



**GOVERNMENT OF THE REPUBLIC  
OF TAJIKISTAN**



# **Prospective Development of Energy Sector of Tajikistan**

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**First Deputy Prime Minister of Tajikistan**

**Dushanbe, June 2, 2007**

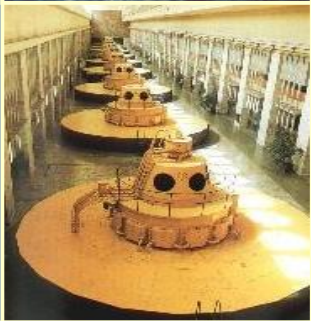


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# Outline

- 🔹 Overview of Tajikistan economy
- 🔹 Energy Sector of Tajikistan
- 🔹 Strategy for energy sector development
- 🔹 Projects and opportunities
  - ◆ Sangtuda 1
  - ◆ Other Projects
  - ◆ Transmission lines
- 🔹 Policies





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# Overview of Tajikistan's Economy



- 💧 Politically very stable
- 💧 Consistent and outward oriented economic policies
- 💧 Continuance in economic team
- 💧 Consistently high rates of economic growth
- 💧 Situated in the middle of the growth quadrangle of China, Russia, India and Kazakhstan – spillover effect?
- 💧 Possesses vast amount of energy resources
- 💧 Result – attractive to foreign investment



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# Energy Sector Development

- 🔥 Is a very high priority for Tajikistan
- 🔥 Will greatly affect economic growth
- 🔥 Has the potential to enable diversification of export earnings





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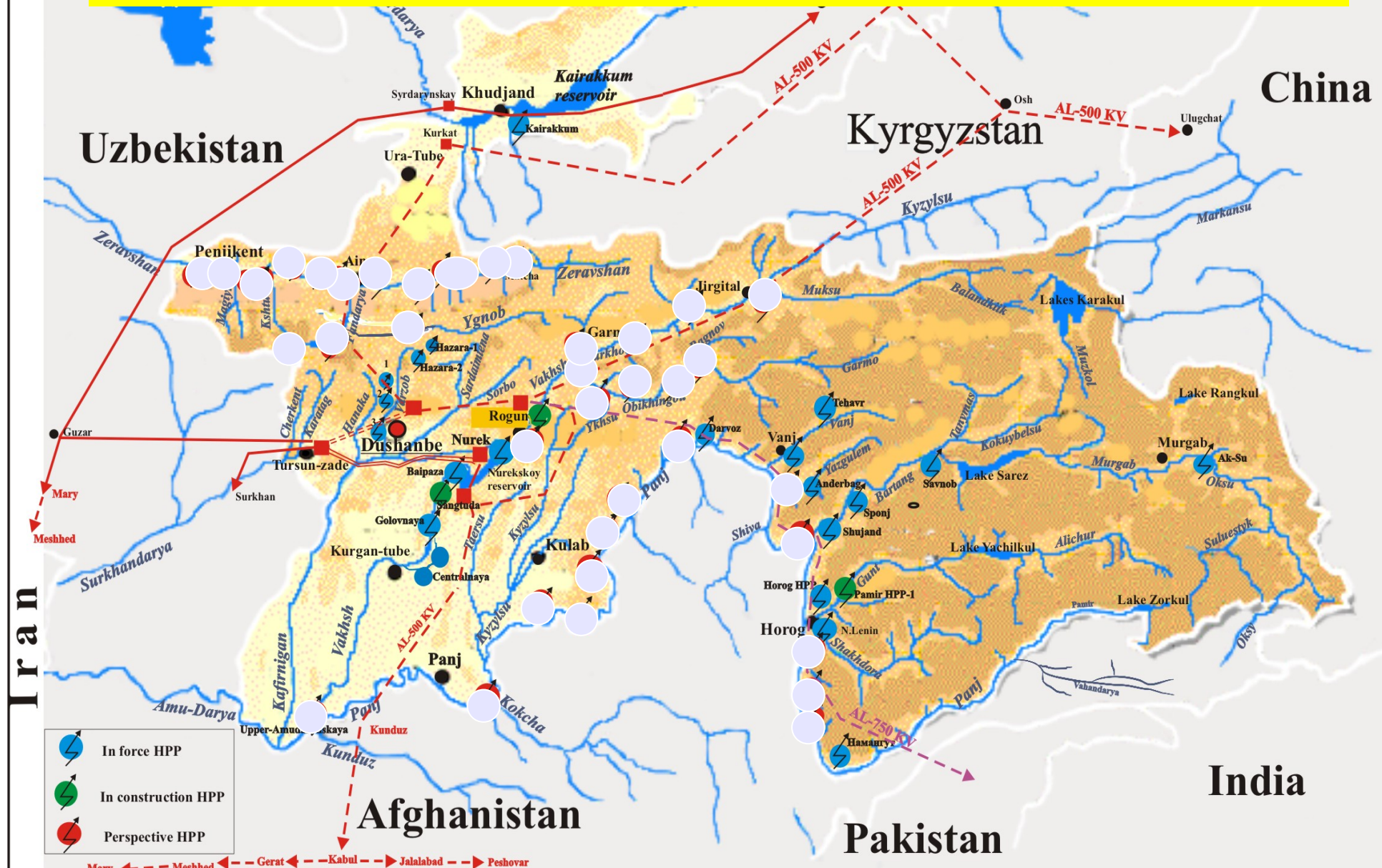
# Prospective Development of Energy Sector of Tajikistan






