



# **The Central Asian Power System**

**An Existing International Power Grid That's Still  
Missing an Integrative, Market-Based Trading Regime**

**Joellyn Murphy**

**8 September 2014**

**Central Asia's vast energy resources are distributed unevenly. The two smallest, poorest countries have huge water resources that the fuel-rich countries need for agriculture.**

Of the 7 largest reservoirs in CAR, Toktogul (KG) and Nurek (TJ) have control over 61% of the region's water storage capacity.

Toktogul is CAR's only multi-year reservoir.



# The USSR “evened out” energy/water resources by creating a balanced electricity system based on barter

- A high voltage (500 kV) transmission grid (“CAPS”) was built in the 70’s that “circled” through Central Asia
- Big new thermal and dual purpose (power & irrigation) hydro plants with reservoirs were also built to create a “balanced” power system (thermal for base load and fast hydro for peak load & frequency regulation)
- The Soviets managed this system for mutual benefit through deliveries of water & associated hydropower in summer to thermal ‘stans in exchange for their electricity & fuel deliveries in winter to the “water ‘stans.”
- In 1991-92, international boundaries & markets for fuel changed the terms of this barter and became a significant source of today’s energy/water conflicts in the region.

# Four important changes in the Central Asian Grid occurred in 2009 further changing “regional power politics”

## 1. New north-south lines connected southern KZ to Russia

- This enabled frequency regulation to come from Russia in addition to Kyrgyzstan’s hydro plants, lessening UZ dependence on KG.
- It also brought “commercial discipline” into CAPS (KZ/UZ had to pay).

## 2. Tajikistan connected the north and south sections of its domestic grid, enabling TJ to supply its north from TJ rather than from UZ.

## 3. Uzbekistan added two new strategically important internal lines:

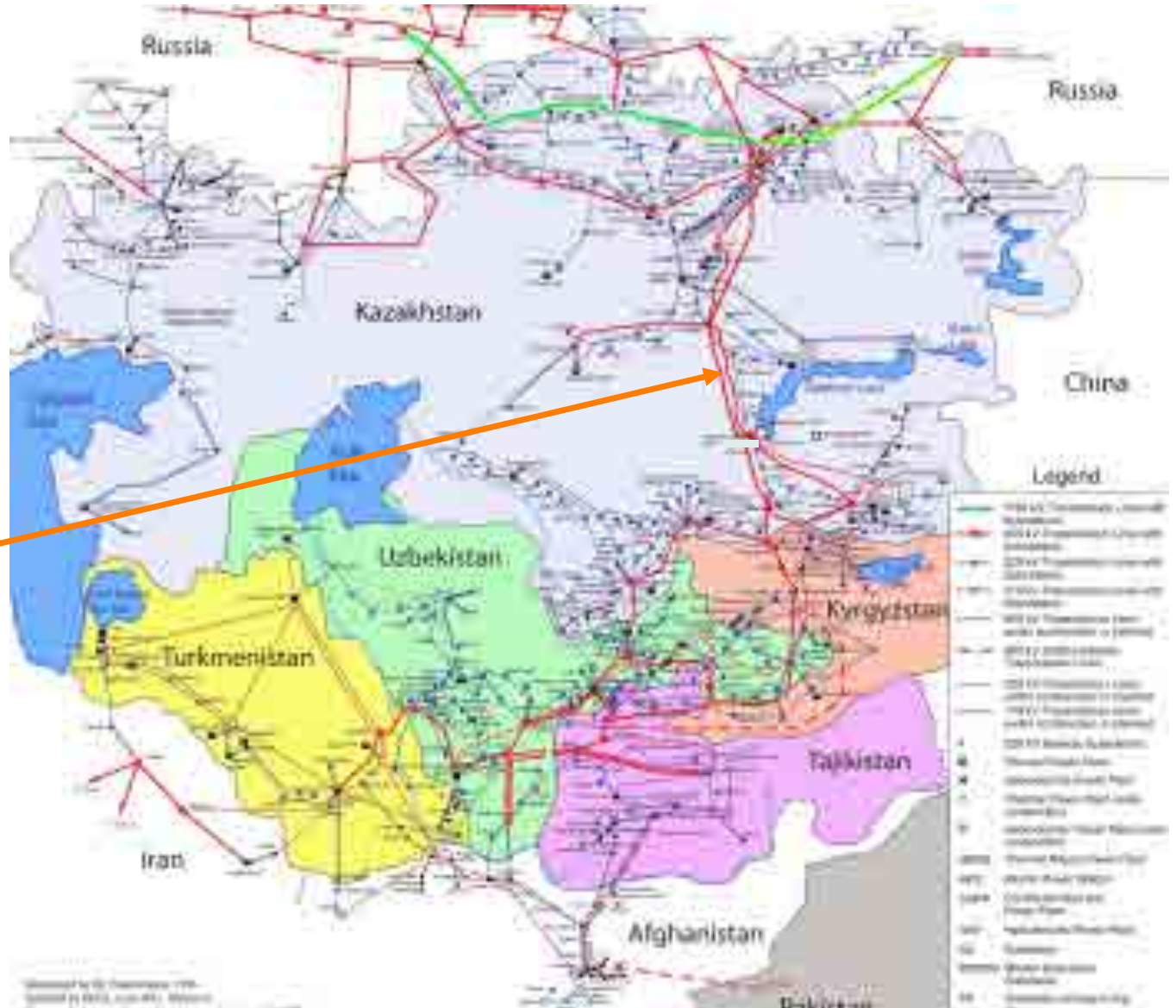
- “New Angren” -- which enabled it to cut off transit of Kyrgyz power to southern Kyrgyzstan and extort payments for “transit” from KG; and
- Gulzar-Surkhan -- which enabled UZ to supply its south and to export to AFG without being connected to Tajikistan.

