SOUTH ASIAN ASSOCIATION FOR REGIONAL COOPERATION (SAARC)

SAARC ENERGY CENTRE
ISLAMABAD

Program Activity: PRG-64/2014/POSIT

SAARC Training Workshop
Power System Studies for Synchronization of Multiple Systems

Organized by

SAARC Energy Centre, Islamabad

in collaboration with

Ministry of Energy and Water, Afghanistan

20-22 October 2014

Kabul, Afghanistan

SAARC Energy Centre
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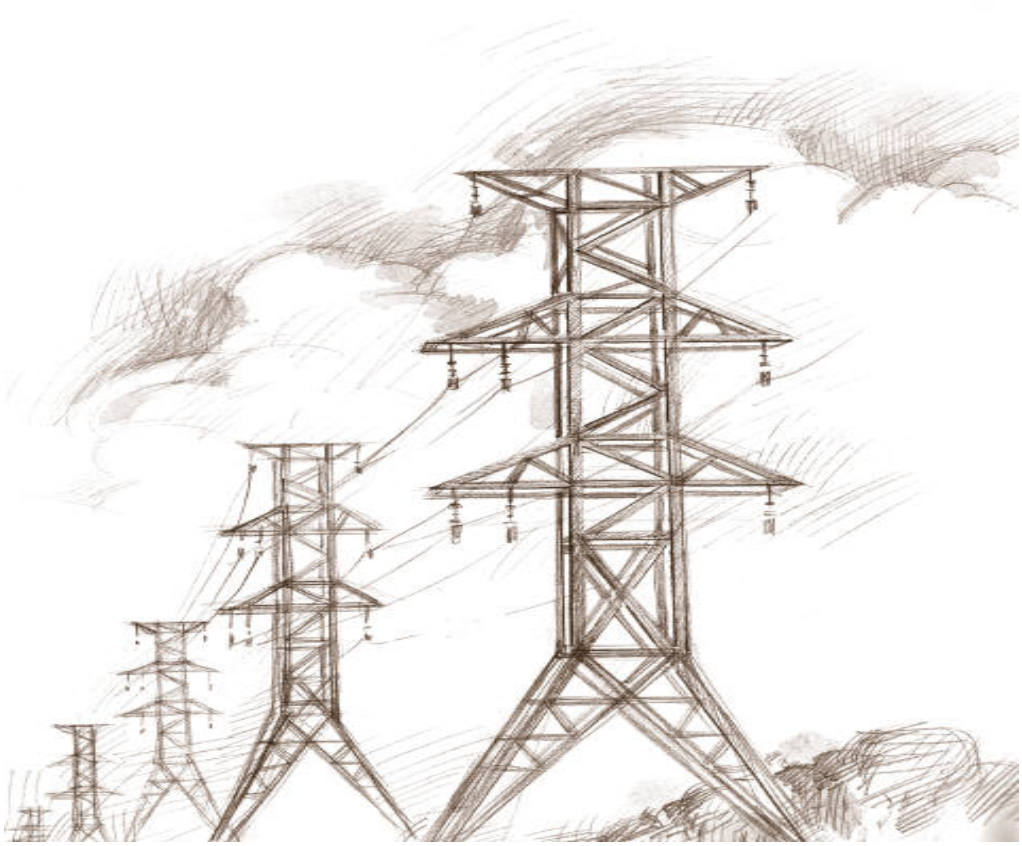
SEC Program Activity (PRG-64/2014/POSIT)

Training Workshop Power 'System Studies for Synchronization of Multiple Systems'

Kabul - Afghanistan, 20-22 October 2014



The Report

Introduction

SAARC Energy Centre, Islamabad under its program for FY 2014 organized a three days training workshop 'Power System Studies for Synchronization of Multiple Systems' on 20-22 October 2014. The event was arranged at Hotel Intercontinental, Kabul, Afghanistan in collaboration with Ministry of Energy and Water, Afghanistan. Copy of the Workshop Program is available at **Annexure I**.

