



# **Investment in the Water and Energy Complex of Central Asia**

Centre for Infrastructure and Industrial Research  
Centre for Integration Studies

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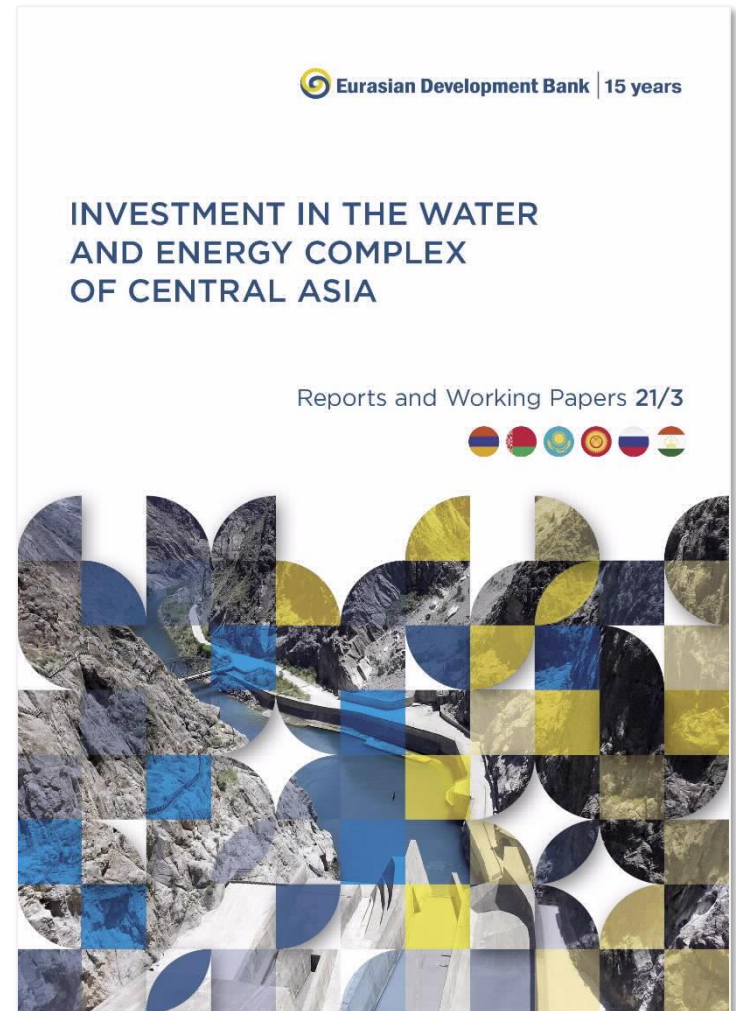
# Development of cooperation in the water and energy complex of Central Asia

The central theme of the report is the **investment in the water and energy complex of Central Asia (CA)**.

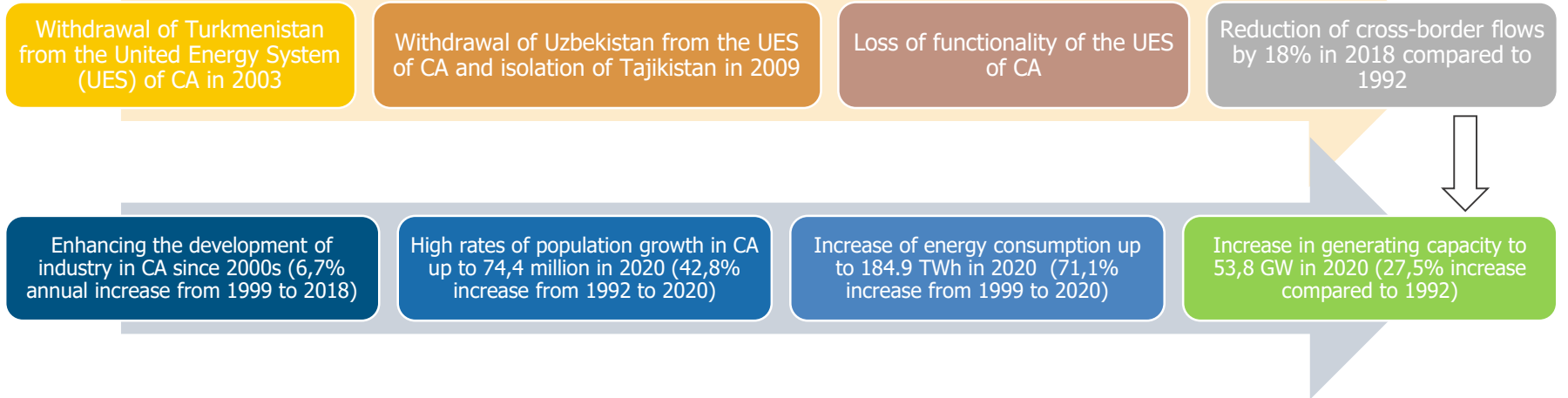
It is a part of the Bank's joint efforts to reach conceptual and concrete solutions for the water and energy complex of CA based on the entire region's interest.

The report covers:

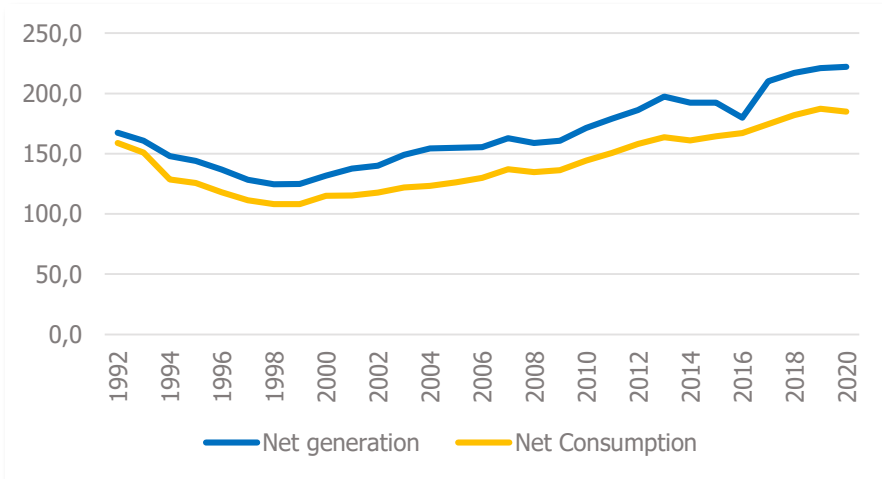
- 1) an analysis of the current situation and challenges in the water and energy complex of CA after 30 years of independence of the five countries of Central Asia;
- 2) diagnostics of investment activities in the water and energy complex of CA by identifying key players, analysing investment strategies and plans, state programmes, current investment proposals, etc.;
- 3) a preliminary assessment of capital investment needs for the infrastructure of the water and energy complex of CA and identification of development directions based on the state programmes.