## 4. Uzbekistan started selling to Afghanistan and cut Tajikistan off from the 500 kV grid, making TJ an “island” without emergency backup and giving UZ a virtual monopoly over major power supply to AF from CAR

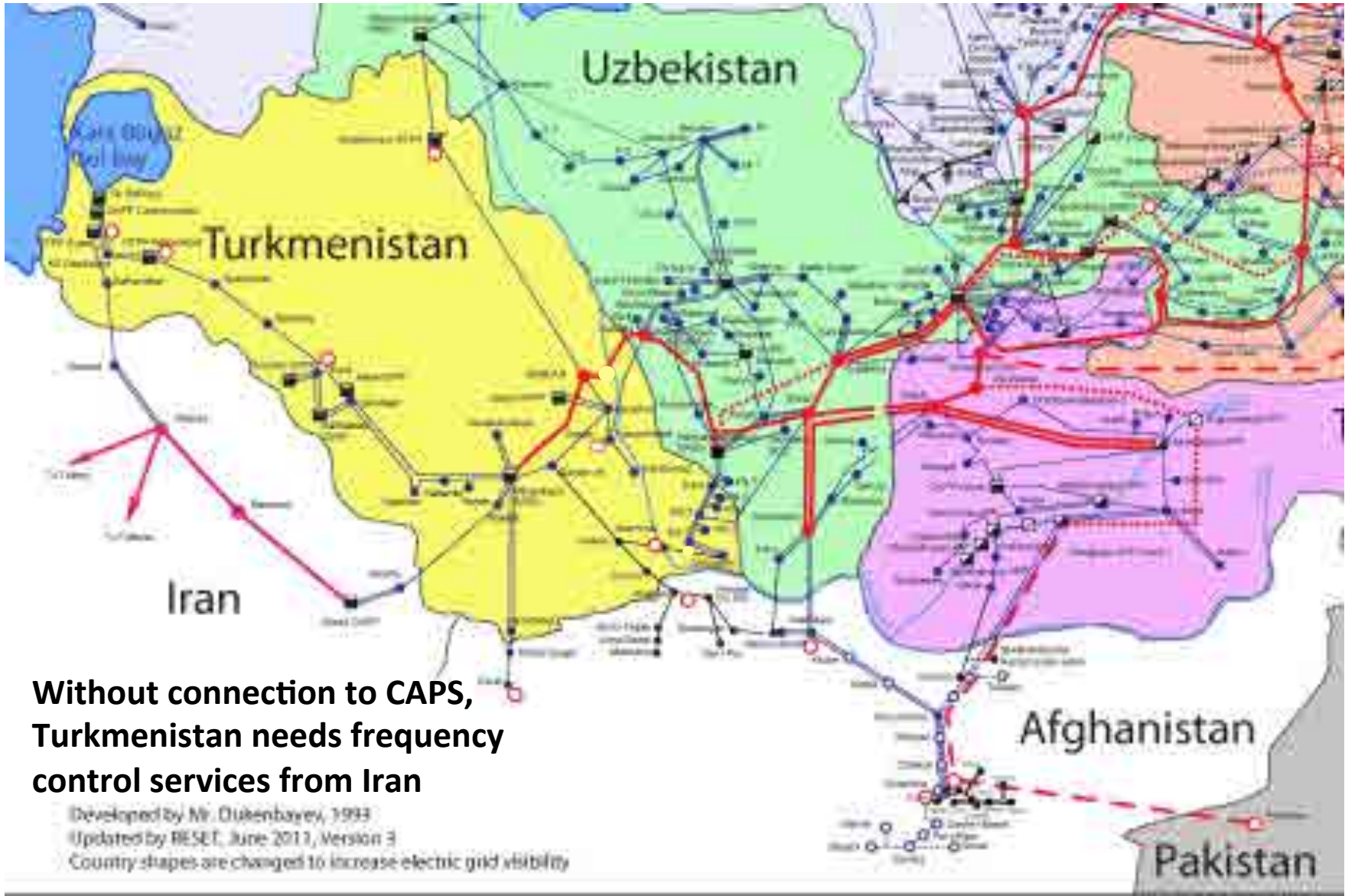
# Central Asia Power System & Kazakhstan: Integrating North

