Eurasian Development Bank

Regulation of the Water and Energy Complex of Central Asia

Reports and Working Papers 22/4

Regulation of the Water and Energy Complex of Central Asia

FACTS AND FIGURES

ANALYTICAL REPORT '22

81% of the population of CA (60 million people) live in the Aral Sea basin

2,8× increase of water stress (SDG 6.4.2) by 2040 in some regions of CA, according to various climate change models

2,5 USD/m³ water use efficiency (SDG 6.4.1) in CA, while the global average is USD 19/m³ per year

POTENTIAL SOLUTIONS TO IMPROVE THE EFFICIENCY OF THE WATER AND ENERGY COMPLEX REGULATION

1 REGIONAL DIALOGUE ON A SYSTEM OF PRINCIPLES

1. Sovereign equality, territorial integrity, and mutual benefits
2. An optimal mix of the irrigation and the energy regimes
3. A market mechanism for meeting the energy needs
4. Streamlining the institutional framework of the CA water and energy complex
5. Coordinated investment policies, among other things based on co-financing
6. Science and technology cooperation

2 INTERNATIONAL FUND FOR SAVING THE ARAL SEA MODERNISATION AS A KEY FACTOR OF COOPERATION

- Having operated for over 30 years, the IFAS has established a sound legal framework and acquired an adequate status and mandate
- Improving the efficiency of the existing IFAS framework (ICWC, BWMO Syr Darya and BWMO Amu Darya, etc.) is of paramount importance
- It is appropriate to establish an arrangement for coordinating decisions on water management and electricity cross-flows in CA
- It is necessary to streamline the modalities of engagement with a financial operator(s)

3 INTERNATIONAL WATER AND ENERGY CONSORTIUM

A. INTERNATIONAL ORGANISATION

- The key function is to finance major joint investment projects
- The consortium may take the form of a legal entity established through an international treaty
- It is expected that states from outside the region and other investment and technology partners would be able to participate
- International financial institutions can act as a financial operator

B. PROJECT CONSORTIUM

- A consortium can be created in a simplified form using the BOT (build–operate–transfer) or BOOT (build–own–operate–transfer) model, etc.
- Various forms of financing major infrastructure projects are widely used in the world due to their flexibility and the option of capital syndication
- A project consortium is established through an agreement in the form of a legal entity within the framework of the national law of the host country
- Optionnaly, establishment of a project managing company

4 ENGAGING A FINANCIAL OPERATOR

- Long-term loans
- Issue of bonds and equity participation
- Creation of joint ventures
- Attraction, monitoring, and control of investment
- Syndicated financing
- Trade financing
- Payment and settlement services
- Technical assistance

5 INTERNATIONAL RESEARCH CENTRE OF THE CA WATER AND ENERGY COMPLEX

- Integrated regional management solutions for the regulation of the water and energy complex
- Interdisciplinary research to ensure water, energy, food, and environmental security in the Aral Sea basin
- Research to introduce advanced technologies in agriculture, energy, water supply, and water use

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The goal of this report is to propose comprehensive solutions for the regulation of the water and energy complex of Central Asia. The report presents an assessment of the state of water resources in Central Asia in the context of climate change. It offers a detailed analysis of the evolution of various forms of regulation of the water and energy complex of Central Asia, from the Soviet period to the present day, reviews the international experience in water basin regulation potentially applicable for the water and energy complex of Central Asia and proposes potential solutions: a system of principles of effective regulation; comprehensive modernisation of the International Fund for Saving the Aral Sea (IFAS) aimed at strengthening of the coordination between the water and energy sectors; an arrangement for creating the International Water and Energy Consortium of Central Asia under the auspices of IFAS in its various forms, etc.

Keywords: regulation, power industry, water resources, transboundary water basins, Central Asia, multilateral development banks, international organisations.

JEL: F15, F36, F55, K32, N45, Q25, Q28, Q48, Q54.

