



MINISTRY OF ENERGY OF
THE KYRGYZ REPUBLIC

PROSPECTIVE GREEN ENERGY PROJECTS OF THE KYRGYZ REPUBLIC



Ibrayev T.O.





ENERGY SYSTEM OF THE KYRGYZ REPUBLIC



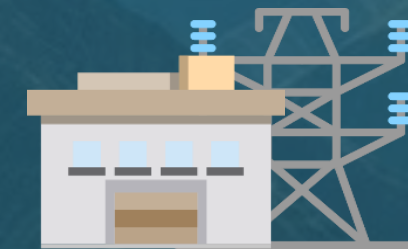
HPP
3,155 MW



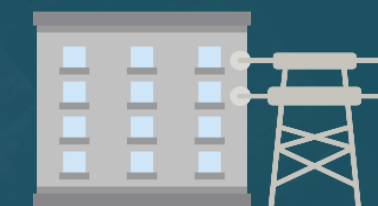
TPP
862 MW



HV lines 110-500 kV
7,500 km



Substations 110-500 kV
200 units, 14,113 MVA



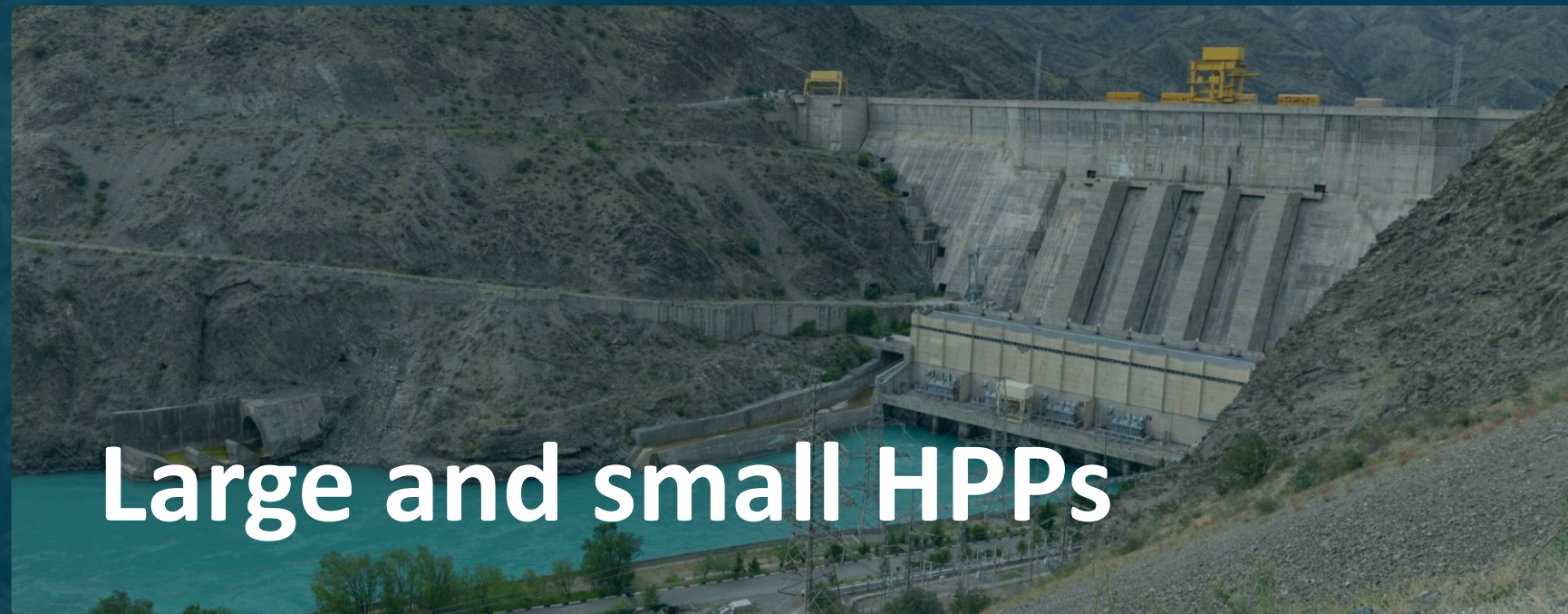
HV line 0.4-35 kV - 59,700 km
Substation & Transformers
26,649 units

- The energy system of the Kyrgyz Republic due to the geographical characteristics is clearly divided into northern and southern parts
- Both parts are connected by lines 500 kV "**Toktogul HPP – Tuleberdiyev – Frunzenskaya**" and the 500 kV "**Datka – Kemin**" line passing through the territory of the Kyrgyz Republic, as well as through the Central Asian United Energy System, covering Tajikistan, Uzbekistan and Kazakhstan
- Within the structure of electricity generation, the main share is held by hydroelectric power plants (90%), most of which are located in the south of the country
- Average annual generation: electricity - 14 billion kWh; thermal energy – 2,000 thousand Gcal



