

Central Asia Energy Water Development Program

PROMOTING PATHWAYS TO ENERGY AND WATER SECURITY

2009-2017 IMPACT REPORT



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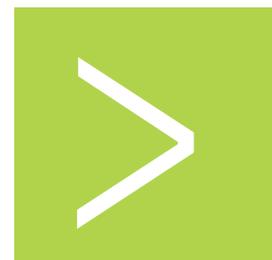
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FOREWORD

Central Asia presents a diverse geographic landscape which perpetually has been at the crossroads of transport and trade; historically, the Silk Road, today, it is a key to connectivity along the Eurasian Belt-and-Road Initiative. The region's wealth of water and energy resources equally create physical interlinkages between the countries that necessitate coordination in the sustainable and equitable management of these resources. To this end, the World Bank and its development partners have established the Central Asia Energy-Water Development Program (CAEWDP) to support countries in their efforts to achieve energy and water security.

The World Bank recognizes that "regional programs offer substantial potential to achieve results on development issues [...] Regional projects have successfully built new assets and protected existing ones in ways expected to benefit all participating countries." (World Bank Independent Evaluation Group). Enhanced collaboration at the national and regional levels provide the Central Asian countries with the necessary information, capacity and resources to catalyze socio-economic development, poverty reduction, and climate resilience.

In this spirit, the Program has been engaged in strengthening an enabling environment to promote energy and water security by supporting national and regional initiatives together with development partners since 2009. Activities have focused on connecting governments, practitioners and youth with technological innovations and solutions to overcome legacy resource management challenges and aging infrastructure.

The Program has and continues to deliver substantial technical expertise, analytics, and diagnostics to enhance knowledge for informed decision-making to leverage smart investments, while also creating the space for collaboration through transparent information platforms and dialogue on energy and water security matters.

CAEWDP has established several important building-blocks and honed credible pathways for significant development impacts. As the program is about to embark on a third funding phase starting 2018, this report provides a stocktaking of CAEWDP results and impacts to date.



Cyril E. Muller
Regional Vice President
Europe and Central Asia

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CHAPTER 1.

INTRODUCTION



REGIONAL WATER AND ENERGY NEXUS

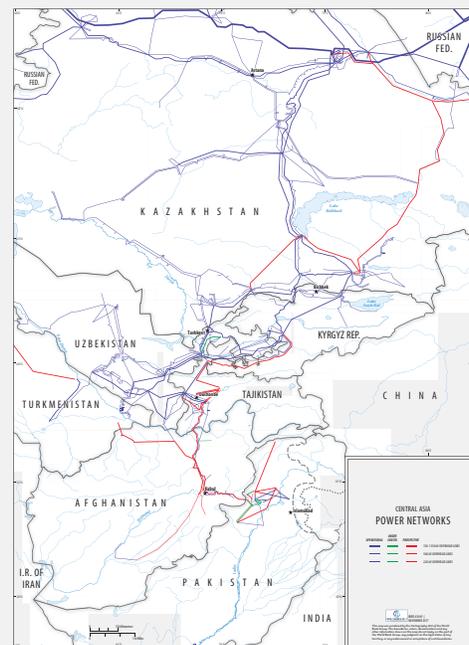
In Central Asia, water and energy systems are inextricably intertwined (Fig. 1 and 2). Nature determines the hydrologic interlinkages: multiple transboundary rivers, including the Amu and Syr Darya of the Aral Sea basin, connect the territories of the Central Asian republics. Energy interdependence is man-made: the newly independent states inherited the remains of an intricate energy-for-water trading scheme which supplied electricity generated from the downstream fossil energy riches to the upstream countries during the cold winter season, so that the latter would store water for summer-irrigation needs in their reservoirs. With the collapse of the Soviet Union a unitary system became transboundary overnight. The re-established national borders continue to pose significant challenges to optimize asset operation and for national and regional water and energy resources management. CAEWDP was established to help the countries with these nexus challenges.

FIGURE 1: WATER RESOURCES IN THE ARAL SEA BASIN ILLUSTRATING AVERAGE RIVER FLOW AND WATER INTAKE BY CANALS (KM³/YEAR).



Source: Aral Sea Water Map: <http://www.flickr.com/photos/zoienvironment/7525832184/in/photostream>

FIGURE 2: CENTRAL ASIA POWER SYSTEM



CHAPTER 2.

CAEWDP OBJECTIVE AND PROGRAMMATIC APPROACH



2.1 PROGRAM STRUCTURE

The Central Asia Energy and Water Development Program (CAEWDP) is a partnership between the World Bank, the European Commission, Switzerland (through SECO), the United Kingdom (through DFID), and the United States (through USAID) to address the challenges of cross-border system interlinkages and national and regional energy and water resources management.

Structured along three themes: (1) energy development; (2) energy-water linkages; and (3) water productivity the program pursued three outcome areas since its inception in 2009: (a) investment preparation; (b) regional institutions; (c) diagnostics and analysis (Fig. 3).

> CAEWDP OBJECTIVE

CAEWDP seeks to strengthen the enabling environment to promote energy and water security at regional level and in the beneficiary countries.

FIGURE 3. SCHEMATIC OF CAEWDP 2009-2017 PRIORITY SECTORS AND PLANNED OUTCOMES

THREE PILLARS



ENERGY DEVELOPMENT

Support policy and investments decisions for the highest value mix of resources



ENERGY-WATER LINKAGES

Improve understanding of linkages between water and energy and facilitate regional dialogue



WATER PRODUCTIVITY

Increase productivity and efficiency of water use in both agriculture and energy sectors

THREE OUTCOMES



INVESTMENT PREPARATION

Expanded water and energy infrastructure investments, with early results



REGIONAL INSTITUTIONS

Strong physical, intellectual and management hubs for regional cooperation and dialogue



DIAGNOSTICS AND ANALYSIS

Better identify the costs, benefits, opportunities and risks of cooperation to national interests

FIGURE 4: CAEWDP OUTCOMES (WITH DIALOGUE PRESENTED AS SEPARATE OUTCOME)

UPGRADING KNOWLEDGE FOUNDATIONS

SHAPING INSTITUTIONS, STRATEGIES AND POLICIES

SUPPORT TO INVESTMENTS

NURTURING REGIONAL DIALOGUE



INFORMATION

- Use of modern technologies
- Analytical development tools
- Diagnostics, new knowledge and platforms for data sharing

INSTITUTIONS

- Strengthening national and regional institutions
- Informed institutions, practitioners and decision makers
- Updating strategies and policies at national and regional levels

INVESTMENTS

- Improved management and investment decisions
- Identification of investments opportunities and options

DIALOGUE

- Building and expanding partnerships
- Consolidating regional coordination on water & energy



2.2 PROGRAM APPROACH

CAEWDP supports the beneficiary countries in achieving their water and energy resources management priorities through national and regional actions, addressing the existing challenges and identifying opportunities to generate benefits at the national level and through regional cooperation. These priorities are framed by the “3-I”s – information, institutions, and investments (Fig 4.). CAEWDP promotes an enabling environment for water and energy security through generation of knowledge, strengthening of capacity and dialogue processes, and identification of investments. From inception, the program broadened its engagement progressively from diagnostic analyses and information to increasingly strengthening institutions and to catalyzing investments.

2.3 HIGHLIGHTS OF ACHIEVEMENTS

CAEWDP’s support catalyzed complex regional investments, such as the Central Asia Hydromet Modernization Project (CAHMP), the Climate Adaptation and Mitigation for the Aral Sea Basin Project (CAMP4ASB) and the Central Asia South Asia Electricity Transmission and Trade Project (CASA-1000). Analytical work at the national level supported policy reforms and institutional strengthening, such as for Tajikistan’s energy sector. Transparent dialogue processes provided opportunities for inclusive engagement of stakeholders and open exchange of opinions among beneficiary countries and development partners, most notably during the six-country consultations on the Rogun Assessment Studies.¹

These examples represent only a selection of the outputs from the program’s technical assistance activities and investment projects. Further achievements and regional impact of the program to date are presented in the following sections.

¹ <http://www.worldbank.org/en/region/eca/brief/rogun-assessment-studies>

CHAPTER 3.

PROGRAM IMPACT



3.1 PROMOTING ENERGY SECURITY

TRADE DISRUPTIONS, AGEING INFRASTRUCTURE AND ELECTRICITY SHORTAGES

The disruption of the centralized Soviet energy trade system had severe impact on electricity supply as well as on power trade and revenue generation. Energy security—an essential component of economic growth—is a critical issue that Central Asian countries need to address at national and regional levels. Failure to do so will continue to hinder economic growth and negatively impact livelihoods and standards of living. CAEWDP approached energy security challenges in Central Asia three dimensionally: inter-regionally, intra-regionally, and nationally.

