



Central Asia Regional Economic Cooperation Program

# Energy Sector Coordinating Committee Work Plan 2013–2015

October 2012

### List of Acronyms

ADB	– Asian Development Bank
APMP	– Afghanistan Power Master Plan
CAPS	– Central Asian Power System
CAREC	– Central Asia Regional Economic Cooperation Program
CASAREM	– Central Asia-South Asia Regional Electricity Market
CDM	– Clean Development Mechanism
EMP	– Energy Action Plan
EWP	– Energy Work Plan
GSPA	– gas sales and purchase agreement
IFAS	– International Fund for Saving the Aral Sea
IGC	– Intergovernmental Council
KM	– kilometer
kV	– kilovolts
MC	– Ministerial Conference
MTPP	– Medium-Term Priority Projects
MVA	– megavolt amperes
MWh	– megawatt per hour
MW	– megawatt
PPP	– public-private-partnership
RPMP	– Regional Power Master Plan
RESET	– Regional Energy Security, Efficiency and Trade
SDC	– Swiss Agency for Development and Cooperation
SPCC	– special purpose consortium company
TAPI	– Turkmenistan-Afghanistan-Pakistan-India
UNRCCA	– United Nation’s Regional Center for Preventive Diplomacy for Central Asia
USAID	– United States Agency for International Development

## 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*”). Following 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, at 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 to accelerate progress across core business areas, including the energy sector.

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 CAREC region as it provides direction for the development of the energy sector in these countries. The EAP laid the foundation for the 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 to energy-water synergies. An EAP Completion Report will be submitted at the next MC.

3. A roadmap for energy sector growth in the 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 across the countries, and (ii) to spur greater ownership of regional initiatives by the countries. The end-result will be optimum energy solutions for the countries and the region, cooperation in areas of trade, joint-use and protection of trans-border river systems, and knowledge sharing.

### II. EAP FRAMEWORK RESULTS TO DATE

4. The preparation of the three-year Energy Work Plan (EWP), for the period 2013-2015, has been guided by *CAREC 2020*. The EWP is built on the foundation of the EAP Framework which has fulfilled its purpose by leading to the following developments:

- a) The pursuit of the goal of regional **Energy Demand/Supply Balance and Infrastructure** has begun through the successful completion of a diagnostic study of energy demand and supply and infrastructure constraints, and of a Regional Power Master Plan (RPMP) which provides a prioritized action plan for strengthening the energy infrastructure in Kazakhstan, Kyrgyz Republic, Tajikistan and Uzbekistan, and for sharing energy resources between these countries;
- b) Headway has been made on **Regional Dispatch and Regulatory Development**. It has been established that the economic benefits of energy trade are substantial, potentially in the range of \$2 billion over the next three years, without any major infrastructure or systems investments. With assistance from the United States Agency for International Development’s (USAID) Regional Energy Security, Efficiency and Trade (RESET)

project, technical and institutional support has been provided through a series of workshops, seminars and other learning events.

- c) The **Energy-Water Linkages** component focuses on the management of energy-water linkages at a regional level, and seeks to strengthen the analytical foundations for assessing the development of both thermal and hydropower energy resources. The goal is to establish an evidence-based dialogue among the countries that will enable mutually beneficial exploitation of Central Asia's mixed energy resources. A roadmap for future collaboration on regional analysis has been developed following a technical workshop 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 focuses 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 roadmap 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 objective of exporting their outputs to second and third countries.*

### III. RATIONALE FOR DEVELOPING THE EWP

5. The EAP has played an important role in defining the approach for the achievement of the region's energy sector objectives, by highlighting the need for key diagnostic and strategic studies, and by defining the guiding principles for the future development of the energy sector of the region. The 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, leading to enhanced energy cooperation among the countries of the region.

