

CAREC

Energy Sector Coordinating Committee Meeting

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REGIONAL DIAGNOSTICS STUDY **for Energy Demand/Supply Balance** **and Infrastructure Constraints**

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- Demand/Supply Balance
- Sector Development Priorities of CAR
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- Conclusions and Next Steps

Energy Demand/Supply and Infrastructure

OCT. 2010

Diagnostics Study

CAREC Institute

NOV. 2010 –
NOV. 2011

**Regional Power Sector
Master Plan**

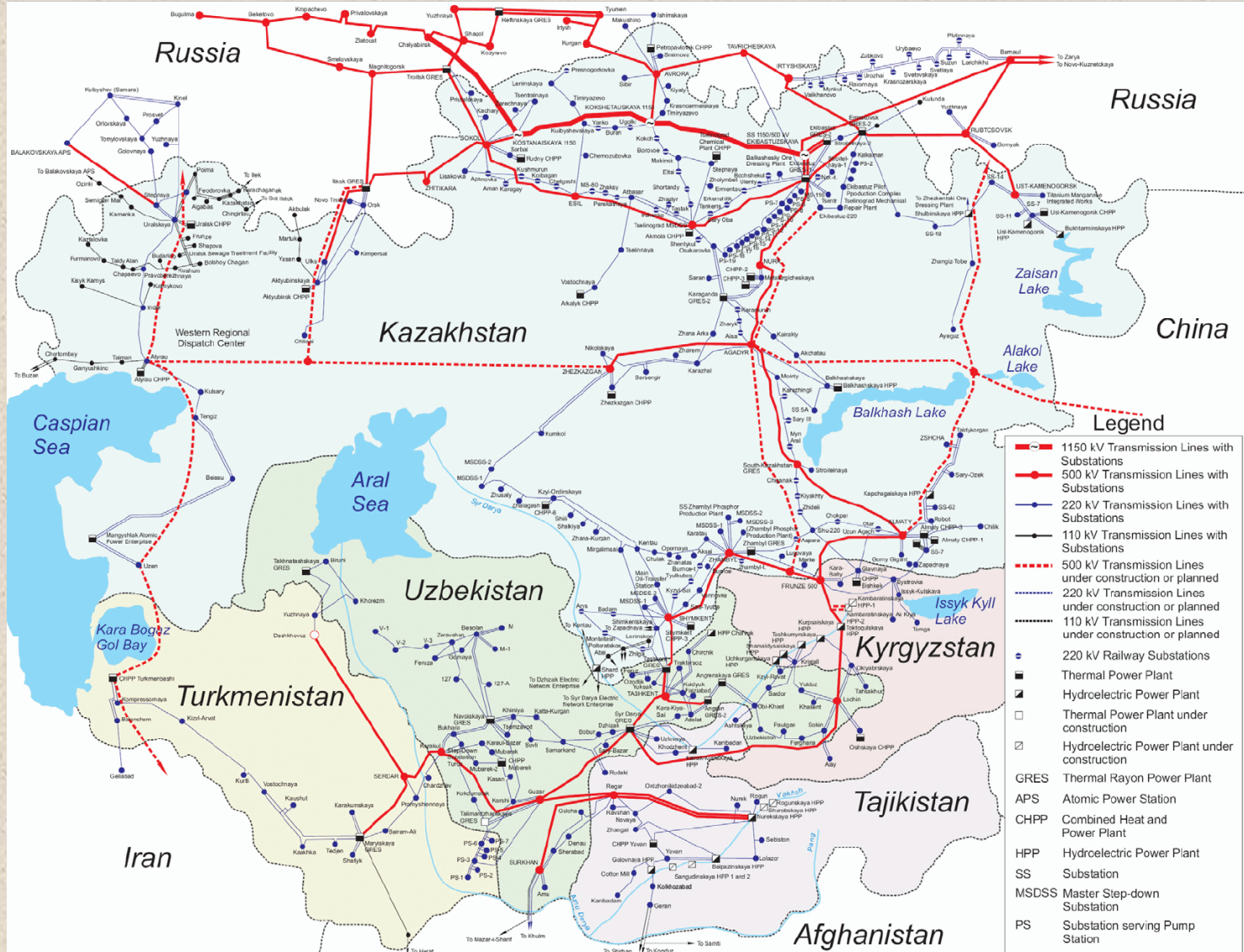
AFG, KAZ, KGZ, TAJ and UZB
- AFG synchronization with
Central Asia regional grid