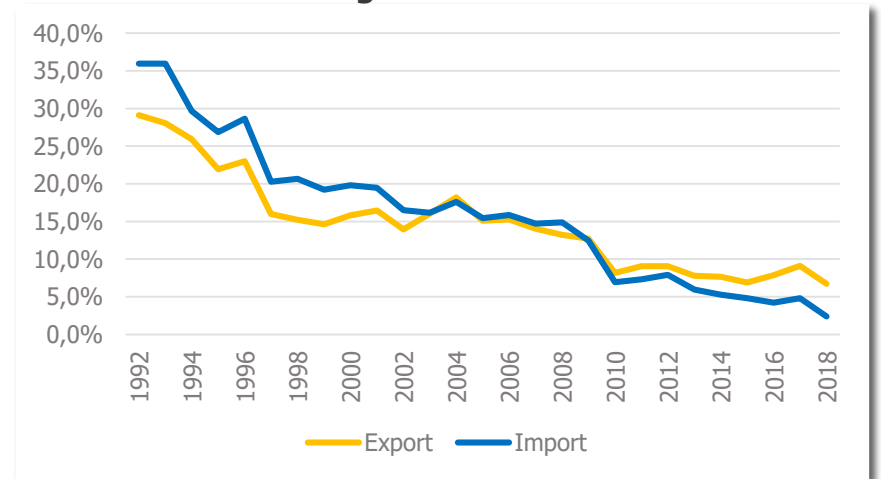
# Current state of the water and energy complex of Central Asia: towards self-sufficiency of national energy systems