2. Through this intervention, SEC had envisaged accomplishing the objectives such as a) Build capacity of the power planners/analysts in carrying out industry standard power system studies for development of Short-term, Mid-term and Long-term power plans including Generation Adequacy Forecasts and Transmission System Planning; b) Facilitate the participants with hands-on working opportunity on the renowned power system analyses

tool using their own data; and c) Spontaneous response to the participants on various what-if situations regarding different scenarios and using multiple planning strategies.

Participation

3. A total of 36 delegates from Afghanistan, Bangladesh, Maldives, Nepal and Pakistan participated in the workshop. Participants list is available at **Annexure II**. The workshop attracted an overwhelming participation from Afghanistan; Afghan delegates, dominated by Ministry of Energy and Water and the power utility Da Afghanistan Breshna Sherkat (DABS), eagerly participated in the workshop proceedings through proactive focus on PSS/E software applications and case studies exclusively customized for this training event. The workshop format was composed of the following sessions:

- Inaugural Session
- Session 'The Perspective'
- Technical Session I 'Load Flow Studies'
- Technical Session II 'Short Circuit Analyses'
- Technical Session III 'Transient and Dynamic Stability Analysis'
- Technical Session IV – 'Managing Synchronization of Multiple Power Systems'
- Valedictory Session

Inaugural Session

4. Engr. Salis Usman, Program Coordinator, SEC, on behalf of Officer-in-charge, SEC, welcomed the resource persons and all the delegates from SAARC Member States for this first ever SAARC event in Afghanistan. He especially thanked Mr. Ghulam Farooq Qazizada, Deputy Minister of Energy, Government of Afghanistan for his gracious presence at this training workshop and for encouraging the SAARC endeavor for capacity building of the planning professionals. He introduced SAARC Energy Centre to the delegates and highlighted its commitment to mitigate energy poverty through fostering energy cooperation within and across South Asia for a better tomorrow. While stressing on the importance of this workshop, he emphasized on organizing such training events as a continuing process to keep the Regional professionals updated and informed of latest tools and techniques. He wished nice stay for participants as well as resource persons at Kabul, Afghanistan.

5. The Chief Guest, Mr. Ghulam Farooq Qazizada inaugurated the workshop. In his inaugural address, the chief guest highly praised SAARC platform, SEC, Resource Persons and the delegates. He highlighted his entire satisfaction on the quality of information to be disseminated in the workshop. To all the delegates, especially Afghan, he emphasized on great interest and commitment in learning and excelling the special purpose, internationally recognized planning software. He reiterated Afghan Government's commitment for all the SAARC initiatives through utmost support by his Ministry. He added that this training workshop will be proved another building block for developing, sustaining and sharing the regional professional expertise in the field of Energy. A group photograph of workshop participants with the Chief Guest was snapped on this occasion.

Technical Proceedings

6. Brief information on the technical proceedings, designed in multiple sessions, is as follows:

a. Session 'The Perspective'

- 'Introduction to Power System Analysis and Pre-Requisites for Synchronization of Multiple Systems ' by Engr. Hassan Jafar Zaidi and Engr. Omair Khalid, Power Planners International, Pakistan
- Team Formation and Data Preparation for hands on training on 'Load Flow Studies', 'Short Circuit Analyses', and 'Transient and Dynamic Stability Analysis'
- Country Scenario: 10-minute presentation by each of the following/participating Member States
  i. Afghanistan
  ii. Bangladesh
  iii. Bhutan
  iv. Nepal
  v. Pakistan

b. Technical Session I 'Load Flow Studies'

- Stage by stage development of schemes of integration through existing and new transmission lines of 220 kV or higher level.
- Integrate existing and new or future power plants into one grid system
- Develop different alternative schemes of integration and determine technically and economically most feasible interconnection schemes of integration.
- Analyze steady state performance of the integrated schemes under normal and contingency conditions for peak and off-peak conditions

c. Technical Session II 'Short Circuit Analyses'

