

Central Asian Power System (CAPS) Wholesale Electricity Trade Development

Sunil Kumar Khosla, Lead Energy Specialist
Europe and Central Asia Department
The World Bank

June 6, 2013
Ashgabat, Turkmenistan



Central Asia Regional Economic Cooperation Program

World Bank



In partnership with ADB

Overview

- ❑ Background and the Current Context
- ❑ Current Challenges
- ❑ Potential Advantages of Improved Trade
- ❑ Moving Forward-*Step by Step Improvements*
- ❑ Possible Next Steps -Options to Move Forward
- ❑ Decision to Move Forward



Central Asia Regional Economic Cooperation Program

World Bank



In partnership with ADB

Background and the Current Context

- From the time of independence, the Central Asian countries worked together to maintain Energy (& Water) flows as prevailed in pre-independence years
- Problems managing both the commercial and interlinked Power & Water issues have continued
- Today, only 3 of the originally 5 countries remain electrically synchronized
- Power trade has been reduced to only one significant annual bilateral transaction (Kazakhstan – Kyrgyzstan)



Central Asia Regional Economic Cooperation Program

World Bank



In partnership with ADB

Current Challenges

Poor Customer Service - In all countries, customers face sometimes significant curtailments

Low Trade Levels- Resulting in suboptimal resource use, seasonal energy imbalances and difficulties with regulation etc

Operational Problems – *Persistent Problem* -Unplanned Power flows on the Interconnected Loop leading sometimes to significant technical problems

Resource Loss - *Significant spillage* of Water in Summer foregoes the ability to displace fossil fuels

Ageing System - **results in High Investment Needs:** Amounts in excess of US\$ 35 billion will be needed in the next decade



Central Asia Regional Economic Cooperation Program

World Bank

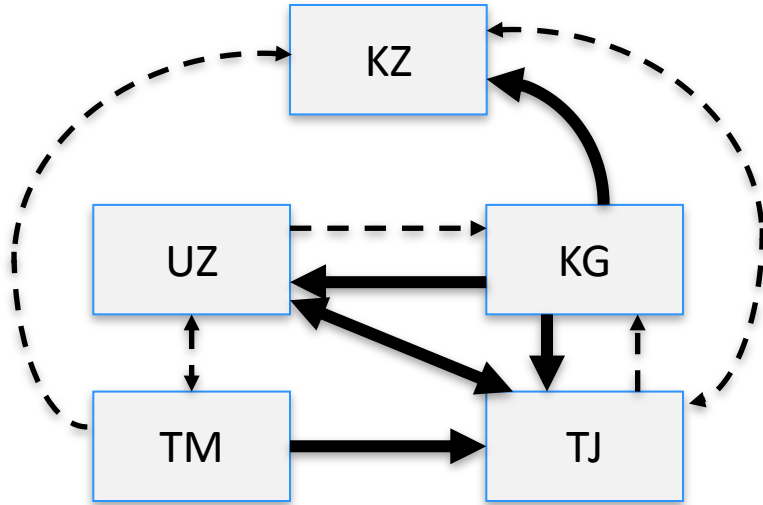


In partnership with ADB

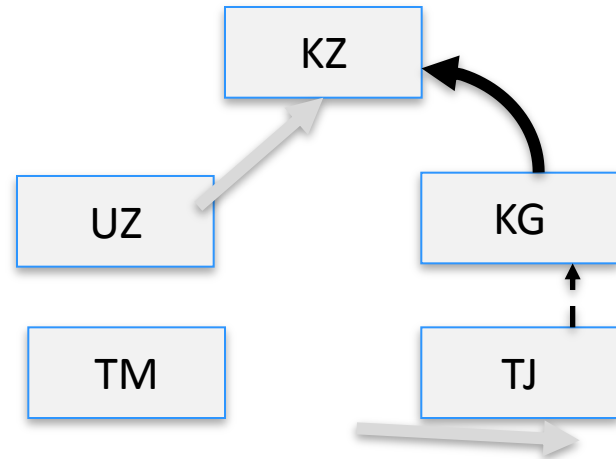
Low Trade Levels

International Trade levels prevailing in early 2000s has almost completely evaporated, leading to poor resource usage, seasonal shortages water spills

