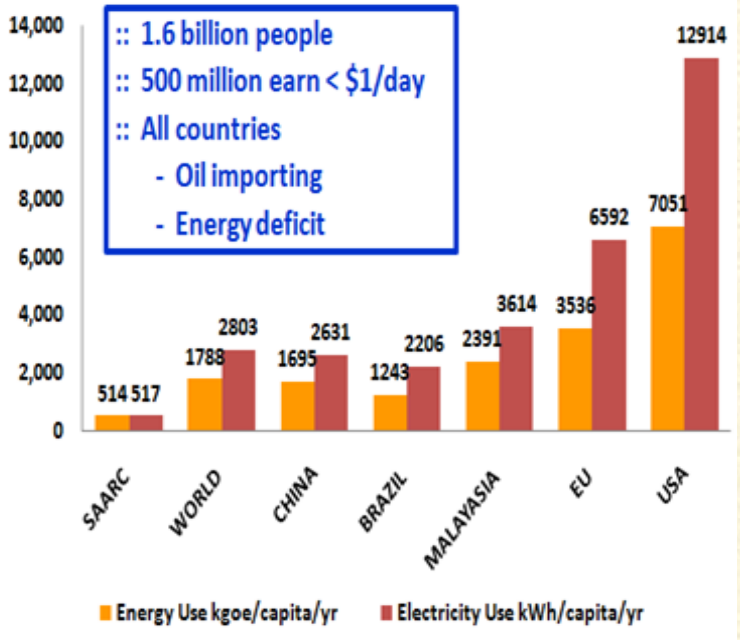
Coal
- 63,036 Million tonnes, proved recoverable

Natural Gas
- 2,308 Billion cubic meters, proved recoverable

Oil
- 785 Million tonnes, proved recoverable

Hydropower
- 4,528,000 GWh/year, gross theoretical capability

Energy Poverty of SAARC Region

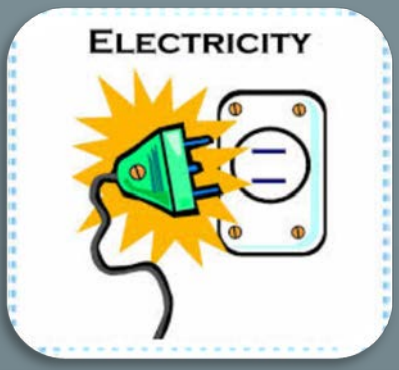


Agenda of Proposed Inter-Governmental Framework Agreement for Energy Cooperation (IGFA)

In order to initiate development of regional hydro potential and grid connectivity, under the directions of SAARC leaders, an appropriate Regional Inter-Governmental Framework Agreement (IGFA) for electricity cooperation was evolved. It was endorsed by Energy Ministers Meeting in Dhaka (15th September 2011). First draft of IGFA, currently under consideration of SAARC Member States, expected to be finalized shortly, provides for:

1. Unrestricted cross-border electricity trade
2. Commercial negotiation of PPAs
3. Exemption from levy of import/export duty
4. Sharing of technical & commercial data/information
5. Encourage process of reform, restructuring in the power sector
6. Joint planning of the cross border grid interconnection
7. Build, own, operate & maintain associated transmission system
8. Enter into Transmission Service Agreements
9. Joint development of the grid operational procedures
10. Non-discriminatory open access to the transmission grids
11. Engagement of regional traders in the cross border electricity trader
12. Participation in power exchanges for collective trading
13. Transfer of technology among the Member states
14. Networking of energy sector experts and professionals
15. Knowledge sharing and joint research in the specified fields
16. Promote sourcing of relevant equipment in the SAARC region
17. Development of an enabling environment for potential regulatory issues

Ultimate objective of IGFA is to create enabling environment for the SAARC Market for Electricity.



