PROMOTING REGIONAL ELECTRICITY TRADE IN CENTRAL ASIA

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Organization of Presentation

A. Regional Power Trade

Section 1 – Benefits of Central Asia Regional Electricity Market

Section 2 – Regional Electricity Market Design and Best Practices

Section 3 – Regional Electricity Market Constraints

Section 4 – Suggested Next Steps for Central Asia

B. Central and South Asia Electricity and Trade Project (CASA 1000)

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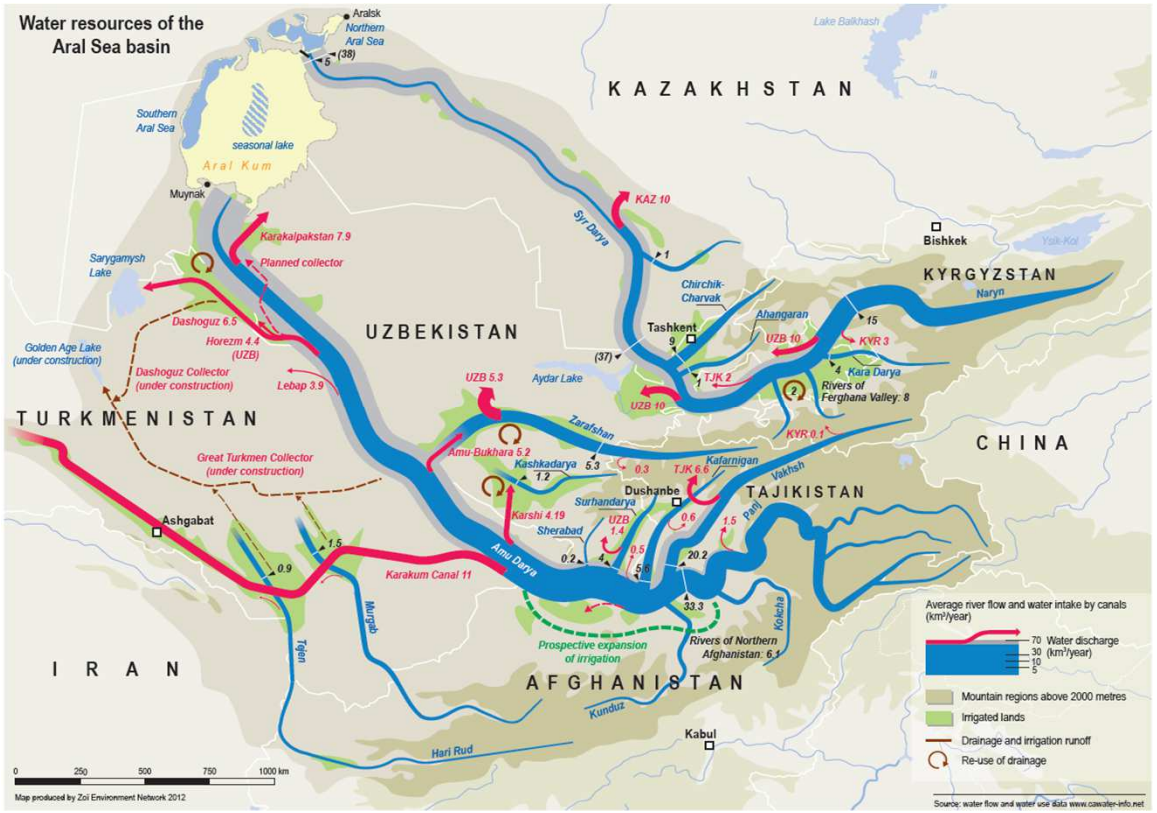
Towards Energy and Water Security

The Challenges

- Landlocked hydrographic system
- High Water Dependency, exacerbated by infrastructure interdependence
- Multiple and competing uses (winter hydropower upstream; summer irrigation downstream)

The Current Situation

- 2 million households face winter shortages of heat and light
- USD1 billion lost annually due to reduced energy trade
- USD188 m/yr additional fiscal burden from unexploited 10 % increase in irrigation efficiency
- >USD200 million forgone in agriculture-compatible hydropower generation per year.