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PLANNED PROJECTS



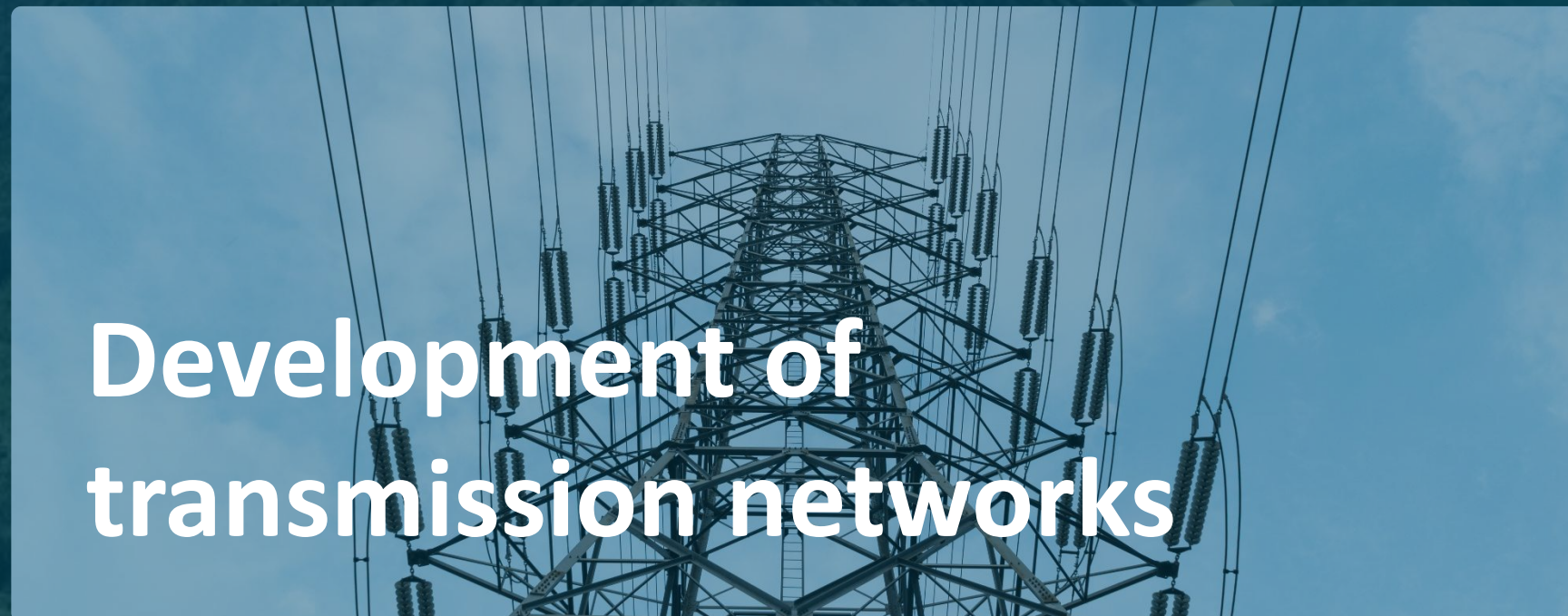
Large and small HPPs



Solar power plants



Wind power plants



Development of transmission networks



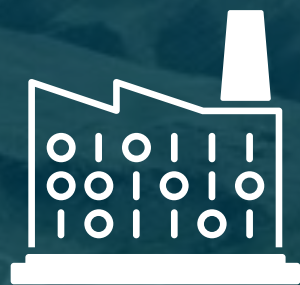
MINISTRY OF ENERGY OF THE KYRGYZ REPUBLIC

HYDROPOWER POTENTIAL



142.5
billion kWh

TOTAL HYDROPOWER
POTENTIAL



LEADING POSITION IN
CENTRAL ASIA IN TERMS OF
HYDROPOWER
POTENTIAL

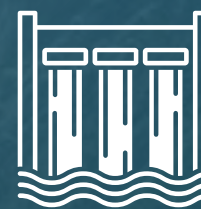
13%

OF REALIZED POTENTIAL

ON THE NARYN RIVER POSSIBLE TO CONSTRUCT:



7 cascades



27 hydro power plants



6,435.4 MW

Total installed capacity



22,555 billion kWh

Average long-term annual generation

KAMBARATA HPP-1





MW



million kWh

million USD

million m³



m

[illegible]



