Central Asia Regional Economic Cooperation Program

Reference Document
For Session 3 of the Senior Officials' Meeting
June 2012

Energy Sector Progress Report (2011–2012)

Senior Officials' Meeting on
Central Asia Regional Economic Cooperation
6–7 June 2012
Hohhot, Inner Mongolia Autonomous Region,
People's Republic of China

I. OVERVIEW OF PROGRESS

1. This progress report focuses on the key developments in the energy sector since the Energy Sector Coordinating Committee (ESCC) meeting held on 27-28 October 2011 in Bangkok, and which was disrupted due to floods. In the ensuing period, the *"Strategic Framework for the Central Asia Regional Cooperation Program 2011-2020" (CAREC 2020)* was completed, which highlights key areas of focus in the energy sector, among others. It also enjoins the need for a programmed approach to achieve sector goals and to focus on knowledge and capacity building to achieve highest benefits from investments.

2. The activities under the Energy Action Plan (EAP) Framework have been concluded and the EAP completion report is under preparation. The ESCC meeting held in May 2012 reviewed and endorsed the table of contents of the completion report, based on which it will be prepared and presented at the next ESCC meeting planned for September 2012. Following are the key achievements made in fulfillment of the main thrusts outlined in the EAP.

II. KEY DEVELOPMENTS IN THE ENERGY SECTOR

A. Sector Implementation

Energy Demand and Supply Balance and Infrastructure Constraints

3. Under the $2 million technical assistance provided by the Asian Development Bank (ADB), Fichtner (Germany) has completed, and ESCC has endorsed the draft report of the Regional Power Master Plan (RPMP), which (i) identifies generation and transmission needs in Kazakhstan, Kyrgyz Republic, Tajikistan, and Uzbekistan, and (ii) addresses the technical arrangements for synchronous interconnection of the Afghanistan system to the Central Asian system. The study included preparation of a 10-year investment plan, which contributed to the preparation of a Medium Term Priority Projects (MTPP) list for the energy sector that accompanied CAREC 2020. CAREC member countries had several opportunities to comment on the master plan at its various stages of preparation. The final RPMP report was presented and discussed during the ESCC meeting held in May 2012.

4. The Power Master Plan of Afghanistan is underway through ADB financing and its inception report was reviewed at a meeting held in Istanbul from 24-26 April 2012. The completed pre-feasibility study of the interconnection between Turkmenistan and Afghanistan was also discussed in this meeting. As both these studies are being done by Fichtner (Germany), and many of the issues on these studies are inter-linked, this joint meeting proved to be highly useful in resolving some key issues. Aside from the high level representatives from Afghanistan and Turkmenistan, the meeting was attended by ADB, Islamic Development Bank, United States Agency for International Development (USAID) and the World Bank, which provided useful inputs to these ongoing studies of a sub-regional nature.

Regional Dispatch and Regulatory Development

5. Beginning with a high level assessment, it was confirmed that the economic benefits of energy trade are substantial, in the range of $2 billion over the next three years with no major infrastructure or system investments. The startup of capacity development work planned for the member countries as a follow-up to the trade diagnostic was delayed by the time taken to hire dedicated staff by the USAID-funded Regional Energy Security, Efficiency and Trade (RESET) project, who are the implementation partners for this activity Separately, the CAREC Institute teamed up with International Energy Agency (IEA) and will finance participation of CAREC energy focal points and their alternates in the IEA-organized Caspian Energy Policy Dialogue and Training. The training is scheduled for July 2012 in Astana and will focus on: (i) high level energy policy dialogue; (ii) renewable energy and (iii) energy efficiency measures in various sectors of economy (transport, industry and construction).

