



Central Asia Regional Economic Cooperation Program

Reference Document  
For Session 2 of the Senior Officials' Meeting  
October 2012

# **Energy Sector Progress Report (2011–2012)**

**11th CAREC Ministerial Conference  
Senior Officials' Meeting  
Central Asia Regional Economic Cooperation  
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## I. KEY DEVELOPMENTS IN THE ENERGY SECTOR

### A. Sector Implementation

1. The work of the energy sector is represented in the overall CAREC results framework by five Level 2 indicators endorsed at the Energy Sector Coordinating Committee (ESCC) meeting in May 2012. These are: (i) transmission lines installed or upgraded (kilometers [km]) (ii) new energy generation capacity (megawatt [MW]), (iii) rehabilitated generation capacity (MW), (iv) new substations installed (megavolt-ampere [MVA]), and (v) substation upgraded (MVA). These indicators seek to capture how CAREC contributes to the development of energy sector infrastructure to enhance energy security, efficiency, and support regional power trade. As only interconnected countries can benefit from installation or upgrading of medium- or large-scale power plants or high voltage transmission assets in a neighboring country, the indicators apply solely to CAREC countries with interconnected power grids. Given this parameter, energy sector indicators currently monitor the progress only in Afghanistan, Kazakhstan, Kyrgyz Republic, Tajikistan, Turkmenistan, and Uzbekistan.

2. Data for 2012 delivered results for one of the five indicators. A total of 322 km of transmission line was completed under the Kazakhstan Moinak Transmission project. Based on recently approved and ongoing CAREC-related energy projects, it is estimated that over the period 2013–2015, 755 km of high-voltage overhead transmission line will be installed or upgraded, 820 MW of generation capacity will be installed, 200 MW of generation capacity will be rehabilitated, and 144 MVA of substations will be installed or upgraded. It should be noted, however, that projected estimates are subject to unforeseen implementation adjustment and/or delay.

**Energy Sector Outputs 2012**

Indicator	2009 Baseline Value	2010	2011	2012	Projected Output for 2013-2015
Transmission lines installed or upgraded (km) <sup>a</sup>	850	...	1,150	322	755
New energy generation capacity (MW) <sup>b</sup>	...	...	...	...	820
Rehabilitated generation capacity (MW) <sup>c</sup>	...	...	...	...	200
New substations installed (MVA) <sup>d</sup>	...	...	...	...	144
Substation upgraded (MVA) <sup>e</sup>	...	...	...	...	...

... = no data available, km = kilometer, MW = megawatt, MVA = megavolt-ampere.

a. New or rehabilitated transmission lines of 220 kV or above (km).

b. New generation added of 50 MW or above (MW).

c. Rehabilitated generation units of 50 MW or above (percentage of funds spent on rehabilitation over total rehabilitation costs, expressed proportionally in MW).

d. New substations added of 220 kV or above (MVA).

e. Rehabilitated substations of 220 kV or above (percentage of funds spent on rehabilitation over total needed rehabilitation costs, expressed proportionally in MVA)

## B. Addressing Actions Proposed in the 2011 CAREC Development Effectiveness Review (2011 CAREC DEfR) and Ongoing Key Issues

### 1. Priority Actions Proposed in the 2011 CAREC DEfR

- Accelerate finalization of the CAREC Energy Work Plan 2013-2015.

#### Action initiated:

3. In May 2012, the ESCC endorsed the outline of a proposed completion report for the CAREC Energy Action Plan (EAP) framework, which summarizes the achievements made under the framework and future directions. The completion report was prepared and endorsed at the September 2012 ESCC meeting. Based on imminent closure of the EAP, the draft Energy Work Plan 2013–2015 (EWP) was discussed at the ESCC meeting held in May 2012, and proposed EWP topics were approved at the CAREC Senior Officials Meeting (SOM) in June 2012. The following progress in Energy Demand and Supply Balance and Infrastructure Constraints, and Energy–Water Linkages has fed into the EWP formulation.

#### Energy Demand and Supply Balance and Infrastructure Constraints

4. Under the \$2 million technical assistance provided by the Asian Development Bank (ADB), Fichtner (Germany) has completed, and ESCC has endorsed, a 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 interconnection of the Afghanistan power system to the Central Asian Power System (CAPS). The study includes the development of a 12-year (2011–2022) investment plan, which contributed to the preparation of a medium-term priority projects (MTPP) list for the energy sector. CAREC member countries had several opportunities to comment on the master plan, at various stages of preparation. The draft final RPMP report was presented and discussed during the ESCC meeting held in May 2012 to ensure submission of the final report by September 2012.