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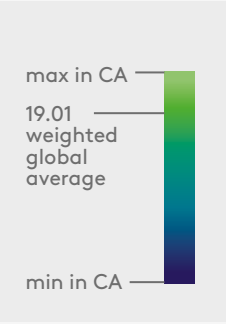
Summary

The economies of Central Asia (CA) are characterised by **a high level of energy and water intensity of the products of various economic sectors**, primarily agriculture and manufacturing. Water use efficiency (SDG 6.4.1) is low compared to global values (see Table A). In 2018, water use efficiency in the CA countries was estimated within a range of USD0.842/m³ in Kyrgyzstan to USD 7.2/m³ in Kazakhstan. The average for the CA region is estimated at USD 2.5/m³, which is extremely low — the weighted global average is USD 19.01/m³. In most (two-thirds) of countries, water use efficiency ranges from USD 5 to USD 100/m³. Based on this indicator, four out of five CA countries (except for Kazakhstan) are on the list of ten world least efficient countries (among 168 countries analysed).

↓ Table A. Water Use Efficiency Indicators in CA, 2018, USD/m³

	Turkmenistan	Kazakhstan	Kyrgyzstan	Uzbekistan	Tajikistan
Irrigated agriculture	0.146	0.035	0.102	0.458	0.227
Manufacturing	28.916	11.556	5.504	12.026	1.643
Services	19.228	31.380	17.298	14.026	5.472
Overall efficiency	1.525	7.201	0.842	1.431	0.882



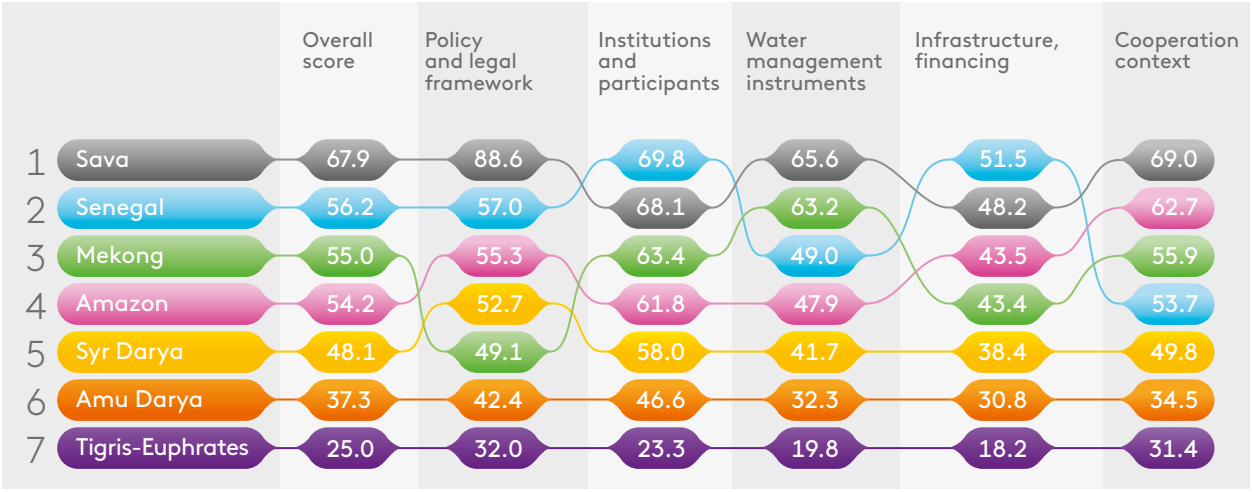
Source: compiled by the authors using UN-Water data (2021).

Coming after generally low level of investment (Vinokurov et al., 2021), the second key reason for the low efficiency of the use of water and energy resources, and thus high economic costs in the region, is **insufficient regional cooperation** among the CA countries. The current format of cooperation in the Aral Sea basin is inconsistent with the principles of effective management of transboundary water and energy resources, does not enhance the efficient use of these resources, and does not help achieve an effective water use regime and improve the environment in the basins of the Syr Darya and Amu Darya rivers (see Table B). The Economist Intelligence Unit Blue Peace Index reports poor performance of the Syr Darya and Amu Darya river basins compared to other basins: they rank respectively 5th and 6th out of 7.