FACILITATING INTER- AND INTRA-REGIONAL ELECTRICITY TRADE

Considering Central Asia’s abundant hydropower potential and surplus production possibilities during the summer months, CAEWDP facilitates the preparation for viable inter-regional energy trade through the CASA-1000 Project. CASA-1000 is designed to export hydropower from the Kyrgyz Republic and Tajikistan to Pakistan and Afghanistan. It is expected to generate revenue in the Kyrgyz Republic and Tajikistan—the two poorest countries in Central Asia— and increase the energy security of their South Asian neighbors. CAEWDP provides support to the Kyrgyz Republic and Tajikistan financing technical expertise and facilitation of meetings and negotiations of project related agreements as well as preparation of country-specific Environmental and Social Impact Assessments. In 2015, this facilitated the approval of several legal and commercial accords for CASA-1000, which marked a fundamental step forward towards proceeding in infrastructure development.

Within the region, CAEWDP informs decision making on the revitalization of the Central Asian Power System (CAPS) to realize the benefits of energy trade. The *Enhancing Regional Power Trade in Central Asia*² study estimates benefits lost to the countries of Central Asia³ due to the underutilized significant potential of regional power trade during 2010-2014 at about US\$ 6.4 billion (Fig. 5). CAEWDP remains committed to facilitate investment preparation to revitalize the intra-regional power trade once the stakeholders achieve agreement.

FIGURE 5. UNREALIZED ECONOMIC BENEFITS DURING 2010-2014 DUE TO LACK OF ELECTRICITY TRADE IN CENTRAL ASIA

	Benefits from fuel savings only at historic energy prices USD million	Benefits from fuel savings and meeting unserved power demand at historic energy prices USD million	Benefits from fuel savings and meeting unserved power demand at market energy prices USD million
Kazakhstan	249	190	293
Uzbekistan	608	3,226	2,932
Kyrgyz Republic	(68)	900	1,813
Tajikistan	699	879	1,316
Total	1,488	5,195	6,354

Source: World Bank (2016) 'Enhancing Regional Power Trade in Central Asia', study by CAEWDP.

2 Accessible at: <http://documents.worldbank.org/curated/en/672501486549955103/pdf/ACS21198-WP-P147021-PUBLIC-EnhancingRegionalPowerTradeinCentralAsiaReport.pdf>

3 Assumed benefits include both fuel savings and economic value of avoiding unserved energy at historic fuel prices.



ADDRESSING WINTER ENERGY SHORTAGES AND STRENGTHENING NATIONAL SECTOR PERFORMANCE

Focusing on alleviating winter electricity supply shortages and improving living conditions, CAEWDP helped identify solutions to heating efficiency improvements and rehabilitation of aging infrastructure in upstream countries. Pilot activities and analytical assessments financed by CAEWDP informed the US\$ 46 million the Kyrgyz Republic: Heat Supply Improvement Project. This project is expected to benefit 215,000 residents in the Kyrgyz Republic through installation of 1.8 kilometers of district heating pipelines, 1,931 substations, 4,020 hot water meters, and provisioning of 14,000 heating stoves for poor households.

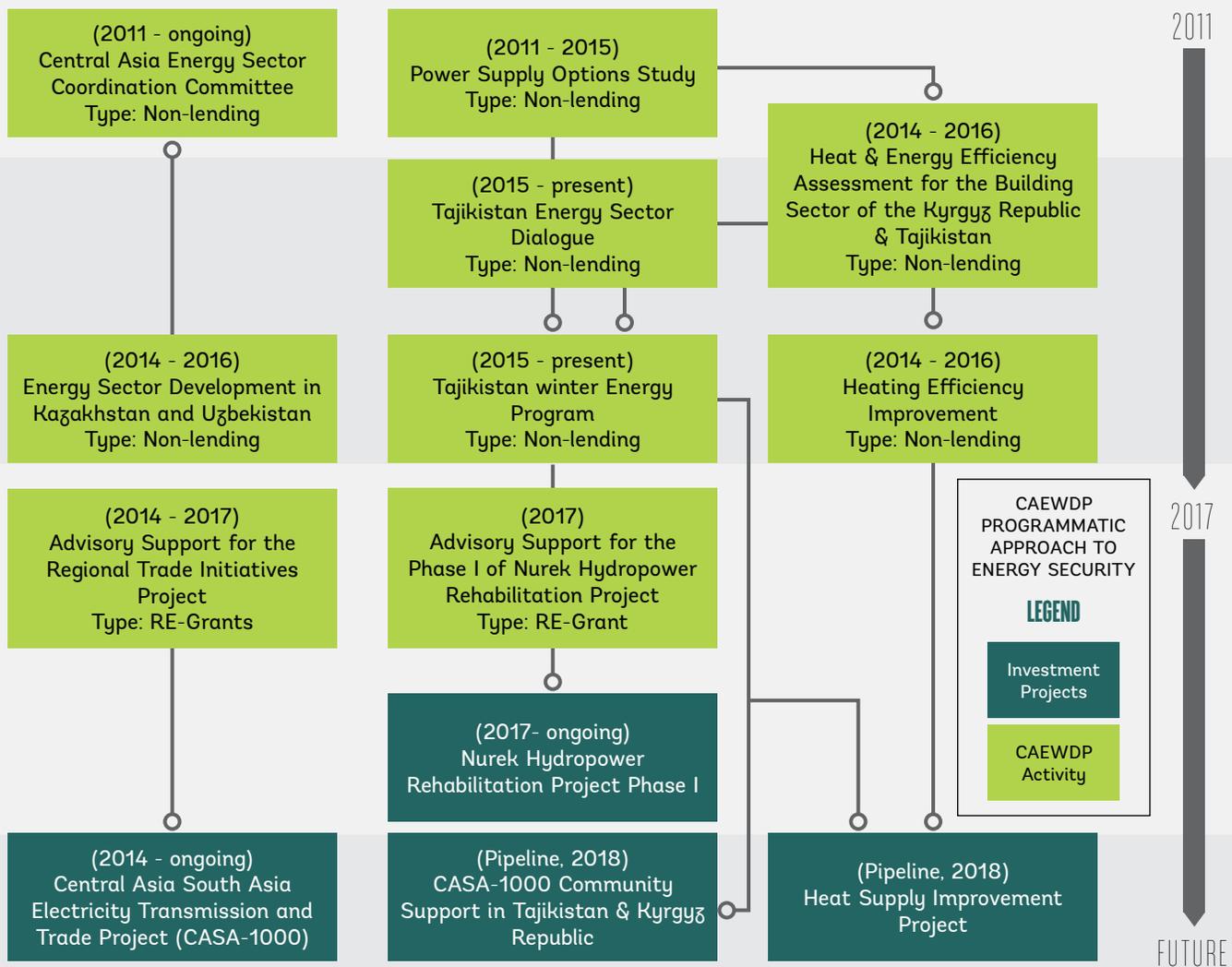
In Tajikistan, CAEWDP support resulted in the US\$ 350 million Nurek Hydro Power Plant (HPP) rehabilitation project. The much-needed rehabilitation is expected to increase the HPP's generation capacity from 2,320 MW to 2,725 MW, extend its operational-life and significantly improve safety at the currently second tallest dam in the world (300-meters).

Kazakhstan and Uzbekistan expressed their intent to modernize and develop their economies by 2030 through their energy sectors. CAEWDP assisted the governments in the preparation of long-term energy sector development plans with diagnostic and analysis, recommendations, and capacity building training.

LEVERAGING LARGE-SCALE INVESTMENTS THROUGH CATALYTIC FINANCING

CAEWDP contributions of approximately US\$ 3.7 million to promoting energy security have leveraged partner financing and investment projects with a value of more than US\$ 1.5 billion. In the next funding phase CAEWDP will continue its support to facilitating investments, including in renewable energies, to help the Central Asian countries along their pathways to sustained energy security.