### IV. KEY ELEMENTS OF THE EWP

6. 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; (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 the EAP, i.e., (a) energy demand and supply balance and infrastructure constraints; (b) regional dispatch and regulatory development; and (c) energy-water linkages. The roles and relationships across the geographical sub-regions and themes led to the following matrix which illustrates that some regions have greater need, as well as potential, for energy sector integration than others:

Strategic Theme / Region	<i>The two regions with the highest need and potential for integration</i>				
	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		

7. 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 its 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 these countries, resulting from their competing needs for energy and irrigation water from regional river basins.

8. In EWP (2013-2015), the Intra-Central Asia corridor will continue to stay in focus given the continued need to match supply with demand within the Central Asian countries and, at the same time, to ensure the stability of the integrated network. In addition, there is the important need for developing “energy highways” into Afghanistan, the entry point for energy transfers to South Asia. This would set the stage for gas and power supply to Afghanistan, and onward to the newest CAREC member Pakistan, thus leading to 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 key strategic goals outlined in both the *Energy Strategy* and *CAREC 2020*, i.e. energy security and energy trade.

9. Central Asian countries are currently seeking independent solutions to their energy and water problems, by developing their own generation capacities and transmission networks. Suitable coordination mechanisms, for energy exchanges and water management among the countries, could help minimize capital outlays through the sharing of existing resources, rationalizing the augmentation of power infrastructure, reducing fuel use and costs and associated emissions. There are, however, various issues (of a technical, commercial, legal, or political nature) which are resulting in sub-optimal regional energy dispatch. For instance, countries with large thermal generation capacity are incurring large expenses to maintain active reserves to cover daily peaks, while countries with significant hydro resources spill water in the summer months due to excessive water levels. This is due to lack of water reservoirs and/or the ability to export excess electricity. As another example, capacity and frequency regulation are

### **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 alternatives. 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 2013–2017: A Strategic Knowledge Framework.*

not optimized at a regional level. By alleviating or resolving regional energy dispatch problems, the EWP attempts to crystallize cooperation arrangements that could lead to the equitable sharing of the region’s energy resources.

10. According to the RPMP, about \$35 billion is required to be invested in the power infrastructure of the four Central Asian countries considered in the study, over a 12-year period (2011-2022). This investment is required for the rehabilitation of existing power infrastructure, on green-field projects for generation and transmission capacity expansion, on projects for energy efficiency improvement, and on the regional transmission system. Given these very large financing requirements, all possible sources of financing, including the private sector, need to be explored, as a part of EWP (2013-2015). The private sector’s role in financing energy infrastructure projects in this region has, thus far, been disappointing. This requires a review of the enabling environment, including the regulatory framework for energy investments and trade.

11. As in the case of the completed EAP, capacity building and related knowledge products will remain a critical feature of EWP (2013-2015). In this regard, steps will continue to be taken, at the national and regional levels, to improve institutional efficiency, and enhance technical skills (for example, by improving energy-water analysis and management capability) which are vital for the efficient integration of power systems of countries in the region. Analytical tools and models developed and used during the EWP period will be transferred to the relevant regional and national institutions, accompanied by appropriate training to support and ensure their widespread use.

12. EWP emphasizes the need to identify priority projects to be implemented over the medium term (2012-2014), and over the longer-term, by the countries concerned. The medium-term priority projects should have firm financing plans (including financing from state governments, and/or bi-lateral or multi-lateral donors). Projects proposed to be

implemented over the longer term (2015 and beyond) also need to be prioritized and their financing options explored.

## V. ENERGY WORK PLAN 2013-2015

### A. Developing the Central Asia – South Asia Energy Corridor

13. There are certain cross-border projects and programs, which are being implemented, or are under active consideration, for the transfer of energy from Central Asia to South Asia, all transiting Afghanistan. These include the TAPI (Turkmenistan-Afghanistan-Pakistan-India) gas pipeline project and the CASA-1000 power transmission project. Other options, aimed at integrating the thermal and hydropower resources of Central Asian countries for power supply to Afghanistan, and onward to Pakistan, are also being examined and EWP (2013-2015) includes activities aimed at developing these initiatives further.