**Electricity Generation and Consumption in CA, billions of kWh**



**Export and Import of Electricity in CA, % of net generation**

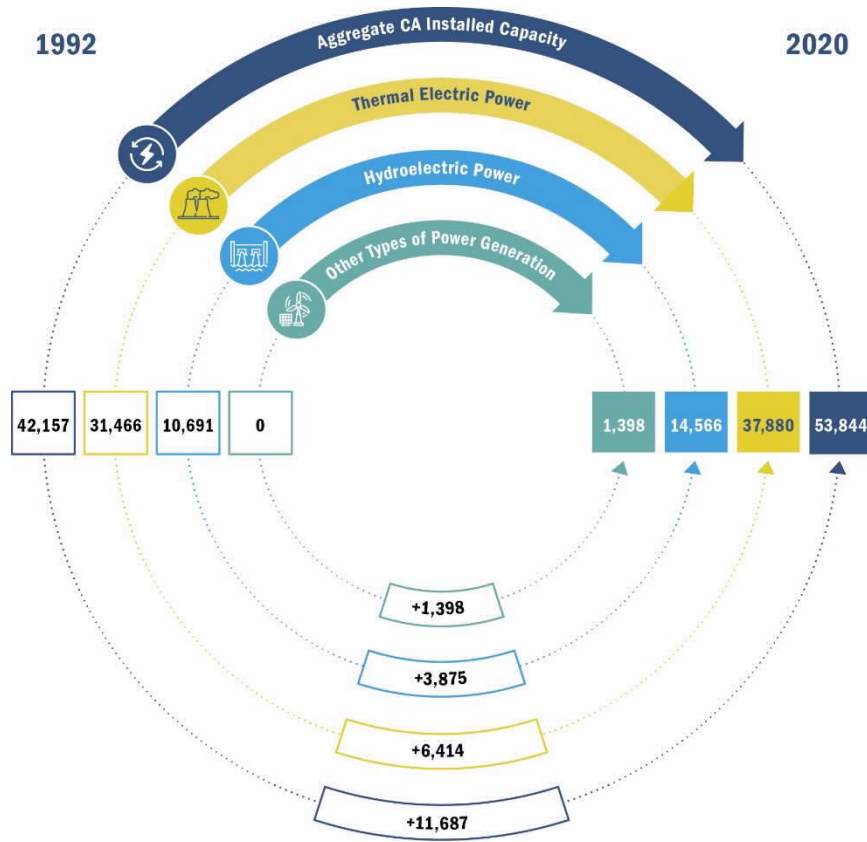


Source: based on EIA data

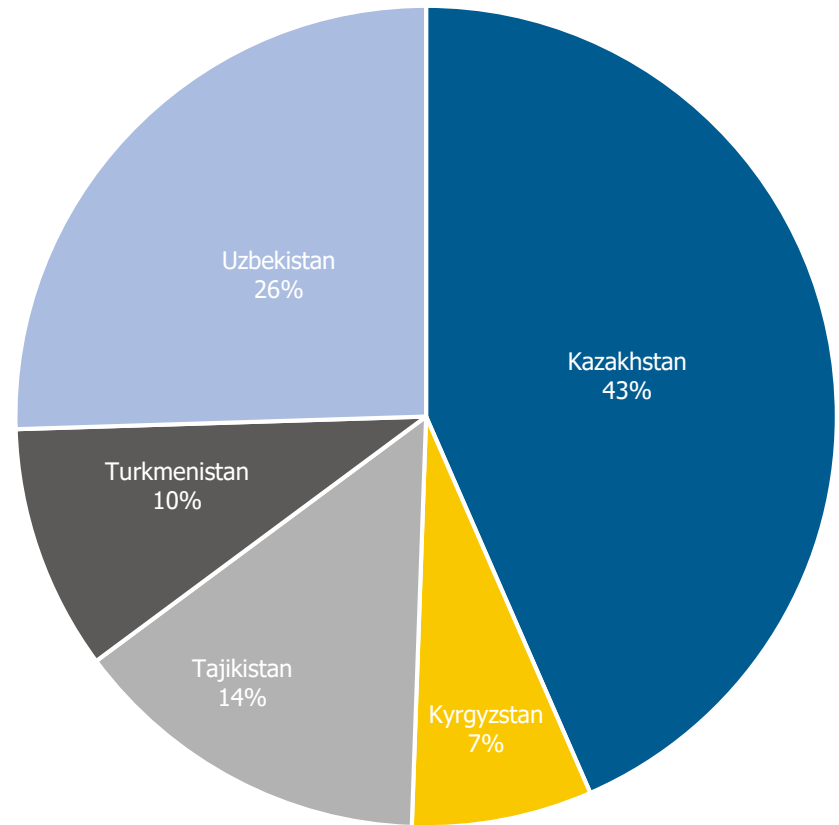
Source: based on EIA data

# Generating capacities in Central Asia have increased because of TPPs and HPPs, followed by renewable energy

Changes in CA Installed Capacity, MW



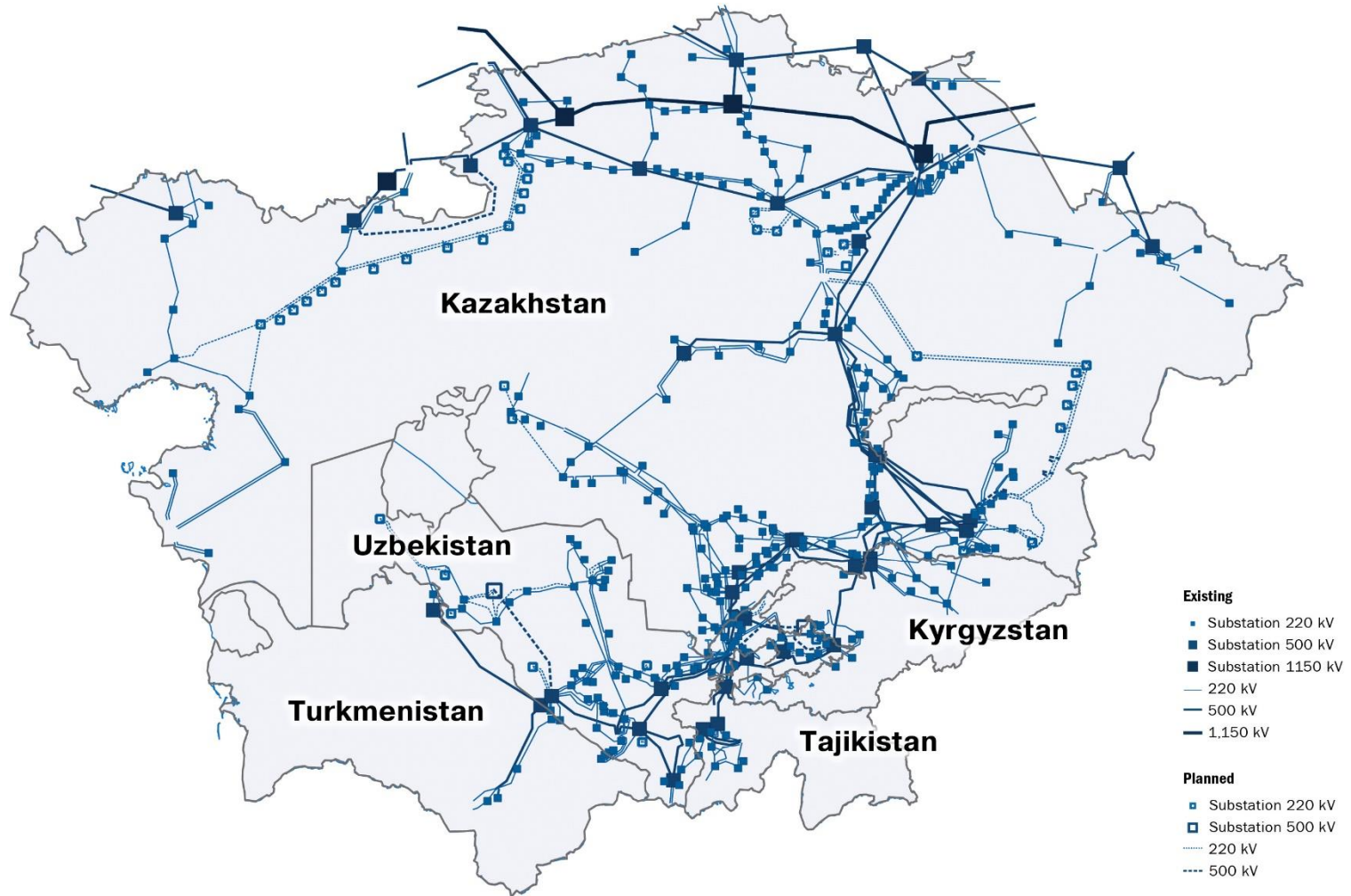
CA Installed Capacity Structure, 2020



Source: based on data provided by EIA and Fitch Solutions

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# The architecture of the regional electric network determines interdependence and the nature of relations among Central Asian countries



Source: ESCAP (2018) Energy and Development in Central Asia. A statistical overview of energy sectors in Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, and Uzbekistan