- Foreign investments in the form of soft credits attracted to the energy sector of Tajikistan in 2007 amounts to more than \$750M
- GoRT with the aim of curbing the unlimited increase in the state debt will encourage FDI investments to the entities and actively seek BOT arrangements in implementation of new energy projects
- President of the Republic of Tajikistan, in his speech made during Second CASAREM Conference, declared about open door policy in terms of investment in the energy sector of the country.
- GoRT pays especial attention to the construction of Sangtudah-1 HPP, which after its completion, will serve as an example of a successful Public Private Partnership and IFI cooperation in implementation of hydroelectricity projects in Tajikistan.

# Energy Resources of Tajikistan - Hydro

Potential Hydro energy



-  In force HPP
-  In construction HPP
-  Perspective HPP



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# Energy Resources of Tajikistan - Coal



💧 To date, more than 36 coal mines and coal expressions have been identified and partially explored. Almost all coal varieties are represented, as enumerated below:

brown coal	144.5 mio tonnes;
coking coal	904.9 mio tonnes;
stone coal	2292.7 mio tonnes;
anthracite	254.8 mio tonnes;
<b>Total:</b>	<b>3,597 mio tonnes</b>





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# Coal Industry of Tajikistan



- Thermal power stations in the vicinity and structure of the coal mining enterprises
  - Advantages: excludes cost prohibitive transportation of coal and reduces the generation cost
- Most attractive in this context are Fon Yaghnob, Nazar Ailok and Shurob mines.



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# Coal Industry of Tajikistan



## Fon Yaghnob Coal Mine



Coal Type	Volume of Reserves, (Millions of tonnes)			
	Proven	Forecast	Total	Incl for open works
Gas-rich	398	507	905	35

### Qualitative Features of Stone Coal

Moisture content	0.35 – 1.88%
Ash value	4.0-24.5 %
Calorific value	7,936 – 8,463 kkal/kg



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# Fon Yaghnob Coal Mine



Общий вид  
одного из устьев  
рабочей штольни

General view of  
working gallery  
entrance





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# Coal Industry of Tajikistan



## Nazar Ailoq Coal Mine



Coal Type	Volume of Reserves, (Millions of tonnes)			
	Proven	Forecast	Total	Incl for open works
Anthracite	64.8	190	254.8	11.1

### Qualitative Features of Anthracites

Moisture content	0.78 – 4.66%
Ash value	1.2-4.2%
Calorific value	7,936 – 8,463 kkal/kg



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# Nazar Ailok Coal Mine



Общий вид  
одного из  
карьеров

General view of one  
of the quarries





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# Coal Industry of Tajikistan



## Shurob Coal Mine



Coal Type	Volume of Reserves, (Millions of tonnes)			Incl for open works
	Proven	Forecast	Total	
Brown	144,5	-	144,5	-

### Qualitative Features of Brown Coal

Moisture content	13.1%
Ash value	12.5%
Calorific value	6,679 kkal/kg



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# Coal Industry of Tajikistan



## Ziddi Coal Mine



Coal Type	Volume of Reserves, (Millions of tonnes)			Incl for open works
	Proven	Forecast	Total	
Stone	46	44	90	2

### Qualitative Features of Stone Coal

Moisture content	3.4 – 10.2%
Ash value	12.6 – 33.7%
Calorific value	7,116 – 7,989 kkal/kg



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# Coal Industry of Tajikistan



Investor's roundtable meeting successfully conducted on May 27-29, 2007 in Dushanbe, where Declaration had been adopted:

- ◆ AES (USA), TOO KiTaKa (Kazakhstan), RAO UES of Russia and Chinese Machinery Export-Import Corporation will participate in the integrated project.
- ◆ A special-purpose company for development of the integrated project, including FS and Government clearances
- ◆ FS will be developed on Fon Yagnob mine for thermal power plant construction and reconstruction of existing Dushanbe and Yavan TPPs
- ◆ US Govt is willing in principle to finance the FS.
- ◆ The IFIs are already helping w/ the realization of CASAREM, which would include this project.
- ◆ Additional financial institutions – CDB, KDB, TDB, EADB – also interested in participating.