Since 1992, the CA states **have made repeated attempts** to establish effective regulation of the CA water and energy complex based on multilateral regional agreements, bilateral agreements, and regional alliances (CAU, CAEC, CAC, EurAsEC) and to resolve the issue of joint management of the region's water and energy resources. However, none of those attempts achieved their goals. Planned projects, such as those to form a common market of the countries of the region, and to create a water and energy consortium for the use of transboundary water resources, failed. Despite the fact that the above alliances, as well as the International Fund for Saving the Aral Sea (IFAS), benefited from strong support from the World Bank, the Asian Development Bank (ADB), and many other international organisations and financial institutions, none of the draft agreements on water and energy cooperation prepared in 1993–2010 attained general agreement from the CA countries.

A window of opportunity may have opened for significant progress in the regulation of the water and energy complex. The processes of regionalisation have accelerated noticeably in CA given the renewed political agenda of Uzbekistan to strengthen trust among the CA countries. In 2017, Uzbekistan proposed a mechanism for holding consultative meetings of Heads of State, establishing a regional economic forum, and creating an association of heads

↓ Table B. Blue Peace Index (BPI) Indicators



		Overall score	Policy and legal framework	Institutions and participants	Water management instruments	Infrastructure, financing	Cooperation context
1	Sava	67.9	88.6	69.8	65.6	51.5	69.0
2	Senegal	56.2	57.0	68.1	63.2	48.2	62.7
3	Mekong	55.0	55.3	63.4	49.0	43.5	55.9
4	Amazon	54.2	52.7	61.8	47.9	43.4	53.7
5	Syr Darya	48.1	49.1	58.0	41.7	38.4	49.8
6	Amu Darya	37.3	42.4	46.6	32.3	30.8	34.5
7	Tigris-Euphrates	25.0	32.0	23.3	19.8	18.2	31.4

Source: EIU, 2020.

of regions and business communities of the countries of the region. A process of removing the political barriers that have long prevented the normalisation of interstate relations in the region is underway. For example, in 2017, after a 25-year break, flights between Dushanbe and Tashkent were resumed. A year later, Tajikistan and Uzbekistan abolished the visa regime, and the countries signed an agreement on strategic partnership the same year. After 30 years, Tajikistan and Uzbekistan restored railway communication: on 21 June 2022, the first train arrived from Dushanbe in Tashkent. On a bilateral basis, cooperation has intensified between Uzbekistan and Kazakhstan as well as Uzbekistan and Tajikistan (in particular, on co-financing construction of the Rogun Hydro Power Plant [HPP] and two HPPs on the Zaravshon River; and the restoration of the parallel operation of the national power systems, including through the CAPS); between Uzbekistan and Kyrgyzstan (in particular, on co-financing construction of the Kambarata-1 HPP); between Kazakhstan and Kyrgyzstan (in particular, on co-financing the construction of the Kambarata-1 HPP); and between Kazakhstan and Tajikistan (a memorandum of intent to develop energy links between the energy systems of the two countries is under development). Cooperation among the CA states within the EAEU has developed to a certain extent. Kazakhstan and Kyrgyzstan are full members of the EAEU, and Uzbekistan has had observer status since 11 December 2020. The high-level political dialogue has significantly altered the countries' positions on economic cooperation and, despite some local border conflicts in 2020–2021, is aimed at enhancing combined efforts to address the key issues of cooperation.

On 26 November 2021, **President of the Republic of Kazakhstan K. K. Tokayev** stressed the feasibility of creating an **International Water and Energy Consortium**. The issue of improving the institutional and legal frameworks for cooperation among the CA countries in the water and energy sectors has always been on the agenda of negotiations among the Heads of State and Government in the region and is also a topic for consultations with international organisations.

On 16 September 2022, the Council of Heads of State of the Shanghai Cooperation Organisation adopted the **Samarkand Declaration** (Xinhua, 2022), in which the member states recognise that lack of access to safe drinking water, basic sanitation, and healthy hygiene are major challenges of our time. The Declaration stressed the need to focus more on sustainable development and water management. Special emphasis was placed on further interaction of the UN with stakeholder states and structures in addressing major problems associated with the desiccation of the Aral Sea. The member states noted "the adoption, at the suggestion of the Republic of Uzbekistan, of the UN General Assembly resolution on declaring the Aral Sea region a zone of ecological innovations and technologies (18 May 2021), as well as, based on the positions of the parties, its initiative to launch the Multi-Partner Human Security Trust Fund in the Aral Sea region".