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Regional Power Trade

Section 1: Benefits of Central Asia Regional Electricity Market

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Regional Trade Leads to a More Productive Use of Each Country's Resources

- Utilize complementary resources within the day and across the year
- Balance demand within the day and across the year when load profiles differ between countries
- Improve integration of renewables
- Pool reserve capacity and other ancillary services, thereby reducing costs of keeping power stations in reserve
- Reduce investment needs when planning carried out on regional, rather than individual country, basis

Study Results under Three Main Scenarios

	Benefits from fuel savings only at historic energy prices USD million	Benefits from fuel savings and meeting unserved power demand at historic energy prices USD million	Benefits from fuel savings and meeting unserved power demand at market energy prices USD million
Kazakhstan	249	190	293
Uzbekistan	608	3,226	2,932
Kyrgyzstan	(68)	900	1,813
Tajikistan	699	879	1,316
Total	1,488	5,195	6,354

Conclusions of the CA REM Study

- Effective regional energy trade in Central Asia can provide significant regional benefits, both monetary and in terms of reductions in energy not supplied
- All Central Asian countries benefit
- Results robust under broad range of scenarios

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Section 2: Regional Electricity Market Design and Best Practices

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Global REM Experience

- *A staged approach is necessary for development of regional electricity markets*
- *One size does not fit all*
- *There are various levels of regional power integration*
- *There are efficiencies to be gained under any integration scheme*
- *There is a need to establish regional institutions*
- *Technical and regulatory harmonization should be addressed as soon as possible*
- *There should be a flexible approach to power sector reform*

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Prerequisites for Functional REM

- ***Reciprocity, fair and non-discriminatory – in terms of access to the grid and pricing***
- ***Harmonized regional technical standards with minimum requirements specified in regional grid code***
- ***Regional governance structure including institutions, market rules and dispute resolution process***

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Section 3: Regional Electricity Market (REM) Constraints

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Takes Many Years to Put Effective Regional Energy Market in Place

- **Before a competitive REM can be established, there are numerous constraints to eliminate and a common regulatory framework to implement**
- **A staged approach is necessary. For example, the EU reform process has been ongoing for the past 20 years:**
  - First liberalization initiatives adopted in 1996
  - Second liberalization initiatives adopted in 2003
  - Third liberalization initiative adopted in 2009
  - Reform continues to this day as the EU adopts additional resolutions to improve the workings of the Internal Electricity Market
- **Central Asia can benefit from the many lessons learned elsewhere**

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Common Barriers to Regional Trade

- **Common barriers to regional trade based on International experience include:**
  - **Lack of trade pricing mechanisms and transparency**
  - **Absence of harmonized regulatory and technical frameworks governing trade**
  - **Institutional weaknesses:**
    - Ineffective regional governance institutions and mandates; i.e., absence of regional Transmission System Operator and Regulator with authority over regional market
    - **Few entities** with the authority, expertise, incentive and financial resources to undertake regional trade

Regional Markets Pose Unique Challenges

- Difficulty in aligning national and regional investment decisions
- Differences in regulatory environments between countries
- Limited financing to expand infrastructure necessary to support regional trade
- Changes in political framework
- Concerns about national sovereignty and energy independence

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Section 4
Suggested Next Steps for Central Asia REM

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Regional Power Trade – Proposed Next Steps

Near-Term

- Develop inter-governmental and stakeholder agreements
- Define the type of transactions or market to be developed and adopt pan-regional technical and commercial documents
- Identify the role of central trading and dispatch institutions, improve regional control systems, communications, and acquire appropriate software

Medium-Term

- Improve system supervision and control software
- Improve commercial metering
- Adopt a system for coordinated system planning, especially for high voltage grid

Longer-Term

- Implement necessary technological changes and improvements
- Move forward with regional grid development and power system projects

Central and South Asia Electricity and Trade Project (CASA 1000)