Before 1991, the CAPS was isolated from the rest of the Soviet Union

These lines (among others) did not exist



The CAPS “southern rim” is de-integrating: TM disconnected in '03 & now operates “in parallel” with Iran & exports to Turkey; UZ in '09 disconnected TJ and connected to AFG. TJ is now an island.



## **CAPS is now simultaneously integrating outward and de-integrating its southern rim within Central Asia**

There is a great irony in this:

- Elsewhere in the world, countries are cooperating to finance & build transmission lines in order to physically integrate and create formal power markets; (e.g. WAPP, EAPP)
- Central Asia already has its inter-linked transmission grid, but can't make the institutional leaps necessary to create a transparent, market-based power regime within Central Asia;
- Each Central Asian Republic seemingly wants to pursue “independence” from the other republics by increasing integration with Russia and neighboring export markets while also “de-integrating” its existing infrastructure in the south

# What's Needed in Central Asia

- Reestablish economic dispatch within Central Asia as a balanced power system under a transparent market-based regime.
- Mobilize the investment in Central Asia's power sector infrastructure that is needed to assure a base-line level of energy and water security in each country.

(Note that “base line security” is not the same as “full independence”

- Increase profitable energy trading within and beyond Central Asia for the benefit of consumers and the further development of each country's energy resources.



# The Big Picture Goal: Evolution of a (Greater) Central Asian Power Market

This is *The Great Idea* that hasn't happened for nearly two decades because of:

- Lack of adequate & tradable surpluses in winter;
- Lack of trust among the countries;
- Lack of “energy security” (defined here as total independence, an extremely high cost approach);
- Passions over water; and
- Vested interests are the “gravity” of the status quo (a polite way to refer to endemic, pervasive corruption)

# Greater Central Asia, heading south



Map by Fichtner

# CASA 1000

The \$1 Billion, 1300 MW CASA Project is the first project of “CASAREM”.

Almost a decade in its development phase so far

Joint Working Group is nearing agreement on “foundation” documents, prices and security arrangements needed to begin procurement phase in 2015





**\$ 80, 000, 000 /year**

# Several Other Big New Transmission & Power Plant Projects Could Become Game-Changers

In combination, other new lines in the region could “bypass” Uzbekistan entirely (The “J” line or “new grid”)

Facilitating the development of these new lines and new power plants for winter supply could be the “backdoor route” to creating a (Greater) Central Asian Power Market

The potential for Afghanistan to become a new “choke point” for all Central Asian power flows to South Asia is a key concern and necessitates the development of the fundamentals of a market regime for “CASAREM”

# A cluster of proposed new lines would deliver power to AFG & on to PK, making AFG the hub of "CASAREM"



# Why This Matters

- “The economic progress of all five Central Asian states continues to be held back by the failure of these states to deal with their common problems:
- the absence of regional trade regimes,
  - competition over water, and
  - the lack of a regional understanding of how to allocate energy resources most efficiently.”

Martha Brill Olcott

Central Asia's Second Chance, 2004

# Thank you!

## Questions??

Joellyn Murphy

Director

E-mail: [Joellyn.Murphy@tetrattech.com](mailto:Joellyn.Murphy@tetrattech.com)

Phone: +1-626 710-0491