Energy Water Linkages

6. This pillar, which focuses on regional level management of energy-water linkages, seeks to improve the analytical foundations for assessing the energy development of both thermal and hydropower resources in order to (i) exploit the benefits of a mixed energy system in the broader Central Asia region, and (ii) establish evidence-based dialogue among countries. Consultations have been held throughout the region identifying the current state of data, models and capacity, as well as the initial conditions for cooperation. An independent first generation demonstration model of water flows has been produced by the University of Washington, the intent of which was to identify the availability of independent, publicly accessible data and model platforms for energy-water analysis (The model was informally presented at the cancelled October 2011 ESCC meeting in Bangkok). At the same time, consultations through the region have clearly established a need to strengthen tools for water management and analysis at the national level from which to build regional tools. At the request of stakeholders, a review of multiple existing models has been completed. An evaluation by the Swiss Development Corporation (SDC) has identified significant constraints on the existing regional data base. A technical seminar for all five Central Asian countries plus Afghanistan (sub-committee 3) in early July 2012 will combine the consultations, review and demonstration of the model with emerging international approaches to data, and modeling into a roadmap for further capacity building and technical assistance. The results will be presented at the September 2012 ESCC meeting and also made available for inclusion in the EAP completion report to be submitted to the Ministerial Conference (MC) in November 2012.

EAP Framework Completion Report

7. The ESCC endorsed the outline of a proposed completion report for the CAREC EAP framework, which will summarize the achievements made under the framework and future directions. It was agreed that the completion report will be presented at the September 2012 ESCC meeting.

B. Resolution of Key Issues Raised to the Senior Officials' Meeting (SOM), November 2011

8. The strategies outlined in *CAREC 2020* became the basis for ESCC to look into the development of new energy corridors as described in the *CAREC Energy Strategy*. Additionally, the issues identified during the implementation of the EAP will require follow up activities. All of these will require the preparation of a new ESCC Energy Work Plan (EWP) that will cover the period 2013–2015.

9. It is planned that the activities of ESCC during the period 2013–2015 will revolve around the following key themes:

(i) **Development of options for Central Asia-South Asia Energy Corridor:** This is a key corridor for energy sector integration among the two regions having a high potential for energy trade and, hence requires close attention. While some integration is currently under consideration, other opportunities are likely and a more comprehensive approach could significantly expand benefits.

(ii) **Regional energy dispatch issues:** Regional dispatch in Intra-Central Asia corridor experiences technical, financial, and legal problems. The ESCC is the right platform to identify those and develop practical solutions, expanding the current capacity-building efforts of ESCC and attending to national level priorities.

(iii) **Fund mobilization for essential power sector investment:** The recently completed RPMP requires multi-billion dollar investment within the next 10 years in the four Central Asian countries in order to meet the power demand and provide quality supply. However, the sources of financing are still unclear and need to be identified. The ESCC might help the countries identify available funding sources and help to categorize the projects according to their financing eligibility.

(iv) **Guidance on and supervision of knowledge based activities:** The ESCC has already identified the priority requirements of capacity building and knowledge sharing that will contribute to the achievement of the goals of medium-term energy sector development plan. Activities have been carried out, but there are still many to be implemented using various modalities such as research, capacity building, and outreach programs.

10. A Medium-Term Priority Projects list was discussed at the CAREC SOM in November 2011 in Baku, Azerbaijan. This resulted in a review of the project selection criteria by ESCC and the preparation of a medium- and long-term projects lists. The medium-term list was defined as the list of projects with substantially identified financing sources, while projects in the long-term list still need to seek financing. Such draft project lists are attached to the EWP. With the preparation of the new EWP, the ESCC revised the energy sector progress indicators and aligned them with the overall CAREC results framework. The ESCC also added few additional indicators to monitor the regional cooperation in the sector.

III. KEY ISSUES FOR GUIDANCE BY THE SOM

11. The topics to be included in the Energy Work Plan 2013–2015 were discussed at the ESCC meeting held in May 2012 and there was a general consensus on them. These topics are now being presented for SOM's approval so that the detailed EWP (2013–2015) may be prepared. The finalized EWP (2013–2015) document will be presented in the next ESCC

meeting in September 2012 following which, it will be submitted to the 11th CAREC MC to be held in October 2012 for its approval.

12. The current medium-term priority projects list attached to the EWP includes only projects from ADB and Islamic Development Bank. It is expected that SOM will request the respective national agencies to update the list to include CAREC-related projects with identified financing from all multilateral or bilateral organizations as well as national budget sources. The final lists will be presented to the MC in October 2012.