The world's demand for electricity grows almost twice as fast as its total energy consumption, and the challenge to meet this demand is heightened by the investment needed to replace ageing power sector infrastructure. *(World Energy Outlook, 2012)*

Energy efficiency and renewable energy are said to be the *twin pillars* of sustainable energy policy and are high priorities in the sustainable energy hierarchy. *(Wikipedia)*

Workshop on Harmonizing Regulations and Policies for Cross Border Power Trade, Risk Sharing and Financial Settlements

Reported by: Mr. Ahsan Javed, Research Fellow (Renewable Energy) SAARC Energy Centre

The SAARC Workshop on **Harmonizing Regulations and Policies for Cross Border Power Trade, Risk Sharing and Financial Settlements** was held at Hotel Soaltee Crowne Plaza, Kathmandu, Nepal on 26-27 June, 2014, in collaboration with Independent Power Producers' Association, Nepal (IPPAN), and Independent Power Producers Association of India (IPPAI) acting as knowledge partner.

A total of 91 delegates from Bangladesh, Bhutan, India, Maldives, Nepal, Sri Lanka, Asian Development Bank, UNDP, GIZ, SAARC Energy Centre and SAARC Secretariat participated in the workshop. The delegates from IPPAN and IPPAI also participated the workshop.

Workshop Objective

The Workshop was designed to deliberate on the issues of harmonizing regulations and policies among the SAARC Member States in order to prepare and promote the power trade in the Region. The ultimate objective of the initiative is to create the SAARC Power Grid as a part of the SAARC Energy Ring envisioned by the SAARC Summit 2004 held at Islamabad.

Workshop Proceedings

The Chief Guest, Honorable Ms. Radha K Gyawali, Minister of Energy, Nepal inaugurated the Workshop on 26 June, 2014. A two-member delegation from SEC, comprising of Mr. Shahzada Khalid, Deputy Director/ Officer-in-charge Mr. Ahsan Javed, Research Fellow (Renewable Energy) participated in the workshop.

The Workshop proceedings started with the country presentation by each of the participating Member States followed by technical sessions. During the workshop 23 presentations were delivered by the delegates from the Member States, Resource Persons and energy professionals from the SAARC Member States. All the presentations made in the following technical sessions are available at the SEC website.

Technical Session 1

Country Presentations: Issues and Challenges regarding Exchange of Power and Harmonization of Regulations & Policies

Technical Session 2

SAARC Power Market (Power Trade scenario in SAARC Region – How nations will benefit)

Technical Session 3

Creating an Enabling Regulatory Environment for SAARC Regional Power Trading (Focus: Identifying a Geographical hub for exchange of Power & Harmonization of Regulations & Policies)

Technical Session 4

Role of Private Sector in Construction, Maintenance and Operation of Trans Border Power Lines

Technical Session 5

Operational Issues (Scheduling, Coordination & Energy Accounting for Cross Border Trade)

Technical Session 6

Strategies to improve the role of IPPs and Utilities in Cross Border Power Trade

Technical Session 7

Power Trade Agreements for Cross Border Power Trade (Focus: Sanctity of Contract, Dispute resolution, Risk Sharing)

Mr. Shahzada Khalid, Officer-In-Charge, SEC shared the report of the Workshop with the participants, along with the recommendations emerging from the deliberations of the workshop.

Valedictory Session

Mr. Radhesh Pant, CEO, Investment Board, Nepal, chaired the valedictory session of the workshop. In his address, he emphasized the importance of cross border power trade in the SAARC Region and lauded the role of SAARC Energy Centre in organizing the Workshop which provided an excellent platform for mutual discussion among the policy makers and regulators from all across the SAARC Region. He expected that SEC will continue playing its role with the same zeal and spirit.

Mr. Shahzada Khalid thanked IPPAN and IPPAI for their contribution in successful culmination of the workshop, and also thanked the participants for their active participation during the workshop. The certificates of participation were awarded to the delegates.

Dr. H. M. Wijekoon Banda, the delegate from Sri Lanka offered vote of thanks on behalf of all the participants to SAARC Energy Centre, IPPAN and IPPAI for successful organizing of the workshop and certificates were handed to participants.