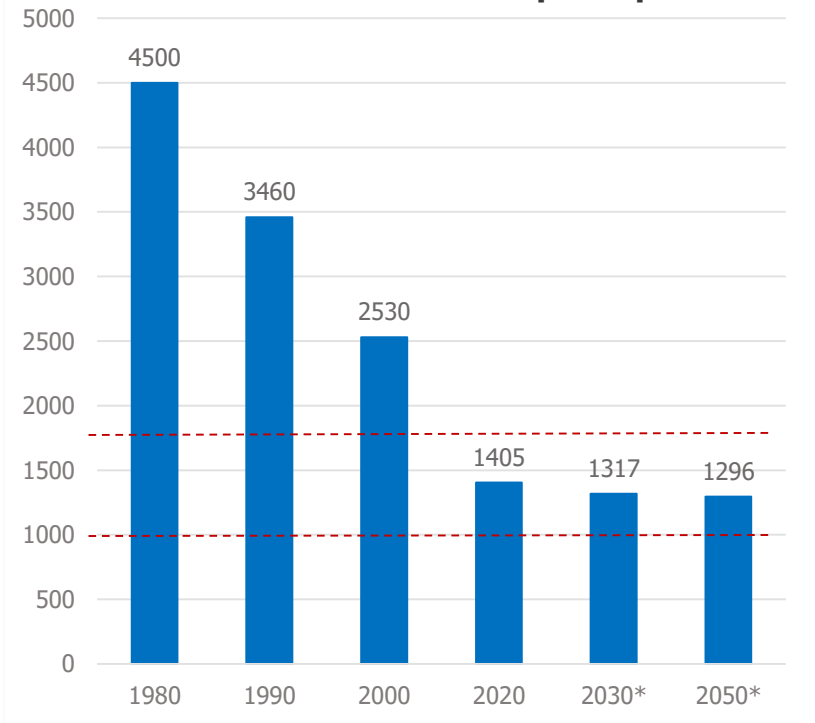
# Water depletion has been occurring due to population growth, development of industry and climate change in CA

## Water resources of Central Asia



Source: UNEP, GRID-Arendal and Zoi Environment Network (2011)

## Water supply level in Central Asia, thousand cubic metres per capita



Source: IWMCC RIC, authors' calculations

The water shortage has taken place for the countries of the Aral Sea basin **up to 1,400 cubic metres per person per year with the threshold of 1,700 cubic metres**. There is a possibility for falling closer to the "scarcity" category (criteria defined by Falkenmark and Widsrand).

# Cooperation status in the water and energy complex of CA

## Countries in the lower reaches of transboundary rivers

### Kazakhstan

- Parallel operation with the United Energy System of CA - ensuring mutual electrical power exchange in the South Zone of the Republic of Kazakhstan.
- The country is opposed to constructing large hydropower facilities in the Syr Darya river basin without agreement with all countries related to the basin.
- It is necessary to solve the issue of water supply, including for irrigation purposes.

### Uzbekistan

- Parallel operation with the United Energy System of CA - ensuring mutual electrical power exchange. Supplies electricity to Afghanistan's North East Power System.
- Since 2017, Uzbekistan has softened its position on constructing the Rogun HPP in Tajikistan and the Kambarata HPP in Kyrgyzstan.
- Practical measures for the restoration of work with the power system of Tajikistan.
- Initiation of a dialogue on the restoration of the United Energy System of CA. Management of the Coordination Dispatch Centre, so-called Energy. A project on launching a regional power exchange.
- It is necessary to solve the issue of water supply, including for irrigation purposes.

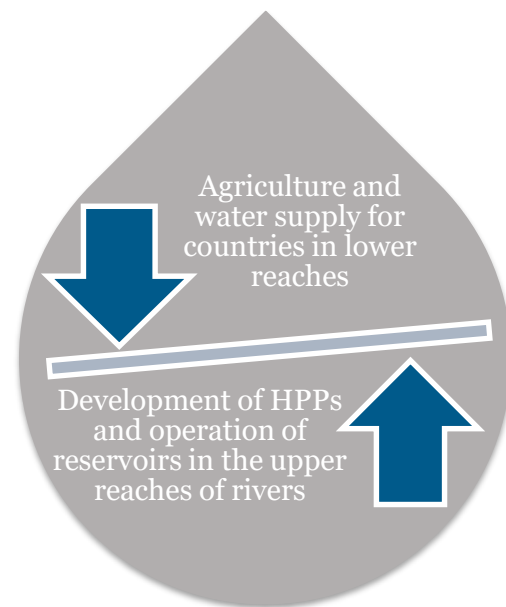
### Turkmenistan

- It is not a member of the United Energy System of CA.
- The country makes efforts to enter the South Asian markets: parallel work with the Iranian power system and interconnecting power grids.
- It is an active participant of the TUTAP project (Turkmenistan - Uzbekistan - Tajikistan - Afghanistan - Pakistan), which implies the supply of electricity from the TPPs of Turkmenistan and Uzbekistan towards Afghanistan and then Pakistan.