IV. CHANGES TO SECTOR ACTION PLAN

13. The first draft of the ESCC EWP for 2013–2015 is attached to this Progress Report. This draft incorporates comments from the ESCC meeting. It will subsequently be further refined before the ESCC meeting in September 2012.

CAREC

Central Asia Regional Economic Cooperation Program

DRAFT OUTLINE OF THE

Energy Sector Coordination Committee Work Plan 2013–2015

27 May 2012

ENERGY WORK PLAN

I. BACKGROUND

1. In November 2008, the Seventh CAREC Ministerial Conference (MC) approved the *Strategy for Regional Cooperation in the Energy Sector of CAREC Countries* ("*Energy Strategy"*). Pursuant to the approval of the strategy document, and upon the directive of the CAREC Senior Officials at their May 2009 meeting, an Energy Action Plan (EAP) Framework was developed which was endorsed by the Eighth MC held in Mongolia in October 2009. More recently, in its meeting held in Baku in November 2011, the MC endorsed a *"Strategic Framework for the Central Asia Regional Economic Cooperation Program 2011-2020" (CAREC 2020*), which highlights the need for a greater impetus to accelerate progress across the core business areas.

2. The *Energy Strategy* document helped to crystallize the vision – energy security, energy market integration, and energy trade-driven growth – for the countries of the region as it provides the vision for the development of the energy sector in the CAREC countries. On the other hand the EAP laid the foundation for the achievement of a coordinated and effective development of the regional energy sector through the prioritization of investments in Central Asia and attention to key aspects of regional coordination of trade and energy-water synergies (The EAP is now being concluded and a completion report prepared for submission at the next MC).

3. The future road-map of the energy sector growth in CAREC region will be anchored in CAREC 2020, which will form the basis of assignment of future priorities and help to track progress against the vision and targets for the sector. The overall sector objectives will continue to be: (i) to overcome the impact of uneven distribution of energy resources, and (ii) to spur greater ownership by the countries of the future regional initiatives. The end-result will be optimized energy solutions for the region and cooperation in the area of trade, market relations, joint use and protection of transborder river systems, and knowledge sharing.

II. EAP FRAMEWORK RESULTS TO DATE

4. The preparation of the three-year (2013–2015) Energy Work Plan (EWP) is being guided by CAREC 2020. The EWP replaces the EAP Framework which has fulfilled its purpose by leading to the following developments:

a) The pursuit of the goal of regional **Energy Demand and Supply Balance** has begun through the successful completion of Regional Power Master Plan (RPMP) which provides an action plan for the sharing of energy resources of Kazakhstan, Kyrgyz Republic, Tajikistan and Uzbekistan;

b) Headway has been made on **Regional Dispatch and Regulatory Development.** Beginning with a high level assessment, it was confirmed that the economic benefits of energy trade are substantial, in the range of $2 billion over the next three years without any major infrastructure or system investments. With assistance from the USAID Regional Energy Security and Efficiency and Trade (RESET) Project, technical and institutional support was provided through a series of seminars and learning events.

c) The **Energy Water Linkages** component focused on regional level management of energy-water linkages, and seeks to improve the analytical foundations for assessing energy development of both thermal and hydropower resources. The goal is to establish evidence-based dialogue among countries that will enable mutually beneficial exploitation of Central Asia's mixed energy resources. A roadmap for future collaboration on regional analysis will be developed following a technical workshop tentatively scheduled in early July 2012. Based on region-wide consultations and an independent first generation demonstration model of water flows (produced by the University of Washington), the roadmap will likely focus on (i) regional activities of key importance (e.g., forecasting); (ii) building analytical capacity at the national levels; and (iii) expanding access and use of internationally available data and modeling resources.

The EWP will help to achieve the following goals:

Further build upon the success of the EAP through providing a road-map for the translation of the vision articulated therein into reality

Provide a mechanism for identifying and developing those projects and programs that have the greatest potential of regional integration and trade

Promote the setting-up of national production facilities with the target of exporting their outputs to second and third countries.