ADB

DEC. 2011

Investment Plan

Central Asian Power Grid



Legend

- 1150 kV Transmission Lines with Substations
- 500 kV Transmission Lines with Substations
- 220 kV Transmission Lines with Substations
- 110 kV Transmission Lines with Substations
- - - 500 kV Transmission Lines under construction or planned
- - - 220 kV Transmission Lines under construction or planned
- - - 110 kV Transmission Lines under construction or planned
- 220 kV Railway Substations
- Thermal Power Plant
- Hydroelectric Power Plant
- Thermal Power Plant under construction
- Hydroelectric Power Plant under construction
- GRES Thermal Rayon Power Plant
- APS Atomic Power Station
- CHPP Combined Heat and Power Plant
- HPP Hydroelectric Power Plant
- SS Substation
- MSDSS Master Step-down Substation
- PS Substation serving Pump Station

Demand/Supply Balance (4 CAR)

	Total
	<i>000 MW</i>
Installed Capacity HPP	11.7
Installed Capacity TPP	28.8
Total Installed Capacity	40.3
Available Capacity	30.6
Peak Demand	29.3
	TWh
Total Production	161
Losses	27%
Net Domestic Supply	120
Export (within region)	2.6
Import (within region)	3.4

Demand/Supply Balance

Winter/Summer extremes

- Winter Shortage -- Energy Crisis
- Summer Surplus -- Negotiations Every year
- Water Issues -- Dependence on Irrigation
(April to Sept.)
- Rising Fuel prices
- Failure to utilize Clean energy opportunities
- Environmental pressing to increase
- Social tensions

Demand/Supply Balance

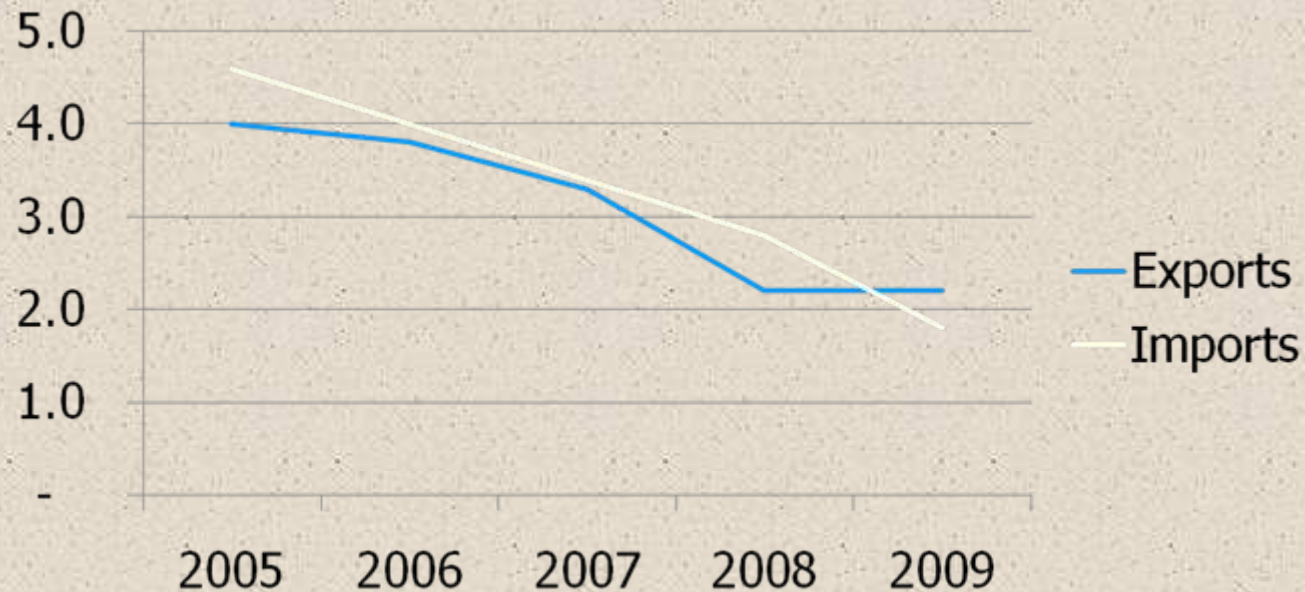
Falling Trade (GWh):