14. TAPI will provide an opportunity to land-locked Turkmenistan to diversify its gas exports to the east, where there is a growing demand for energy. The TAPI project aims to export up to 33 billion cubic meters per year of natural gas, through a proposed 1,800 kilometer pipeline, from Turkmenistan to Afghanistan, Pakistan and India. Project cost was estimated at \$7.6 billion in 2008. TAPI will be operated by a special purpose consortium company (SPCC). At the request of the four countries, Asian Development Bank (ADB) has been TAPI's secretariat since 2002. TAPI is being implemented in four phases. Phase 1 was completed in December 2010, with the signing of the gas pipeline framework agreement, inter-governmental agreement, and heads of agreement relating to the gas sales and purchase agreement (GSPA). Phase 2 is expected to end in 2012, with the expected signing of the GSPA. During the EWP period, Phase 3 will be implemented with ADB's technical assistance. This will entail, *inter alia*, selection of a commercial entity to lead the SPCC, establishing the SPCC, and finalizing GSPA-related operational agreements. The subsequent phase will cover pipeline construction activities.

15. The proposed CASA-1000 project is the first phase of the Central Asia-South Asia Regional Electricity Market (CASAREM) development program. The project supports trade of up to 1,300 megawatt (MW) of clean electricity between the two regions, and will be setting the stage for a greater degree of energy trade between Central Asia and South Asia. Besides alleviating electricity shortages in Afghanistan and Pakistan, it will help establish Afghanistan's role as a transit country. CASA-1000 will also ensure a steady source of revenue from power exports of summer surplus for Tajikistan and Kyrgyz Republic which could help support the economies of these two poorest countries in the Central Asia region. The project is estimated to cost \$1 billion. The four countries established an Intergovernmental Council (IGC) at Minister level in 2008 to guide the project, and constituted dedicated working groups in 2011, to accelerate preparatory work. The techno-economic feasibility study, environmental and social impact assessment, project development structure, and risk assessment for the project have been completed. Work on commercial agreements, and procurement of an international project developer and operator is in progress. The last IGC meeting in Dubai, directed the Joint Working Groups to prepare open access rules to facilitate the participation of more countries in the CASA-1000 project. Project implementation is planned to start from 2014.

16. Power supply from the thermal power sources in Turkmenistan and Uzbekistan, and from hydropower resources in Tajikistan and Kyrgyzstan, can be connected to a national grid in Afghanistan, for meeting Afghanistan's power requirements, and for power transfer to Pakistan. Work undertaken under the Afghanistan Power Master Plan (APMP), and other technical and cost analyses, suggest that such a scheme could yield significant benefits in terms of the flexible integration of energy sources in Central Asia, full-year power export from Central Asia to South Asia, creation of a national power system for Afghanistan with the integration of its own

power generation projects, and the possibility of power wheeling between the Central Asian countries themselves. A detailed study has been included in EWP (2013-2015) which will, *inter alia*, examine technical options for the integration of Central Asian and South Asian power markets more critically (e.g., synchronous versus asynchronous connections) and select an optimum technical configuration, recommend appropriate phasing or modular development of the integration scheme (e.g., the timing for power supply to Pakistan), develop more accurate cost estimates, recommend a phase-wise financing plan, and establish the financial and economic viability of the scheme, both for the countries involved and for the region.

## **B. Resolving Regional Energy Dispatch Issues**

17. The economic study of electricity trade undertaken under the EAP clearly shows significant benefits. The study also identifies numerous actions that could be undertaken at little cost to help re-establish some trade patterns. USAID will be addressing several of these in the RESET program. The following studies are intended to be undertaken in the first year:

- Potential legal, regulatory, and governance mechanisms for future power trade (Central and South Asia);
- Unplanned power flows and international best practices; and
- Metering automation and unification of international energy trade

18. It is also proposed to explore four additional topics over the course of the EWP:

- Simple interconnections (including reinforcement of existing ones) between two national systems and one-off, cross-border, electricity trade projects (including islanded trades, outside the synchronized system);
- Detailed national analyses of the benefits and risks of trade;
- Possible investments to increase alternative trade routes, such as Kyrgyz Republic/Kazakhstan; and
- The potential for tradable reserves and the strengthening of information management of Central Asian Power System (CAPS) members.