III. RATIONALE FOR DEVELOPING THE EWP

5. The EAP played an important role in defining the approach for the achievement of region's energy sector objectives by highlighting the need for key strategic and diagnostic studies and through outlining the guiding principles for the future development of the energy sector of the region. Three key guiding principles in the EAP were: (a) Build on phased investments for energy security and trade; (b) Focus on those investments that have high cooperation content; and (c) Address key constraints to cooperation. The formulation and approval of a coherent EWP would act as a suitable mechanism for the step-wise realization of projects and programs that will lead to enhanced energy cooperation among countries of the region.

IV. KEY ELEMENTS OF THE EWP

6. Rather than resolving issues relating to costs of electricity generated from the power stations, the costs of coal and gas for compensation of electricity supplies, and the costs of water for irrigation, the Central Asian countries are currently seeking a solution to their energy and water problems by developing their own generation capacities and transmission networks. In contrast, a suitable price and coordination mechanism of water management and energy exchanges among the countries could help to avoid huge capital outlays through the sharing of existing resources and thus having to build the minimum necessary power infrastructure, and reduce fuel costs and associated emissions. The EWP attempts to concretize the cooperation arrangements that could lead to the sharing by all the countries of the region's energy sources by offering regional dispatch solutions, resources management arrangements, and viable alternatives.

7. The CAREC Energy Strategy document identifies five main regional energy corridors, namely (i) Central Asia – East Asia; (ii) Central Asia – South Asia; (iii) Intra – Central Asia cooperation; (iv) Central Asia – Russian Federation; and (v) Central Asia – European Union.

Given the very large combined power infrastructure needs of these sub-regions, there is a need to rank them in order of their importance. This priority ranking can be assigned across the three key themes that were outlined in EAP, which are as follows: (a) Energy Demand/Supply Balance and Infrastructure; (b) Regional Dispatch and Regulatory Development; and (c) Energy-Water Linkages. The roles and relationships across the geographical sub-regions and themes lead to the following matrix which illustrates that some regions have greater need as well as potential of power sector integration than others:

		The 2 regions with the highest need and potential of integration			
Strategic Theme / Region	Central Asia - East Asia	Central Asia - South Asia	Intra-Central Asia	Central Asia - Russian Federation	Central Asia - European Union
Energy Demand/Supply Balance and Infrastructure Constraints	x	x	x		x
Regional Dispatch and Regulatory Development		x	x	x	x
Energy-Water Linkages		x	x		

8. It can be concluded from the above matrix that two of the corridors – Central Asia-South Asia and Intra-Central Asia – have the most pronounced need for integration across the themes of the EAP. Guided by this heightened need and potential for integration, the EAP (2010–2012) mainly focused on the Intra-Central Asia corridor, one of the key activities being the completion of the RPMP covering four countries (Kazakhstan, Kyrgyz Republic, Tajikistan and Uzbekistan). This was justified due to the complex energy relationships between and among them resulting from the competing needs of these countries for energy and irrigation water from the regional river basins.

9. In the EWP (which spans the period 2013–2015), the Intra-Central Asia corridor will continue to stay in focus given the continued need to match the supply with demand within the Central Asian countries at the same time ensuring the stability of the integrated network. In addition, there is the important need of building high-voltage “power-highways” into Afghanistan – the entry point of transmission lines into South Asia. This would set the stage for power supply to Afghanistan and onward to the newest CAREC member Pakistan, thus lending itself into the second corridor of greatest importance and potential for integration: Central Asia – South Asia. It also opens new opportunities for integration of the Turkmenistan (another new CAREC member) energy sector. This complementary approach, targeted heavily at the corridors with the highest integration potential, will help meet a key strategic goal outlined in both the Energy Strategy and CAREC 2020, i.e. energy security and trade. It may be noted that, for these two high priority energy corridors, the focus will be on, but not limited to, power exchanges.

