CAREC Energy Sector Coordinating Committee Meeting (ESCC)
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Energy Demand/Supply Balances and Infrastructure Constraints Limiting Trade

(Backgrounder)

1. Description of Issue

The region of Central Asia, comprising Kazakhstan (KAZ), Kyrgyz Republic (KGZ), Tajikistan (TAJ), Turkmenistan (TKM) and Uzbekistan (UZB), collectively known as the Central Asian Republics (CARs), enjoys abundant energy resources. However the resources are not distributed evenly with KAZ having large oil and coal reserves, UZB and TKM having sizeable gas reserves, and KGZ and TAJ having significant hydro power resources. This uneven distribution of resources means that regional cooperation is advantageous as each country can import and export the most appropriate energy form at the appropriate time to mutual advantage.

During the Soviet era the CAR energy system was designed to take advantage of regional variations. The CARs were interconnected to some extent by gas and to a lesser extent by oil pipelines. It was by mainly by electrical interconnection, through the 500kV Central Asian Power System (CAPS), where regional cooperation exploited the thermal based power systems of KAZ, TKM and UZB systems with the hydro based systems of TAJ and KGZ. TAJ and KGZ exported during summer when their hydro based power was at a maximum and imported during winter when they were in energy deficit. The TAJ and KGZ water releases were coordinated with the overriding goal to meet irrigation needs of downstream countries.

Since 1990 the CAR countries have largely followed an energy self-sufficiency model with regional electric trade collapsing from 25GWh in 1990 to 3.7GWh in 2008. This has resulted in occasional summer spillage in TAJ due to water storage limitations and winter energy deficits in TAJ and KGZ. In recent years due to low hydrologic conditions winter energy deficits have been more pronounced with the winter of 2007/8 being particularly severe. The differing times of year for hydro power requirements (mainly in winter) and for irrigation (mainly in summer) pose problems for reservoir operation, replacement of winter hydro power by supplies of fossil power and fuel, and exchange conditions between water and energy. The result is that some countries are generating electricity using high value fossil fuels rather that importing from neighboring countries with surplus electricity generated from renewable resources.

A further problem is that the advantages of regional trade can be disguised due to nonmarket based energy prices whereby primary energy sources for thermal generation are undervalued thereby conveying incorrect market signals to regional energy players. Indeed final energy prices are also distorted, whereby below cost tariffs are encouraging the shift of heating demand to electricity from other lower cost alternatives.

2. Current Activity

The Central Asia Power System (CAPS) continues as an interconnected network with system operation and planning being managed by the Central Dispatching Centre (CDC) located in Tashkent. TKM withdrew from CAPS in 2003 but continues to export to CAR countries from islanded power plants.

Afghanistan (AFG) is in the process of joining CAPS and wishes to meet a portion of its demand with imports from CAR countries. A summary of recent energy trade is presented in following table:

CAPS Electricity Trade 9 year Average (2000-2008)

GWh		IMPORT					TOTAL Export	Net Exporter (+) / Net Importer (-)
		KAZ[1]	KGZ	TAJ	UZB	TKM		
EXPORT	KAZ	X	0.0	2.3	0.0	0.0	**2.3**	**-1,718.3**
	KGZ	1,642.2	X	223.0	515.9	0.0	**2,381.2**	**2,230.1**
	TAJ	69.6	62.6	X	560.5	0.0	**692.7**	**-657.8**
	UZB[2]	0.0	88.4	705.2	X	5.2	**798.9**	**-284.0**
	TKM	8.8	0.0	419.9	6.5	X	**435.2**	**430.0**
TOTAL Imports		**1,720.6**	**151.1**	**1,350.5**	**1,082.9**	**5.2**	**4,310.4**	**0.0**

Notes:

[1] *- KAZ imports also includes electricity for further re-export for RAO UES*

[2] *- UZB export to TAJ includes intergovermental agreements and exports to TALCO*

It is observed that trade is generally conducted on a bilateral basis and subject to physical constraints as:

- TAJ-UZB trade is governed by annual barter agreements whereby TAJ exports in summer and UZB exports in winter in ratio of 150 TAJ exports to 100 UZB exports. Volume is limited by transmission constraints, hydrologic conditions and UZB winter surplus. Meanwhile with the commissioning of Sangtuda 1 (670MWs) in 2009 and Sangtuda 2 (200MWs) in 2011, TAJ is forecast to have up to 3,000GWh summer surplus energy on a average year.
- TAJ-TKM trade is governed by annual agreements covering the winter period. Energy is wheeled through the UZB system. Transmission constraints in UZB can restrict this trade.
- TAJ-AFG trade will be conducted over a 220kV line currently under construction and is covered by a 20 year PPA with volume restricted by AFG's ability to use imported power.
- UZB-AFG trade is conducted over a 220kV line commissioned in 2009 and is covered by annual agreements with first trade having commenced in 2009. Reinforcement of UZB grid is required to increase export capacity to planned 300MW.
- KGZ-KAZ trade is conducted over a 500kV interconnection. KGZ's multi-year reservoirs are currently almost empty following a period of low hydrology and winter exports. KGZ will need to manage exports to bring reservoirs back to optimum levels. Exports are also constrained due to unreliability of 500kV line

3. Objectives of Action Plan

Regional energy trade can bring financial and economic benefits to the participating countries by ensuring energy demand is met in an efficient manner while taking into account wide distribution of energy resources and types and seasonal variations on output. However, laws, regulations and contracts must be designed to allow such trade and the regional infrastructure and institutions must exist. The Action Plan to be presented at the Energy Sector Coordinating Committee (ESCC) meeting will address a selection of these issues over a number of presentations. The Key Actions of this session of the ESCC meeting will focus on infrastructure.

4. Core Action Items (to be included in Action Plan)

- Participating countries confirm their commitment to energy development and regional trade to be conducted on economic principles while meeting the needs and opportunities across the region
- Regional energy projects currently under planning and execution to be presented at this and future ESCC meetings. Country participants and IFI representatives will elaborate on the status of their projects thereby allowing an up to date status list to be maintained and shared.
- The Central Asia South Asia Regional Electricity Market (CASAREM) initiative supports a series of investment and technical assistance projects designed to enhance regional trade. Identify proposed CASAREM projects in UZB, TAJ, KGZ and AFG and new projects for fast track development which can bring early gains.
- A Regional Technical Assistance project be undertaken to identify long term solutions to balancing demand and supply taking into account optimization of current assets, regional demand projections, and commercial opportunities for exports. The Regional Generation & Transmission Master Plan would study i) demand and growth projections at country level, ii) assessment of existing assets and planned rehabilitation/new assets at country level, iii) creation of regional generation and transmission model simulating existing and planned scenarios with 10 year horizon, iv) assessment of currently planned projects from a regional perspective with identification of alternatives, and v) preparation of a regional plan with identification of benefits.
- Identify and strengthen an appropriate body for ongoing regional energy planning and investment assessment and who would also be the Executing agency for the Regional Generation & Transmission Master Plan