Do You Know…?

Nepal and Bhutan together have over 100 GW of high quality hydropower potential and comparatively small local demand. This huge potential can be harnessed to meet the electricity shortfall of the SAARC region.

Second Meeting of the Expert Group on Renewable Energy

Reported by: Mr. Ahsan Javed, Research Fellow (Renewable Energy) SAARC Energy Centre

The Energy Ministers, during their Third Meeting (Colombo, 29 January 2009), considered and approved a Concept Paper on SAARC Energy Ring, with the observation that it is a dynamic concept and will evolve over time with the experience of Member States and changing ground realities. The Meeting further decided on formation of Expert Groups for different commodities and services. As a follow-up, the Working Group on Energy constituted four Expert Groups. Being the lead country for the Expert Group on Renewable Energy, the Government of Pakistan convened the first Meeting of the Expert Group on Renewable Energy (Islamabad, 24 August 2011). The Group, in its first Meeting, finalized the Terms of Reference (ToR) and Work Plan.

During the Forty-fourth Session of the Programming Committee (SAARC Secretariat, 9-11 December 2013), Pakistan announced to host the Second Meeting of the Expert Group on Renewable Energy in the second half of 2014. Accordingly, the "Second Meeting of the Expert Group on Renewable Energy" was convened in Islamabad on 11-12 June 2014.

The Meeting was opened by Mr. Ahmar Ismail, Director (ETS) as representative of the SAARC Secretary General and chaired by Mr. Asjad Imtiaz Ali, Chief Executive Officer, Alternative Energy Development Board (AEDB), Pakistan. The meeting was attended by government delegates and SAARC representatives from Bangladesh, India, Nepal and Pakistan. Mr. Shahzada Khalid, Deputy Director/Officer-in-Charge, Mr. Md. Anwarul Islam, Research Fellow (Technology Transfer) and Mr. Ahsan Javed, Research Fellow (Renewable Energy) from SAARC Energy Centre, Islamabad also attended the meeting. Mr. Shahzada Khalid, Deputy Director/ Officer- in-charge, SAARC Energy Centre, delivered a presentation on the activities of SEC pertaining to the field of Renewable Energy. Dr. N. P. Singh, head of the delegation of India, delivered a brief presentation on "Renewable Energy Programme and Policies in India". Mr. Mohammad Alauddin, head of delegation from Bangladesh, delivered a brief presentation on "Renewable Energy in Bangladesh". Upon request of the Chair and delegates, Mr. Alauddin also delivered a presentation on "Solar Home System" in Bangladesh.

The Expert Group considered the TOR and status of implementation of the Work Plan finalized during the First Meeting of the Expert Group on Renewable Energy (Islamabad, 24 August 2011). After detailed deliberations, the Group updated its Work Plan based on key points/ decisions reached during the meeting.

The Group agreed that SEC will conduct the study on "Study of the national policies and programmes on Renewable Energy, along-with present status, in SAARC region, and identify the scope and areas for regional cooperation", as identified in the relevant Concept paper.

The Group deliberated on the Concept Paper on "The Way Forward for Mobilizing International and Regional Funding Including Clean Development Mechanism (CDM) Support, for Implementation of Renewable Energy Projects in the Member States" circulated by AEDB and agreed that AEDB will provide ToR for conducting the Study. After incorporating the comments of the Member States, SEC will carry out the study.

The Group also agreed that the Member States will offer their views on the Concept Paper on "Measures to Promote Availability and Access to Renewable Energy Products, Services and Equipment in the Region" (prepared by the AEDB), afterwards AEDB will prepare and circulate the ToR among the Member States. SEC will then conduct the Study in accordance with the finalized Concept Paper.

Alternative Energy Development Board will prepare the TOR for the study "Potential for Promoting Renewable Energy in the Regional Power Markets" and SEC will conduct the study.