A Case Study in Institutional Capacity Building

The building of the so called "power highways" from Central Asia to Afghanistan offers a technical and financial challenge given the need to synchronize the electrical grids of exporting countries (Kyrgyz Republic, Tajikistan, Turkmenistan and Uzbekistan) with the Northern Afghanistan electrical system. For this purpose, Afghanistan's linkage with the Central Asian Power System (CAPS) is necessary which could take several years of studies, extensive regional and international engagement and capacity building, all at a huge financial and human cost. The alternative is to continue the imports into Afghanistan in an "island" mode (i.e. presently, transmission lines enter specific geographical areas and are isolated from one another) – not a preferred option in the long run. A more suitable alternative might be that all import lines are bundled together at one point and a large, modular, back-to-back (DC/AC) converter station is set up which will isolate the exporting countries' grids from Afghan grid as well as from one another. The latter is a high-cost solution of the problem, but is considered to be technically reliable.

This case highlights the importance of making informed choices among competing technical solutions by studying the merits and demerits of each of the possible alternative. However, such analytical work is highly complex as it is spread across several disciplines (transmission systems, control hierarchies, mathematical modeling, etc.) and, therefore, demands the creation of training and knowledge platforms that equip the governments, utilities and other decision-makers with the necessary skills and understanding thus empowering them to make these techno-commercial decisions. One of the aims of the EWP is to enhance this capability through introducing and disseminating the necessary knowledge products which will be done with the help of CAREC Institute as highlighted in the CAREC Institute 2012–2017: A Strategic Knowledge Framework.

10. Given the very large amounts of financing needed for undertaking the generation and transmission projects in the Medium–Term Priority Projects (MTPP) list, additional sources of financing will need to be identified including private sector investments. For the development of large, green-field investment projects for which the multilateral development banks (MDBs) and governments cannot jointly come up with all the needed funds, other financing options will be explored. In parallel, regulatory regimes will need to be strengthened in those countries where they appear suitable to substitute the sponsorship of power generation projects from the public to the private sector.

11. Finally, as in the case of the completed EAP, capacity building and related knowledge products will remain the center-piece of the EWP. In this regard, steps will continue to be taken at the national and regional levels to improve institutional efficiency as well as to improve the energy and energy-water management analysis that are vital to the efficient integration of power systems of countries in the region. Furthermore, any developed analytical tools/models will be transferred to the relevant regional and national institution(s), accompanied by appropriate training to support and ensure their wide-spread use. The analytical tools/models will include the essential element of clean development and will incorporate steps that would lead to efficiency improvements in the existing power assets.

V. OUTLINE OF THE EWP

12. The EAP, which covered the period 2010–2012, was successful in bringing immediate gains through building the foundation for cooperative and efficient development of the sector as well as delivered results in the form of investments, knowledge creation and capacity building. The gains of the EAP need to be augmented by creating an EWP outlining the near-term (2012–2014) investments and capacity building initiatives that need to be launched, at the same time keeping an eye on the longer term (beyond 2015) programs of infrastructure development for which preparations need to begin now.

13. The multi-year EWP has been divided in two categories: (i) projects to be approved in the medium term (2012–2014) based on the criteria that firm financing is available either from the MDBs, bilateral donors and/or the state governments (see detailed list at **Annex 1)**; and (ii)

Examples of ESCC role in EWP Implementation:

Pricing and related issues often arise among the energy trade partners of Central Asia for which the ESCC can act as a platform for the resolution of these issues

For multi-country trade projects, the ESCC can act as the coordination group that interacts with the private sector until the setting up of formal inter-governmental bodies (councils)

The ESCC can review and develop a consensus on the outcomes and recommendations resulting from complex technical studies of regional

indicative projects to be approved in the long term (2015 and beyond) for which financing arrangements have yet to be firmed up (see detailed list at **Annex 2**).