Demand/Supply Balance

Falling Trade:

KAZAKHSTAN, TWh



Note: Data includes trade with Russia

Sector Development Priorities of CAR

Country Strategies

- Kazakhstan
(North-South, Coal Generation, Tech Modernization and Reliability, RER)
- Kyrgyzstan
(North-South, HPPs, CASAREM, Base Coal Generation, Energy Efficiency)
- Tajikistan
(HPPs, Modernization of HPPs, CASAREM, AFG, Iran)
- - Uzbekistan
(Fergana, Tech Modernization, TPPs, AFG, Environmental Impact)

Investment Projects

- **Energy efficiency**

(High Losses)

- **Generation**

(Talimarjan TPP, Moinak HPP, Sangtuda 2, Rogun HPP, Kambarata HPP)

- **Transmission**

(Tech Modernization, Syr Darya-Sogdiana-Talimarjan, Kemin-Almaty w/ S/S Alma, Datka-Kemin, Hatlon-Lolazor)

- **Operations and communications systems**

(SCADA/ASCDA, Fiber-optics, Metering)

- *Completed (during 2000 – 2010)*

- *Ongoing*

- *Planned*

Self-Sufficiency Developments

Self-sufficiency investments – Good and Bad

- *UZB (SS Uzbekistan, 220 kV network)*
- *KAZ (North-South 500 kV line)*

- **KGZ (SS Datka, Datka-Kemin)**
- **TAJ (South-North line)**

Gaps and Overlaps

(Over and Under Concentrations of Effort)

- Concentration of Effort on Transmission Assets.
- More consideration needed for Interconnection abilities.
- Many HPP 10 – 50 MW opportunities waiting investment.
- Not enough attention to National / Regional Dispatch Centres.
- More attention needed on capacity building, market reform, performance optimisation, kWh cost recovery, and separation of generation & transmission ownerships.

Future Opportunities

GOOD BASE FOR COOPERATION

- About 20 years of independence/experience
- Basic Market Reforms
- Global economic conditions/ Effect of globalization
- Technical base (UESCA 500kV; CDC)
- Membership in Regional and International Organs.
- Support of IFIs

Future Opportunities

GOOD BASE FOR COOPERATION

- Understanding of Economic / Social benefits of Power Intertrade
- Examine and rectify market imbalances
- Coordinate & Prioritise HPP Investments 10 – 50 MW
- Specifications for all Transmission Lines & SSs to accommodate Interconnection
- Greater role for MLDBs