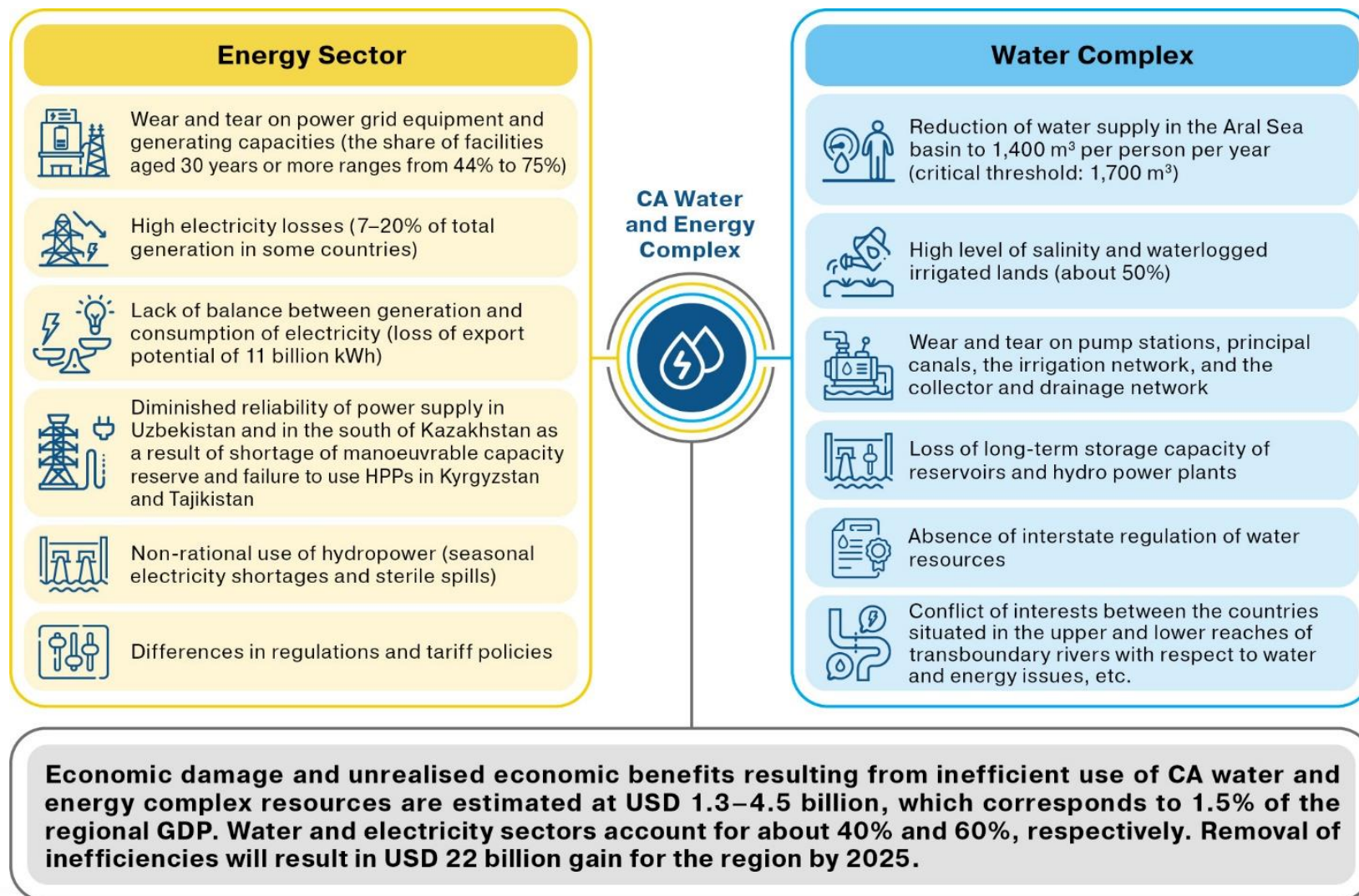
## Countries in the upper reaches of transboundary rivers

### Kyrgyzstan and Tajikistan

- The countries promote projects on the construction of hydroelectric complexes on the beds of transboundary rivers and integrated management of water and energy infrastructure.
- Request for compensation of expenses for the maintenance of interstate hydro-technical facilities.
- Kyrgyzstan has retained its work with the United Energy System of CA for mutual electrical power exchange.
- Tajikistan re-entered the United Energy System of CA in March 2018. At the same time, it is seeking to enter the South Asian markets to export the expected surplus of electricity (CASA-1000).



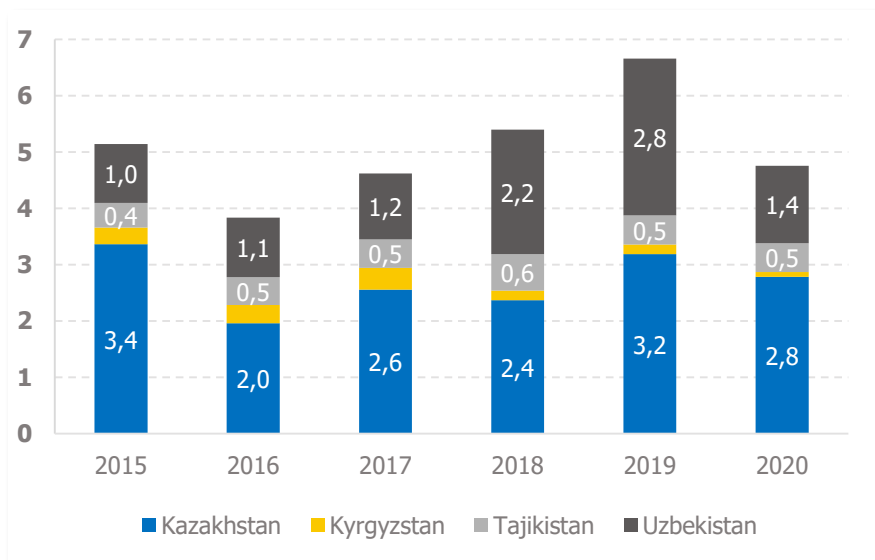
# The enhancing cooperation will solve the main challenges of the water and energy complex of CA and increase the GDP growth rate by 1.5 p.p. in five years





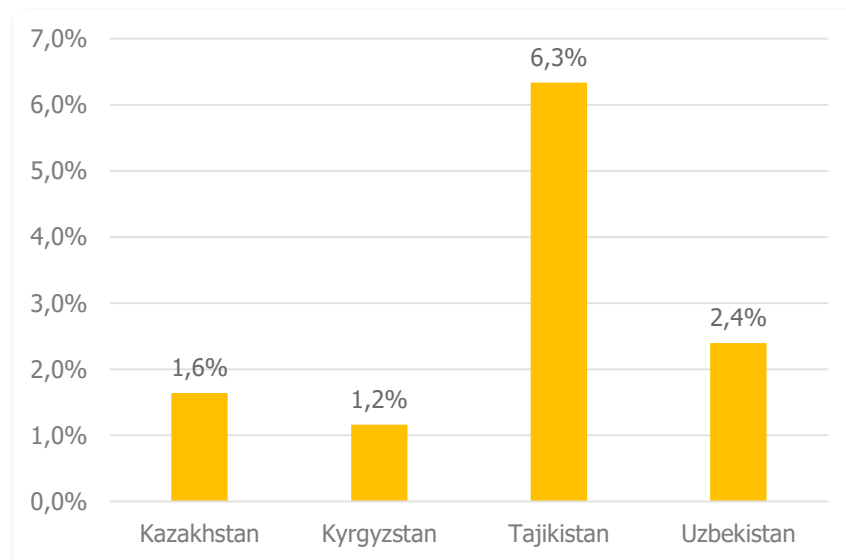
# Central Asian countries play a crucial role in the development of the water and energy complex