Central Electricity Authority, India will update SEC on the "Study the Technical Standards for Grid Connectivity of Renewable Energy Projects in Various Countries and Suggest Guidelines".

It was decided that the Member States may send their proposals to the SAARC Secretariat on "Identify Pilot and Demonstration projects on Regional and Sub-regional Basis and Suggest Mechanism for Implementation in Member States".

The delegate from Bangladesh circulated a Concept Paper on "Identify and Propose Ways and Means for Short Term, Medium Term and Long Term Training of Professionals at All Levels for Continual Skill Development"; the Group agreed that the Member States will offer their views on this Concept Paper. Bangladesh will revise the Concept Paper, based on the inputs and circulate the same among all the Member States, through the SAARC Secretariat.

The Group discussed and proposed the creation of a "Revolving Fund" for the promotion of renewable energy in the SAARC region, for consideration of higher SAARC bodies. Pakistan consented to circulate a Concept Paper to all Member States through SAARC Secretariat.

Taking note of the already existing provisions of renewable energy (solar) installations at places of national and international importance in certain Member States, the Group proposed to replicate this experience in all the Member States. As a pilot project, the Expert Group proposed that the Member States may identify one or two prominent public buildings for the promotion of Renewable Energy. SEC may identify modalities regarding implementation of the pilot project.

Member States may nominate and convey contact details of Nodal Officials (by designation) dealing with renewable energy in the relevant Ministry/department(s).

Mr. Mukundaraj Prakash Ghimire, leader of the delegation of Nepal, offered vote of thanks. He expressed his appreciation to the Government of Pakistan for hosting the Meeting and for extending warm hospitality to the delegates and making excellent arrangements for the Meeting.

Upcoming Event

SAARC Workshop on

Cogeneration Opportunities in Sugar and Paper Industries

Organized By

SAARC Energy Center

25-26 September, 2014
Colombo, Sri Lanka

Role of SAARC Energy Centre as a Change Agent

By Salis Usman, Research Fellow (Energy Efficiency), SAARC Energy Centre

Energy plays a critical role in the development of human life and hence is acknowledged as the major pre-requisite for the prosperity of people. A range of essential activities - including agriculture, manufacturing, construction, transportation, computing, and health and social services - depend on access to different forms of energy. Energy growth and its sustainability, therefore, are directly linked to prosperity of the mankind. However, electricity is still not available to about half of 1.6 billion people living in South Asia. Quality of life marred due to poor access to energy is reflected from the fact that 500 million people of South Asia live below $1 per day poverty line.

South Asia is the least integrated region in the world. Intraregional trade is less than 2% of GDP, compared to more than 20% for East Asia. The cost of trading across borders in South Asia is one of the highest in the world. Energy trade in the region is low. Only India, Bhutan, Bangladesh and Nepal currently trade electricity. Currently, average energy utilization in South Asia is even less than one third of the world averages whereas average electricity usage is less than one fifth of the world averages. Within the region, Coal dominates by 50% of the commercial energy, followed by 29% oil most of which is imported. Only 7% of the huge potential of hydropower has so far been harnessed.

Consequently, an aggressive, integrated approach is required to make energy accessible, affordable and reliable in South Asia. These targets for South Asia like any other part of the world are both necessary and difficult since governments, citizens, private sector and NGOs all have different interests when it comes to energy. For energy transition in South Asia, in view of the huge quantum of the population versus limited funds availability, we particularly require smart solutions to offset large scale deployment.

SAARC Energy Centre (SEC) was created in 2006 to realize the vision of SAARC leaders to establish an Energy Ring in South Asia. It is mandated to initiate, coordinate and facilitate regional, joint and collective activities on energy in the SAARC region; provide technical inputs for the SAARC working group on energy, energy ministers' forum and other SAARC meetings on energy; help in the integration of regional energy strategies by providing relevant information and expertise; and be a catalyst for the economic growth and development of the South Asia region. The core areas of activity of SEC include Energy Efficiency, Renewable Energy, Power and Energy Trade, Energy Laws, Regulations and Policies, Energy Resources Exploitation, Sharing Best Practices, Capacity Building and Energy Data Bank.