Amid enhanced regional cooperation in CA and increasing scarcity of water and energy resources, **an opportunity emerges to reformat the architecture of relationships in the CA water and energy complex in order to bring a joint solution to the growing shortage of water and energy resources**. The main objectives of integration and regional cooperation in CA include ensuring a sustainable supply of drinking water to the population, as well as water and energy resources to sectors of the economy based on effective functioning of the water and energy complex. Therefore, it is necessary to further improve the mechanism of cooperation for sharing water and energy resources to align it with the political, economic, financial, and environmental goals of each state.

This report suggests the following key elements of potential solutions:

First

Based on an analysis of the evolution of various arrangements for the regulation of water and energy resources in transboundary river basins in the region and around the world, we have identified the **key principles** for developing effective new solutions for regulation and ensuring productive regional cooperation.

Those key principles include:

- **Sovereign equality, territorial integrity, and mutual benefits** of equitable use of water and energy resources in the region on the basis of international water law and international principles of integrated resources management for all member states;

- Ensuring an **optimal mix of the irrigation and energy regimes** of operation of reservoir cascades, taking into account annual and long-term cycles of flow fluctuations and balances of water and energy resources. At the same time, the irrigation regime of operation of the CA water and energy complex is preferable from the point of view of economic feasibility (based on historical experience and the findings of most studies). The critical aspects include the **optimisation of water use technologies (irrigation)** in the states of the lower reaches of the Aral Sea basin (Kazakhstan, Turkmenistan, Uzbekistan) and addressing the issue of **joint maintenance of waterworks** in the upper reaches of the rivers (Kyrgyzstan and Tajikistan).

- **A market mechanism for meeting the energy needs** of the states of the upper reaches of the Aral Sea basin (Kyrgyzstan and Tajikistan), among other things **on the basis of contractual and market principles** (development of the regional market, in particular an appropriate institutional environment and connective cross-border infrastructure) and **coordinated investment policies** aimed at creating an optimal regional mix of generating capacities and ensuring reliable access to energy resources (electricity, fuel and energy resources) through joint construction, upgrading, and operation of the necessary power generation infrastructure;

- **Strengthening the existing and creating new interstate governing and executive bodies** with appropriate status to perform their functions **of coordinated and transparent regulation of the water and energy regimes of the rivers** on the basis of the basin principle; development and use of water and energy resources; regulation of interstate electricity cross-flows and energy supplies associated with the agreed water and energy regime of the rivers in the CA region;

- **An effective mechanism to create investment** incentives and attract investment (security of property rights; investment protection; and, possibly, equitable distribution of incomes and costs related to joint operation of facilities [cf. the experience of the Senegal River basin]) to implement projects (including joint ones) to renovate

existing and build new hydropower and water management facilities of interstate importance, in order to develop and effectively use the water and energy potential of the region, taking into account environmental protection requirements;

- Creating conditions for **industrial, technological, and scientific cooperation** in the water and energy sectors to enhance their export potential and introduce advanced technologies.