FIGURE 6: PATHWAYS TO ENERGY SECURITY: FROM TECHNICAL ASSISTANCE TO INVESTMENTS

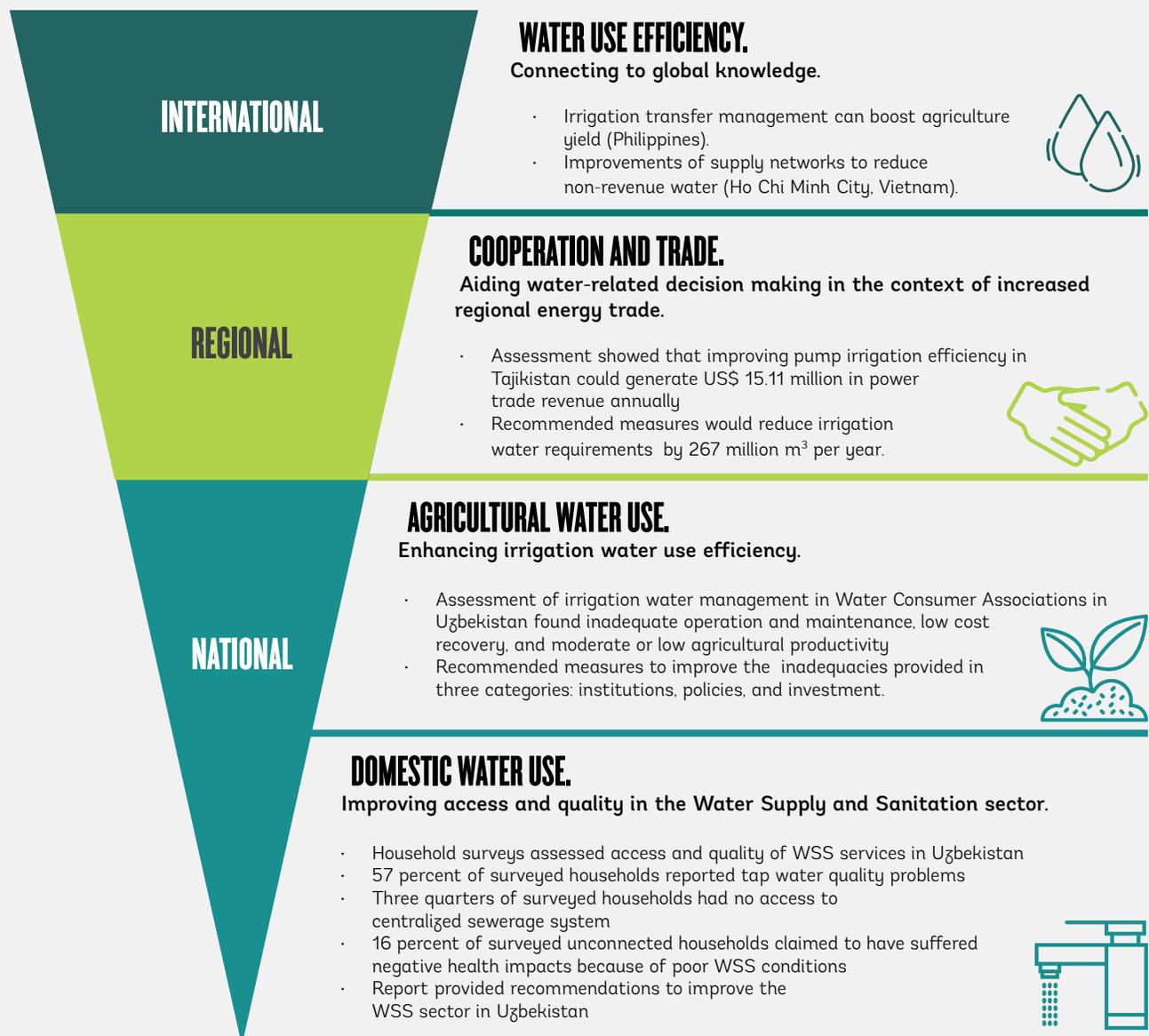


3.2 EXPLORING SOLUTIONS FOR WATER SECURITY

HYDROLOGIC VARIABILITY, WATER LOGGING AND SOIL SALINIZATION

Surface water flows in the region vary significantly between years and seasons. The expansive semi-arid steppe receives little to no rainfall, while the upstream mountainous areas receive plenty. Given the hydrologic variability and uneven distribution of the resource, rural, urban and industrial development is dependent on adequate flow management along the rivers that connect Central Asian countries. At the same time, national governments struggle to rehabilitate ageing irrigation, drainage and water supply infrastructure (e.g. 50 percent of irrigated lands are affected by salinization and waterlogging because of poor irrigation and drainage systems). Looking ahead, population growth and the need for increased agricultural production will continue to strain the region's water resources. CAEWDP works with governments to explore solutions and integrate best practices that foster water security (Fig. 7).

FIGURE 7. EXPLORING PATHWAYS TO WATER SECURITY



CONNECTING TO GLOBAL KNOWLEDGE

Internationally, CAEWDP connects the region to global knowledge and good practice. At the *High Level Symposium on SDG 6 and Targets: Ensuring that No One is Left Behind in Access to Water and Sanitation* hosted by the Government of Tajikistan on August 9-11, 2016 in Dushanbe, CAEWDP organized a Thematic Session on Increasing Water Use Efficiency bringing the World Bank's global experience. The session discussed the challenges as well as solutions from Vietnam, Mexico, the Philippines and the Nile Basin to effectively implement Sustainable Development Goal (SDG) 6.4 to "substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity, and substantially reduce the number of people suffering from water scarcity."

IDENTIFYING SOLUTIONS FOR INCREASED ENERGY AND WATER PRODUCTIVITY IN AGRICULTURE

CAEWDP serves as a platform to link national water management to the regional energy-water nexus. The Program informs policy decisions of the Central Asian governments through diagnostic analysis and investment recommendations. The assessment on the *Costs of Irrigation Inefficiency in Tajikistan* demonstrated the high opportunity costs of pumped irrigation; recommended improvements could generate up to US\$ 15.11 million in power trade revenue annually in the context of CASA-1000. The interest of Kazakhstan to conduct a similar study through a Reimbursable Advisory Services (RAS) initiative created opportunities for cross-learning and knowledge exchange.

Nationally, CAEWDP helps governments to identify alternatives for optimization of agricultural water use. Diagnostic activities performed by CAEWDP for the governments of Uzbekistan and Tajikistan assessed irrigation inefficiency within the countries by examining water management, irrigation methods, and pumped irrigation schemes. The knowledge generated on efficient water allocation and use, better crop cultivation, and stakeholder relationship building from these activities informs decision making on national policies and legal frameworks, such as the Water Code in Uzbekistan, currently being discussed in the national parliament.

ANALYZING EFFECTIVENESS OF SERVICE PROVISION

The ultimate beneficiaries of water security investments are at the household level. With a view to addressing public health risks and improving living conditions in the region, CAEWDP financed diagnostic analyses of water supply and sanitation (WSS) services in various countries. Recommendations coming out of these studies contribute to national WSS programs and inform government decision-making. Within this context, the World Bank is currently working with the Governments of Uzbekistan and Tajikistan to prepare investments in WSS institutions and infrastructure.



3.3 ADDRESSING CLIMATE RISKS

ABOVE AVERAGE TEMPERATURES AND MELTING GLACIERS

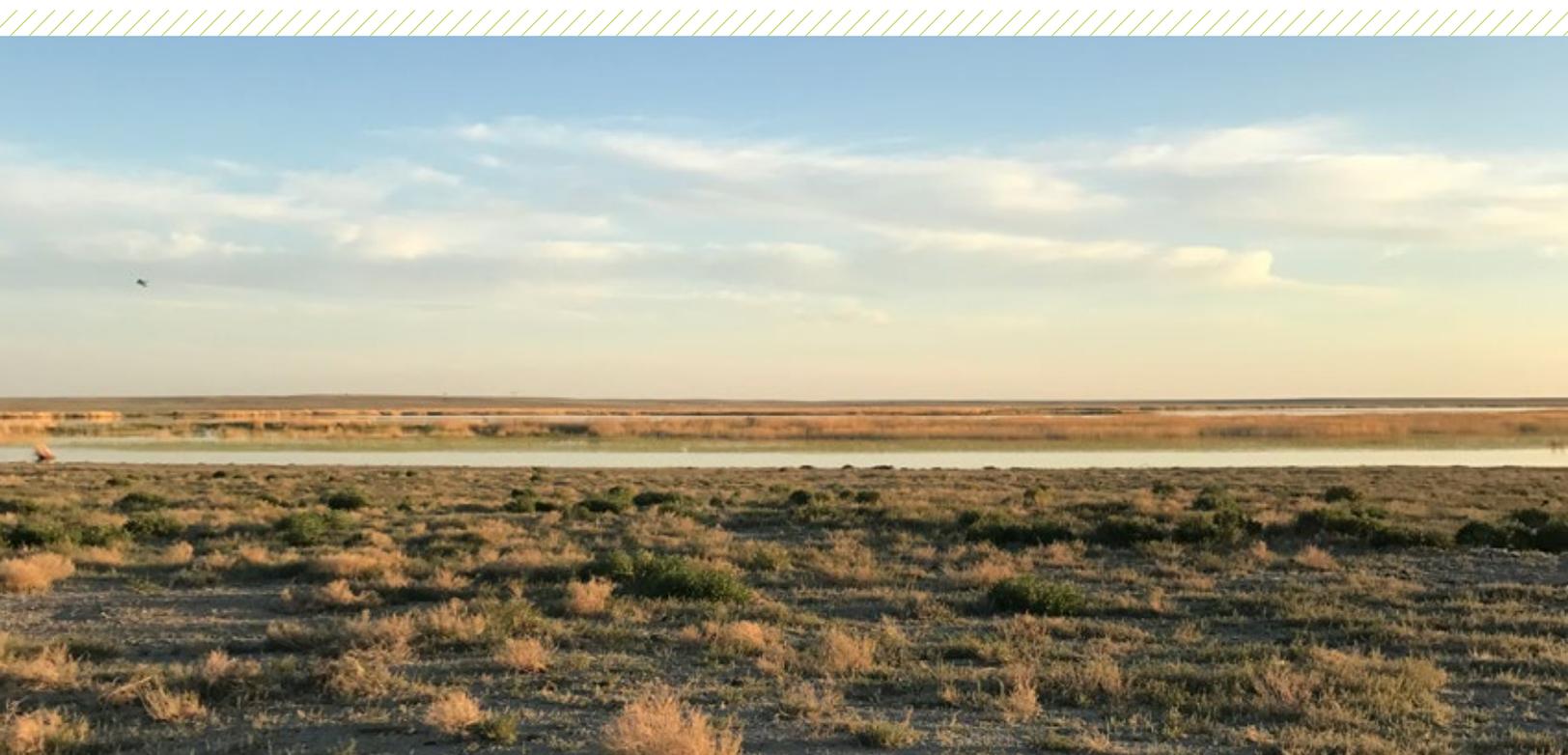
Climate change challenges are closely interwoven with the issues of water availability and energy security with significant risks to livelihoods in Central Asia. The World Bank report *Turn Down the Heat: Confronting the New Climate Normal*, co-financed by CAEWDP, predicts more intense warming in Central Asia than the global average in a 4°C warmer world. Impacts will be felt in all sectors vital to economic growth and development in the region. The region's glaciers, accounting for 10 percent of the annual stream flow in the Amu Darya and Syr Darya basins, have already shrunk by one-third in volume since the beginning of the 20th century. Climate change is projected to lead to more severe and prolonged droughts and increased incidents of flooding. Costs of weather-related disasters already account for 1 percent of GDP per year in Tajikistan and the Kyrgyz Republic. Adaptation will be a requirement rather than an option for the region.