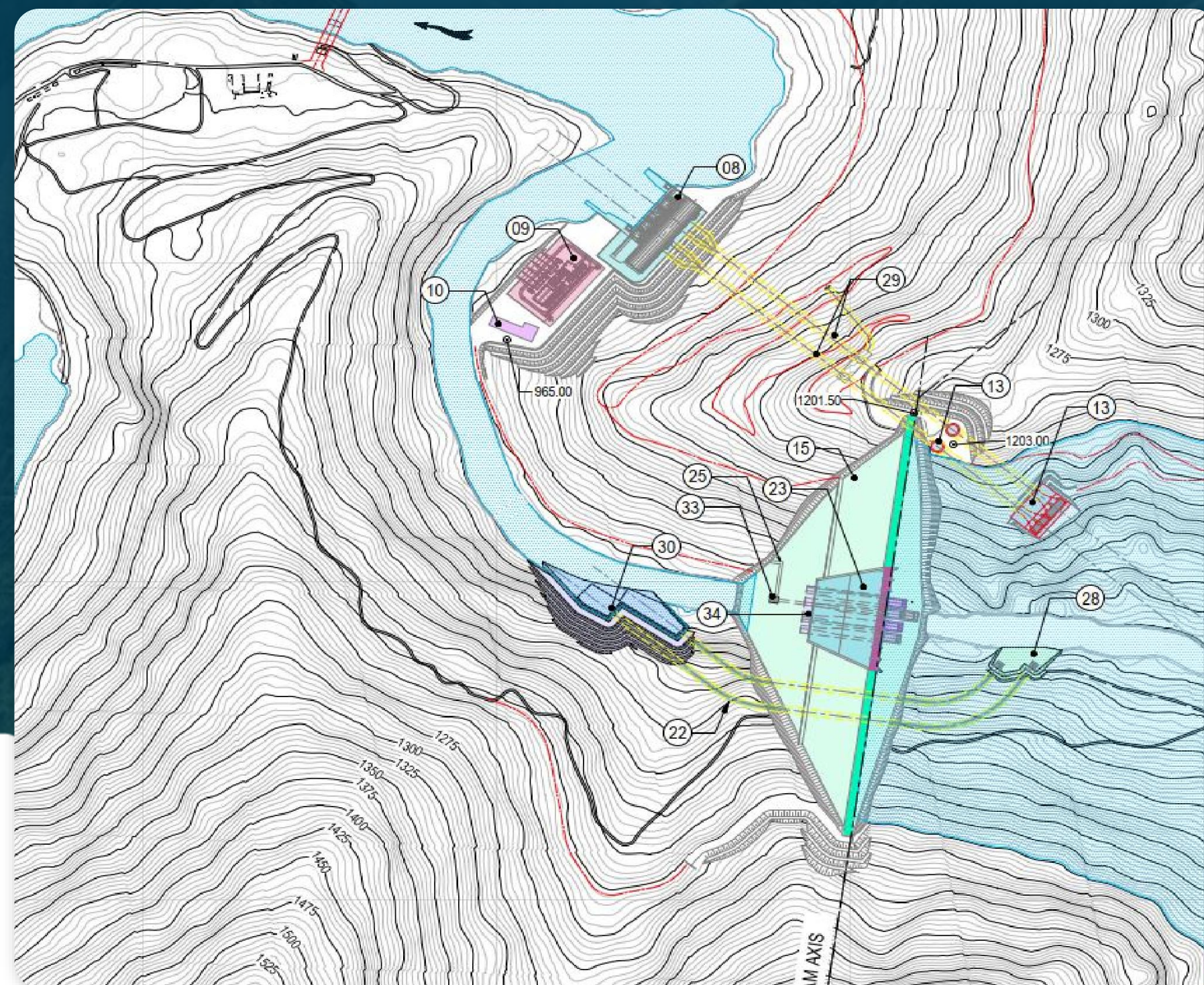
GENERAL LAYOUT

The general plan of the hydropower complex "Kambar-Ata HPP-1" includes the following:

A gravity dam constructed from roller-compacted concrete (RCC), with a maximum height of 261 m on deep foundations, featuring an uncontrolled spillway and rapid flow structures on the downstream face of the dam, as well as four medium-level outlets and one bottom outlet through the dam body. The powerhouse facility is located at the downstream toe of the dam, equipped with four turbine-generator units with a capacity of 470 MW. Water is supplied to each of the two turbine-generator installations via individual high-pressure tunnels and a shared double intake structure for the HPP

The 500 kV switchyard with gas-insulated switchgear (GIS) is located in a separate building next to the power station and connected to the 500 kV Datka-Kemin transmission line.

Two diversion tunnels are provided to divert the river channel during the construction period





ALABUGA CASCADE OF HYDRO POWER PLANTS





MAIN INDICATORS OF THE ALABUGA HPP CASCADE

Name of HPP	Absolute Elevations of Water Levels			Reservoir capacity		Flow rates		Heads (Hydraulic Head)			Installed capacity, MW	Average Annual Electricity Generation, million kWh
	Full Supply Level (FSL), m	Dead Storage Level (DSL), m	Tailwater Level, m	Total Capacity, million m ³	Active Storage, million m ³	Long-Term Average Flow, m ³ /s	Design Flow Rate, m ³ /s	Max, m	Min, m	Design, m		
Arpanskaya HPP-1	2,625	2,565	2,180	310	288	18.5	40	406.5	346.5	383	136	556
Arpanskaya HPP-2	2,180	2,150	2,063	200	124	27.6	62.5	114.4	84.4	103.5	58	216.5
Makmalskaya HPP	2,063	-	1,815	27	-	27.6	55	230.8	-	230.8	113	464.5
Sazskaya HPP	1,815	-	1,575	19.8	-	29.1	55	223.5	-	223.5	108	472.9
TOTAL											415 MW	1 709.9 million kWh