VI. ROLE OF ESCC IN IMPLEMENTING THE EWP

14. The ESCC will guide and oversee implementation of the EWP as well as the conclusions and recommendations of any diagnostic work and studies to be carried out in support of the EWP. The ESCC will monitor and report on progress of the EWP on a regular basis, share outputs, and discuss key conclusions/initiatives. Regular (bi-annual) meetings will be held, with an agenda that will cover reports on EWP items, progress on the two key corridors of focus (Intra-Central Asia and Central Asia – South Asia) as well as updates on all other regional energy themes. The key roles to be played by the ESCC in its future deliberations will be around the following subjects each of which is vital to the successful implementation of the EWP:

(i) **Guide the development of the Central Asia – South Asia Energy Corridor**: The ESCC is in a position to play the role of a facilitator to ensure that intra and inter-regional issues that could impact on the benefits which would result from a smooth energy trade, are resolved effectively and in a timely manner. The export of summer surplus electricity generated from hydro power plants from Central Asia to South Asia has been discussed for many years. Electricity export from thermal power generation has also been under consideration. However, the options to interconnect Central Asia-South Asia have to be reconsidered in order to involve greater number of Central Asian countries, and to identify the most economical and cost-effective solution for efficient energy resource utilization, the elimination of summer/winter power deficit, and meeting of energy demand. The ESCC is the right platform to explore such options and identify one that brings maximum benefits for each individual country and the region.

(ii) **Study and address regional energy dispatch issues**: The problems associated with regional dispatch resulted in disconnection of countries from the integrated power system. Uncontrolled power flows also resulted in accumulation of liabilities. Problems could be categorized according to technical, legal/commercial, and financial. The ESCC could be an appropriate mechanism to help in resolving, if not all, at least some of those.

(iii) **Steer the mobilization of funds**: The recently completed RPMP requires multi-billion dollar investment within the next 10 years in four Central Asian countries in order to meet the power demand and provide quality supply. There is a need to identify possible sources and business environment required to attract financial resources to meet the additional investment needs of the long-term projects list. Options include, but are not limited to, mobilizing the private sector, bilateral financiers and sovereign wealth funds. The ESCC might help the countries to identify available funding sources and help to categorize the projects according to their financing eligibility.

(iv) **Guide and supervise knowledge based activities:** The ESCC has already identified the priority requirements of capacity building and knowledge sharing that will contribute to the achievement of goals of the medium-term energy sector development plan. A number of activities have been carried out but many still remain to be implemented using various modalities such as research, capacity building, and outreach programs. The ESCC in cooperation with CAREC Institute might consider organizing of a Knowledge Week, a few days workshop where countries will be able to exchange their experiences, interact with top class professionals from various fields of the energy sector, and get trained in modern technologies. Possible areas of activities are attached as **Annex 4**, which will explicitly continue efforts to improve analytical tools and capacity for energy-water linkages started under the EAP.

VII. RESULTS BASED FRAMEWORK INDICATORS AND PROJECTS LISTS

15. The overall CAREC results framework monitors the progress under each sector using various indicators. The overarching vision for the countries of the CAREC region is to bring about energy security through regional energy market integration. CAREC-related energy sector projects are those that impact regional cooperation in energy field. A set of measurable indicators must be in place in order to periodically monitor the progress being made by the countries toward the achievement of this goal. So far, the following CAREC energy sector indicators are being used: energy generation capacity measured in megawatts (MW); and, high voltage transmission lines (HVTL) added in kilometers (km). With the preparation of new EWP, the ESCC revised the energy sector progress indicators and aligned them with overall CAREC results framework. The ESCC also added few additional indicators to monitor the regional cooperation in the sector.

16. Installation of a new or rehabilitation of existing sizable generation unit or high voltage transmission asset in one country significantly impacts the operation of a grid in other countries that is interconnected by HVTL. Stability of the national grid of interconnected countries impacts its neighbors. The addition of new generation and transmission facilities and the rehabilitation of existing ones are considered to be quantifiable outputs that can be used for measuring the progress toward the goal of integration and energy trade. The following indicators will be used to monitor the progress of CAREC energy sector for interconnected countries only:

(i) New generation added of 50 MW or above (MW);
(ii) Rehabilitated generation units of 50 MW or above (percentage of funds spent on rehabilitation over total rehabilitation costs, expressed proportionally in MW);
(iii) New or rehabilitated transmission lines of 220 kV or above (km);
(iv) New substations added of 220 kV or above (in megavolt amperes [MVA])
(v) Rehabilitated substations of 220 kV or above (percentage of funds spent on rehabilitation over total needed rehabilitation costs, expressed proportionally in MVA);
(vi) Total energy generated by countries of the region (in megawatt hours [MWh] of production); and
(vii) Electricity trade among CAREC countries (MWh);