In its brief history, SEC has been able to launch a number of initiatives within its core areas of activity, essentially aiming at materializing the SAARC Energy Ring comprising of various links among the Member States in terms of both power and gas where Gas is to be imported from Qatar, Iran and Turkmenistan (though Afghanistan) to Pakistan and India. Further, gas import from Myanmar is also envisioned to Bangladesh and India. Power interconnections are perceived between Sri-Lanka, Nepal-India-Pakistan, Nepal-India-Bhutan-Bangladesh,Iran-Afghanistan-Turkmenistan-Uzbekistan-Kyrgyzstan-Tajikistan-Pakistan.

One of the study 'SAARC Regional Energy Trade' launched by SEC, within the initiative SAARC Energy Ring, identified four regional/sub-regional trade options as depicted in the Figure 1:

Figure 1: Identified Regional/Sub Regional Trade Options

A follow up study on South Asia Regional Power Exchange has identified various opportunities in electricity trade. Data Table 1 provides six different power interconnections.

Within this perspective, SEC now looks forward to undertake the following three important tasks:

a. SAARC Inter-Governmental Framework Agreement for Regional Cooperation in Energy (Electricity)

Draft of "SAARC Inter-Governmental Framework Agreement for Energy Cooperation (Electricity)" endorsed by Energy Ministers Meeting in Dhaka, September 2011, is under consideration of SAARC Member States. Ultimate objective of this framework agreement is to create a SAARC Market for Electricity (SAME).

b. Detailed Scenario Analysis on Regional Interconnections

Table 1: Planned Power Grid Interconnections

#	Interconnection	Capacity (MW)	Estimated Cost (Million USD)	Annual Benefit (Million USD)
1	India-Bhutan	2,100	140-160	1,840
2	India-Nepal	1,000	186	105
3	India-Sri Lanka	500	600	186
4	India-Bangladesh	500	192-250	145-389
5	India-Pakistan	250-500	50-150	335-491
6	CASA 1,000	1,000	970	906

Amazingly, the overall infrastructure cost for all the six interconnection projects extending a capacity of 5,600 MW would be covered well within the first couple of years of their development.

This task would cover detailed analysis of different scenarios pertaining to the operation of the interconnection including high water season, low water season, winter season, etc.

c. SAARC Electricity Transmission Master Plan

Essentially, it would be a consolidation plan of transmission master pans of individual SAARC Member States covering generation adequacy report, development/ augmentation of transmission system, etc.

Further, SEC is busy in organizing different activities under the thematic areas 1. Power and Energy Trade; 2. Integrated Assessment of Energy Transport and Environment; 3. Minimizing Oil Imports through Improvements in Energy Efficiency and Fuel Substitution; 4. Successful Implementation of Technology Transfer; and 5. Rural Electricity for Poverty Alleviation. All these programming activities complement the vision of SAARC Leaders pertaining to setting up SAARC Energy Ring.

Thanks to cooperation extended by all member states in achieving the objectives of SEC's programming activities, SEC has been able to achieve a significant impact in the following perspectives:

- International and regional cooperation has become a reality. IFIs such as UNESCAP, World Bank, Asian Development Bank, USAID, GIZ Japan, etc. have joined hands with SEC for realization of the SAARC vision of the Energy Ring
- Sensitizing the need and importance of regional energy cooperation as a business opportunity by the industry, e.g. SAARC Chamber of Commerce and Industry, Confederation of Indian Industries, etc.
- Improved flow of information across SAARC region
- Initiation of energy trade in public and private sectors

SEC is thus performing a proactive role in mitigating energy poverty in South Asia through fostering energy cooperation within and across the region for a better tomorrow. SEC strongly believes that synergy among the SAARC Member States is the key to create significant opportunities for cooperation and trade in the energy sector and eventually for creating one of the world's largest integrated energy markets.