Changes in Capital Investment in CA Water and Energy Complex in 2015-2020, USD billions



Source: based on data provided by statistical agencies and CEIC

Share of Capital Investment in CA Water and Energy Complex in 2020, % of GDP



Source: based on data provided by statistical agencies and CEIC

- **The Central Asian states take an active part in** 1) developing strategic directions; 2) determining tariff policy; 3) finding funding sources; 4) implementation of investment projects, etc.
- **In 2020, the largest providers of investment in the water and energy complex were Kazakhstan (USD 2.783 billion, or 1.6% of GDP) and Uzbekistan (USD 1.377 billion, or 2.4% of GDP).** In Tajikistan and Kyrgyzstan, the capital investments in the water and energy complex amounted to USD 507 million (6.3% of GDP) and USD 89 million (1.2% of GDP), respectively.

# MDBs are strategic investors in the water and energy complex of CA

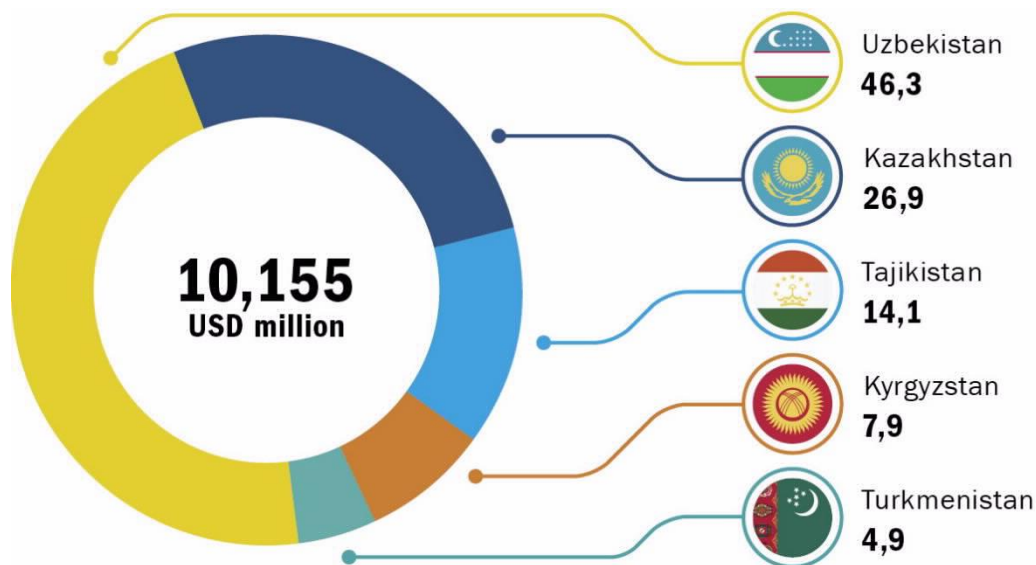
Share in Total CA Financing, %		Amount of Financing, USD billions	
 32.7	 European Bank for Reconstruction and Development	3.318	
 29.6	 THE WORLD BANK IBRD - IDA	3.005	
 26.2	 ADB ASIAN DEVELOPMENT BANK	2.659	
 6.7	 Eurasian Development Bank EFSD Eurasian Fund for Stabilization and Development	0.677	
 3.8	 European Investment Bank	0.389	
1.1	 AIIB ASIAN INFRASTRUCTURE INVESTMENT BANK	0.107	
 <b>100</b>	<b>Total:</b>	<b>10.155</b>	

Source: calculated by the authors on the basis of public MDB data as of 1 April 2021.

- There are **104 ongoing MDB-financed projects**, with a total value of USD 10.2 billion.
- **The EBRD tops the list of funding providers** with a portfolio of USD 3.3 billion or 32.7% of total MDB financing in CA.
- It is followed by the **WB (USD 3.0 billion, or 29.6%)** and the **ADB (USD 2.6 billion, or 26.2%)**. The combined EDB, EFSD, EIB, and AIIB portfolio stands at USD 1.2 billion (11.5%).

# Uzbekistan is the leader in Central Asia in terms of funding allocation from MDBs

Share of CA Countries in Total MDB Financing, %



Source: calculated by the authors on the basis of public MDB data as of 1 April 2021.

**Uzbekistan is the leader in Central Asia in attracting funding from MDBs (USD 4.7 billion or 46,3%).**

Cooperation with the MDBs has enhanced significantly after the government announced a course towards political and economic openness.

However, **Kazakhstan** has the **largest number of active water and energy projects – 39 projects for a total of USD 2.7 billion, or 26.9%.**

The structure of MDB investments in the water and energy complex of CA shows that **energy projects prevail** over water resource management and water supply projects.