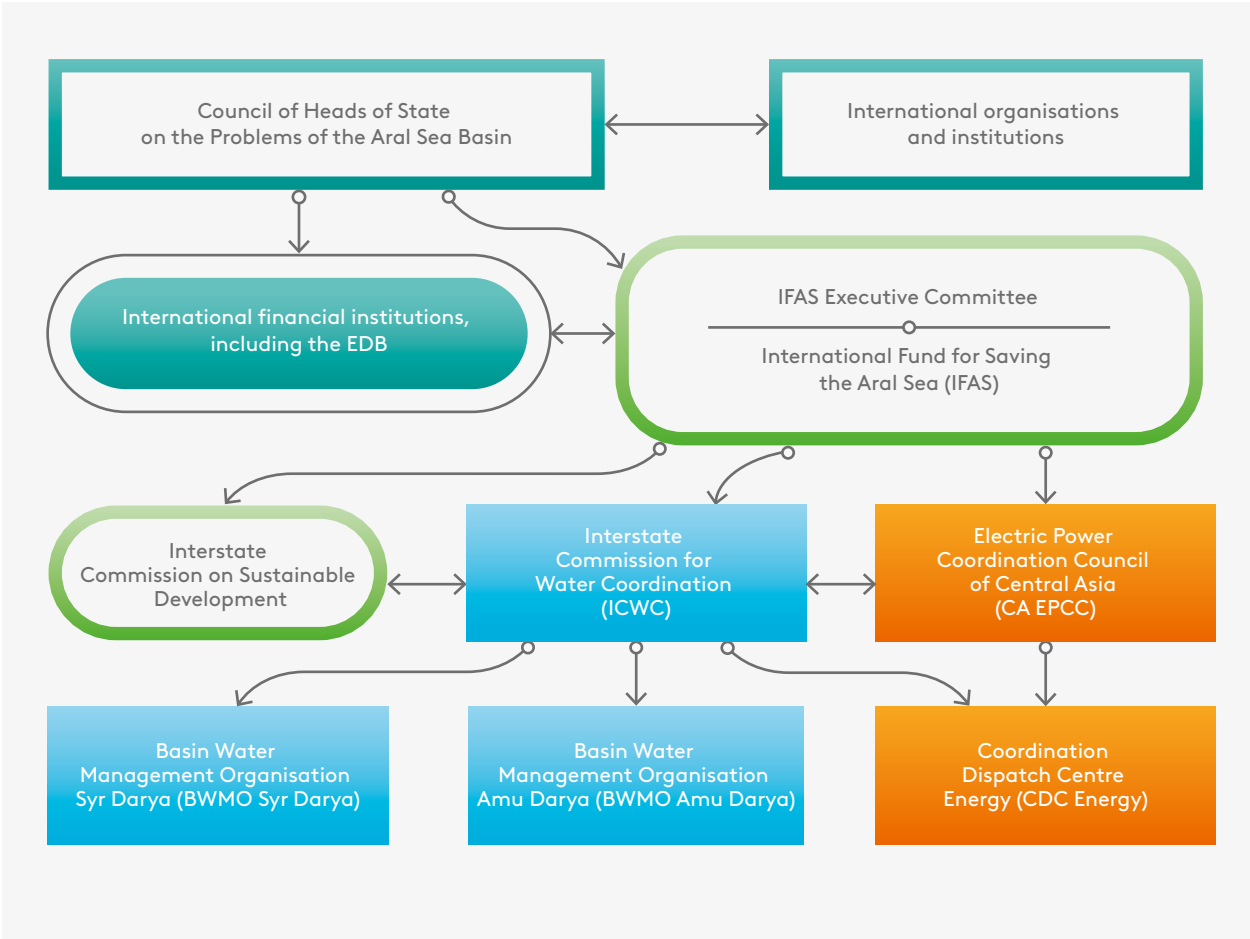
Second

A solution for regulation of the CA water and energy complex based on the identified key principles is primarily associated with **upgrading and enhancing the existing regional organisations** involved in regulation (see Figure A). This applies primarily to **IFAS**, as well as the regulatory entities of the Central Asia Power System (CAPS) — **the Electric Power Coordination Council of Central Asia (CA EPCC) and the Coordination Dispatch Centre Energy (CDC Energy).**

A separate component of the solution is a mechanism for interaction with international financial institutions (IFIs) (including the EDB) to search for financing and jointly implement investment projects.

It seems appropriate and timely **to enhance the role of IFAS** as a political platform for economic integration of the CA countries based on their common interests. Over 30 years of activity, IFAS has formed a sufficient legal framework. The basic institutions for management of transboundary resources are in place, including the Interstate Commission for Water Coordination (ICWC), Basin Water Management Organisation (BWMO) Syr Darya, and BWMO Amu Darya. There are political

↓ Figure A. Proposed IFAS Institutional Framework with Participation of International Financial Institutions



Source: EDB.

opportunities for that: IFAS is headed by one of the CA Heads of State, and the Council of CA Heads of State on the Problems of the Aral Sea Basin is operational.