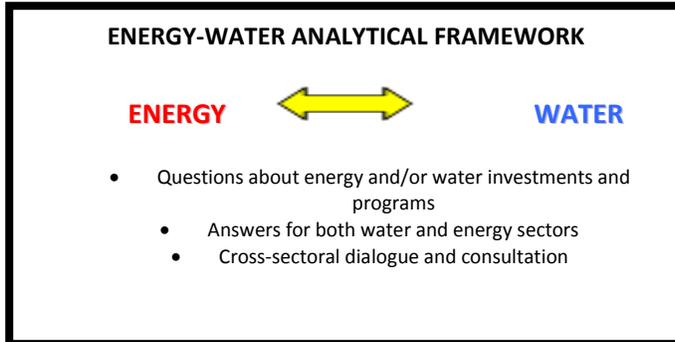
## **C. Managing Energy-Water Linkages**

19. The “energy-water nexus” related to winter energy deficits and summer flows has received considerable attention in Central Asia. In addition to numerous analytical studies, several attempts have been made to work out agreeable solutions for power or water sharing, to replace the old central planning approach with mechanisms that are appropriate to the new economies and that respect national sovereignty. Most attempts did not yield desired results and supporting mechanisms continue to elude the region. Part of the problem has been failure to include both energy and water in the same analysis, and the lack of collective ownership of data and analytical tools.

20. The third pillar of the EAP focused on energy-water linkages with the objective to strengthen the analytical framework that integrates energy and water for the region. The

ultimate goal is to help decision-makers better understand and exploit the value of energy-water linkages, while ensuring negative linkages are managed.

21. The pillar was divided into two phases: Phase 1 prepared a roadmap for strengthening analysis based on country and regional-level consultations, analytical reviews



- Can hydro storage increase reliability of wind resources? How much additional energy would be available?
- What are long term implications of each country adopting a single resource approach to energy security?
- Can agricultural water savings moderate the demand for summer flows?
- What potential exists for rehabilitation in terms of water use productivity and incremental energy/capacity?
- Does small hydro offer an important short term resource? Does it help/exacerbate water distribution?

of existing models and development of a demonstration model for the Aral Sea Basin. The product of a six-country, multi-sectoral workshop in July 2012, the draft roadmap established the principles for a different approach to energy-water analysis. Phase 2, which is proposed for EWP, implements the recommendations of the roadmap.

22. The roadmap consists of eight principles which emphasize balancing of regional and national ownership of analytical tools, open source data, and wide dissemination of information products. It identifies three levels of engagement: national, regional (all six countries) and multi-lateral (some sub-set of the six countries). The Energy Sector Coordinating Committee (ESCC) EWP focuses on the regional and multi-lateral activities. The workshop identified the core activities for the roadmap, consistent with:

- Data: Enhance access to and use of open source data;<sup>1</sup>
- Modeling/analytical tools: Migrate to a system of models to (i) broadly understand basin-wide linkages; and (ii) analyze specific operational issues such as water conservation, disaster risk management, and climate change;
- Institutional development: Articulating the appropriate roles and responsibilities of existing regional organizations such as International Fund for Saving the Aral Sea (IFAS), and explore creation of issue-specific hubs/centers of excellence; and
- Capacity development: Focused seminars on open source data and integrating with local information, and issue-specific topics as arise from other initiatives

23. Specific tasks will be identified and sequenced subject to detailed discussions at the national level and consistency with other regional programs (such as the Third Aral Sea Program of IFAS). It is recognized that activities undertaken as part of EWP (2013-2015) will be coordinated with other development partners and organizations, such as United Nation's Regional Center for Preventive Diplomacy for Central Asia's (UNRCCA) capacity building-in-

<sup>1</sup> Data available from public sources, including satellite imagery

scenario analysis and Swiss Agency for Development and Cooperation (SDC) analysis and management of data flows.