- **Average Annual Flows, 2000 - 2008: An Interconnected, High Trade System**



- **Reduced International Trade (2010) Power Exchanges Flows from UZ to TJ later discontinued fully**



Flow > 100 gwh / year
Flow < 100 gwh / year

Source: Mercados (2010)
World Bank



Central Asia Regional Economic Cooperation Program



In partnership with ADB

Ageing System High Investment Needs

- **Over 75% of Generation assets are over 20 years old**
- **Some US\$ 35 billion might be needed in the next 10 years in CAPS-4 alone, excluding potential South Asia export links. Even if different projects / priorities are chosen (vs the studies), the total amount is still huge.**

Investment Needs US\$ Million, 10 Year Time Horizon					Current Generation Assets > 20 Years
	Transmission	Generation		Total	
		Domestic	Export		
Kazakhstan	839	15,236		16,075	77 %
Kyrgyzstan	438	1,430	5,430	7,298	87 %
Tajikistan	623	3,517		4,140	86 %
Uzbekistan	743	7,079		7,822	88 %
Total	2,643	27,262	5,430	35,335	



Source: CARAEC funded Fichtner, October 2012 report. Investment estimates exclude transboundary transmission, transmission links to southern markets, and CDC Energia needs.

Potential Advantages of Improved Trade

- ◆ **Security of Supply:** Avoiding customer curtailments and maintaining adequate reserve margins
- ◆ **Minimizing Cost of Supply:** Achieving least-cost service, consistent with long-term viability
- ◆ **Mobilizing Investment Resources and Opportunities:** Taking advantage of un-exploited hydro and fossil fuel resources; building new economic generation
- ◆ **Improved Regional Cooperation:** Avoiding operational and commercial problems experienced in the past
- ◆ **Additional Country-Specific Objectives:** Specific objectives related to technical resources, system needs, and new commercial opportunities



Central Asia Regional Economic Cooperation Program

World Bank



In partnership with ADB

Potential Advantages of Improved Trade - *continued*

- ◆ **Cost Savings and Technical Benefits:** Conceptual benefits of large-scale trade & system optimization are well known and include both cost savings and technical benefits
- ◆ **Estimated Cost Savings:**
 - Mercados, e.g., estimated approx. \$500 -- \$600 million per year savings, with additional benefits arising from avoided curtailments, all without additional investments
 - The allocation of savings – who receives the benefits – is determined by how bilateral prices are negotiated; in principal, all countries can share benefits
- ◆ **Addressing Investment Needs with Affordable Tariffs:** In an environment where objectives include minimization of operating costs in order to maintain affordable tariffs, and meeting huge investment needs, sharing these potential savings appears vital.



Central Asia Regional Economic Cooperation Program

World Bank



In partnership with ADB

Moving Forward – Step by Step Improvements

- ✓ An immediate transition to “*full, efficient wholesale markets*” is neither practical nor feasible from today’s position
- ✓ Instead, a series of *smaller, incremental changes* might be taken
 - It is necessary to build confidence, trust, and experience with new arrangements and potential new roles for policymakers
 - It is also necessary to adapt any such incremental changes to the structural differences (vertical integration vs unbundling) and tariff level / regulatory differences among the countries today
- ✓ Ultimately, any steps to move forward must arise “*bottom up*” from the industry participants and the national policymakers in the countries today



Central Asia Regional Economic Cooperation Program

World Bank



In partnership with ADB

Possible Next Steps

1. Longer-Term Bilateral Commercial Contracts

- Today's principal commercial transaction in the region – KZ / KG annual exchange – is negotiated annually in a process that consumes time and resources.
- A longer-term (3 – 5 year) arrangement could ease this cost while providing some greater planning certainty.