It seems necessary to ensure **interaction** of the bodies involved in regional regulation of water and energy resources under the auspices of IFAS. Among them are the ICWC, BWMO Syr Darya, and BWMO Amu Darya, **as well as the CA EPCC and CDC Energy**. This would ensure coordinated development of the water and energy segments of the single complex, including through identification of regional priorities in the use of water and energy resources and the development of integrated investment policies. Such interaction, based on the development of joint solutions by the ICWC and the CA EPCC, will make it possible to coordinate annual water and electricity needs (in terms of volume and delivery time). It would facilitate the development of optimal operating regimes of HPPs and reservoirs in order to minimise operating costs and ensure maximum water supply, taking into account environmental requirements, as well as to assist in determining a schedule of needs for fuel and energy resources.

Implementation of national and regional water management programmes and projects requires **sustained investment support**. However, the countries of the region do not have sufficient financial and physical resources to achieve the goals defined for water economy and water resources management. Water management and hydropower projects are among the world's most capital-intensive. IFIs, including the EDB, could assume the **role of financial agents** to mobilise and pool funds from international donors and other stakeholders for programmes and projects and could participate in financing national and transboundary water and energy infrastructure projects in the CA water and energy complex.

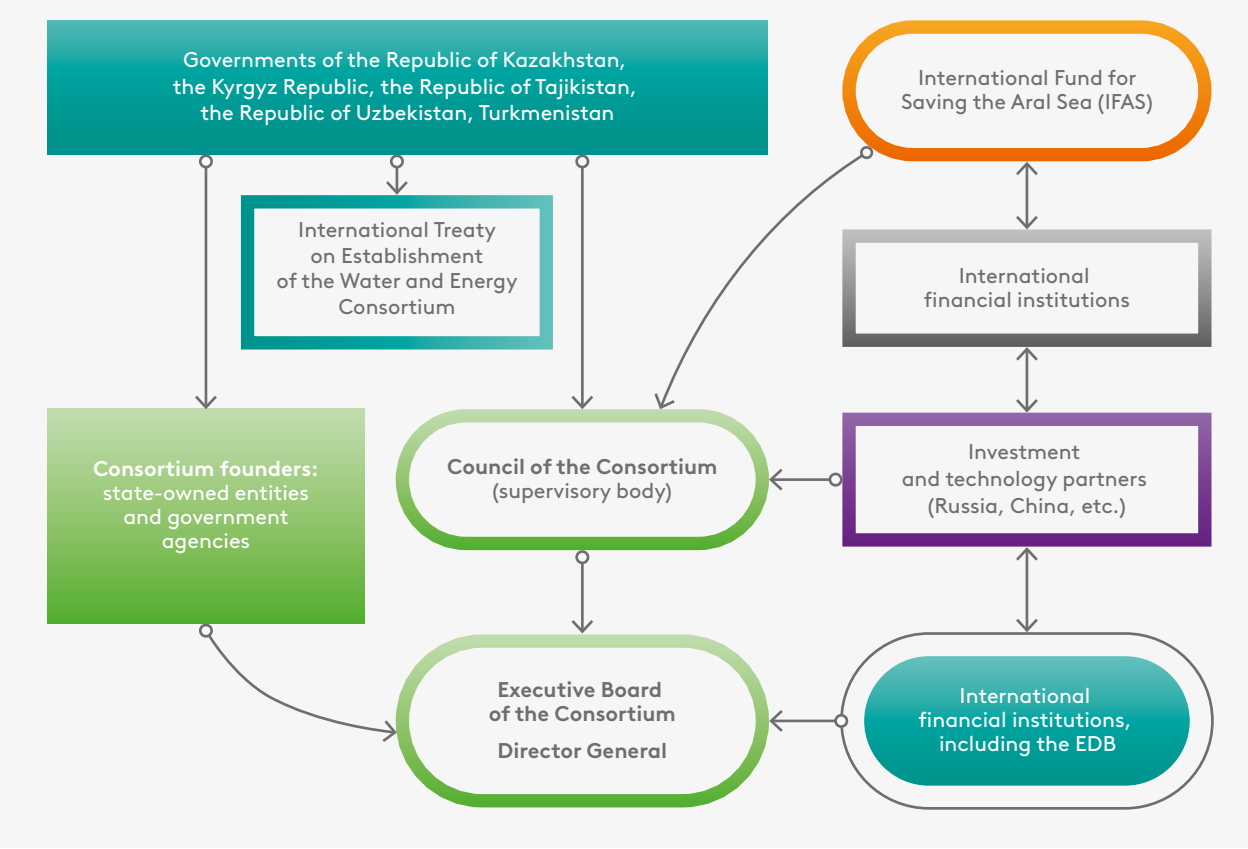
Third

Creation of a new institution — the **International Water and Energy Consortium of Central Asia on the political platform of IFAS** — would be able to take on the key function of seeking and providing financing for national and transboundary infrastructure projects in the CA water and energy sectors (see