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# Energy Sector Development Strategy



## 💧 A two-track strategy

- ◆ First track focused on the improvement of the domestic energy sector
- ◆ Second track focused on development of large projects whose majority production would be exported
- ◆ But some of it will be used to meet domestic demand

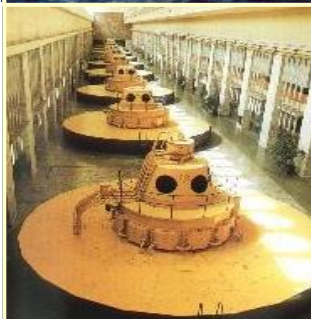




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# Measures on Strengthening Domestic Energy System



- Program for Development of Fuel and Energy Complex Subsectors during 2007-2015:
  - Calls for continuation of implementation of projects on rehabilitation and modernization of major facilities of the energy system, incl. power plants, transformer substations, transmission lines
  - Energy Loss reduction, efficiency improvement and conservation
- Projects on upgrade of power plants, concurrently with their rehabilitation:
  - Increase in the capacity of units by an incremental 10%
  - Increase in the design capacity of HPPs by 350-400 MW
  - Works are completed on:
    - Rehabilitation of Centralnaya HPP (30 MW, ADB credit), development of feasibility study for modernization of Kairakum HPP(126 MW), Varzob HPP cascade (25 MW) [USTDA grant]. Preparation of Nurek HPP (3000 MW) upgrade and rehabilitation feasibility study is nearing completion.



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# Development of Small Hydro

## 💧 Program of Micro-HPP Construction with Involvement of Domestic and Foreign Investors during 2007-2020:

- ◆ Was adopted by the GoRT in October 2006
- ◆ 71 small HPPs with aggregate capacity of 75.6 MW and generation output of 800 million kWh per annum.
- ◆ IsDB, ADB, UNDP already financing 23 micro-HPPs (should be commissioned by 2010)





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# Second Track of the Strategy

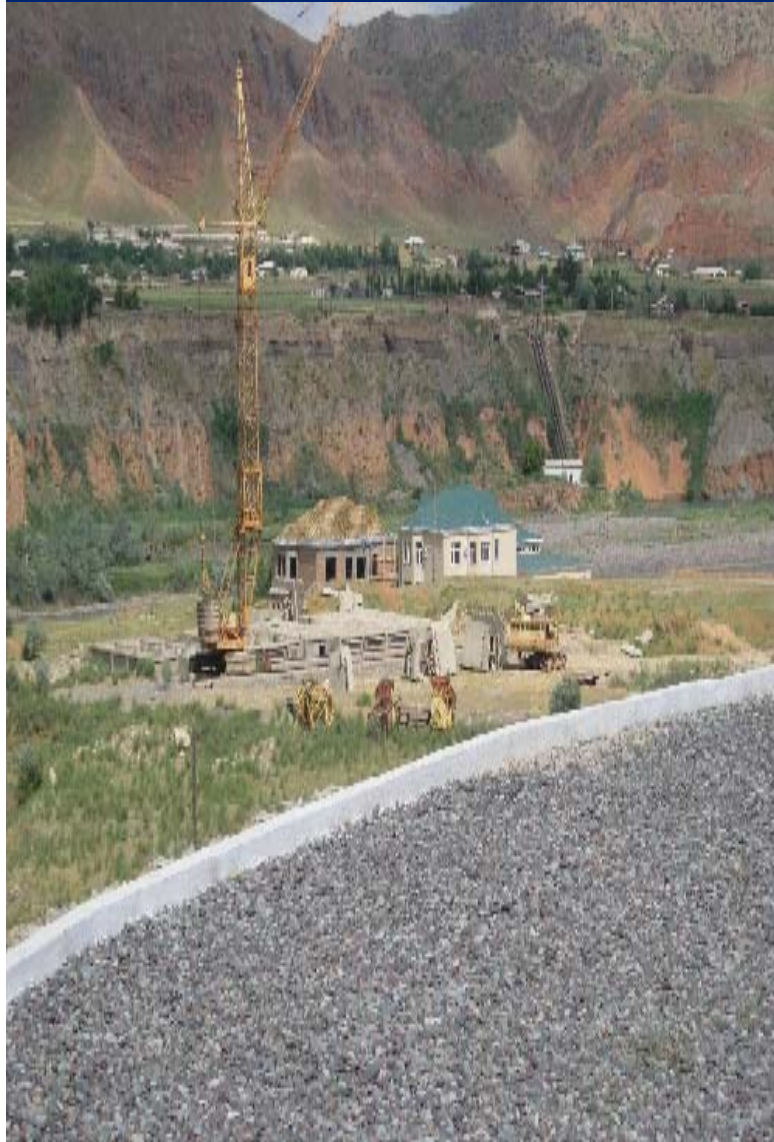
- 🔹 Focus on Large projects
- 🔹 Majority of production export oriented
  - ◆ But also to meet domestic demand
- 🔹 Private and foreign investors will be attracted
- 🔹 Regional cooperation needed
- 🔹 Sangtuda – 1 Hydroelectric project is the first of these projects