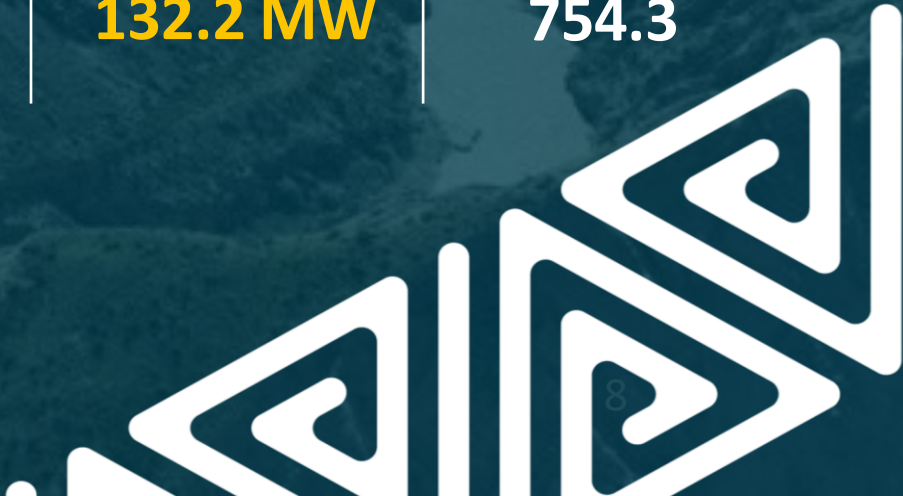
CASCADE OF HPPPS ON THE AT-BASHY RIVER





MAIN INDICATORS OF THE CASCADE OF HPPs ON THE AT-BASHY RIVER

Name of HPP	Absolute Elevations of Water Levels			Reservoir capacity		Flow rates		Heads (Hydraulic Head)			Installed capacity, MW	Average Annual Electricity Generation, million kWh
	Full Supply Level (FSL), m	Dead Storage Level (DSL), m	Tailwater Level, m	Total Capacity, million m³	Active Storage, million m³	Long-Term Average Flow, m³/s	Design Flow Rate, m³/s	Max, m	Min, m	Design, m		
Taldysuyskaya HPP-1	2,720	2,700	2,575	306.5	163	16.6	20	117.2	97.2	113	20	119.5
Taldysuyskaya HPP-2	2,575	-	2,420	-	-	16.6	20	150.6	-	150.6	26.7	161
Oiterekskaya HPP-1	2,420	-	2,250	-	-	16.6	20	161.3	-	161.3	28.5	172.2
Oiterekskaya HPP-2	2,250	-	2,150	-	-	16.6	20	96	-	96	17	102.6
Akdzharskaya HPP	1,990	1,960	1,904	278.3	218	33.8	60	83	53	75.3	40	199
TOTAL											132.2 MW	754.3



KULANAK

CASCADE HPP





MAIN INDICATORS OF THE KULANAK HPP CASCADE

Name of HPP	Absolute Elevations of Water Levels			Reservoir capacity		Flow rates		Heads (Hydraulic Head)			Installed capacity, MW	Average Annual Electricity Generation, million kWh
	Full Supply Level (FSL), m	Dead Storage Level (DSL), m	Tailwater Level, m	Total Capacity, million m ³	Active Storage, million m ³	Long-Term Average Flow, m ³ /s	Design Flow Rate, m ³ /s	Max, m	Min, m	Design, m		
At-Bashy HPP (Naryn river discharge)	1,997		1,830.3			84.5	105	145.8		145.8	135	756.7
Aktalinskaya HPP	1,742		1,713.5	24		141.6	160	26.8		26.8	38	238.9
Zhylan-Aryk HPP-1	1,713.3		1,652			141.3	160	56.5		56.5	80	503
Zhylan Aryk HPP-2	1,651.8		1,578.1			141.1	160	69.5		69.5	98.6	503
TOTAL											351.6 MW	2,001.6 million kWh



The background of the slide features a photograph of a deep, rugged mountain valley. A river flows through the center of the valley, its surface reflecting the surrounding landscape. The mountains are steep and rocky, with some snow visible in the distant peaks. In the bottom right corner, there is a decorative graphic consisting of a series of white, stylized, nested triangles that create a sense of depth and movement.

ORUKTAM HPP CASCADE IN THE UPPER REACHES OF THE NARYN RIVER



MAIN INDICATORS OF THE ORUKTAM HPP CASCADE ON THE NARYN RIVER

Name of HPP	Absolute Elevations of Water Levels			Reservoir capacity		Flow rates		Heads (Hydraulic Head)			Installed capacity, MW	Average Annual Electricity Generation, million kWh
	Full Supply Level (FSL), m	Dead Storage Level (DSL), m	Tailwater Level, m	Total Capacity, million m³	Active Storage, million m³	Long-Term Average Flow, m³/s	Design Flow Rate, m³/s	Max, m	Min, m	Design, m		
Oruktam HPP-1	2,600	2,550	2,480	561.3	431	35.9	70	118.5	68.5	97	60	254.3
Oruktam HPP-2	2,480			30		35.9	70				48	225.9
Dzhanikelskaya	2,500	2,440	2,315	450.2	325.2	35.9	84	180.4	120.4	141.3	100	434
TOTAL											208 MW	914.2 million kWh