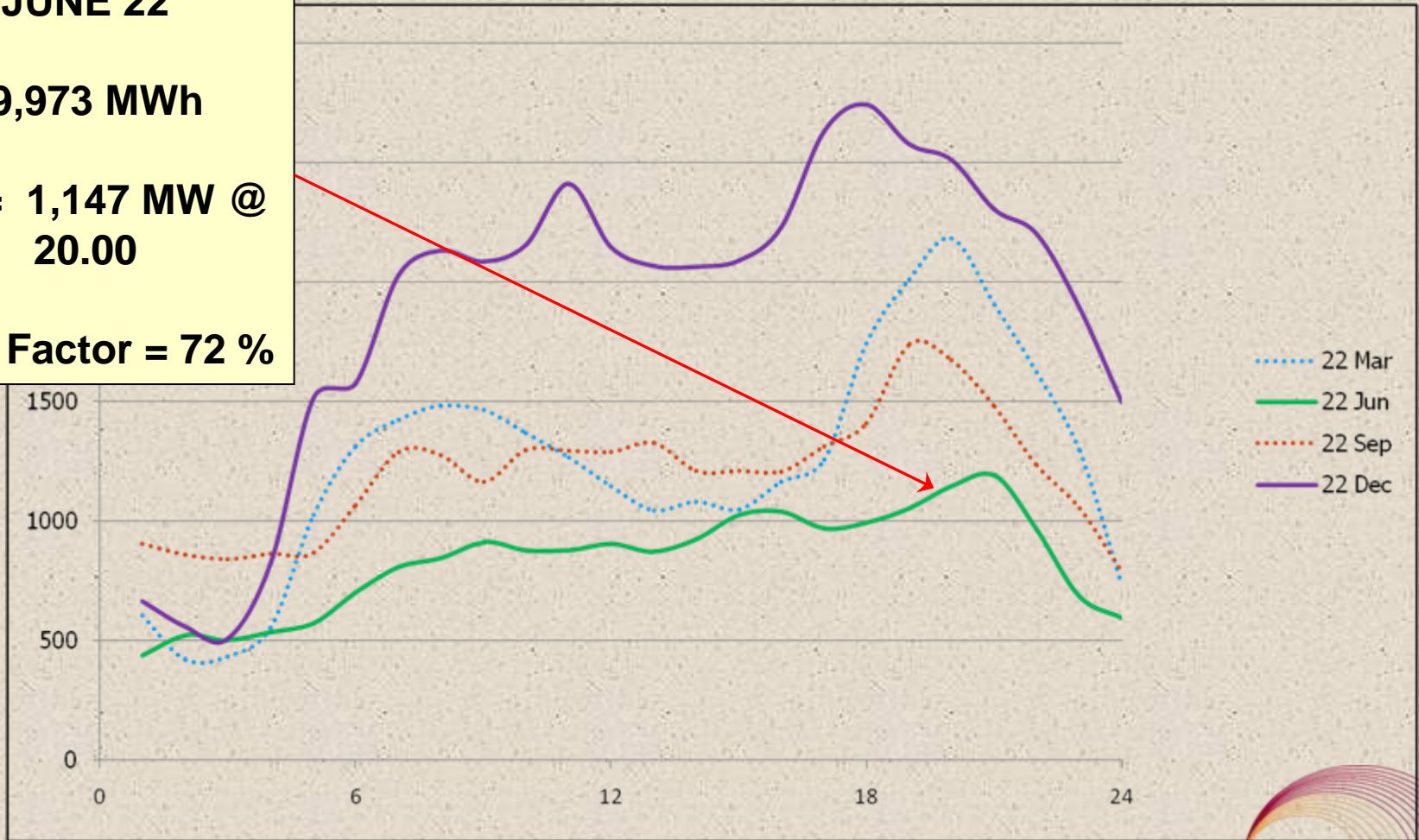
KYRGYZSTAN GENERATION 2009 MW

JUNE 22

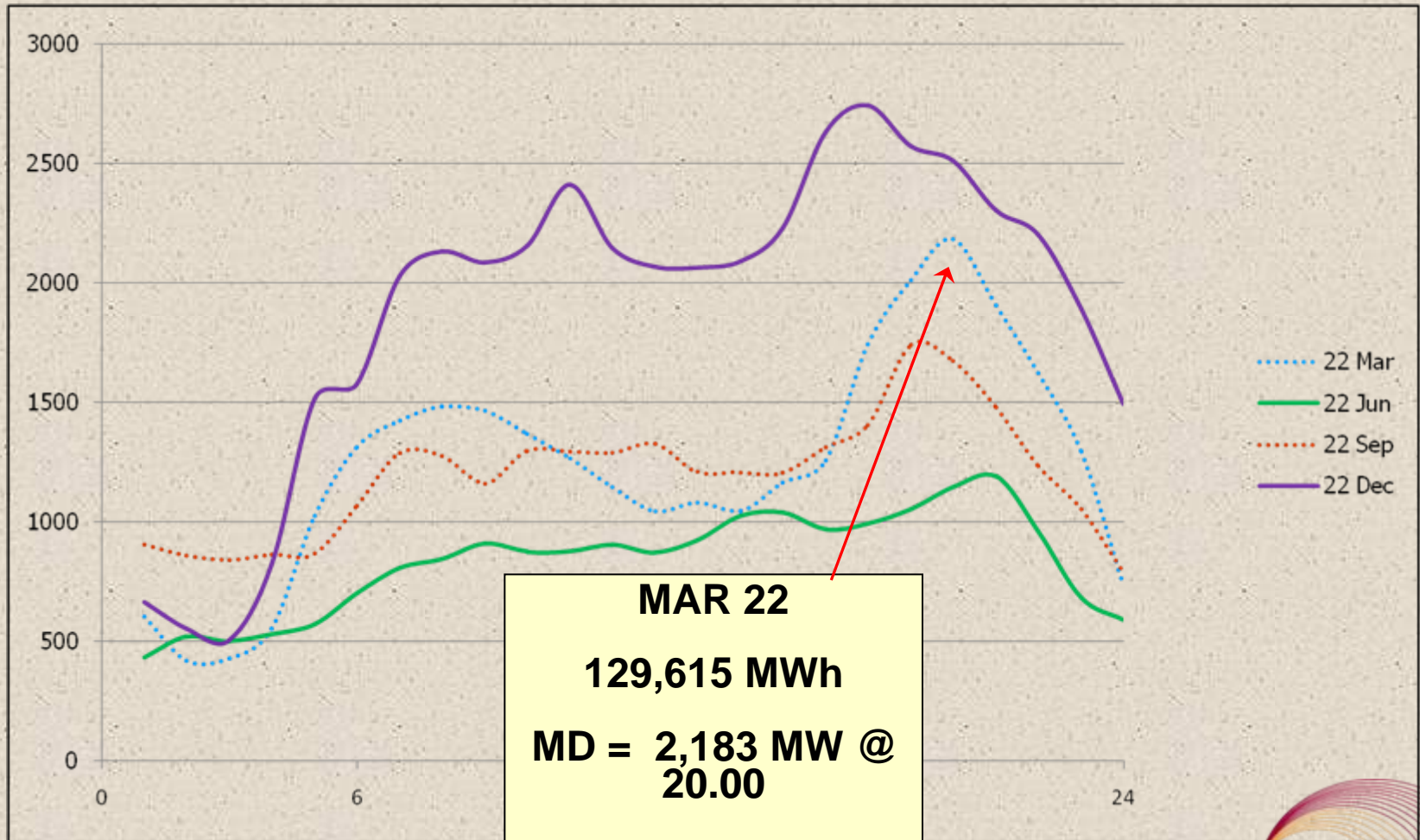
19,973 MWh

**MD = 1,147 MW @
20.00**

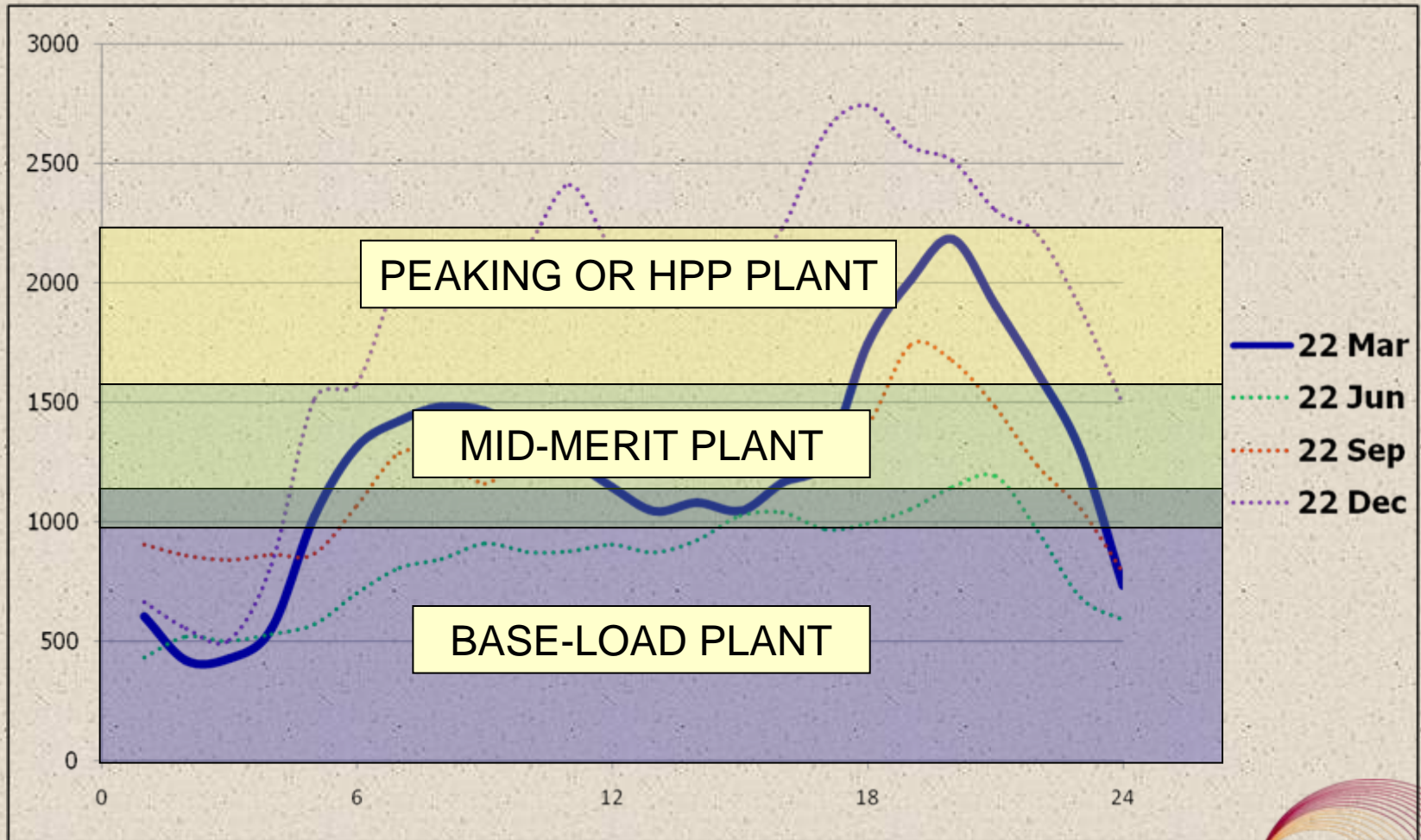
Load Factor = 72 %



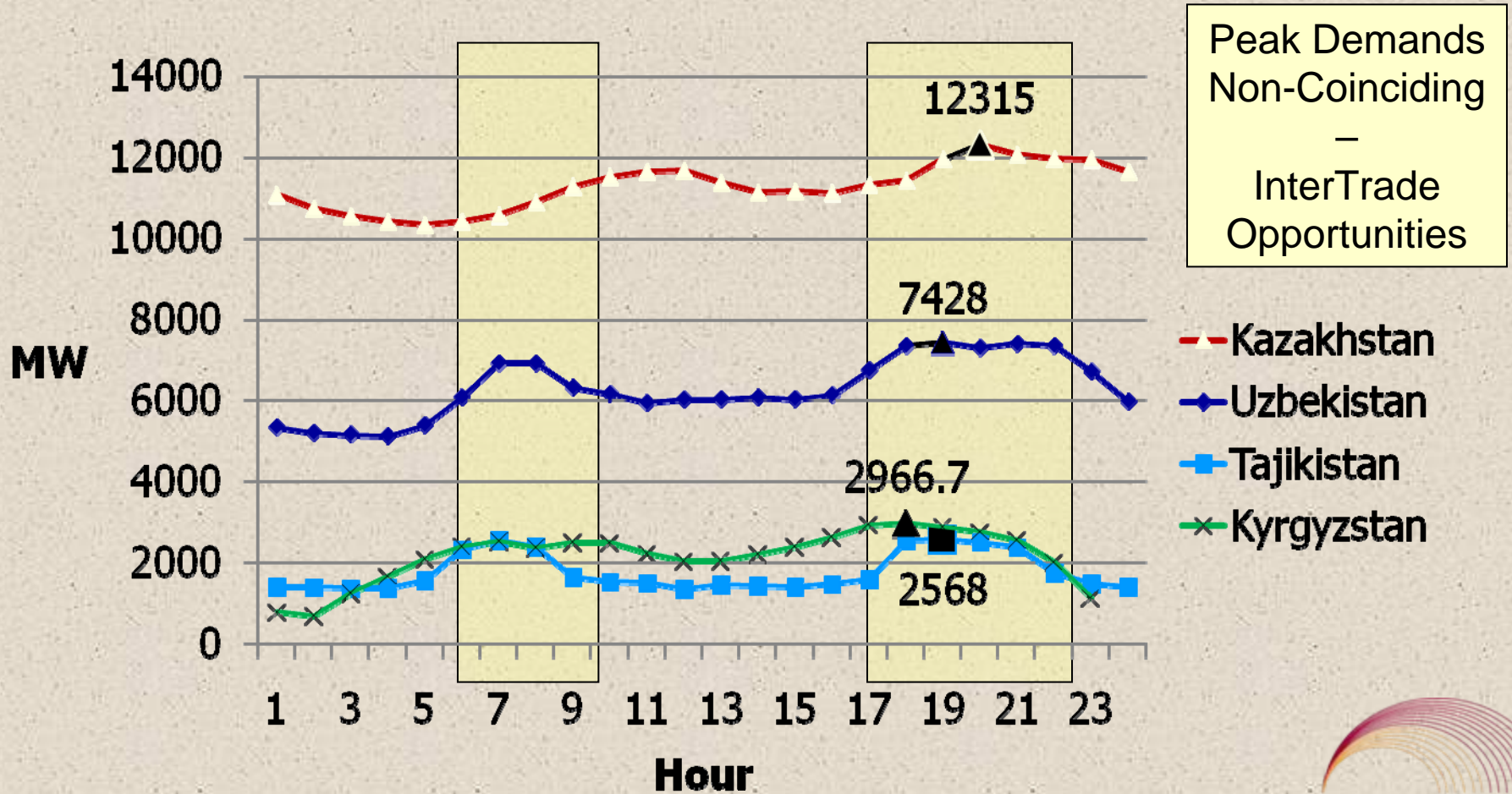
KYRGYZSTAN GENERATION 2009 MW



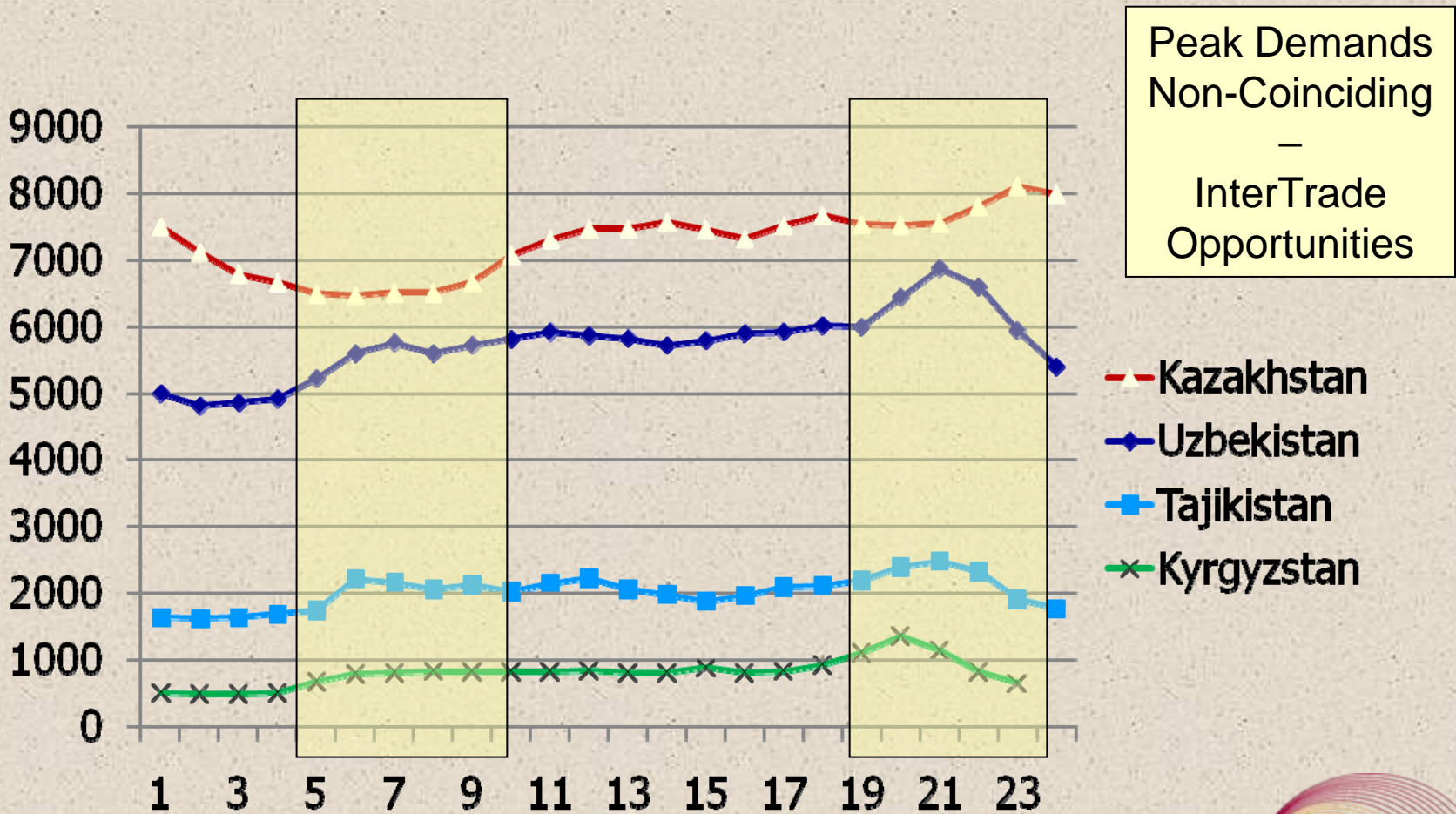
KYRGYZSTAN GENERATION 2009 MW