Figure B). The proposed approach is based on the economic interest of the parties in **joint implementation of new water and energy projects** and the operation of existing facilities, as well as enhancement of regional and national water and energy infrastructure. The Water and Energy Consortium should rely on the modernised existing framework: IFAS, the ICWC, BWMO Amu Darya, BWMO Syr Darya, CDC Energy, etc.

The International Water and Energy Consortium of Central Asia could exist in the form of an international organisation — a legal entity created on the basis of an international treaty. Alternatively, options could be developed for the International Water and Energy Consortium and its subsidiaries (for example, for individual water management facilities) within the framework of national law. A combination of options is possible — the International Water and Energy Consortium itself as an international organisation, and individual facilities within the framework of national law. Legal advice is needed on the issue in order to determine the most flexible and simple form.

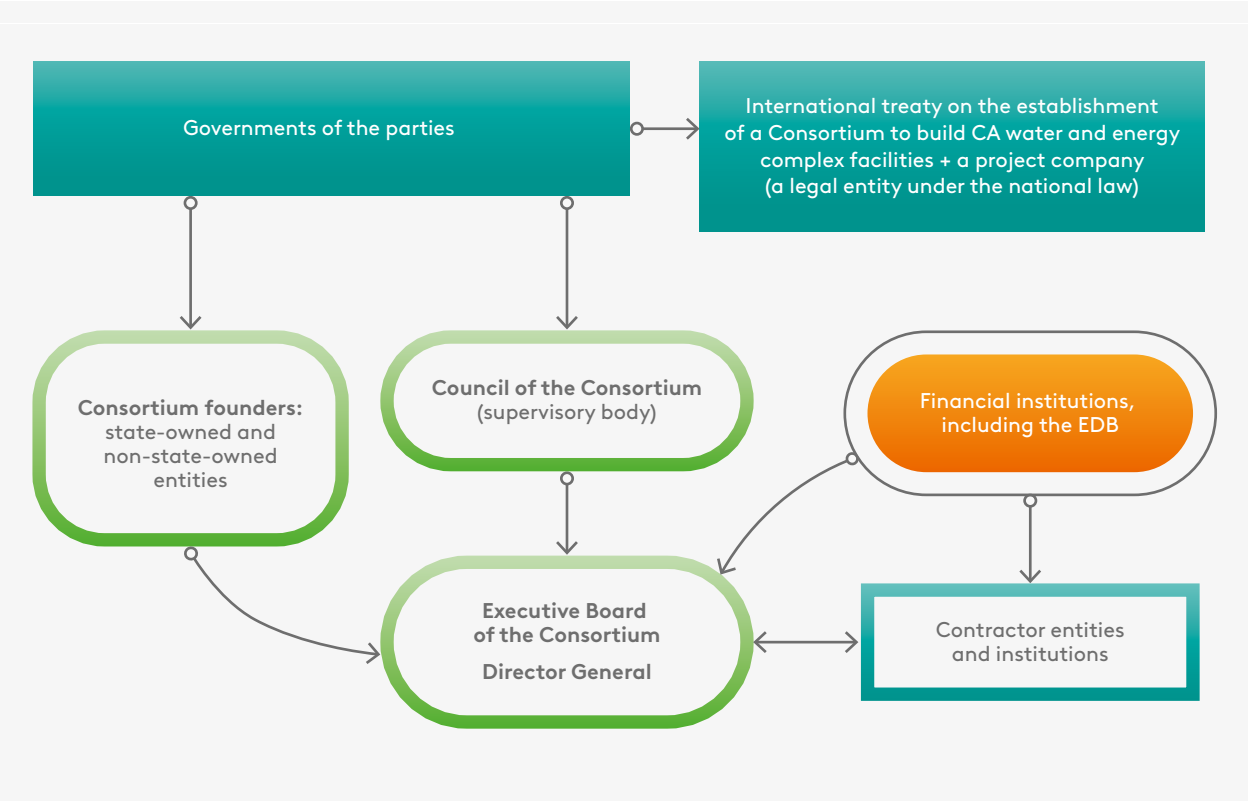
However, the creation of a water and energy consortium in Central Asia to encompass the water and energy complex of the entire region is a difficult task and is still unparalleled anywhere in the world. First of all, regulating the operation of international consortium is not covered by the national legislation of the CA states. Another obstacle to the creation of a consortium is that the CA water and energy complex consists of numerous national hydropower and irrigation facilities, with the exclusive and sovereign right to own and manage them reserved by the relevant CA states. Therefore, stakeholders could rely on simpler forms of cooperation to build major infrastructure facilities for the CA water and energy complex (for example, HPPs), such as a project consortium using the BOT (build — operate — transfer) or BOOT (build — own — operate — transfer) model and based on the principles of project financing.