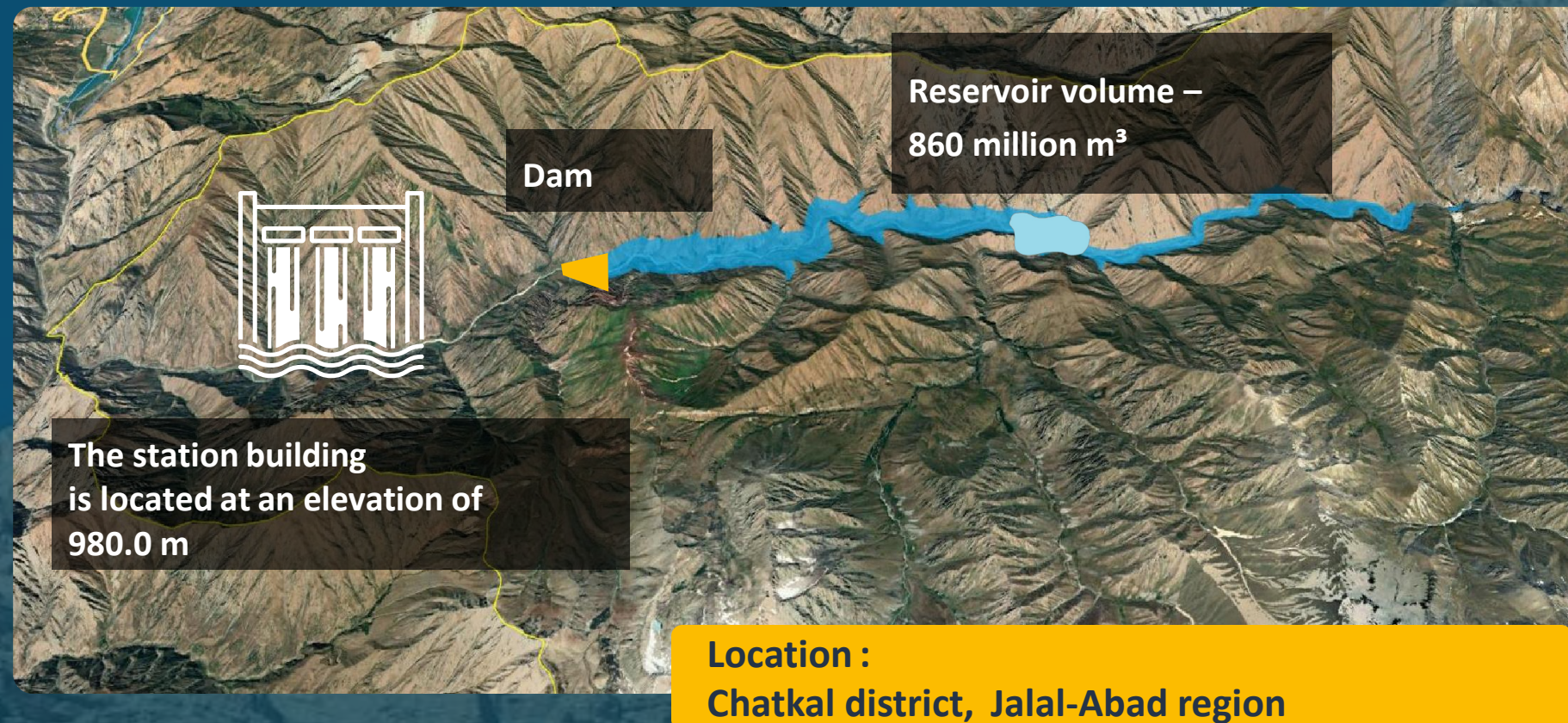
CHATKAL HYDRO POWER PLANT





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CHATKAL HPP PROJECT



Average annual flow rate: 75.6 m³/sec



Height: 180 m



Volume: 860 million m³



Length: 10 km



Area for construction: 1,600 ha



Installed capacity: 251 MW



Average annual generation: 1.68 billion kWh



Construction period: 5 years



Equity capital investments: 2,500 \$/kW



SARY-JAZ CASCADE



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CONSTRUCTION OF 6 HYDRO POWER PLANTS ON THE SARY-JAZ RIVER



Total project cost

2.2–3 billion US dollars



Project construction site

Kyrgyz Republic,
Issyk-Kulregion, Ak-Suu district



Installed capacity, MW

Total cascade capacity – 1,100 MW

Kuylyuk HPP – 170 MW; Enilchek HPP – 60 MW
Kaindy-Enilchek HPP – 20 MW; Ak-Shyirak HPP – 350 MW
Kok-Shaal HPP – 250 MW; Kuyukap HPP – 250 MW