INFORMING HYDROPOWER DEVELOPMENT PLANS

Analysis deepened the understanding of climate change impacts on future hydropower potential and the region's water and energy resources. The CAEWDP financed *Assessment of the Role of Glaciers in Stream Flow from the Pamir and Tien Shan mountains* analyzes the role of glaciers in Amu Darya and Syr Darya stream flows and assess the potential impacts of various climate change scenarios. This study provided important information on future availability of water resources for hydropower production during the CASA-1000 negotiations. The *Turn Down the Heat: Confronting the New Climate Normal* report has been globally disseminated. It exposes alarming scenarios of climate impacts in a +4-degree world, urging the global community to undertake proactive actions to meet world carbon reduction goals.

CATALYZING REGIONAL INVESTMENT PROGRAMS

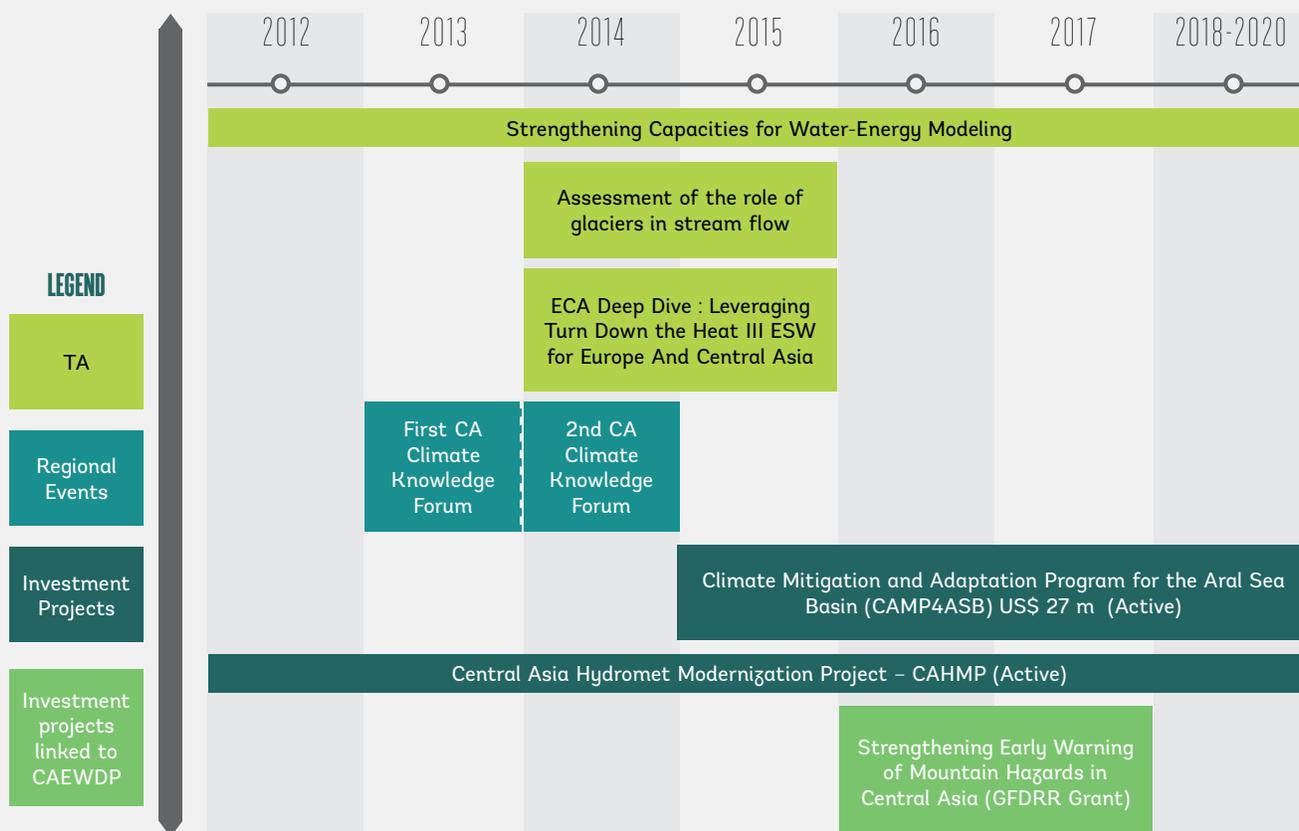
CAEWDP expanded the scope of the water-energy nexus integrating climate resilience aspects, in line with the 3-I's approach. Two high-profile Climate Knowledge Forums, which took place in 2013 and 2014, led to the first investment program for Climate Mitigation and Adaptation in the Aral Sea Basin (CAMP4ASB). Involving a wide range of



stakeholders at all levels, this program promotes the modernization of climate knowledge services and establishes a platform for climate resilience investments. More than 215 sub-loans in Tajikistan and 4 credits in Uzbekistan are currently being implemented with direct involvement of civil society.

The Central Asia Hydrometeorology Modernization Project (CAHMP), prepared with CAEWDP support, aims at improving the accuracy and timeliness of hydromet services for improved early warning, weather forecasting, and climate change assessments. It represents a significant investment in technological upgrades and the region's human capital. Activities support south-south learning exchanges, and training courses on emergency situations, involving both immediate-responders and civil servants from the Kyrgyz Republic, Tajikistan, Kazakhstan and Uzbekistan. (Fig. 8)