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# Sangtudah-1 HPP, Main Parameters



**Design Capacity: 670 MW**

**Dam type: rockfill/earthfill with loam soil nucleus**  
**Dam parameters: Height - 70 m**  
**Crest length - 520 m**

**Reservoir volume on Vakhsh River :**  
**FRL - 258 mio m<sup>3</sup>, URL -16 mio m<sup>3</sup>**  
**Reservoir mirror area – 9.75 km<sup>2</sup>**

**Nominal capacity of each of the 4 units – 167.5 MW**

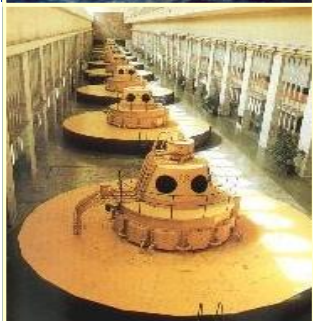
**Average Annual Electricity Output – 2.733 TW/h**



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# Sangtudah-1 HPP



## Two starting complexes:

- ◆ 1<sup>st</sup> SC = first unit

- Planned to be commissioned in Dec 2007

- ◆ 2<sup>nd</sup> SC = second, third and fourth units.

- Planned to be commissioned before 2009.



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# Sangtudah-1 HPP, Economic and Financial

- Views of Government of Republic of Tajikistan:
  - 55% to 60% of electricity generation output which will be in the summer will be dedicated for export to the countries of South Asia.
  - The share of Tajikistan should not be less than 25% + 1 share.
  - Attracting IFI financing is highly preferable
  - GoRT is committed to do whatever necessary on its part to realize IFI financing

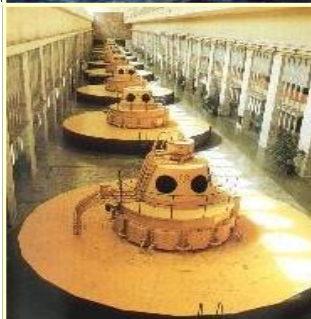




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# Other HPPs Under Construction



- ♦ Sangtudah-2 HPP (220 MW) on Vakhsh river:
  - ♦ Preparatory works for construction are on-going,
  - ♦ Build-Own-Transfer Contract Holder is Farob Co (Iran).
  - ♦ Islamic Republic of Iran Credit (\$180 M).
- ♦ Zarafshan HPP (150 MW) on Zarafshan river:
  - ♦ EPC Contract with Sinohydro Corporation (China).
  - ♦ Credit financing from China is expected.
- ♦ Roghun HPP (3600 MW) on Vakhsh river:
  - ♦ Bankable Feasibility Study had been conducted by Lahmeyer International (Germany) under the financing of Russian Aluminum (Russia)
  - ♦ GoRT did not agree with the conclusions of Lahmeyer in terms of incomplete construction valuation and construction parameters and type of dam

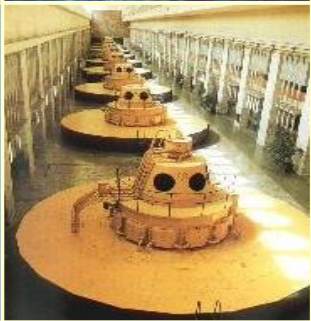


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# Endeavors of GoRT in Implementation of Large Projects

- GoRT has requested the World Bank to render advisory assistance in energy sector;
- GoRT is seeking new investors to set up a consortium for Roghun HPP construction.



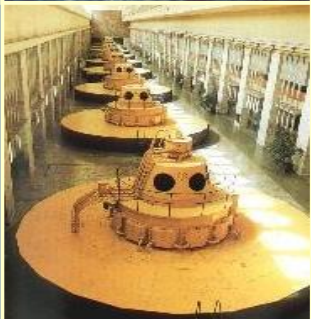


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# Export orientation of Large Projects

- Sangtudah-1, Sangtudah-2, Zarafshan and Roghun HPP electricity generation is oriented to export
- It is important to concurrently construct the Transmission lines and execute electricity trade agreements with the countries of Central and South Asia.