↓ Figure B. Proposed Institutional Framework for the International Water and Energy Consortium of Central Asia. Option of Creation of an International Organisation



Note: the diagram shows the functional interaction of IFAS with the Consortium (not reflecting the hierarchy). IFAS remains subordinate to the Council of Heads of State.
Source: EDB

↓ Figure C. Institutional Framework for a Consortium Based on the BOT or BOOT Model



Source: EDB

Fourth

The financial operator of the International Water and Energy Consortium may be an IFI (or IFIs), including the EDB, whose activities will be regulated by a special agreement with the Consortium. The modalities of the financial operator's engagement in the CA water and energy complex activities may include:

- provision of **long-term loans**, including project-related ones (and under government guarantees), to finance the construction of power generation and water management facilities;

- investment **through the issue of bonds** (green bonds in the power industry and their derivative water bonds in the water sector to finance the construction and upgrading of water pipelines and sewers), as well as acquisition of shares in facilities under construction;

- **creation of joint ventures** for the construction and operation of facilities with resources potentially mobilised from IFIs, international donors, and private investors;

- **organisation of syndicated financing** to pool financial resources from international donors and potentially mobilise additional external and domestic financial resources of the private sector;

- **trade financing** aimed at ensuring timely mutual settlements of the Consortium members for the supply of electricity, fuel and energy resources, payments for water management services, purchases of appropriate power generation equipment, etc. The Consortium can streamline the system of payments and cash flows among the CA states and thereby ensure sustainable functioning of the CA water and energy complex; and provision of **financial, technical, and advisory assistance** in the preparation of feasibility studies for the construction of facilities and enhancement of the research potential in the area of management of water and energy resources in CA.

The development of mechanisms for joint regulation of the CA water and energy complex can **serve as a basis for enhancing economic, trade, and investment cooperation** in the region. By providing a legal framework for cooperation at the regional level and incentives for combined efforts, the new approaches to the CA water and energy complex regulation may substantially simplify and accelerate the formation of an Integrated Energy Market (IEM) in the region.

Fifth

Effective regulation and development of the CA water and energy complex is a tough challenge. Other measures can and should be added to the above key proposals, building a kind of **"ecosystem" of CA water and energy complex institutions and organisations as a result**. In particular, the activities of the SIC ICWC and CDC Energy based in Tashkent could be supplemented through the creation of an **International Research Centre of the Water and Energy Complex of Central Asia**. This goal could be achieved with technical assistance from international development bank, including the EDB.