CAREC Regional Demand Profile 25th December 2009



CAREC Regional Demand Profile 16th June 2009



SCALE OF INTER-TRADE OPPORTUNITIES

- 2009 – 160 TWh Generated in Region
- 1990 – 25 TWh Intertrade; 2008 – 3.7 TWh
- Each TWh of Missed Inter-Trade Opportunity costs -
 - **\$30 M** of missed revenue sales (@ \$0.03 / kWh)
 - **\$200 M** (cost of unserved energy if loads shed)
 - **\$30 M** if peaking plant dispatch is required
 - **\$20 M** opportunity cost of lost gas/coal sales
 - **??? M** – Cost of Carbon

Prevailing Non-cooperation

Key Issues

– Technical

- Interconnectors
- Controls, Protection, SCADA/ACDA, Synchronicity
- Metering and Accuracies

– Commercial

- Market Mechanisms
- Fair Trade
- Financing of the regional projects/ Cost sharing

– Political Willingness

- The Real Issue

Prevailing Non-cooperation Consequences

- Resources are wasted
- Cost of Electricity is more expensive
- Less economic growth
- Less job opportunities
- More poverty
- Social tensions/conflicts

Conclusions and Next Steps

- Good understanding of benefits of trade and regional cooperation among utility companies and experts.
- Need for better regional cooperation still remains an issue – mainly due to political reasons.
- Debate, agree on and then systematically address the issues under technical, commercial and political headings.
- Broad dissemination of the results of Study to push forward Energy Action Plan and regional cooperation.
- Use IFI leverages to support and encourage cooperation.