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# Tajikistan has already begun the construction of TL



## ♦ 500 kV TL “South-North” and 220 kV TL “Lolazor-Khatlon”:

### 1. 500 kV TL “South-North”

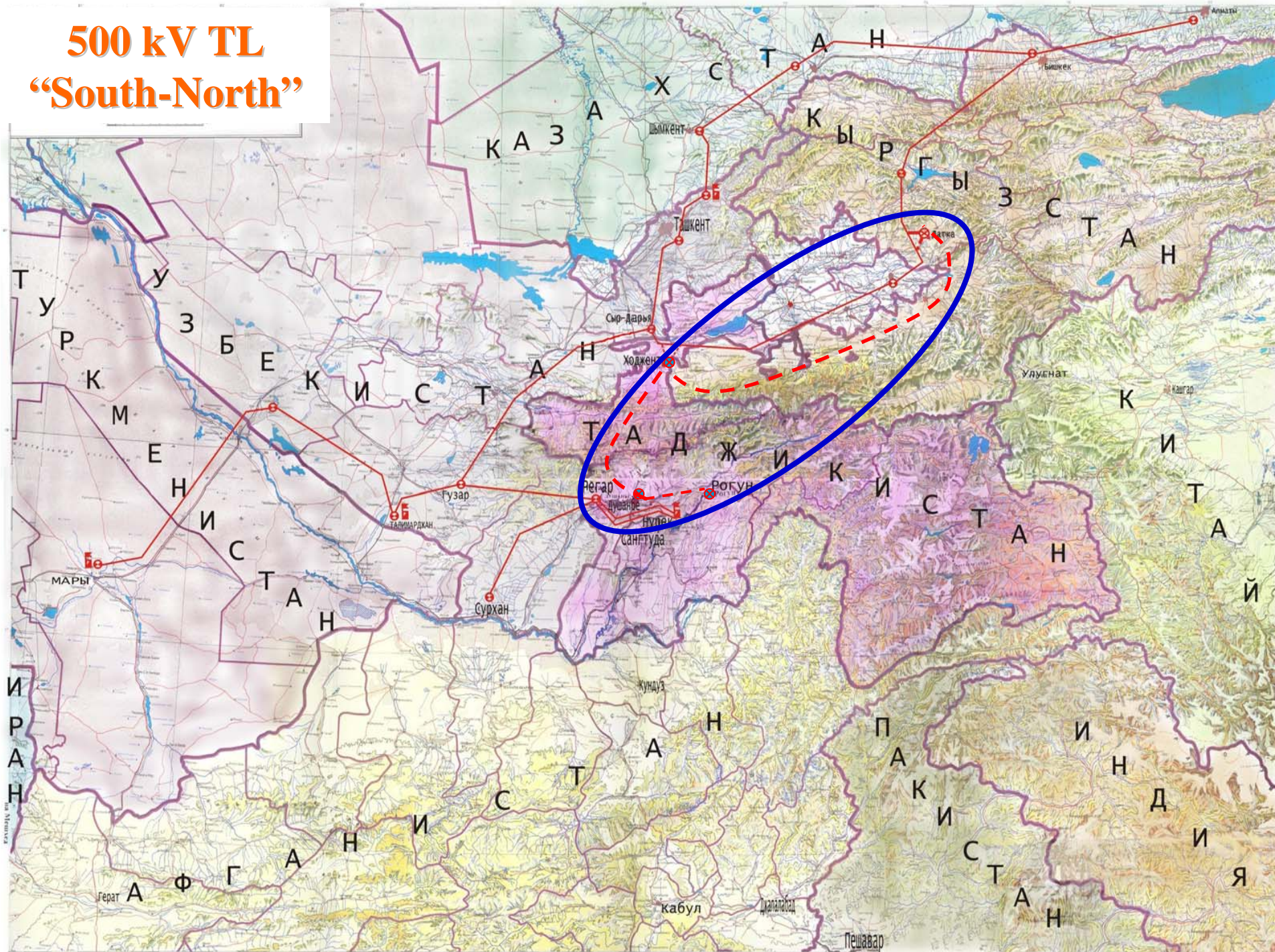
- ✓ length – 386 km;
- ✓ Project cost – US\$282M;  
➔ Chinese credit – US\$276 M;
- ✓ Construction period – 3 yrs;
- ✓ Transmission capacity – 8.6 billion kWh per annum;
- ✓ The Project includes two 500 kV substations: one in Dushanbe and one in Khujand;
- ✓ Rehabilitation of 500 kV SS «Regar».

### 2. 220 kV TL “Lolazor-Khatlon”

- ✓ length – 90 km.
- ✓ Project cost – US\$58M;  
➔ Chinese credit – US\$56 M;
- ✓ Two 220 kV SS.

