

SAARC –Seminar on Role of Private Sector in Regional Power Trade

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AFGHANISTAN ROLE IN CONTRIBUTING TO A SECURITY REGIONAL POWER TRADE.

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DABS PRESENTATION

AFGHANISTAN ROLE CONTRIBUTION TO A SECURITY REGIONAL POWER TRADE .

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I. INTRODUCTION

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I. INTRODUCTION

Within the past years, most of the Central Asian Countries opted to operate their power systems independent from the others due to unresolved challenges resulting from the lack of agreements, procedures, pricing. To mention some:

1. Transmission system overload resulting on regional blackouts.
2. Unscheduled power flow through the regional interconnections.
3. Damage of some facilities during blackouts.
4. Weak coordination between Regional and National Dispatch Control Centers.

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I. INTRODUCTION (Cont.)

5. Disputes over power trade prices as well as over compensations for transit power.
6. Costs of water for irrigation when multiregional resources.
7. Political discrepancies.
8. Non strong technical groups.
9. Others

As a result, the Central Asian Countries are seeking independence of power supply from neighboring countries by developing their own generation capacities and transmission networks.

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I. INTRODUCTION (Cont.)

The Government of Islamic Republic of Afghanistan (GoIRA) firmly believes that in order to **secure energy** for each of our countries, a Regional Market shall be established solving the present challenges.

Isolated power network operation is weaker and more costly compared with a parallel operation amongst Central and South Asian countries.

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II. AFGHANISTAN POWER SYSTEM DEVELOPMENT

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II. Afghanistan Power System Development

- ✓ Power generation in Afghanistan is mainly hydro based.
- ✓ Access to electricity in the major economic hubs has improved significantly.
- ✓ More than 75% of the population in Kabul, Herat, Mazar-e Sharif, Kunduz, Zarange, Aybak, Maymana and Pul-e Khumri have a 24-hour power supply for the first time in decades.
- ✓ Kabul for example, had 6% of households connected in 2001 to more than 75% in 2013.
- ✓ DABS customers connected to the National Grid have increased on more than 60% within the last 6 years.

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II. Afghanistan Power System Development (Cont.)

- ✓ The rapid growth of house holds with access to electricity has been driven by the availability of additional energy's imports.
- ✓ The energy's imports in 2011-2012 represented 75% of the total supply while only 40% in 2006-07.
- ✓ This is the result of the construction of North East Power System (NEPS), transmission system, that interconnects Uzbekistan and Tajikistan to Afghanistan and the expansion of the Distribution Network

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II. Afghanistan Power System Development (Cont.)

- ✓ Security Energy in Afghanistan is being achieved due to regional interconnections.
- ✓ Despite these developments, more challenges are to be faced to achieve a security regional electricity market.
- ✓ Aware of this, Afghanistan Power Expansion Plan includes reinforcements to facilitate a regional interconnection.

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III. AFGHANISTAN'S MAIN ENERGY RESOURCES

III. Afghanistan's Main Energy Resources

Hydro Power Potential

- Hydro power potential for Afghanistan is in excess of 23,000 MW (large, medium and micro hydro power plants)
- Out of this potential 1,580 MW are part of short term Afghanistan's Master Plan.
- The Power Plants included in this Master Plan will be discussed later.