- Determining the fault levels of existing and future substations to specify the ratings of switchgear of these substations.
- Determining the fault levels of existing and new power plants to specify the ratings of switchgear at the switchyard equipment of these plants
- Determining the fault levels to decide if switchgear at some existing substations needs to be replaced if the fault levels are exceeding the ratings of the existing switchgear.

d. Technical Session III 'Transient and Dynamic Stability Analysis'

- Checking the system stability due to different disturbances happening in the system such as 3-Phase or Single Line-to-Ground faults

- Checking the strength of the generating units in the existing and future power plants to withstand different disturbances occurring at different locations in the proposed integrated system
- Determine the adequacy of the transmission network integrating the entire grid in terms of transfer of power from one end of the country to the other far end under disturbances and system outages.
- Checking for any oscillatory instability or small-signal stability issues inherent in the system
- Checking the voltage stability of at all locations of the system, far or near the location of disturbance.
- Propose measures to strengthen the integrated system to achieve perfectly reliable and stable operation of system under all kinds of disturbances on the network.

e. Technical Session IV 'Managing Synchronization of Multiple Power Systems'

- Mechanism to synchronize different power systems (simulating, analyzing and optimizing the network)

7. All the presentations and case studies along with other relevant documentation have been uploaded at the SEC Web. SEC has also arranged video recording of the whole event which will be shortly available in the form of an Interactive Multimedia DVD; the same DVD will also contain other relevant data/information including presentations, still photographs, etc.

Reception

8. SAARC Energy Centre hosted welcome dinner on the evening of the opening day for the workshop participants providing an informal opportunity for close interaction and networking. A number of ministers and deputy ministers along with technocrats also joined on this occasion.

Valedictory Session

9. Engr. Salis Usman on behalf of SEC thanked all the stakeholders particularly Ministry of Energy and Water, Afghanistan for their enthusiastic collaboration. He also highlighted relevant upcoming activities of SEC including Certificate Course on Power System through Distance Learning and Knowledge Sharing Workshop on HVDC Interconnection; he invited the delegates for continuous interaction with the SEC through its website www.saarcenergy.org. Engr. Usman reiterated SEC's commitment to continue working for such knowledge sharing activities and proposed closed liaison among the resource persons and delegates for sustained growth and development.

10. Mr. Muhamamd Arif, Senior Energy Advisor, Ministry of Energy and Water Afghanistan chaired the valedictory session. Through his address to the workshop participants, he expressed his gratitude for SAARC to organize this invaluable opportunity for the engineers and power planners of the SAARC Region for learning the extremely useful

and the most popular planning tool. He was particularly thankful to the Resource Persons for their precious contribution in building the regional capacity in terms of power planning. He also thanked the participants for coming to Afghanistan and joining the workshop with great interest and vigor. At the end, he hoped that SAARC will continue organizing such learning initiatives for the capacity building of the regional professionals.

11. Eng. Shabnam, Ministry of Energy and Water, Afghanistan offered vote of thanks on behalf of all the participants to the Resource Persons, Government of Afghanistan and SAARC Energy Centre for successful organizing of the training workshop and managing high enthusiasm and involvement on the part of delegates throughout the process. She also hoped that the cooperation and guidance by the Resource Persons and interaction among the participants will continue for collaborative learning and growth of all the regional professionals.