Official Commencement of Construction: Sept 15, 2006

# 500 kV TL “South-North”



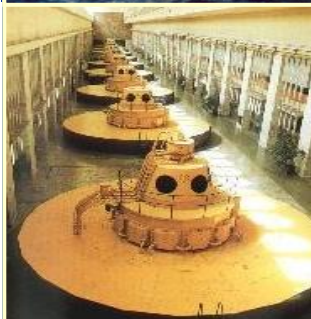


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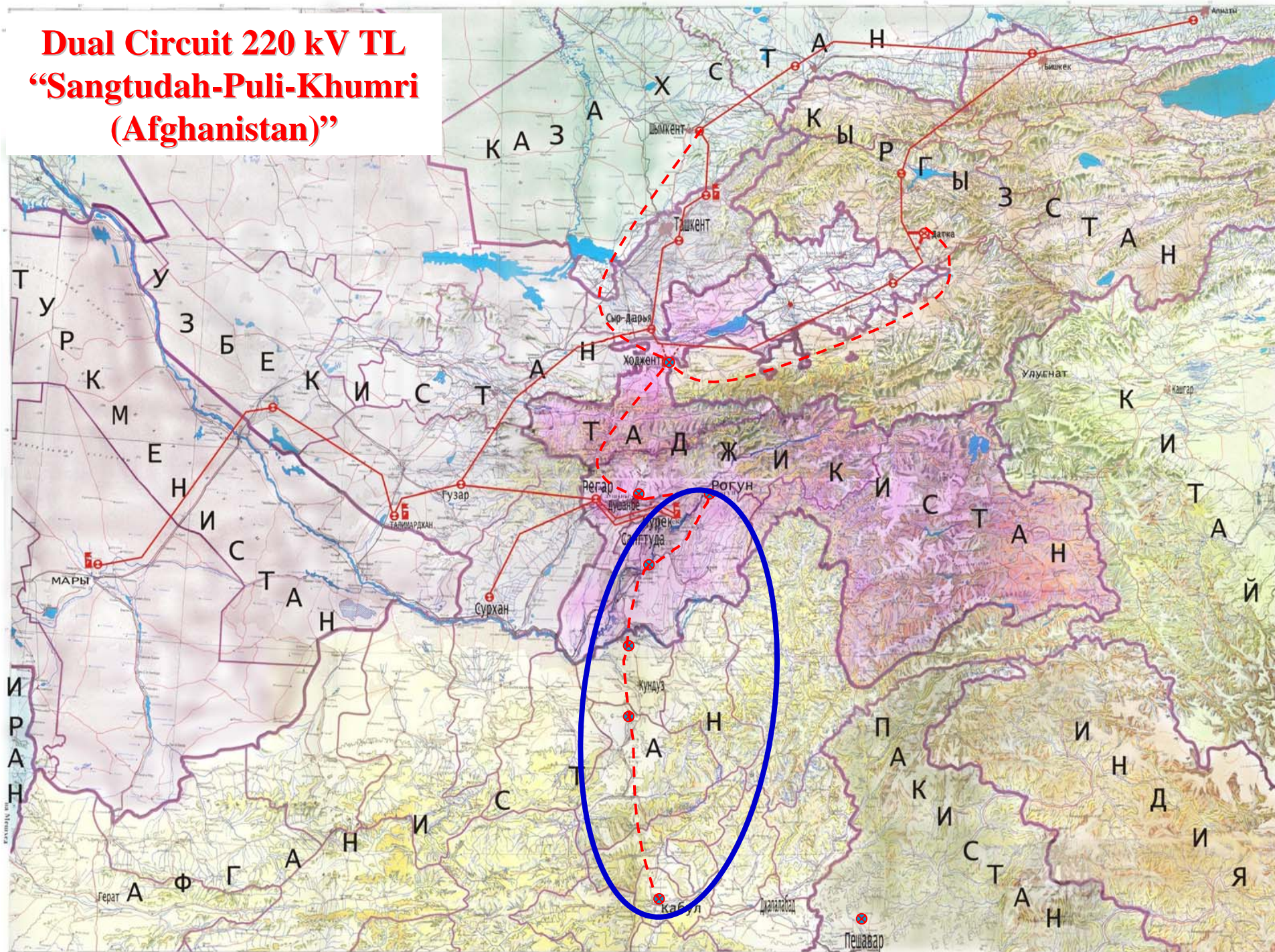


# Tajikistan – Afghanistan Exports

- ♦ Dual Circuit 220 kV TL “Sangtudah-Puli-Khumri (Afghanistan)”
  - ♦ Commencement date: March 2007
  - ♦ Credit financing: ADB
  - ♦ Feasibility study on-going.
  - ♦ Transmission capacity: approx 4 billion kWh annually → will ensure transport of 300 MW electricity, as requested by Afghanistan for 2008-2010 (summer season).