Average annual generation, million kWh

Over 4,760 million kWh

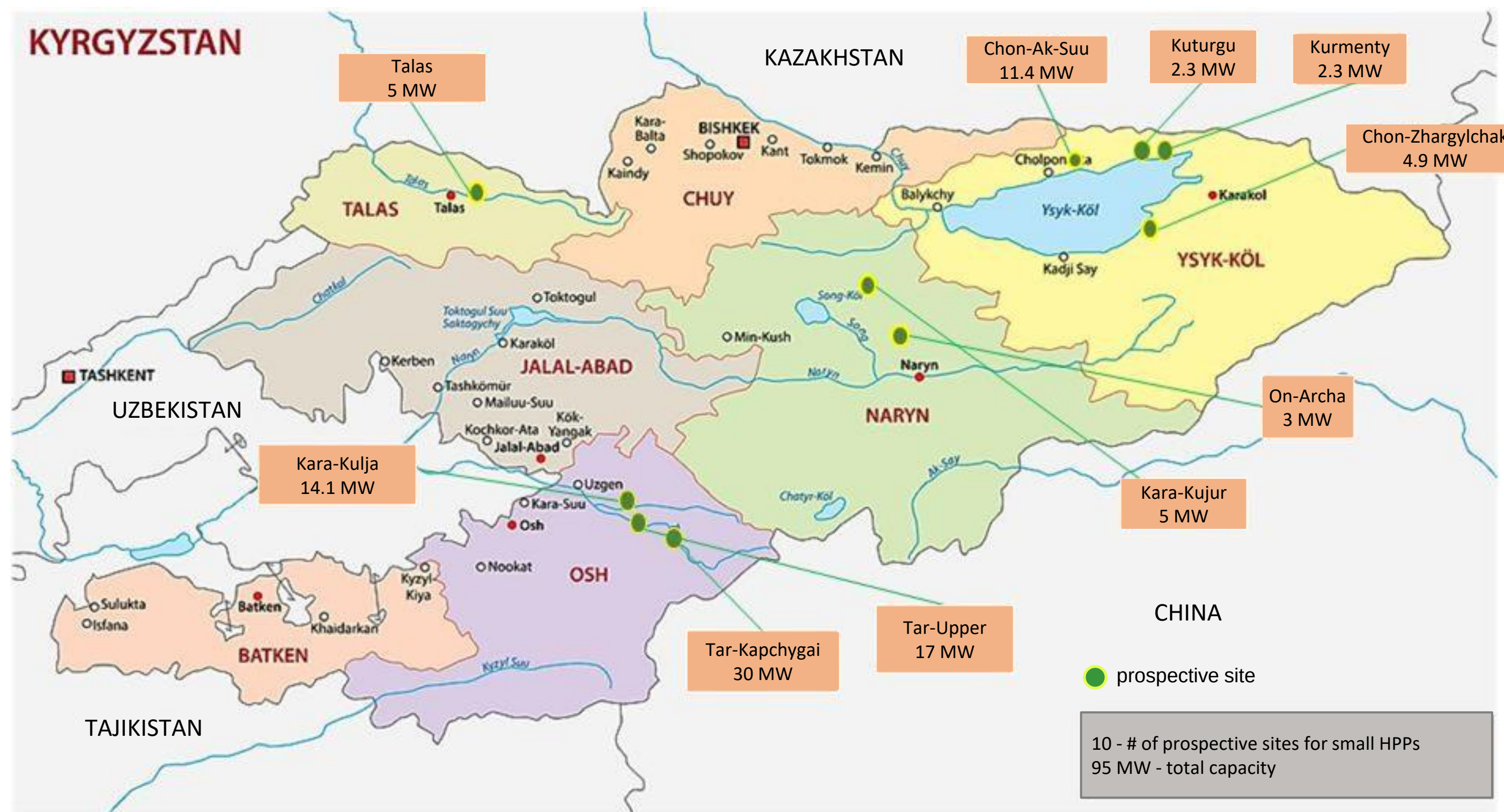


Project impact on the environment

As there are conservation areas and specially protected natural territories in the Sary-Jaz river basin, an Environmental Impact Assessment is necessary



PROSPECTIVE SITES FOR THE CONSTRUCTION OF SMALL HPPS





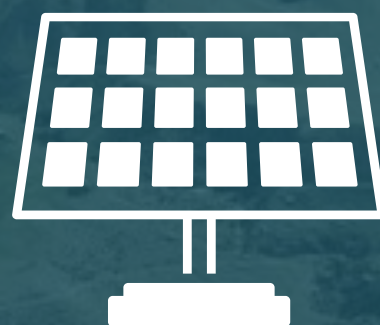
PROSPECTIVE SITES FOR SMALL HPPS

No.	Name of site/river	Capacity, MW	Waterflow, m ³ /sec	Head, m	Annual electricity generation, million kWh	Location
1	Tar Kapchygai	30	97.0	40	121.0	Osh region, Kara-Kulja district, Tar River
2	Tar Upper	17	75.0	27	67.0	Osh region, Kara-Kulja district, Tar River
3	Kara-Kulja	14.1	20	90	85.5	Osh region, Kara-Kulja district, river Kara-Kulja
4	Chon-Ak-Suu	11.4	5	260	63.4	Issyk-Kul region, Issyk-Kul district, river Chon-Ak-Suu
5	Talas	7	18.5	43	36.7	Talas region, Talas district, river Talas
6	Chon-Zhargylchak	4.9	2.27	316	30	Issyk-Kul region, Jeti-Oguz district, river Chon-Zhargylchak
7	Kara-Kujur	5	10	37	20.5	Naryn region, Kochkor district, river Kara-Kujur
8	On-Archa	3	12.0	32	17.7	Naryn region, Naryn district, river On-Archa
9	Kuturgu	2.3	1.06	241	11.89	Issyk-Kul region, Tyup district, river Kuturgu
10	Kurmenty	2.3	1.05	281	11.9	Issyk-Kul region, Tyup district, river Kurmenty