2. Credit-Enhancement Arrangements

- A variety of different mechanisms could be implemented to provide greater commercial security for these or other commercial flows
- Consideration could also be given to avoiding any “barter” (energy swap) arrangements and recognizing different values for peak / off-peak power

World Bank



Central Asia Regional Economic Cooperation Program



In partnership with ADB

Possible Next Steps (continued)

3. Joint Generation Station Ownership

- Joint ownership can align commercial interests of different industry participants, encouraging cooperation.

Contracts put in place prior to joint ownership can assure plans for energy delivery, operating regimes, or even sourcing of fuel purchases (e.g., purchases of KZ coal by a thermal generator in KG)

3. Joint Transmission Network Ownership

- The common CAPS loop is currently vital infrastructure. Joint ownership and control / operations can add some security for those reliant upon it
- As future transmission upgrades enhance transfer capabilities and security, the CAPS loop will remain important, but possibly to a lesser degree



Central Asia Regional Economic Cooperation Program

World Bank



In partnership with ADB

Possible Next Steps (continued)

5. Access to the Market for Large Customers

- The entry of large customers into the market (i.e., purchasing energy directly from generators or from a power exchange) can act as a “bottom up” mechanism to force improvements in overall ‘
- Any such changes here would have to recognize the existing tariff cross-subsidies present in some CAPS countries between industrial and domestic customers

5. A Smaller, then Larger CAPS

- If future transmission upgrades reduce dependence on the CAPS loop, then it might be possible to reconfigure CAPS operations for some time to achieve a more harmonious operating regime. As experience is regained with such a system, step-by-step re-expansion might follow.



Central Asia Regional Economic Cooperation Program

World Bank



In partnership with ADB

Possible Next Step – Road to a Long-Term Transition

Near Term	Medium Term	Longer Term
<ul style="list-style-type: none"> • Contracts • Improved credit enhancement arrangements. Longer-Term Bilateral 	<ul style="list-style-type: none"> • Joint Generation Ownership • Market Access for Industrial Customers • Optimise CAPS Structure 	<ul style="list-style-type: none"> • Joint Transmission Ownership / Operation • Optimise CAPS Structure • Real-Time Market Trading
<ul style="list-style-type: none"> • Improved Protection Coordination • Emergency Support Arrangements 	<ul style="list-style-type: none"> • Commercial Metering • Improved despatch and settlement software 	<ul style="list-style-type: none"> • Regional Scale Projects • Reinforcement of Transmission and generation systems
<ul style="list-style-type: none"> • Focused Issues Discussions • Capacity Building • Dispute Resolution Methodology 	<ul style="list-style-type: none"> • Regional Transmission Planning • National vs Regional Policy coordination • Tariff re-Balancing 	<ul style="list-style-type: none"> • Transmission policy and development • Tariff re-Balancing



Central Asia Regional Economic Cooperation Program

World Bank



In partnership with ADB

Decision on the Next Step

- The decision for the next step or how to move forward must come from within CAPS
- An external study could be designed to assist in this process, while reporting to ESCC
 - A two-phase Study could be initiated to determine feasible /attractive Options and specify Implementation;
 - Once consensus is reached – move to the implementation of the Option Selected.
 - Some Options will of course also require physical hardware improvements (e.g., metering, control systems etc) and possibly overall capacity building among industry participants and other stakeholders



Central Asia Regional Economic Cooperation Program

World Bank



In partnership with ADB

Next Step – Two Phased Study With External Financing

Phase One

- Options for Incremental Steps
- Issues Identification
- Stakeholder Input / Views
- ESCC Reporting
- Preferred Options
- First-Level Detailing of Multiple Options
- ESCC Reporting
- Finalise Next Steps
- Procure Phase 2, if desired

Phase Two

- Begin required Capacity Building
- Detailing of Incremental Step [1]
- Example / pro forma documentation
- Pre-feasibility work if required
- Stakeholder / ESCC Review
- Agreed Next Steps
- Repeat process for subsequent proposed incremental steps



Central Asia Regional Economic Cooperation Program

World Bank



In partnership with ADB