# Dual Circuit 220 kV TL “Sangtudah-Puli-Khumri (Afghanistan)”





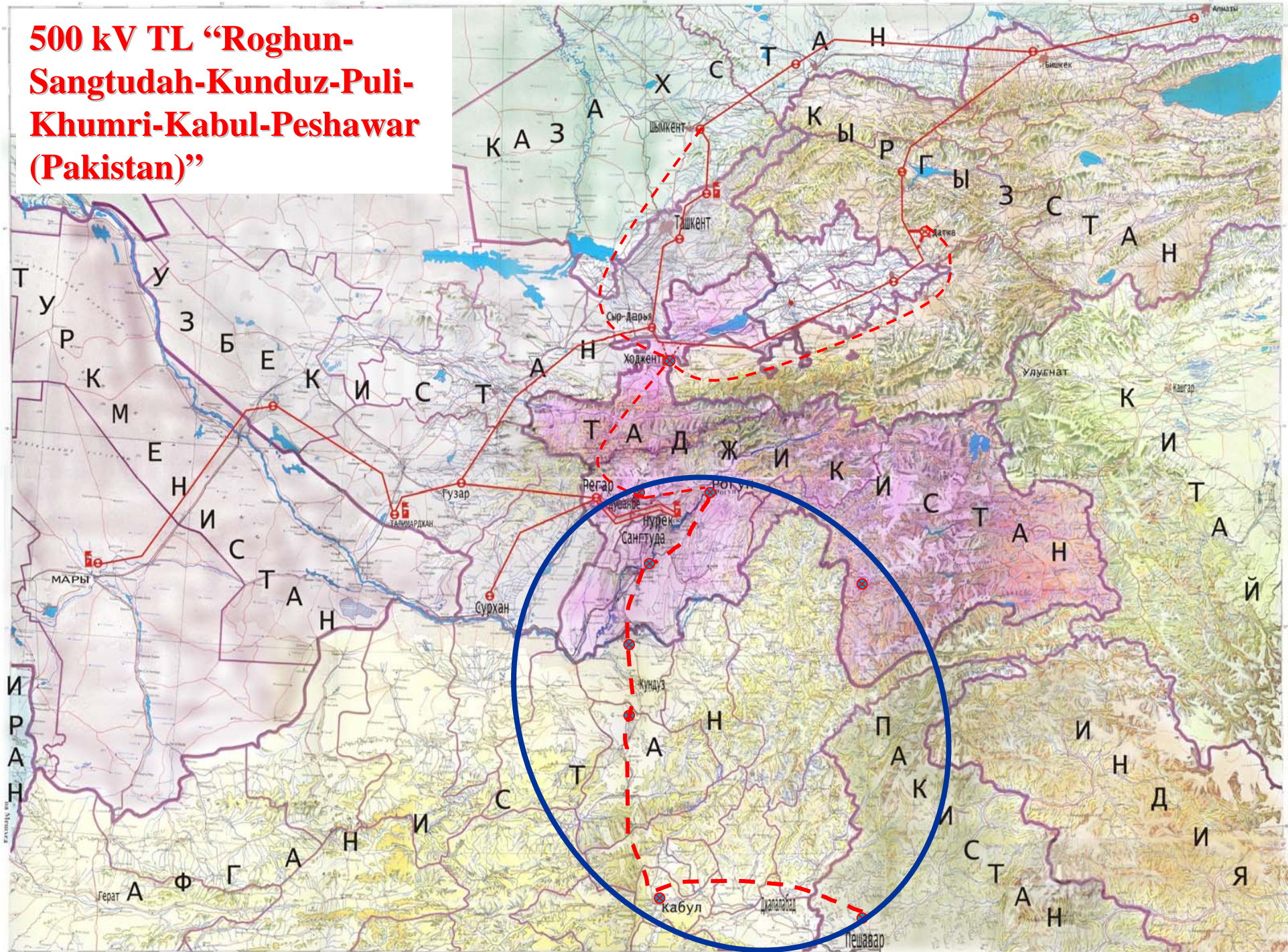
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# Tajikistan Playing Critical Role in Development of Regional Electricity Market



- 🔥 Potential electricity markets identified:
  - Governments of Afghanistan, Iran and Pakistan confirmed their interest in electricity imports
  - Higher electricity tariffs + peak consumption coincides with summer period, when the energy system experiences the most of the surpluses.
- 🔥 First (Islamabad, 05/2006) and Second (Dushanbe, 10/2006) Conference on CASAREM Development:
  - ◆ Committed to undertake specific measures for development of hydro energy in Tajikistan
- 🔥 Two studies launched
  - ◆ Techno-Economic Assessment and IFRL studies
  - ◆ Meetings successfully held in Tajikistan on Apr 24

**500 kV TL “Roghun-Sangtudah-Kunduz-Puli-Khumri-Kabul-Peshawar (Pakistan)”**





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# Policies for Development of Energy Sector

## Government has adopted:

- 🔥 A Medium Term Tariff policy for electricity (and gas)
- 🔥 A concomitant Social Protection Policy
- 🔥 Measures to improve financial discipline
- 🔥 Industry Structure policy whereby the transmission grid and the Nurek – Baipaza generation assets will remain in the state's hands
- 🔥 Private sector participation is sought in distribution, and in smaller generation plants
  - ◆ Large projects will of course be developed with private sector participation





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# Electricity Tariff Policy

## Electricity Tariffs

♦ **Objective:** increase electricity tariff levels to cost recovery level of 2.5 cents per kWh (in 2006 terms)