Annexure I

Programme

SAARC Training Workshop

Power System Studies for Synchronization of Multiple Systems

Kabul - Afghanistan

20 - 22 October 2014

Sunday, 19 October 2014	
Guests Arrive: Kabul, Afghanistan	
Monday, 20 October 2014	
Inaugural Session	
Time	**Description**
0830-0900	Registration
0900-0915	Welcome address by Salis Usman, Program Coordinator, SAARC Energy Centre
0915-0930	Inaugural address by the Chief Guest, Mr. Ghulam Farooq Qazizada, Deputy Minister of Energy, Government of Afghanistan
0930-1000	Coffee/Tea Break and Group Photo
Session 'The Perspective'	
1000-1100	"Introduction to Power System Analysis and Pre-Requisites for Synchroniza-tion of Multiple Systems " Mr. Hassan Jafar Zaidi, CEO, Power Planners International
1100-1140	Team Formation & Data Preparation for training on 'Load Flow Studies', 'Short Circuit Analyses', and 'Transient & Dynamic Stability Analysis'
1140-1300	Country Scenario: 10-minute presentation by each of the participating Member States
1300-1400	Luncheon
Technical Session I 'Load Flow Studies'	
1400-1500	• Stage by stage development of schemes of integration through existing and new transmission lines of 220 kV or higher level. • Integrate existing and new or future power plants into one grid system
1500-1520	Coffee/Tea Break

1520-1630	• Develop different alternative schemes of integration and determine technically and economically most feasible interconnection schemes of integration. • Analyze steady state performance of the integrated schemes under normal and contingency conditions for peak and off-peak conditions
Welcome Dinner	
1930-2130	Welcome Dinner hosted by the SAARC Energy Centre
Tuesday, 21 October 2014	
0830-0945	Evolve future plan of new transmission lines and substations to cater for future needs of the country at the level of national grid
0945-1110	Presentation of future plan developed by each team
1110-1130	Coffee/Tea Break
Technical Session II 'Short Circuit Analyses'	
1130-1300	• Determining the fault levels of existing and future substations to specify the ratings of switchgear of these substations. • Determining the fault levels of existing and new power plants to specify the ratings of switchgear at the switchyard equipment of these plants
1300-1400	Luncheon
1400-1540	Determining the fault levels to decide if switchgear at some existing substations needs to be replaced if the fault levels are exceeding the ratings of the existing switchgear.
1540-1600	Coffee/Tea Break
Wednesday, 22 October 2014	
Technical Session III 'Transient and Dynamic Stability Analysis'	
0830-1030	• Checking the system stability due to different disturbances happening in the system such as 3-Phase or Single Line-to-Ground faults • Checking the strength of the generating units in the existing and future power plants to withstand different disturbances occurring at different locations in the proposed integrated system • Determine the adequacy of the transmission network integrating the entire grid in terms of transfer of power from one end of the country to the other far end under disturbances and system outages.
1030-1050	Coffee/Tea Break

1050-1300	• Checking if there is any oscillatory instability or small-signal stability issues inherent in the system • Checking the voltage stability of at all locations of the system, far or near the location of disturbance. • Propose measures to strengthen the integrated system to achieve perfectly reliable and stable operation of system under all kinds of disturbances on the network.
1300-1400	Luncheon
Technical Session IV – Managing Synchronization of Multiple Power Systems	
1400-1530	Mechanism to synchronize different power systems (simulating, analyzing and optimizing the network)
Valedictory Session	
Chair: Mr. Muhamamd Arif, Senior Energy Advisor, Ministry of Energy and Water Afghanistan	
1530-1545	Group Photo
1545-1600	The Way Forward by Salis Usman, Program Coordinator, SAARC Energy Centre
1600-1620	Address by the Chief Guest
1620-1635	Distribution of certificates
1635-1645	Vote of thanks by Eng. Shabnam, Ministry of Energy and Water
1645-1715	Refreshments/Group Photo

Annexure II

SAARC Training Workshop

Power System Studies for Synchronization of Multiple Systems

20 - 22 October 2014, Kabul, Afghanistan

List of Resource Persons and Delegates

#	Name and Organization	Contact
	Resource Team	
1.	**Mr. Hassan Jafar Zaidi** CEO, Power Planners International, Pakistan	hassan@powerplannersint.com Mobile: +92 301 414 5264
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	Delegates	
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