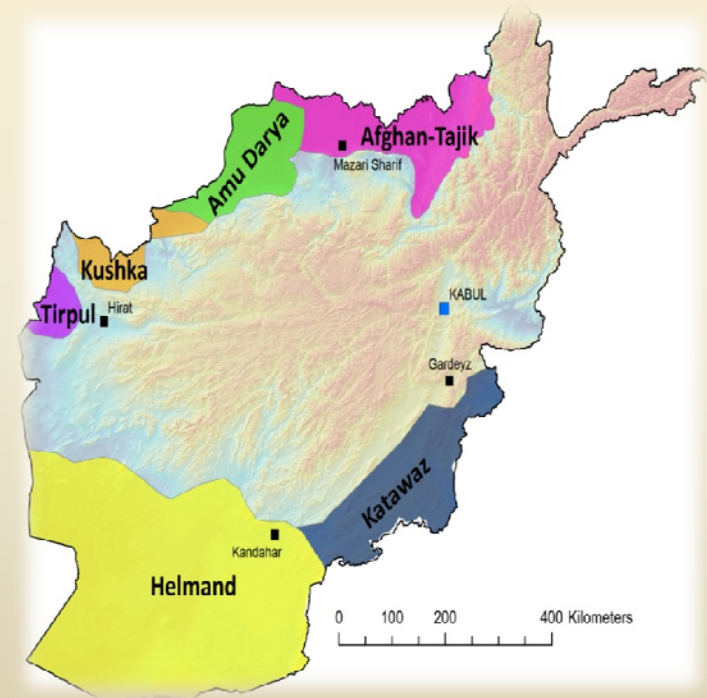
III. Afghanistan's main Energy Resources (Cont.)

Afghanistan Oil and natural Gas

- Basins cover more than 515,000 km² with more than 500 blocks identified
- Four proven basins with oil and gas: Amu Darya, Afghan-Tajik, Tirpul (Herat), and Kushka.
- Gas Proven Reserves 75.7 BCM

Undiscovered resources, mean volumes (USGS FS-3031, 2006)

- 1.6 billion barrels of potential unexploited petroleum liquids.
- 444 billion cubic meter of probable natural gas resource.
- 0.50 billion barrels of probable natural liquid gas.



General location of the 6 sedimentary basins in Afghanistan

Major Thermal Generation Projects

USAID: Sheberghan gas to generation project.

Rehabilitation and drilling of gas wells at Juma/Bashinkurd gas field.

Gas Processing Plant

Attracting private investors for the installation and operation of a 200 MW gas fire power plant.

International consortium: Hajigak iron mine: 800 MW coal power plant to cover their own load and to provide 400 MW to national grid.



Major Hydro Generation Projects

- Kunar A: Hydro Power Plant with an estimated capacity of 789 MW.
- Kunar B: Hydro Power Plant with an estimated capacity of 300 MW
- Baghdara: Hydro Power Plant with an estimated capacity of 210 MW.
- Surobi 2: Hydro Power Plant with an estimated capacity of 180 MW.
- Kajaki 2: Hydro Power Plant with an estimated capacity of 100 MW.



Afghanistan Major Generation Projects' Portfolio



Recently an agreement was reached between the governments of Afghanistan and Pakistan for the developing Kunar Irrigation and Generation project.

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V. AFGHANISTAN'S CURRENT POWER SYSTEM AND MAJOR EXPANSION PLAN TOWARD A REGIONAL INTERCONNECTION.

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V. AFGHANISTAN'S CURRENT POWER SYSTEM AND MAJOR EXPANSION PLAN TOWARD A REGIONAL INTERCONNECTION.

Current

- Afghanistan's Power System is interconnected with Uzbekistan and Tajikistan via the North East Power System, NEPS.
- NEPS is a 220 kV transmission system that interconnects North part of Afghanistan with Kabul.
- Uzbekistan is supplying 300 MW year around.
- Tajikistan is a seasonal supply in spring and summer up to a maximum of 400 MW.

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V. AFGHANISTAN'S CURRENT POWER SYSTEM AND MAJOR EXPANSION PLAN TOWARD A REGIONAL INTERCONNECTION.

Current (Cont.)

- Due to transmission constraints in a portion of NEPS, Pul-e-Khumri to Kabul, currently 300 MW is the maximum capacity able to transmit from North to South Afghanistan.
- Afghanistan it is also interconnected with Iran and Turkmenistan supplying power to Herat and to the Northwest provinces.
- Due to asynchronous operation of Central Asian power systems, Afghanistan operates its power system in several isolated electrical islands.

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V. AFGHANISTAN'S CURRENT POWER SYSTEM AND MAJOR EXPANSION PLAN TOWARD A REGIONAL INTERCONNECTION.