FIGURE 8. CAEWDP APPROACH TO ADDRESSING CLIMATE RISKS

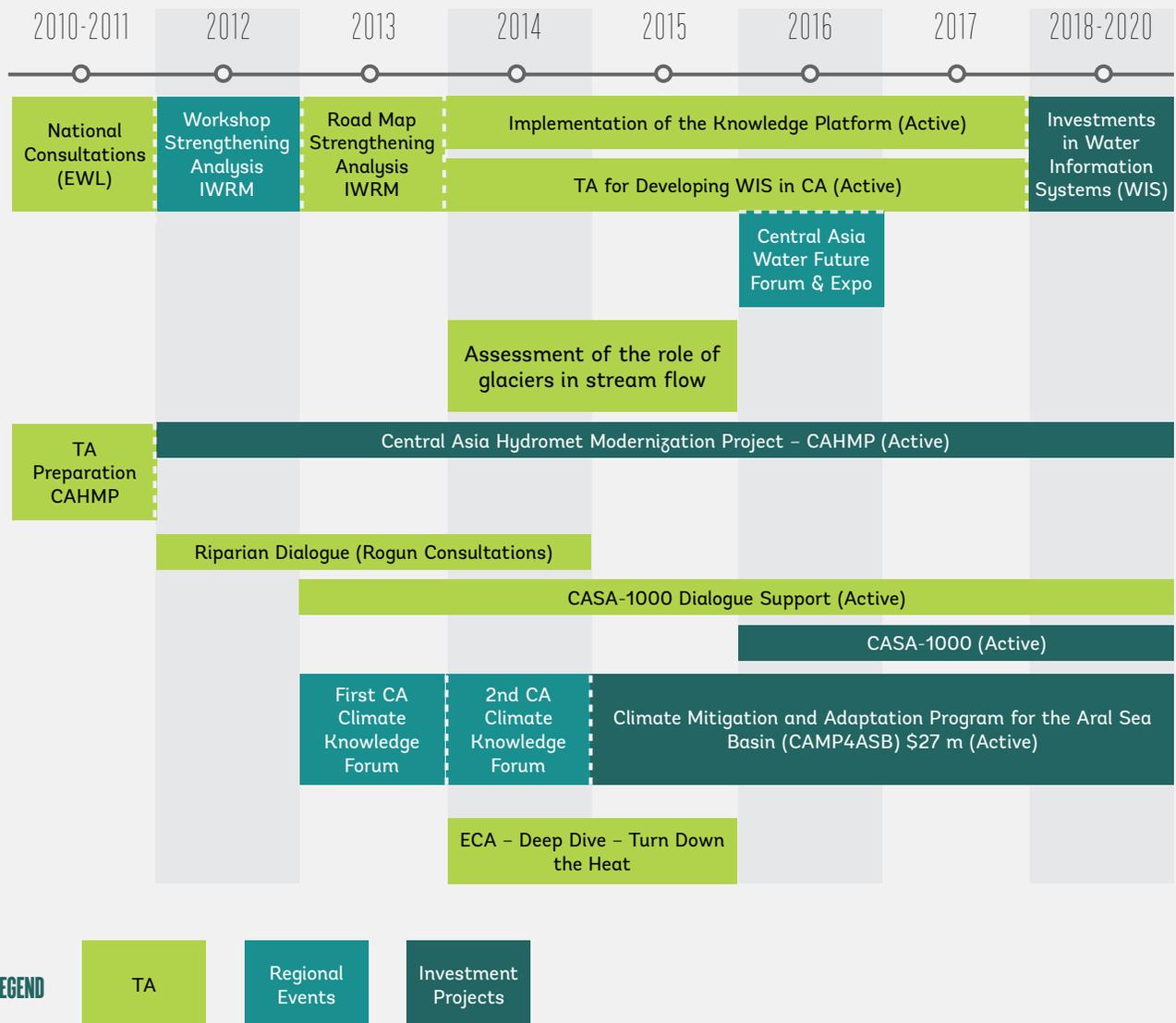


3.4 EMPOWERING THROUGH NETWORKS AND KNOWLEDGE

LIMITED RESOURCES TO MODERNIZE INFORMATION SYSTEMS AND TRAIN THE NEXT GENERATION

Resources are limited to upgrade and modernize outdated water and energy information systems, rehabilitate facilities and training, and strengthen institutions. The lack of resources contributes to the unreliability of data exchange and increasing capacity gaps within institutions. This negatively affects the enabling environment for effective regional water and energy resources management and coordination. At the same time, there are windows of opportunity to harness the knowledge of the current water managers and the eagerness of young professional to embrace new technologies and innovations. (Fig. 9)

FIGURE 9: CAEWDP PATHWAYS TO ADDRESSING ENERGY-WATER LINKAGES



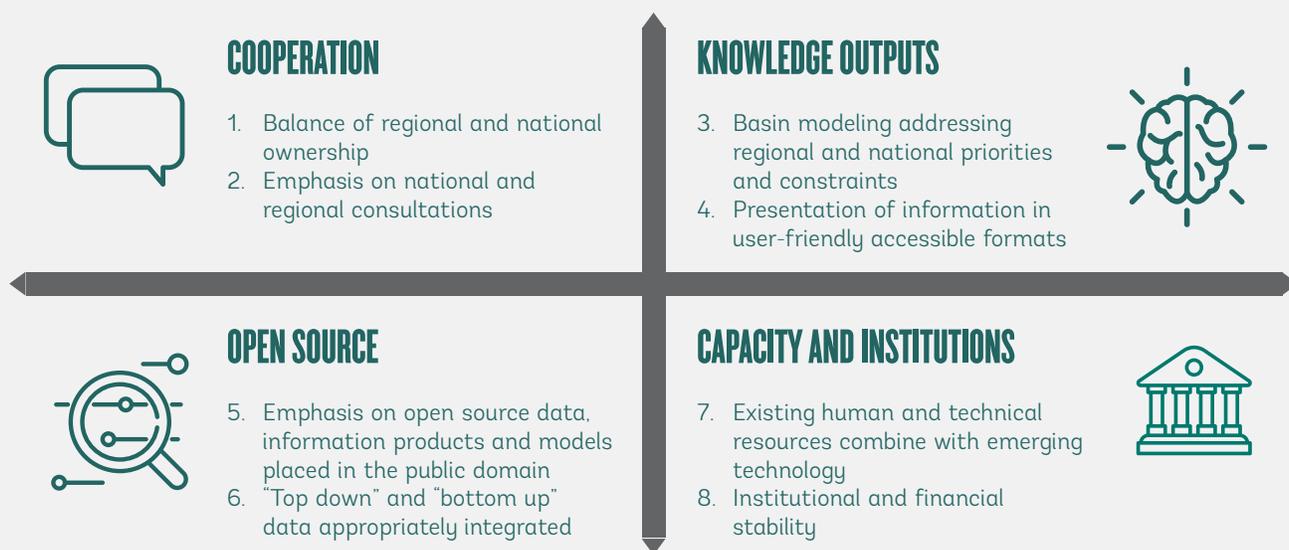
ESTABLISHING COMMUNITIES OF PRACTICE AND INVESTING IN THE NEXT GENERATION

Addressing Integrated Water Resource Management (IWRM) challenges requires commitment to coordination among different agencies and institutions across and despite administrative barriers. CAEWDP facilitated cross-sectoral working groups (CWG) of experts to develop solutions tackling IWRM challenges. The CWG under the Regional Center of Hydrology developed practical recommendations for decision makers on priority measures for preventing Shardara Dam safety failure and enhancing emergency measures in case of disaster. The CWG recommendations were adopted by the Government of Kazakhstan and measures focused on mudflow security and hydro meteorological monitoring and forecasting have been implemented by the respective ministries.

Through collaboration with the Regional Environmental Centre for Central Asia (CAREC) and CAEWDP financing, the **Knowledge Institutions Network in Central Asia**, consisting of 26 regional universities, promoted cross-regional academic cooperation for youth development. Over 30 events reaching more than 500 participants from the five Central Asian countries and Afghanistan took place between 2014-2017 to facilitate cross-country knowledge exchange on water resource management and climate issues. Twenty successful proposals from a research competition were selected for funding and contributed with new knowledge and solutions to water-energy related problems. The wider Knowledge Network supported by CAEWDP also includes the Central Asia Youth Forum on Water.



FIGURE 10: GUIDING PRINCIPLES FOR DEVELOPING THE KNOWLEDGE PLATFORM



BRIDGING KNOWLEDGE GAPS THROUGH INFORMATION EXCHANGE AND TRANSPARENCY

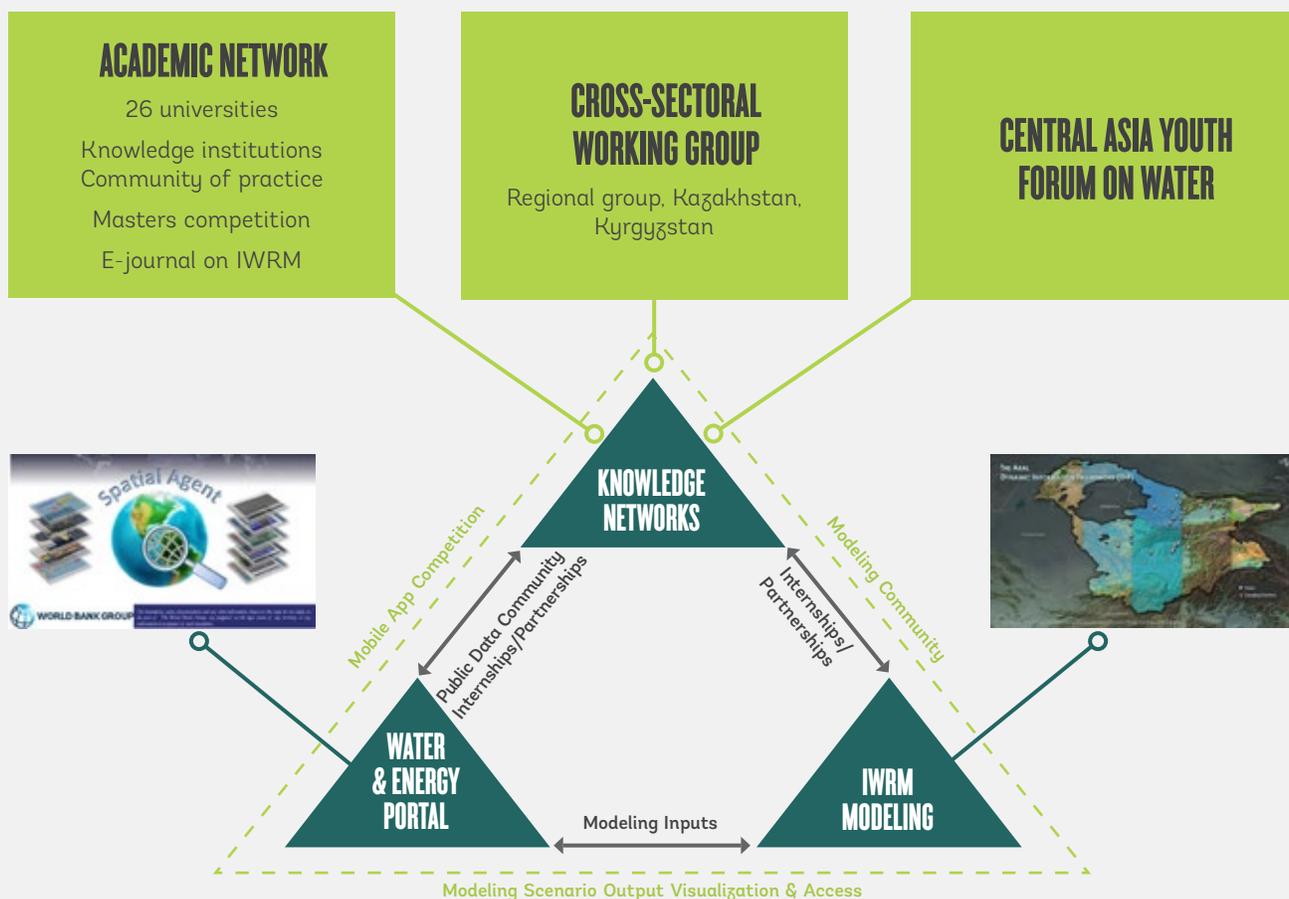
Following an inclusive national and regional consultation process, CAEWDP prepared the **Strengthening Analysis for integrated water resources management in Central Asia: a Road Map for Action in 2012**. The Road Map identifies twelve distinct activities focusing on data management, modeling, governance and capacity building. This provided the framework for CAEWDP’s engagement in developing a shared and accessible knowledge platform following eight guiding principles for regional efforts that were identified during the consultation process (Fig. 10).