MINISTRY OF ENERGY OF THE KYRGYZ REPUBLIC

RENEWABLE ENERGY SOURCES POTENTIAL



2,100–2,900 h

Average annual duration of sunshine

Annual irradiation on the surface **1,700 kWh/m²**

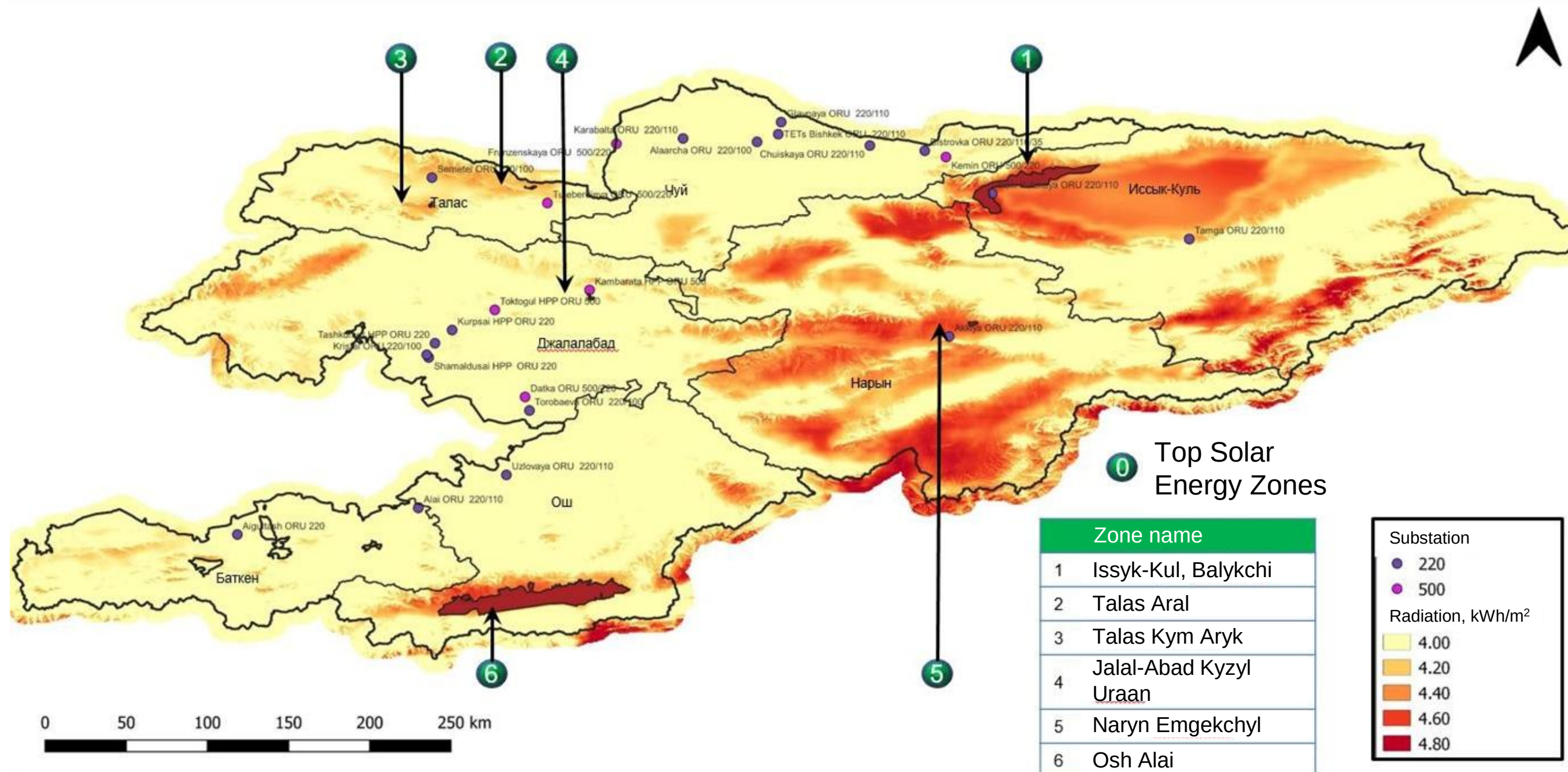


2 billion kWh

Wind energy potential

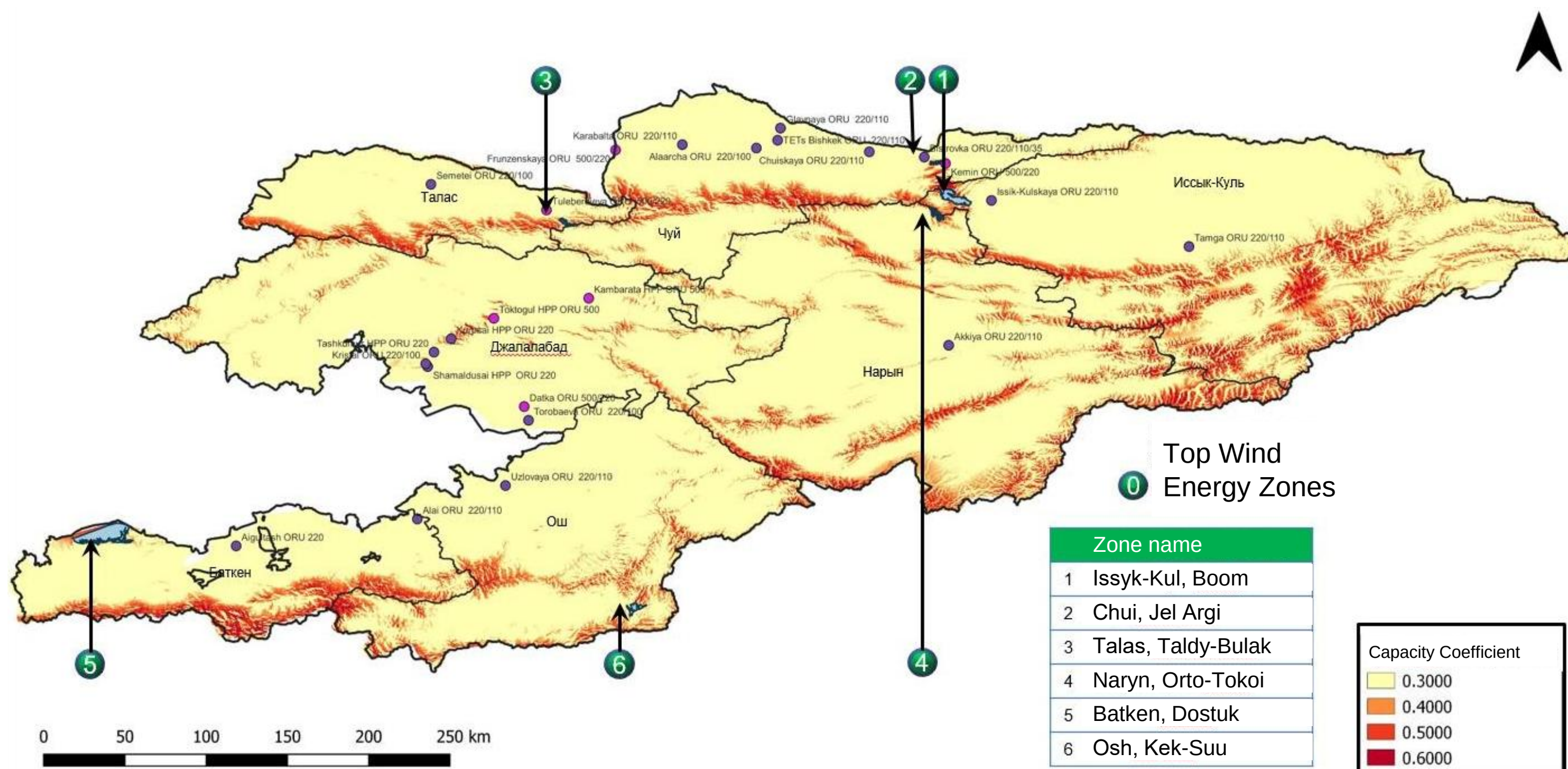


POTENTIAL ZONES FOR CONSTRUCTION OF SOLAR POWER PLANTS





POTENTIAL ZONES FOR THE CONSTRUCTION OF WIND POWER PLANTS





DEVELOPMENT OF HIGH-VOLTAGE NETWORKS FOR RECEIVING AND TRANSMITTING POWER FROM RENEWABLE ENERGY SITES

Projects for reconstruction and modernization

Project cost

Implementation period

Construction 220/110/10 kV substation in Uchkun, AT 2*125 MVA, connection to 220 kV transmission line Kemin–Ala-Archa

34.5 million \$ (substation)+2.82 million \$ (transmission line)

2026–2027

Construction 220 kV transmission line Tamga–Karakol and 220/110/10 kV Substation Karakol with installation of AT 2*125 MVA near Chelpek village and Karakol city

34.5 million \$ (substation) + 12.69 million \$ (transmission line)

2026–2028

Construction 500/220/10 kV substation Bishkek, AT 2*501 MVA, construction of 500 kV transmission line Frunzenskaya–Bishkek–Kemin

148.13 million \$ (substation) + 156 million \$ (transmission line)

2028–2030

Construction of 220/110/10 kV substation Isanov with two ATs of 125 MVA and 220 kV transmission line Datka–Uzlovaya-1, 2

34.5 million \$ (substation) + 1.4 million \$ (transmission line)

2026–2027

Construction of 500 kV substation Balykchy and 500 kV transmission line Kemin–Balykchy

193.5 million \$

2028–2030

Construction of 500 kV transmission line Kemin–Torugart

218 million \$

2028–2030

Conversion 110/35/10 kV substation Alamedin to 220 kV with two ATs of 125 MVA and construction of 220 kV transmission line Bishkek 500–Alamedin-1, 2

34.5 million \$ (substation) + 1.9 million \$ (transmission line)

2028–2030

NOTE: For the integration of renewable energy sources into the energy system, it is necessary to implement investment projects and increase the transmission capacity of substations and transmission lines



INCREASING THE TRANSMISSION CAPACITY OF SUBSTATIONS AND TRANSMISSION LINES

Facility name	Costs, million KGS	Note