Major Expansion Plan Toward a Regional Interconnection

ADB: Additional Hindu Kush Crossing (Salang Pass) at 500 kV.

To increase transmission capacity from North to South Afghanistan, from 300 MW to 1000 MW.

500 kV from Pul-e-Khumri to Kabul.

Scheduled for 2018.

ADB: On going TKM-AFG Regional Power Interconnection Project at 220kV.

About to release tenders. Construction scheduled to be completed at the end of 2017.

ADB: TKM-AFG Interconnection at 500 kV. From Turkmenistan to Pul-e- Khumri.

Increase of supply up to 1000 MW from Turkmenistan.

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V. AFGHANISTAN'S CURRENT POWER SYSTEM AND MAJOR EXPANSION PLAN TOWARD A REGIONAL INTERCONNECTION.

Major Expansion Plan Toward a Regional Interconnection (Cont)

ADB: 110 kV transmission line as initial connection to Jalalabad via Kabul, to cover domestic demand.

USAID & USFOR-A: 220 kV double circuit transmission line from Kabul to Southern Afghanistan: Gardez, Qalat, Kandahar. Base on national load demand needs, initially only one of the two circuit will be strung with a transmission capacity of 300MW.

Other: Back to back substations to operate all the generation sources in parallel (interconnections and domestic generation).

Afghanistan Pakistan Electrical Interconnection: fast track, by stringing the second circuit from Kabul to Southern Afghanistan or, by a 500 kV system or higher.

Afghanistan Transmission and Generation Expansion Plan - Possible Interconnection with Pakistan by Reinforcing SEPS' 220 kV

ADB: AFG-TMK Regional Interconnection Project

Sheberghan phase1 Gas TPP
Capacity: 200MW
Sheberghan phase2 Gas TPP
Capacity: 200MW

ADB: AFG-TMK 500kV Interconnection

ADB: Additional 500 kV Hindu Kosh Crossing (Salang Pass)
Resolve currently transmission capacity limitation

USAID, USFOR-A and ADB: **SEPS** – South East
Power System double circuit only one to be strung

Kajaki HPP
100MW

Hajigak Coal TPP
Capacity: 800MW

CASA-1000 DC 500kV

Baghdara HPP
Capacity: 210MW

Kunar HPP
Capacity: 1089MW

Surobi2 HPP
Capacity: 180MW

Interconnection with Pakistan reinforcing SEPS
stringing the second circuit.

Legend

Exist 220kV
Future AC 500kV
CASA- 1000 DC 500kV
Future AC 220kV
SEPS's 220kV Reinforcement to Pakistan



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VI. SECURITY REGIONAL POWER TRADE - Regional Challenges

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VI. SECURITY REGIONAL POWER TRADE - Regional Challenges

Due to asynchronous operation between the neighbored countries, Afghanistan's Power System operates in electrical islands, one per each of the interconnected countries, and another with afghan domestic generation.

Challenge 1: To work toward synchronous operation:

- Through countries' political decisions to work in parallel.
- By installing back to back substations as it is shown in figure below (more expensive solution).



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VI. POWER SECURITY - Regional Challenges (Cont.)

Challenge 2: Conduct Regional Generation and Transmission Expansion Plans and Power including:

- a) Protections and generation controls improvements,
- b) Establishment of a regional dispatch center,
- c) Development and implementation of procedures.
- d) Additional actions.

Challenge 3: Create portfolios of regional generation facilities using countries' natural resources.

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VI. POWER SECURITY - Regional Challenges (Cont.)

Challenge 4: Attract private investors.

Challenge 5: Design and implementation of a regional capacity building projects to enable the personnel in each country to operate, control, monitor and expand the power system, etc.

Challenge 6: Implement:

- A legal and regulatory framework to facilitate a regional electricity market.
- Water Rights regulation to facilitate the development of multinational hydro power projects.

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Conclusion:

We need to make a leap beyond our past limitations, eliminate barriers at our borders, and secure a Regional Power Trade to help create PEACE and PROSPERITY for all.



Thank You

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