The knowledge platform is driven by the concept of an integrated decision-support system for informed decision making, which includes three key parameters: data, analytics, and institutions. Guided by these parameters, the systematic engagement at the national-level and in regional forums focused on introducing an increased understanding of the energy-water nexus principles and possibilities through exemplar, modeling tools (i.e. AralDIF, BasinIT, & BEAM models, and Spatial Agent App). It links with the Knowledge Network to provide stakeholders with a platform for dialogue and information exchange (Fig.11) Large-scale international knowledge events, such as the 2016 Water Futures Forum & EXPO, provided opportunities for the countries to connect, advance mutual understanding and create a fertile ground for new ideas.

FACILITATING THE REGIONAL DIALOGUE

CAEWDP’s active engagement with EC-IFAS provided an opportunity to open a dialogue on priority water issues. Established in 1993, the International Fund for Saving the Aral Sea (IFAS) is the regional organization mandated by the Heads of State of five Central Asian countries working for cooperation in water resources and environmental management. CAEWDP worked with its Executive Committee (EC-IFAS) to prepare the Aral Sea Basin Program 3.

FIGURE 11: MULTIPLE PARAMETERS TO BUILD KNOWLEDGE NETWORKS AND FOSTER INFORMATION EXCHANGE



World Bank co-chairs the Central Asia Regional Economic Cooperation Energy Sector Coordinating Committee (CAREC ESCC) meetings and successfully uses this platform to advance water issues to the ESCC energy agenda. The CAREC Engagement Project convened Eurasia/Asia energy experts to commence a dialogue on energy issues in Central Asia. The issue of energy-water linkages was recognized by the ESCC and became one of the three main components of the CAREC ESCC’s Energy Action Plan (EAP) and Energy Work Plans (EWPs).

CAEWDP led the riparian consultation process for the Rogun Hydropower Assessment Studies from 2011-2014. The transparent consultative process served as a basis for decision-making and open exchange of views among the riparian countries. In July 2014, the final phase of consultations was followed by a High-level Meeting of the First Deputy Prime Ministers on Regional Riparian Issues.

➤ “To strengthen energy-water linkages, a common understanding has been reached on the initial need to develop the analytical tools for water management at the national and regional levels...”

Joint Ministerial Statement - Council of ministers - 11th Central Asia Regional Economic Cooperation (CAREC) ministerial meetings in Wuhan, China:

CHAPTER 4.

FOSTERING PARTNERSHIPS



4.1 ONE REGION, SIX COUNTRIES AND DIVERSE DEVELOPMENT PARTNERS

Many development partners engage on energy and water issues with the six countries in the region. This inherently carries the risk of uncoordinated interventions missing out opportunities to increase impact through synergistic planning and complementarity. Collaboration and coordination requires effort and has transaction costs. However, regular consultations and coordination among development partners enhance impact, prevent duplication and strengthen complementarity. The World Bank, recognized as an honest broker, addresses partnership coordination directly through CAEWDP.

4.2 ESTABLISHING PARTNERSHIPS AT MULTIPLE LEVELS

Partnerships are critical to the rational and sustainable use of water and energy resources in Central Asia. CAEWDP brings together governments, national and regional organizations, civil society organizations, and development partners, including other international financial institutions. The Program is anchored in partnerships with governments to ensure that program activities address national priorities. CAEWDP also partners with regional organizations whose mandates are to convene discussions on regional issues, such as the International Fund for Saving the Aral Sea (IFAS). And finally, CAEWDP cooperates with other development and financing partners to enhance impact in meeting its objectives and to leverage investments by others. Within the Central Asia region, CAEWDP collaborates, among others, with the Organization for Security and Co-operation in Europe (OSCE), European Investment Bank (EIB), Asian Development Bank (ADB), and German Society for International Cooperation (GIZ). The *Road Map for Strengthening IWRM Analysis* was developed in partnership with the Swiss Development Corporation (SDC) and United Nations Economic Commission for Europe (UNECE); and CAEWDP partnered with the UNRCCA in the Rogun consultations⁴ and the UNRCCA's regional dialogue on a cooperative framework for transboundary water management.

CAEWDP engages at multiple levels to ensure effective coordination among stakeholders in the region and beyond. The program participates in several coordination platforms; including the Energy Donor Coordination Committee (DCC) in Tajikistan, the CAREC ESCC⁵, the Regional Environmental Center for Central Asia (CAREC) and the Enhanced Regional Cooperation on Environment, Climate Change and Water Project of the European Union (WECCOP). Joint efforts to address energy and water issues comprehensively have been recognized by the Central Asian governments at the 11th CAREC Ministerial Meetings in Wuhan China in November 2012.

⁴ The Rogun Consultations engaged the governments of the Aral Sea Basin (Central Asia and Afghanistan), civil societies, and diplomatic and development agencies in a program to share information and analysis from the assessment studies of the proposed Rogun Hydropower project.

⁵ The ESCC is one of four working committees of the CAREC program, an ADB-hosted partnership of ten countries (Afghanistan, Azerbaijan, China, Mongolia, Kazakhstan, the Kyrgyz Republic, Pakistan, Tajikistan, Turkmenistan, and Uzbekistan) supported by six multilateral institutions (ADB, Islamic Development Bank, JICA, USAID, UNDP and World Bank) working together to promote accelerated growth and poverty reduction through cooperation.



"We are delighted to note that some of the academic exchange activities carried out under our program will be further scaled up under the USAID-funded Smart Waters Project, to be implemented by CAREC in 2015-2020. Linking now practitioners with youth from all over Central Asia in the area of water resource management will contribute to enhanced security and development in the region in the future."

Julia Komagaeva, Program Coordinator of the Central Asia Knowledge Network Program

4.3 CREATING FINANCING PARTNERSHIPS AND CATALYZING INVESTMENTS

CAEWDP serves as a platform to identify and finance priority development interventions together with others partners. In 2014-2015, the Knowledge Institutions Network partnered with CAREC to launch a research competition among Masters' students from the Central Asian countries as part of the capacity building and youth engagement efforts. Based on the success of this initiative, USAID provided over US\$10 million additional financing to CAREC for the "Smart Water" project to further expand water-energy nexus Research & Development activities for youth in Central Asia from 2015-2020. Energy projects supported through CAEWDP are being realized by large financing consortiums. CASA-1000 is financed by a consortium which includes the European Bank for Reconstruction and Development, the EIB, the Islamic Development Bank, the United Kingdom, the United States and the World Bank together with the four participating countries. And the rehabilitation of Nurek Hydroelectric Plant, the preparation of which was initially supported by CAEWDP and which will ease Tajikistan's winter energy deficit, has become possible through a financing partnership of the World Bank, the Asian Infrastructure Investment Bank and the Eurasian Development Bank with the Government of Tajikistan.



4.4 THE WAY AHEAD

The achievement of high-level regional goals is possible only through continued and dedicated long-term engagement. CAEWDP will continue to promote water and energy security working at national scale to carry on with the strengthening of national institutional capacities and sector performance, while at the same time keeping regional cooperation on the political dialogue agenda to create an enabling environment for national priorities and regional priorities to eventually converge. As the Program enters its third funding phase in 2018, the Program reflects the official addition of Afghanistan as a sixth direct beneficiary country of CAEWDP funds. This formalizes the ongoing practice of Afghanistan's participation in multiple CAEWDP activities, in particularly those focused on regional consultations. The CAEWDP partnership of donors remains open to all development partners who want to contribute to promoting pathways to energy and water security in Central Asia.