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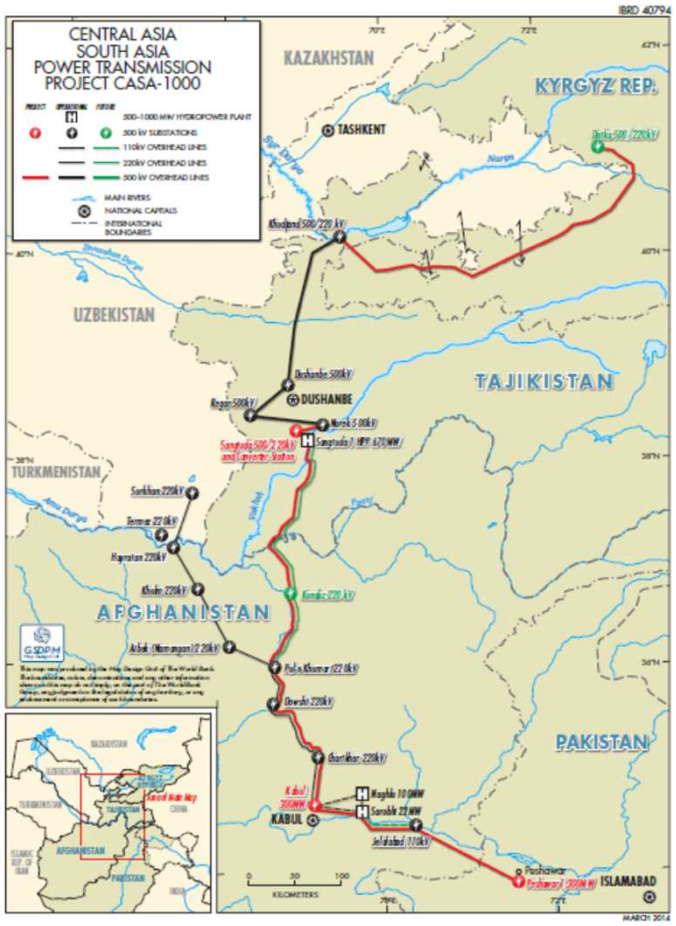
Central Asia South Asia Electricity Transmission and Trade Project - CASA 1000



- **CASA-1000 is transformational multi regional Project for electricity supply (1300 MW) from Central Asia to South Asia**
- **Strong partnership (> $ 1000 m financing) including IsDB, US Gov, DFID, EIB, EBRD, and WBG**
- **Project ensures long term operational sustainability**
- **Current Status:**
  1. Work to achieve effectiveness conditions is well advanced.
  2. Bidding for critical AC/DC converter stations and HVDC transmission line is progressing well.
  3. Major procurement packages in advanced stages with most contract awards likely completed by end of 2017

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THANK YOU!

The CASAREM VISION

The Central Asia South Asia Regional Electricity Market (CASAREM) will help develop a modern, sustainable electricity market between the two neighboring regions.

Central Asian countries, endowed with large energy resources, can help South Asian Countries meet their rapidly increasing demand for electricity – a key growth constraint

The Central Asian countries could diversify markets for their energy exports and create a source of revenue for their own economic development.

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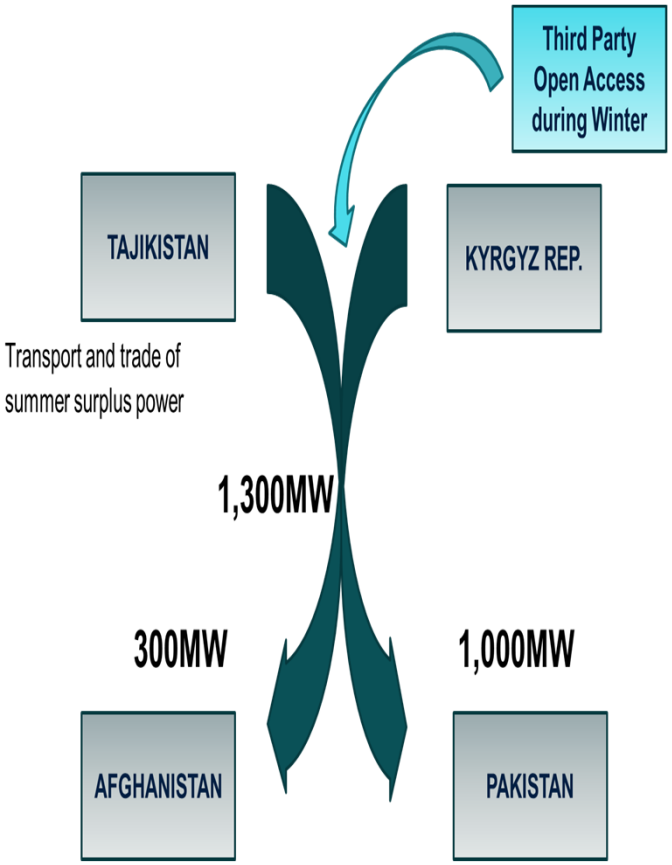
CASA-1000 is a First Phase of CASARM