Main substation construction, 3rd stage, AT 250 MVA	315	The increase in capacity will be 745 MVA — accordingly, an increase in capacity on the part of the 110/35/10/0.4 kV side by 745 MVA is required Costs for the 110 kV substation: 5.8 billion KGS Costs for 10/0.4 kV transformer substations: 1.64 billion KGS
Replacement of 110 kV overhead line wire Main–Kyzyl-Asker-1, 2 with a larger cross-section (240 mm ²)	10.4	
Replacement of 110 kV overhead line wire CHP–Parkovaya-1, 2 with a larger cross-section (240 mm ²)	8.1	
Kara-Balta substation – replacement of 3 ATs with 200 MVA units	450	
Replacement of 220 kV overhead line wire Kemin–Chui with a larger cross-section (400 mm ²)	74.1	
Issyk-Kul substation – replacement of 2 ATs with 250 MVA units	300	
Replacement of 110 kV overhead line wire Issyk-Kul–Cholpon-Ata-1, 2 and 110 kV Cholpon-Ata–Ananyevo with a larger cross-section (300 mm ²)	104	
Replacement of 220 kV overhead line wire Issyk-Kul–Tamga with a larger cross-section (400 mm ²)	210.2	





INCREASE OF TRANSMISSION CAPACITY OF SUBSTATIONS AND TRANSMISSION LINES

Facility name	Costs, mln. KGS	Remarks
Torobaeva substation, replacement of 3 AT to 200 MVA	450	The increase in capacity will be 600 MVA - accordingly, an increase in capacity on the part of the 110/35/10/0.4 kV side by 600 MVA is required Costs for the construction of 110 kV substations: 4.7 billion KGS Costs for the construction of 10/0.4 kV transformer substations: 1.3 billion KGS
Construction of the second 110 kV overhead line Torobaev-Kara-Suu (185 mm ²)	60.1	
Alai substation replacement of AT-2 with 125 MVA	130	
Aigul-Tash substation construction of the 2nd stage of AT	150	
Replacement of 220 kV Uzlovaya–Alai transmission line conductor with larger cross-section	96.5	





STATE SUPPORT (PREFERENCES)

- 01 Protection of foreign investments
- 02 Assistance in obtaining licenses, permits, and approvals, including allocation of land
- 03 Equal conditions of operation for foreign and local companies
- 04 Opportunities for extensive cooperation within the framework of PPP
- 05 Available qualified personnel
- 06 Exemption for import of equipment for construction of renewable energy facilities
- 07 Payment in foreign currency
- 08 Guaranteed tariff for green energy projects



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THE KYRGYZ REPUBLIC

**WE INVITE YOU TO INVEST
IN THE ENERGY SECTOR OF
THE KYRGYZ REPUBLIC!**



Ibrayev T.O.