ANNEX: CAEWDP ACTIVITY OUTPUTS⁶

Country/Activity	Outputs
Facilitating Energy Security	
Tajikistan: Power Supply Options Study	<p>Summary Report: Tajikistan's Winter Energy Crisis: Electricity Supply and Demand Alternatives URL: http://documents.worldbank.org/curated/en/217861467987890492/Tajikistans-winter-energy-crisis-electricity-supply-and-demand-alternatives</p>
Kyrgyz Republic and Tajikistan: Heating and Energy Efficiency Assessment for the Building Sector	<p>Keeping warm: Urban Heating Options in Tajikistan URL: https://openknowledge.worldbank.org/handle/10986/22088 or http://documents.worldbank.org/curated/en/353391467986295623/Keeping-warm-urban-heating-options-in-Tajikistan-summary-report or http://documents.worldbank.org/curated/en/docsearch/projects/P133058</p> <p>Feature Story: Reliable and Affordable Heating is Essential to Everyday Life in Tajikistan URL: http://www.worldbank.org/en/news/feature/2015/07/23/reliable-and-affordable-heating-is-essential-to-everyday-life-in-tajikistan</p> <p>Summary Report: Keeping warm: urban heating options in the Kyrgyz Republic URL: http://documents.worldbank.org/curated/en/55502146801161504/Keeping-warm-urban-heating-options-in-the-Kyrgyz-Republic-summary-report or http://documents.worldbank.org/curated/en/docsearch/projects/P133058</p> <p>Slideshow: Urban Heating Options for the Kyrgyz Republic URL: http://www.worldbank.org/en/news/video/2015/02/25/slideshow-urban-heating-options-for-kyrgyz-republic</p> <p>Feature Story: Urban Heating Options for the Kyrgyz Republic URL: http://www.worldbank.org/en/news/feature/2015/02/25/urban-heating-options-for-the-kyrgyz-republic</p> <p>Press Release: Kyrgyz Republic Heating Sector Assessment discussed in Bishkek URL: http://www.worldbank.org/en/news/press-release/2015/02/25/kyrgyz-republic-heating-sector-assessment-discussed-in-bishkek</p> <p>Infographic: Urban Heating Options for the Kyrgyz Republic URL: http://www.worldbank.org/en/news/feature/2015/02/25/infographic-urban-heating-options-for-the-kyrgyz-republic</p>
Kyrgyz Republic & Tajikistan: CASA- 1000 Advisory Support for the Regional Trade Initiatives Project	<p>Project Website: Central Asia South Asia Trade Initiatives Project (CASA 1000) URL: http://www.casa-1000.org/</p>
Kyrgyz Republic: Heating Efficiency Improvement	<p>Kyrgyz Republic – Heat Supply Improvement Project URL: http://documents.worldbank.org/curated/en/292401509328823311/Kyrgyz-Republic-Heat-Supply-Improvement-Project</p>

⁶ This list includes all publicly available CAEWDP outputs (reports, videos, etc.) and related websites. It does not include documents, such as consultant inception reports, interim financial reports and other similar internal documents (meeting reports, initial assessments, talking points, briefing notes, etc.)

Country/Activity	Outputs
Central Asia: Enhancing Regional Power Trade	<p>Report: Enhancing Regional Power Trade in Central Asia URL: http://documents.worldbank.org/curated/en/672501486549955103/Enhancing-regional-power-trade-in-Central-Asia</p> <p>Strengthening the Central Asian Power Systems (CAPS). Central Asia Energy-Water Development Program brief; no. 1. World Bank Group URL: http://documents.worldbank.org/curated/en/866191467998204221/Study-on-strengthening-the-Central-Asian-Power-Systems-CAPS</p> <p>Presentation: Regional Power Trade Unrealized Benefits for Central Asia for 2010-2014 URL: http://www.carecprogram.org/uploads/events/2016/04-21st-ESCC-Meeting/Presentation-Materials/ESCC-Meeting/Element%20.%20CA%20Power%20Trade_ESCC%20Islamabad%20April%202016.pdf</p> <p>Presentation Enhancing Regional Power Trade in Central Asia: Project Overview and Current Status URL: http://www.carecprogram.org/uploads/events/2015/028-20th-ESCC-Meeting/Presentation-Materials/2015-20th-ESCC-Presentation-6-World-Bank.pdf</p> <p>Presentation: Lessons Learned from the Development of the Regional Power Market in the Balkans URL: http://www.carecprogram.org/uploads/events/2014/ESCC-Meeting-PRC/Presentation-Materials/005_104_209_Session%20II.Element%20.SnezanaMijailovic.Eng.pdf</p> <p>Presentation: Enhancing Regional Power Trade in Central Asia URL: http://www.carecprogram.org/uploads/events/2014/ESCC-Meeting-KGZ/Presentation-Materials/Day-1/005_104_209_Session-II-Element-2-Yuriy-Myroshnychenko-Hans-Bredesen.pdf</p>
Kazakhstan: Electricity Market Options	<p>Kazakhstan Power Sector: Stuck in Transition. Four Technical Reports: based on an extensive analysis, detailed interviews, and system modelling URL: http://documents.worldbank.org/curated/en/104181488537871278/Stuck-in-transition-reform-experiences-and-challenges-ahead-in-the-Kazakhstan-power-sector URL: https://openknowledge.worldbank.org/bitstream/handle/10986/25742/9781464809712.pdf?sequence=4 URL: http://www.worldbank.org/en/country/kazakhstan/publication/kazakhstan-power-sector-note</p> <p>Infographic: Kazakhstan Power Sector: Reform Experiences and Challenges Ahead URL: http://www.worldbank.org/en/news/infographic/2017/03/16/kazakhstan-power-sector-reform-experiences-and-challenges-ahead</p>
Central Asia Energy Sector Coordinating Committee	<p>Energy Work Plan 2013-2015 URL: http://www.carecprogram.org/uploads/docs/CAREC-Energy-Sector-Coordinating-Committee-Work-Plan-2013-2015.pdf</p> <p>Energy Action Plan 2009-2012 Completion Report URL: http://www.carecprogram.org/uploads/events/2012/ESCC-Meeting-Sep/005_104_209_Energy-Action-Plan-2009-2012-Completion-Report.pdf</p> <p>Senior Officials' Meeting. Summary of Proceedings: June 2014 Manila, Philippines URL: http://www.carecprogram.org/uploads/events/2014/SOM-June/002_101_207_Summary-of-Proceedings.pdf</p>

Country/Activity	Outputs
CAREC Energy Sector Coordination	<p>Meeting Summary of the 17th CAREC Energy Sector Coordinating Committee (ESCC) Meeting, April 2-3, 2014, Bishkek, Kyrgyz Republic URL: http://www.carecprogram.org/uploads/events/2014/ESCC-Meeting-KGZ/Key-Documents/005_104_207_Meeting-Summary.pdf</p>
	<p>Meeting Summary of the 18th CAREC ESCC Meeting, September 4-5, Beijing, China: Meeting Summary URL: http://www.carecprogram.org/uploads/events/2014/ESCC-Meeting-PRC/Key-Documents/005_104_207_Meeting-Summary.eng.pdf</p>
	<p>Meeting Summary of the 19th CAREC ESCC Meeting, March 30-31, 2015, Ulaanbaatar, Mongolia URL: http://www.carecprogram.org/uploads/events/2015/7-ESCC-Meeting-Mongolia/19th-ESCC-Meeting-Summary.pdf</p>
	<p>Meeting Summary of the 20th CAREC ESCC Meeting, September 7, 2015, Kuala Lumpur, Malaysia URL: http://www.carecprogram.org/uploads/events/2015/028-20th-ESCC-Meeting/Key-Documents/2015-20th-ESCC-Meeting-Summary.pdf</p>
	<p>Meeting Summary of the CAREC ESCC Preparatory Meeting for the Energy Investment Forum, July 18, 2016, Islamabad, Pakistan URL: http://www.carecprogram.org/uploads/events/2016/04-21st-ESCC-Meeting/2016-21st-ESCC-Meeting-Summary.pdf</p>
	<p>Meeting Highlights of the CAREC ESCC Meeting, May 11-12, 2017, Dushanbe, Tajikistan URL: http://www.carecprogram.org/uploads/events/2017/11-ESCC-Tajikistan/2017-ESCC-Tajikistan-Highlights.pdf</p>
	<p>Strategy and Work Plan (2016-2020) for Regional Cooperation in the Energy Sector of CAREC Countries URL: http://www.carecprogram.org/uploads/docs/CAREC-Energy-Sector-Coordinating-Committee-Work-Plan-2016-2020.pdf</p>
Tajikistan: Winter Energy Program	<p>Video: Clean and Efficient Stoves In Kyrgyzstan and Tajikistan URL: http://www.worldbank.org/en/news/video/2017/06/20/clean-individual-heating-solutions-in-the-kyrgyz-republic-and-tajikistan</p>
	<p>Project Appraisal Document: Nurek Hydropower Rehabilitation Project Phase 1 URL: http://projects.worldbank.org/p150816?lang=en</p>
	<p>Tajikistan's winter energy crisis: electricity supply and demand alternatives. Central Asia Energy-Water Development Program Brief; no. 2. World Bank Group URL: http://documents.worldbank.org/curated/en/217861467987890492/Tajikistans-winter-energy-crisis-electricity-supply-and-demand-alternatives</p>

Country/Activity**Outputs****Empowering Through Knowledge and Network & Climate Risks**

Central Asia Water and Energy Portal

Web version prototype, Central Asia Water and Energy Portal

URL: <http://www.appolutelydigital.com/SpatialAgent/>

Spatial Agent App

URL: <https://itunes.apple.com/us/app/spatial-agent/id890565166?mt=8> or URL: <https://play.google.com/store/apps/details?id=org.worldbank.spatialagent&hl=en>

E-Book: Central Asia Atlas (forthcoming)