Upcoming Event

SAARC Training Workshop on

Power System Studies for Synchronization of Multiple Systems

Organized By

SAARC Energy Center

20-22 October, 2014
Kabul, Afghanistan

Governing Board of SEC

SEC Governing Board on the eve of its 8th Meeting

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Mr. Karma Tshewang Chief Engineer, Transmission & Power System Division, Ministry of Economic Affairs, Thimpu, Bhutan +975-1777 5454; pcd.doe@gmail.com	Mr. Ahmar Ismail Director (ETS) SAARC Secretariat +977 9851029004; dirpak@sarrc-sec.org
Mr. K. N. Garg Member (Hydro), Central Electricity Authority, India +91 99 108 223 32; kngarg@cea.nic.in	

Upcoming Event

9th Meeting of the SEC Governing Board

11-12 September, 2014
Islamabad, Pakistan

SEC Professional Strength

New Joining

Mr. Ahsan Javed has joined SAARC Energy Centre as Research Fellow (Renewable Energy) in March 2014.

Graduated from National University of Sciences & Technology (NUST), Rawalpindi in Mechanical Engineering and finished his Postgraduate Programme for Renewable Energy from Carl von Ossietzky University, Oldenburg, Germany.

Mr. Javed has served Alternative Energy Development Board of Pakistan and Climate Change Division. He has invaluable exposure of Off-grid Rural Electrification through Solar PV Technology evaluation of Clean Development Mechanism projects related to Energy, Industrial and Waste Management sectors against National Sustainable Development criteria and UNFCCC regulations. He has participated and represented Pakistan in a number of workshops, seminars in China, Germany, Nepal, South Africa, Thailand and United Arab Emirates. He may be contacted at:

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Upcoming Event

SAARC Webinar on

Concept, Establishment and Operation of a Power Exchange

Organized By

SAARC Energy Center

15 October, 2014

A Few Energy Related Web Sources

Source Title	Links
The European Commission Energy	http://ec.europa.eu/energy/about/index_en.htm
Advanced Energy	http://www.advanced-energy.com/
International Energy Agency	http://www.iea.org/
The United Nations Development Program (Energy)	http://www.undp.org/energy
Department of Energy, USA	http://www.energy.gov
Federal Energy Regulation Commission, USA	http://www.ferc.gov/
U.S. Energy Information Administration	http://www.eia.gov/
United States Nuclear Regulatory Commission	http://www.nrc.gov/
Alliance to Save Energy	http://ase.org/
OPEC Archive	http://opecarchive.com/
ABB Oil, Gas and Petrochemical Industry Portal	http://www.abb.com/industries/us/9AAC123932.aspx
Oil Voice Pakistan	http://www.oilvoice.com/country/Pakistan/3446db88.aspx
Report Linker (Full access to more than 1.2 million reports with data on 450 industries & 3,000 sub-industries around the world, published by 200,000 reliable public sources)	http: //www.reportlinker.com/country
The World Bank – Oil, Gas & Mining Unit	http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTOGMC
International Renewable Energy Agency (IRENA)	http://www.irena.org

Global CO2 emissions hit a new record level in 2013, climbing to 35.1 billion tonnes, about 670 million more tonnes of carbon dioxide from fossil fuels than was blown into the atmosphere the year before, according to IWR, a Muenster-based renewable energy institute. This represents an increase of 1.9 percent and a continuous rise since the advent of the economic and financial crisis in 2009. *(Renewable Energy Magazine, September 2014)*

Thematic Areas of SEC Programme Activities

PROMO: Programme to Minimize Oil Imports

PETREN: Programme on Integrated Assessments of Energy, Transport, and Environment

PREPA: Programme on Rural Electricity for Poverty Alleviation

POSIT: Programme to Successfully Implement Technology Transfer

PENT: Programme on Energy Trade between the SAARC Countries

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