# Cooperation develops within the framework of international and regional initiatives (including MDBs' support)



CAREC Energy Strategy 2030  
(ADB)



World Bank's Central Asia  
Energy-Water Development  
Programme



Deutsche Gesellschaft  
für Internationale  
Zusammenarbeit (GIZ) GmbH

Transboundary Water  
Management in Central Asia,  
GIZ (German Federal Foreign  
Office)



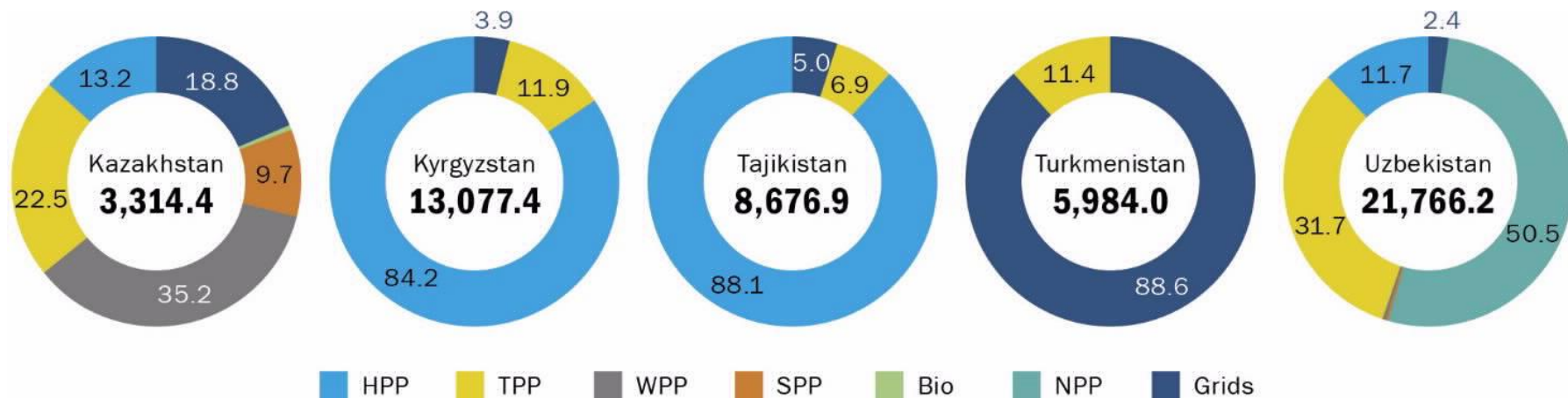
Transboundary Water  
Management Adaptation in  
the Amu Darya Basin to  
Climate Change Uncertainties

These initiatives are aimed at:

- **environmental improvement;**
- promotion of **integrated water resources management** technologies;
- adoption and **development of green energy** through exchange of experience and technologies;
- providing **technical assistance** in the energy sector, water supply and effective management of water and land resources;
- improvement of **melioration, irrigation, and drainage systems.**

The initiatives also pursue political goals through the proposed configuration.

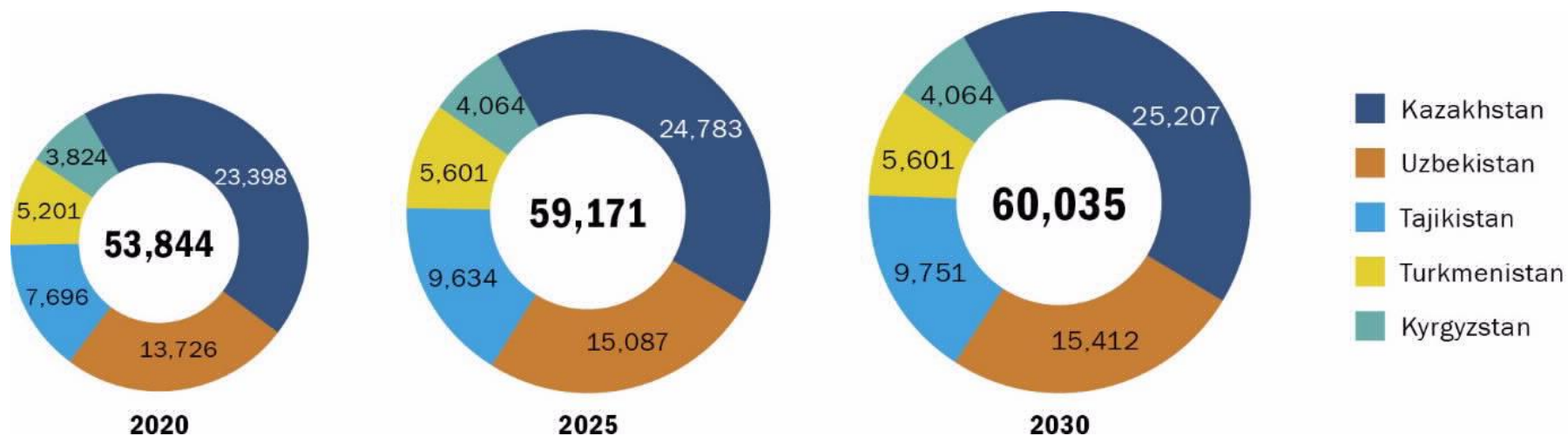
# Investment proposals in the energy sector of the water and energy complex of CA are estimated at USD 52.8 billion



- **The generation segment** and the power grid **account for USD 45.4 billion (86.0%)** and USD 7.4 billion (14.0%), accordingly.
- **Uzbekistan is the leader in announced projects** (USD 21.8 billion, or 41.2%).
- **Kyrgyzstan** (USD 13.1 billion, or 24.8%) and **Tajikistan** (USD 8.7 billion, or 16.4%) have been trying to build up their **hydropower potential** for a long time.
- **Kazakhstan (USD 3.3 billion, or 6.3%) actively develops renewable energy.** SPP and WPP construction projects account for 35.2% (USD 1.2 billion) and 9.7% (USD 323.1 million), respectively.

# The implementation of the current investment projects contributes to the increase in capacity to 60GW by 2030

Projected CA Installed Capacity, 2021–2030, MW



- The relatively high growth of GDP **is expected** to remain in the period from 2020 to 2030 and thereby **increase the loads on the existing generating capacity and grid infrastructure** (by 13.6% or 25.1 TWh).
- The active **policy** of expanding generating capacity pursued by most CA countries (increase by 12.4%, or by 6.6 GW to 60 GW in 2030) will make it possible to **meet the growing regional demand**.

# Investment proposals in the water sector of the water and energy complex of CA are estimated at USD 8.7 billion by 2030

In 2020, Central Asian countries **experienced the shortage of water:** water availability level was 1,405 cubic metres per person per year with the threshold of 1,700 cubic metres.