- ♦ Program of sequenced increase of electricity tariffs during 2007-2010 to attain a cost recovery level
- ♦ First such increase – a 38% increase in US\$ terms has been made effective February 1, 2007 tariffs for all consumer groups
- ♦ Additional increase will come effective Jul 1, 2007 – currently under consideration of the GoRT





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# New Policy Measures

- 🔹 Government contemplating measures to improve fiscal revenues from energy sector
- 🔹 A royalty or other fiscal regime on use of water and fossil resources of the country being contemplated
  - ◆ Will be non-discriminatory
  - ◆ Will be set to ensure competitiveness in export markets and affordability in domestic market

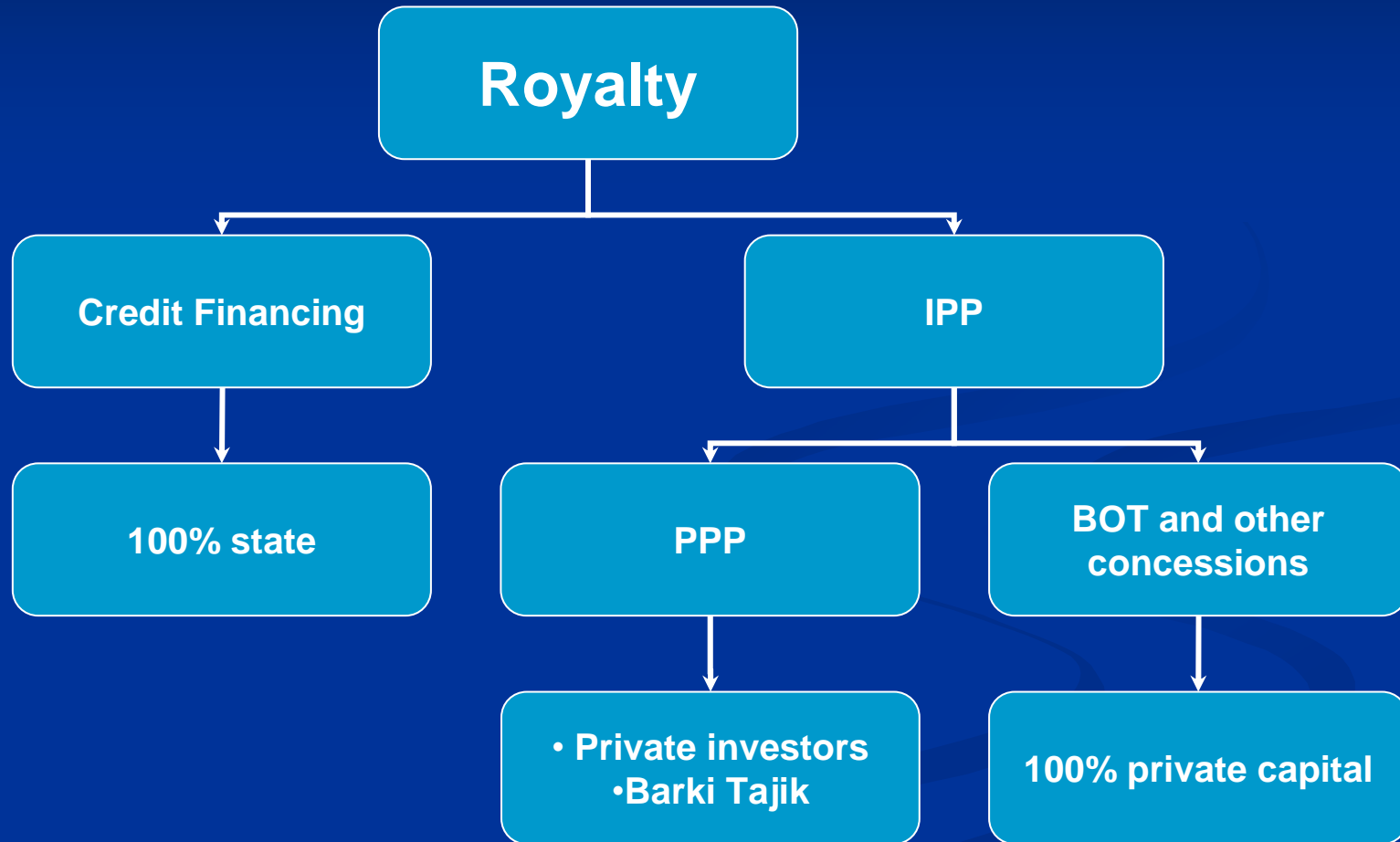




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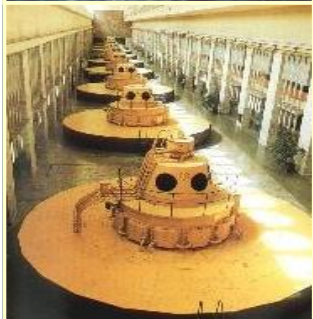


# Proposed Royalty System





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**Thank you for your attention!**