E-Book: Spatial Data Primer (forthcoming)

Building Resilient Communities: ArcGIS Open Data, Airbus Satellite Tasking and The World Bank Spatial Agent. Conference July 14th, 2014

URL: <http://www.esri.com/videos/watch?videoid=3660&isLegacy=true&title=open-access-with-arcgis-open-data>

Central Asia Knowledge Network

E-journal: Central Asian Journal of Water Research

URL: <http://www.water-ca.org/>

Central Asia Knowledge Network: Building Partnerships for Regional Cooperation on Water and Energy Brief. 2016

URL: <http://www.worldbank.org/en/region/eca/brief/central-asia-knowledge-network-building-partnerships-for-regional-cooperation-on-water-and-energy>

Capacity Strengthening for IWRM Modeling

E-Book Curriculum: Capacity strengthening for integrated water resources modeling (forthcoming)

Central Asia Energy-Water Modeling

Main Report: Strengthening analysis for integrated water resources management in Central Asia: A Road Map for Action

URL: <http://documents.worldbank.org/curated/en/426561468236366856/Main-report> and <http://documents.worldbank.org/curated/en/226411467993190553/Annexes>

Central Asia Water Management

Central Asia Water Series – Volume 1 Agriculture and Irrigation in the Aral Sea Basin: A Summary of Issues, Challenges and Possible Solutions (forthcoming)

Central Asia Water Series – Volume 2 Economic Impact Assessment of Inadequate Water Supply and Sanitation Services in Central Asia: A First Approximation (forthcoming)

Central Asia Water Series – Volume 3 Economic Benefits of Cooperation on Transboundary Waters in Central Asia: A Literature Review (forthcoming)

ECA Deep Dive: Leveraging Turn Down the Heat III ESW for Europe and Central Asia

Turn Down the Heat: Confronting the New Climate Normal

URL: <http://documents.worldbank.org/curated/en/317301468242098870/Main-report> or <https://openknowledge.worldbank.org/handle/10986/20595>

Abstract at: <http://documents.worldbank.org/curated/en/294131467991967756/The-climate-challenge-for-Central-Asia>

Capacity Building Workshop for Regional Scientists, Potsdam (Germany) – March 11-13, 2014

URL: <https://www.pik-potsdam.de/research/climate-impacts-and-vulnerabilities/projects/project-pages/world-bank-report/Turn%20Down%20the%20Heat%203>

Assessment of the Role of Glaciers in Stream Flow from the Pamir and Tien Shan Mountains

Assessment of the Role of Glaciers in Stream Flow from the Pamir and Tien Shan Mountains, World Bank Report

URL: <http://documents.worldbank.org/curated/en/663361468283187700/Europe-and-Central-Asia-Assessment-of-the-role-of-glaciers-in-stream-flow-from-the-Pamir-and-Tien-Shan-mountains>

Country/Activity	Outputs
Central Asia Climate Change Knowledge Forum	<p>Event Announcement: 2nd Central Asia Climate Knowledge Forum, held in May 2014 in Almaty, Kazakhstan URL: http://www.worldbank.org/en/events/2014/04/08/second-central-asia-climate-knowledge-forum-moving-towards-regional-climate-resilience</p> <p>Slideshow: Second Central Asia Climate Knowledge Forum URL: http://www.worldbank.org/en/news/video/2014/05/14/slideshow-second-central-asia-climate-knowledge-forum</p>
Climate Adaptation & Mitigation Program for Central Asia (CAMP4CA)	<p>Project Document: Central Asia - Climate Adaptation and Mitigation Program for the Aral Sea Basin Project (CAMP4ASB) URL: http://projects.worldbank.org/P151363?lang=en</p>
CAEWDP Riparian Dialogue & Assessment Studies and Summary Report for the proposed Rogun Hydropower Project	<p>Reports: Assessment Studies and Summary Report for the proposed Rogun Hydropower Project URL: http://www.worldbank.org/en/events/2014/06/17/fifth-information-sharing-and-consultation-meeting-on-the-assessment-studies-of-the-proposed-rogun-hydropower-project-hpp</p> <p>Press release: Fifth and Final Riparian Meetings on Rogun Assessment Studies URL: http://www.worldbank.org/en/news/press-release/2014/07/18/fifth-and-final-riparian-meetings-on-rogun-assessment-studies</p> <p>Brief: Assessment Studies for Proposed Rogun Hydropower Project in Tajikistan URL: http://www.worldbank.org/en/region/eca/brief/rogun-assessment-studies</p> <p>Speeches and Transcripts for Q&A with Saroj Kumar Jha on the Rogun Assessment Studies and World Bank support to water and energy sectors in Central Asia URL: http://www.worldbank.org/en/news/speech/2014/07/21/q-and-a-with-saroj-jha-on-the-rogun-assessment-studies-and-consultation-process</p> <p>Riparian consultations on the Rogun Assessment Studies. Central Asia Energy-Water Development Program Brief; no. 4. World Bank Group URL: http://documents.worldbank.org/curated/en/200551468000021450/Riparian-consultations-on-the-Rogun-assessment-studies</p>
Central Asia Water Resources Management (CA-WARM) Phase-I Project & Forum	<p>CAWARM Future Forum and Expo, Almaty, September 19, 2016 URL: http://www.worldbank.org/en/events/2016/08/23/central-asia-water-future-forum-expo and http://centralasiawaterfuture.org/</p> <p>Press release: Modernizing the Water Future of Central Asia. Water Forum and Expo Promotes Knowledge and Good Practices URL: http://www.worldbank.org/en/news/press-release/2016/09/19/modernizing-the-water-future-of-central-asia</p>
Strengthening Water Services and Governance	
Strengthening Irrigation Governance	<p>Report: Exploratory Assessment of Factors that Influence Quality of Local Irrigation Water Governance in Uzbekistan, 2015 URL: https://openknowledge.worldbank.org/handle/10986/25178 or http://documents.worldbank.org/curated/en/590421472098503155/Exploratory-assessment-of-factors-that-influence-quality-of-local-irrigation-water-governance-in-Uzbekistan</p>
Social Impact Analysis of Water Supply and Sanitation Services in Central Asia	<p>Report: Social Impact Analysis of Water Supply and Sanitation Services in Central Asia: the Case of Uzbekistan URL: http://documents.worldbank.org/curated/en/860101467994584583/Social-impact-analysis-of-water-supply-and-sanitation-services-in-Central-Asia-the-case-of-Uzbekistan or https://openknowledge.worldbank.org/handle/10986/23816</p>

Country/Activity	Outputs
Program Reports	
Program Website	<p>Central Asia Energy - Water Development Program URL: http://www.worldbank.org/en/region/eca/brief/caewdp</p>
Central Asia Energy Water Development Program Outreach & Dissemination	<p>ANNUAL REPORTS:</p> <p>Central Asia Energy-Water Development Program: Annual Report 2012 URL: http://documents.worldbank.org/curated/en/129781467986258638/Central-Asia-Energy-Water-Development-Program-Annual-Report-2012</p> <p>Central Asia Energy-Water Development Program: Annual Report 2013 URL: http://documents.worldbank.org/curated/en/463501468197341249/Central-Asia-Energy-Water-Development-Program-Annual-Report-2013</p> <p>Central Asia Energy-Water Development Program: Annual Report 2014 URL: http://documents.worldbank.org/curated/en/381571468188369260/Central-Asia-Energy-Water-Development-Program-Annual-Report-2014</p> <p>Central Asia Energy-Water Development Program: Annual Report 2015 URL: http://documents.worldbank.org/curated/en/27251148775228782/Central-Asia-Energy-Water-Development-Program-Annual-Report-2015</p> <p>Central Asia Energy-Water Development Program: Annual Report 2016 URL: http://documents.worldbank.org/curated/en/979261502174391564/annual-report-2016</p> <p>CAEWDP Brochure URL: http://pubdocs.worldbank.org/en/370421487798756349/CAEWDP-Brochure-140807-en.pdf</p> <p>Toward Integrated Water Resources Management (IWRM) in Central Asia. Central Asia Energy-Water Development Program Brief; no. 3. World Bank Group URL: http://documents.worldbank.org/curated/en/322511468184753628/Toward-Integrated-Water-Resources-Management-IWRM-in-Central-Asia</p> <p>Central Asia: Energy-Water Lifeline: CAEWDP Results and Impact Film Shorts URL: http://www.worldbank.org/en/news/video/2016/06/15/central-asia-energy-water-lifeline</p> <p>The Water-Energy Challenge in Central Asia: CAEWDP Results and Impact Film Shorts URL: http://www.worldbank.org/en/news/video/2016/06/30/water-energy-challenge-in-central-asia or https://www.youtube.com/watch?v=wMtdByx9mm0</p> <p>Central Asia: Ending Energy Poverty: CAEWDP Results and Impact Film Shorts URL: http://www.worldbank.org/en/news/video/2016/06/15/central-asia-ending-energy-poverty or https://www.youtube.com/watch?v=IOMLTV76Gow</p> <p>Video: Tajikistan Winter Energy Access - Clean and Efficient Stoves in Kyrgyzstan and Tajikistan URL: https://vimeo.com/219332950</p>