17. The indicators will be monitored by the ESCC on an annual basis.

18. However, the targets have to be elaborated in order to use indicators for monitoring progress. To create such target list, all CAREC members are requested to complete the list of ongoing projects and indicate expected output on a yearly basis. Annex 3 provides a sample of

projects and their expected outputs with no consideration of financing source (multilaterals or bilateral organizations, foreign government agencies, state budget, utility budgets, etc).

List of Annexes
Annex 1: Draft MTPP List (2012-14)
Annex 2: Draft Long-Term Projects List (2015-20)
Annex 3: On-going Energy Projects List
Annex 4: Draft ESCC knowledge-based activities list

Annex 1

Draft Medium Term Priority Projects (MTPP) List 2012–2014

Generation (including renewable energy)				
	Project Name	***Total Amount ($ mln)***	**Project Start Year**	***Remarks***
AFG	Energy Sector Development Investment Program: Tranche 4	150	2012	
AFG	Energy Sector Development Investment Program: Tranche 5	100	2013	
UZB	Takhiatash CCGT Power Generation Project	300	2013	
UZB	Solar Demonstration Project	100	2013	
UZB	Modernization of Hydropower Plant (Phase I)	185	2013	
TAJ	Energy Development Project	69	2014	
UZB	Syrdarya Energy Development Project	225	2014	
	Total	**1,129**		

Transmission				
	Project Name	***Total Amount ($ mln)***	**Project Start Year**	***Remarks***
AFG & TKM	AFG and TKM: Regional Power Interconnection Project	360	2012	Includes transmission and generation; Total length is approximate
UZB	Namangan 500 KV Power Transmission Project	250	2012	175km of 500 kv, 32km of 220kv
AFG	Regional Energy Connectivity	1,000	2014	
UZB	Transmission Improvement Project	200	2014	
	Total	**1,810**		

Rehabilitation & Efficiency Improvement				
	Project Name	***Total Amount ($ mln)***	**Project Start Year**	***Remarks***
KGZ	Power Sector Rehabilitation Project	55	2012	Reliability of HPP of 1200 MW capacity is improved (no new output is added)
TKM	Rehabilitation of Mary Power Station	500	2013	
KAZ	Energy Efficiency Project	100	2014	
	Total	**655**		

Note: The present list is a draft and prepared based on the information provided by some multilateral institutions. CAREC members are requested to update the list with projects that have regional impact, based on criteria defined in EWP.

Annex 2

Draft CAREC Long-Term Projects List for 2015–2020 (in US $million)

Country	Project	Type	Cost
KAZ & KGZ	500 kV Line Kemin SS - Almaty SS and Feeders	Transmission	160
KGZ & TAJ	500 kV Line Datka SS - Hodzhent SS	Transmission	190
AFG	MFF Energy Sector Development Investment Program	Transmission	280
	Naghlu Hydropower Rehabilitation Phase II	Generation	50
KAZ	Rehabilitation of 500/220 kV Substations	Substation	210
	Third 500 kV North-South Transmission Line	Transmission	410
	Chu-Zhambul 500 kV Line	Transmission	120
	Rehabilitation of HPPs	Generation	460
	Construction of New HPP (50 MW)	Generation	110
	Construction of New TPP (2640 MW)	Generation	5,000
	Energy Efficiency Project Investments	Energy efficiency	50
KGZ	Rehabilitation of 500/220 kV Substations	Transmission	100
	Datka-Kemin Line and Kemin Substation	Transmission	340
	Rehabilitation of HPPs	Generation	770
	Construction of New TPP (1200 MW)	Generation	2,300
	Construction of New HPPs (RoR 610 MW total)	Generation	1,000
	Energy Efficiency Project Investments	Energy efficiency	10
TAJ	Rehabilitation of 500/220 kV Substations	Transmission	130
	500 kV Transmission Line Dushanbe - Obi Gran and Substation Obi Garn	Transmission	160
	500 kV Transmission Line Obi Garn - Sangtuda-1 HPP and 500 kV substation	Transmission	110
	500 kV Line Regar SS - Sangtuda-1 HPP	Transmission	50
	Rehabilitation of HPPs	Generation	1,300
	Construction of New TPP (600 MW)	Generation	1,200
	Construction of New HPP (360 MW)	Generation	720
	Energy Efficiency Project Investments	Energy efficiency	10
UZB	Rehabilitation of 500/220 kV Substations	Substation	400
	Syr Darya-Novo-Angren 500 kV Line and Feeders	Transmission	100
	Rehabilitation of HPPs	Generation	750
	Planned Power Plants (1090 MW)	Generation	1,470
	Construction of Additional New TPPs (5100 MW)	Generation	4,860
	Energy Efficiency Project Investments	Energy efficiency	120