•**Project Components**

A. Transmission Infrastructure

- A1 – HVDC Line (~750km/500kV/1,300MW) in Tajikistan, Afghanistan and Pakistan.
- A2 – 2 HVDC Converter Stations at Sangtuda (1,300MW) and Nowshera (1,300MW) -- (Supply to Afghanistan through existing 220 KV line with Tajikistan)
- A3 – HVAC Line between Kyrgyz Republic and Tajikistan (~475km/500kV).
- A4 – Tajikistan grid reinforcement. (~115 km/500 kV) AC line from Regar to Sangtuda and other network upgrade.

B. Technical Assistance and Implementation Support

- B1 – HVDC and HVAC Owner's Engineers
- B2 – Environment and Social Management Support
- B3 –Audits, Financial and Revenue Management
- B4 – Project Management Support
- B5 – Coordination
- B6 – Project Communications
- B7 – Capacity Building

C. Community Support Programs (CSP)

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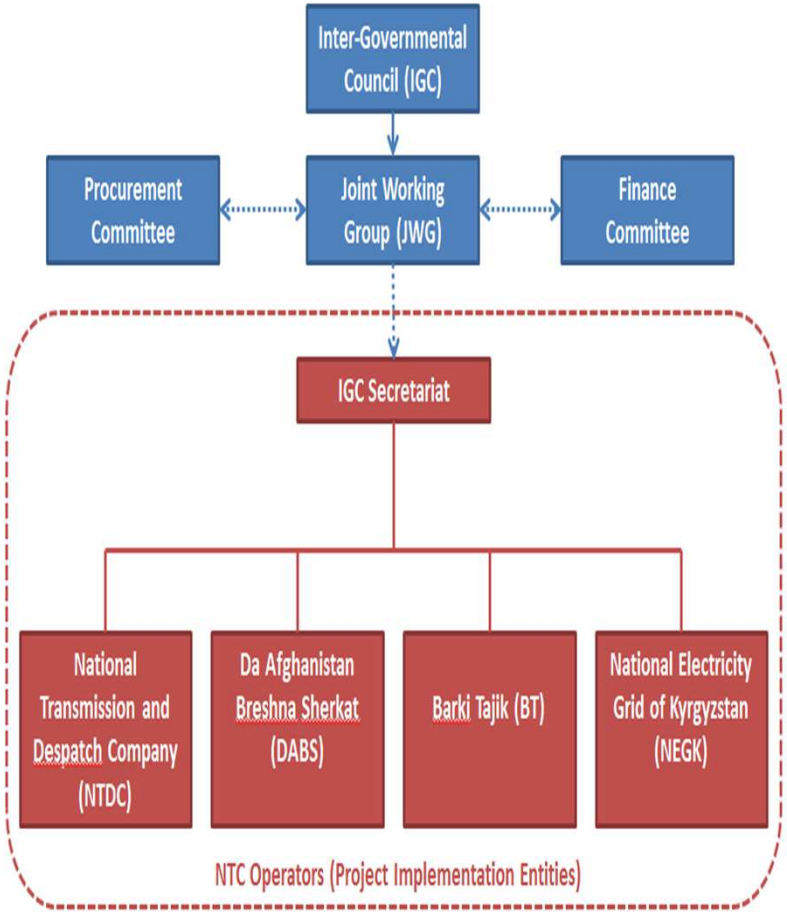
Country Ownership: Dedicated Institutions to ensure implementation sustainability



- **Building ownership through the dedicated regional institution**
  - Inter-Governmental Council (IGC) and Joint Working Group (JWG)
  - IGC Secretariat for coordination
- **IGC approved the Commercial Framework for the project with the Master Agreement and Power Purchase Agreements have been signed.**
- **Major procurement packages in advanced stages with most contract awards likely completed by end of 2017**
- **Increasing regional market interest in accessing CASA for expanding regional electricity trade**

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