#### **D. Mobilizing Funds for Building Energy Assets**

24. As a part of the EWP, the capacity of each country to finance the projects identified in the RPMP from its own resources will be assessed and, if necessary, other potential sources of financing will be identified, including private investment. Historically, private sector involvement in the development of energy infrastructure in the CAREC region has been minimal and this could be promoted through the public-private-partnership (PPP) modality. A number of factors determine a project's position in the PPP spectrum including country rating, the extent of private sector activity in the country, the extent of private sector investment in the sector, the presence of private sector operators in the sector, the regulatory and legal framework, project size, credit worthiness of stakeholders, etc. Challenges notwithstanding, there is potential for expanding the role of the private sector and PPPs in the development of CAREC energy infrastructure.

25. Preparatory work will also be undertaken during the EWP period for the establishment of a CAREC regional project development facility, as envisaged in *CAREC 2020*, to mobilize private sector interest and help prepare potential PPP projects. Technical assistance will be provided for determining an appropriate institutional structure for this facility, its operational mechanism, and its funding requirements.

#### **E. Implementing Medium-Term Priority Projects (MTPP)**

26. A list of priority projects to be implemented over the medium-term (2012-2014) needs to be finalized, updated and revised periodically, by the countries concerned, based on confirmation of national and regional priorities, and taking into account the project prioritization plan outlined in the RPMP.

27. A set of measurable indicators has been put in place in order to periodically monitor the progress made by the countries towards achievement of the goal regional cooperation. For EWP (2013-2015), the ESCC has developed a list of energy sector progress indicators and aligned them with the overall CAREC results framework. The installation of new generation assets or high-voltage transmission line assets, or the sizable rehabilitation of such assets, in one country could significantly impact on the operation of grids in countries that are connected by high-voltage transmission lines. These are quantifiable outputs that can be used for measuring progress toward the goal of integration and energy trade. The following indicators will be used by ESCC to monitor progress in the implementation of the priority projects, based on targets specified by the countries:

- (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 kilovolt (kV) or above kilometer(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)

#### **F. Capacity Building and Knowledge Management**

28. A number of capacity-building opportunities have been identified during the course of implementation of the EAP, and these are illustrated in Annex 1: Draft List of ESCC Knowledge-Based Activities Under the CAREC Institute. EWP (2013-2015) aims to bridge the capacity gap in the CAREC countries and provides for the implementation of capacity-building programs of a technical, financial, legal, and commercial nature. The programs include: interconnection options for the Central Asia-South Asia energy corridor, regulatory framework for energy trade in the CAREC region, potential for balancing CAREC's energy portfolio through the development of renewable energy resources, regional energy dispatch issues such as cross-border metering, lessons for CAREC from regional power trade models and case studies, system planning and optimization software, institutional arrangements and their implications for energy trade, database of energy expertise and knowledge products in the CAREC region, and demand-side management measures including energy efficiency and energy conservation. The prioritization of capacity-building programs (delivered through studies, workshops, seminars) would depend on the availability of resources. A list of programs to be implemented during the EWP period will, therefore, be finalized, in consultation with the CAREC countries and the CAREC Institute and these programs will be implemented with the support of bi-lateral and multi-lateral institutions.

#### **VI. ROLE OF ESCC IN IMPLEMENTING EWP (2013-2015)**

29. The ESCC will guide and oversee implementation of EWP (2013-2015) as well as the conclusions and recommendations of any diagnostic work and studies to be carried out in support of EWP (2013-2015). The ESCC will monitor and report on progress of EWP (2013-2015) 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 (2013-2015) 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 EWP (2013-2015):

- (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 adversely on energy trade, are resolved effectively and in a timely manner. The various options to connect Central Asia to South Asia, for energy trade, have to be carefully analyzed to identify the most economical and cost-effective solutions for efficient energy resource utilization and for meeting energy demand, including the elimination of seasonal power deficits. The ESCC is the right platform to explore such options and identify a course of action which yields maximum benefits for the countries involved, and for the region.

**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 consensus on outcomes and recommendations of complex technical studies on regional trade*

(ii) **Study and address regional energy dispatch issues:** Problems associated with regional dispatch have resulted in disconnection of certain countries from the integrated Central Asian Power System. Such problems could be categorized as technical, legal, commercial and financial and the ESCC is the appropriate forum for addressing them.