HDP=hydropower plant; SS=substation; TPP=thermal power plant

Note: The present list is a draft and prepared based on the information provided by some multilateral institutions and Regional Power Sector Master Plan. CAREC members are requested to update the list with projects that have regional impact, based on criteria defined in EWP.

Annex 3

Ongoing CAREC Energy Projects List

	Project Name	*Total Amount ($ mln)*	*Output*			Project Completion Date	*Remarks*
			MW	*km*	MVA (for SS)		
AFG & TAJ	Regional Power Transmission Interconnection Project	35	45	118		2012	Construction work completed in 2011, but project commissioning in 2012
AFG	Energy Sector Development Investment Program-Tranche 1	176	2.0	67	-	2016	40,000 distribution connections 2 MW generation under the $12 m JFPR Project
AFG	Energy Sector Development Investment Program-Tranche 2	81.5	-	30	120	2016	60,000 distribution connections
AFG	Energy Sector Development Investment Program-Tranche 3		4.8	30	-	2015	
AFG	Regional Power Interconnection Project	16			81	2012	
KGZ	Power Sector Improvement					2014	
KGZ	Improvement of Electricity Supply in Bishkek & Osh Cities	23		20	63.5	2015	
TAJ	Regional Power Transmission Project			140	-	2015	
TAJ	Nurek 550KV Switchyard Reconstruction					2014	
UZB	Talimarjan Power Generation Project		820			2014	

MVA=megavolt amperes; SS=substation

Note: The above list includes only ADB and IsDB projects as they are the only IFIs that have so far provided this information. CAREC Members are requested to update the list with projects that have regional impact, based on criteria defined in EWP.

Annex 4

Draft List of ESCC Knowledge-based Activities Under the CAREC Institute

Components	Knowledge Generation	Knowledge Services	Knowledge Management
Investment measures (focus on energy security, efficiency and conservation)	- National and regional power sector development master plans - Technical operation of regional dispatch and its alternatives - Energy corridors and inter and intra regional linkages - National and regional energy efficiency statistics, policies and measures	- Energy efficiency and demand management - Renewable energy - Regional transmission organizations - System planning and optimization software - Energy trade grid and management compliance - Loss reduction methods in energy grids - Smart grid and smart metering - Modernization of combined heat and power systems	- Database of existing energy sector expertise in CAREC Database of energy projects in CAREC
Legal and Commercial policies	- Legal and regulatory implications of regional trade and dispatch - Design of energy regulatory frameworks - National and regional grid codes	- Commercial operations (negotiations, contracting, dispatch and systems control, metering, billing and collections, utility accounting and audit - Governance, tariff adjustments, and operational efficiency - PPPs in energy - Regional power trade models and case studies - Developing international agreements - Cross-border metering and protocol - Institutional structure for the energy sector - Cross border CDM trade	- Seminar: Successful PPPs in energy - Seminar: Energy trade in Africa, Latin America
Energy-water linkages (incl. transboundary river management and protection)	- Issue-based regional analysis (e.g., flood management) - Improved forecasting	- Multipurpose management of water reservoirs - Hydropower development in international rivers - National level technical skills in modeling	- Seminar: International experience in transboundary river management