All CA countries expect a **further increase in the use of water resources** for irrigation and hydropower.

**Investment needs** at the moment amount to about **USD 8.7 billion** for the period from 2021 to 2030.

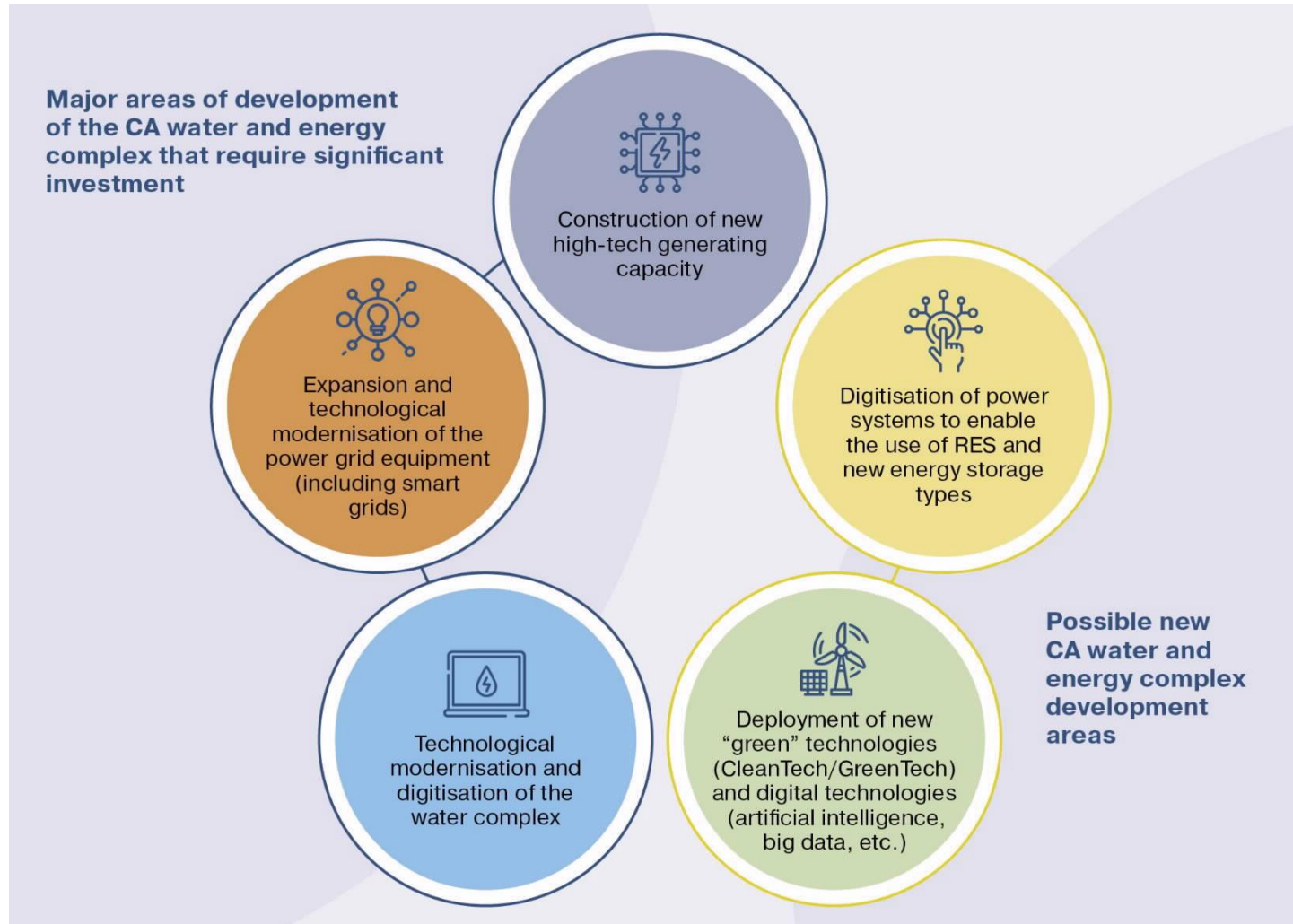
The bulk of water sector investments will go to **Kazakhstan (49.3%)** and **Uzbekistan (26.2%)**.

## Planned and Projected Investment in CA Water Sector

	2021–2025, USD millions		2026–2030, USD millions	
	annual average	over a period	annual average	over a period
<b>Kazakhstan</b>	530	2140	535	2140
<b>Kyrgyzstan</b>	70	350	75	375
<b>Tajikistan</b>	45	225	50	250
<b>Turkmenistan</b>	90	450	95	475
<b>Uzbekistan</b>	250	1250	205	1025
<b>Total</b>	990	4415	960	4265

Source: authors' calculations based on publicly available data

# The main directions of the water and energy complex development in Central Asia





# Conclusion



The analysis of investment trends shows that the **key principle of the water and energy complex of CA**, which implies that **water is more important than energy, has not been observed** for more than 30 years.



Under the insufficient investment attractiveness of the water and energy complex of CA and the low profitability of projects for private capital, the **states and the MDBs are the main players**. The MDBs currently implement **104 projects** worth **USD 10.2 billion**.



The ongoing and prospective investment projects in the energy and water sectors of the water and energy complex of CA are estimated at **USD 52.8 billion** and **USD 8.7 billion** until 2030. The projects aim to meet national interests, which is a consequence of the **uncoordinated development of the water and energy complex**.



Natural and geopolitical factors and environmental challenges **predetermine the need for regional integration into the water and energy complex of CA**, which is especially relevant in the context of water depletion in the Aral Sea basin.



Enhancing cooperation in the water and energy complex of CA will make it possible to increase the **efficiency of using water and energy resources** in the region and **optimise the amount and structure of investments**.



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Thank you for your attention!  
Շնորհակալություն ուշադրության համար.  
Дзякуй за ўвагу!  
Назар аударғандарыңызға рахмет!  
Назар салганыңыздарга рахмат!  
Благодарю за внимание!  
Раҳмати калон!