(iii) **Steer the mobilization of funds:** The recently completed RPMP requires a multi-billion dollar investment, over the next 10 years, in order to meet energy demand, and to provide quality energy supply to CAREC countries. There is a need to identify sources to meet these financing requirements. Potential project financing sources include government or state-owned enterprise budgets, sovereign wealth funds, multi-lateral and bi-lateral agencies, and private investment. There is a need, across the CAREC region, to improve the business environment, for attracting private investment. The ESCC could help the countries to identify available

funding sources, and to categorize projects according to their financing eligibility. The ESCC needs to consider the establishment of a CAREC regional project development facility, to mobilize interest in potential financiers, in particular the private sector, and to help prepare potential PPP projects.

(iv) **Guide and supervise knowledge-based activities:** The ESCC has already identified certain requirements of capacity building and knowledge sharing that will contribute to the achievement of goals of the medium-term energy sector development plan. Although a number of activities have been carried out, many still remain to be implemented using various modalities such as research, capacity building, and outreach programs. The ESCC, in cooperation with CAREC Institute, could guide the prioritization of the capacity-building program.

(v) **Guide the development of MTPP portfolio:** The successful implementation of core, medium-term, projects is important for addressing supply-demand imbalances within the countries by strengthening and augmenting energy infrastructure, by implementing energy efficiency measures (including demand-side management), and by providing a platform for promoting power trade. The ESCC is the appropriate forum for finalizing, reviewing and updating the MTPP list, as necessary, based on national and regional requirements. The ESCC is also the right forum for reviewing MTPP implementation progress, based on the agreed performance indicators.

## Annex 1

## 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)	<ul style="list-style-type: none"> <li>- National and regional power sector development master plans</li> <li>- Technical operation of regional dispatch and its alternatives</li> <li>- Energy corridors and inter- and intra-regional linkages</li> <li>- National and regional energy efficiency statistics, policies and measures</li> </ul>	<ul style="list-style-type: none"> <li>- Energy efficiency and demand management</li> <li>- Renewable energy</li> <li>- Regional transmission organizations</li> <li>- System planning and optimization software</li> <li>- Energy trade grid and management compliance</li> <li>- Loss reduction methods in energy grids</li> <li>- Smart grid and smart metering</li> <li>- Modernization of combined heat and power systems</li> </ul>	<ul style="list-style-type: none"> <li>- Database of existing energy sector expertise in CAREC</li> <li>- Database of energy projects in CAREC</li> </ul>
Legal and Commercial policies	<ul style="list-style-type: none"> <li>- Legal and regulatory implications of regional trade and dispatch</li> <li>- Design of energy regulatory frameworks</li> <li>- National and regional grid codes</li> </ul>	<ul style="list-style-type: none"> <li>- Commercial operations (negotiations, contracting, dispatch and systems control, metering, billing and collections, utility accounting and audit</li> <li>- Governance, tariff adjustments, and operational efficiency</li> <li>- PPPs in energy</li> <li>- Regional power trade models and case studies</li> <li>- Developing international agreements</li> <li>- Cross-border metering and protocol</li> <li>- Institutional structure for the energy sector</li> <li>- Cross border Clean Development Mechanism (CDM) trade</li> </ul>	<ul style="list-style-type: none"> <li>- Seminar: Successful PPPs in energy</li> <li>- Seminar: Energy trade in Africa and Latin America</li> </ul>
Energy-water linkages (incl. transboundary river management and protection)	<ul style="list-style-type: none"> <li>- Issue-based regional analysis (e.g., flood management)</li> <li>- Improved forecasting</li> </ul>	<ul style="list-style-type: none"> <li>- Multipurpose management of water reservoirs</li> <li>- Hydropower development in international rivers</li> <li>- National level technical skills in modeling</li> </ul>	<ul style="list-style-type: none"> <li>- Seminar: International experience in transboundary river management</li> </ul>