5. Specifically, the RPMP provides detailed analysis on the power sector of Kazakhstan, Kyrgyz Republic, Tajikistan, and Uzbekistan which includes *inter alia*: (i) an assessment of the existing power sector infrastructure, and trading arrangements, in these countries under CAPS; (ii) an estimation of future power demand in each country; (iii) an assessment of ongoing power sector projects (based on technical, environmental, and social considerations); and (iv) a review of power generation and transmission plans and programs. The RPMP outlines the benefits of regional cooperation in the energy sector, and proposes a 12-year investment plan, with a cumulative financing requirement of about \$35 billion. This investment is aimed at strengthening the power sector infrastructure in each country, and providing interconnection systems for promoting regional integration. The RPMP also includes an analysis of requirements for connecting Afghanistan to CAPS, with the further possibility of exporting electricity to Pakistan.

6. An ADB-supported technical assistance program (\$1.5 million) is underway to prepare the Afghanistan Power Sector Master Plan (APMP). Its inception report was presented by the consultant (Fichtner), and reviewed by senior energy officials from Afghanistan and Turkmenistan, at a meeting held in Istanbul, Turkey, 24–26 April 2012. The completed pre-feasibility study of the interconnection between Turkmenistan and Afghanistan was also

discussed at this meeting. As both these studies are being done by Fichtner (Germany), and many of the issues in these studies are inter-linked, this joint meeting proved highly useful in resolving some key issues. The meeting was attended by ADB, Islamic Development Bank, United States Agency for International Development (USAID) and the World Bank, and provided useful inputs to these ongoing sub-regional studies.

7. The APMP study contains (i) power demand projections, (ii) existing power assets assessment, (iii) analysis of capacity generation and transmission expansion scenarios, (iv) analysis of power generation and transmission plans, (v) review of power purchasing agreements (PPAs) with neighboring countries (i.e., Iran, Turkmenistan, Tajikistan, and Uzbekistan), and (vi) analysis of RPMP integration. Initial findings show that gross energy demand in Afghanistan is expected to increase by about 8.5% annually over the next 20 years. A power system optimization model has been established, and options for additional generation and transmission identified, with focus on utilizing local resources (gas, coal, and hydro) and on creating a national grid. Regional projects involving Afghanistan, including a proposal to wheel power to Pakistan from Turkmenistan, Uzbekistan, and Tajikistan is also being considered in the study.

### Energy–Water Linkages

8. Since the May 2012 ESCC meeting, and at the request of national stakeholders, the World Bank undertook a review of existing basin models, with the intention of comparing differences in features and informing all countries on the range of available analytical tools. In July 2012, the World Bank and its partners, the Swiss Agency for Development and Coordination and the United Nations Economic Commission for Europe, hosted a knowledge-exchange workshop Strengthening Analysis for Integrated and Adaptive Water Resources Management in Central Asia, in Almaty, Kazakhstan. The objective of the workshop was to build on individual national engagement to date, develop analytical work, and define a comprehensive program to strengthen data and analysis for dialogue and decisions for resource management. The workshop engaged a range of technical and policy expertise from Central Asia and the international community. Workshop participants included delegates from each of the six riparian countries: Afghanistan, Kazakhstan, Kyrgyz Republic, Tajikistan, Turkmenistan, and Uzbekistan, representing a range of sectors (e.g., water resources, agriculture, hydro-meteorological, environment, and policy-makers). In addition, a cadre of technical specialists complemented Central Asia speakers on international experiences, and numerous international donor organizations observed.

9. The workshop agenda explored current approaches and emerging analytical tools. These included a range of data and information sources, models, information interfaces, standardized data integrating open source ‘top-down’ (such as the AralDIF platform discussed at the previous two ESCC meetings) with local-sourced ‘bottom-up’ data. A review of the current institutional structure in Central Asia provided recommendations for a more effective legal framework and transparent institutions to build cross-border trust regarding data exchange. Participants confirmed that working with only one model is inadequate to address the complexity of resource management issues: far preferable is a system of models supplemented and complemented by new technologies and approaches. Delegates agreed to explore further the AralDIF, BEAM, and ASBOMM models and are open to consider other options for a system of models. In addition, participants agreed that more targeted models and analysis for specific cross-border operational issues (such as flood management) would be valuable.

10. The Almaty workshop concluded with a road map for the EWP. Significantly, the workshop identified eight principles that establish a new paradigm for future work (Box 1). The road map proposes a regional work program for 2013-2015 to be supported by and integrated with individual national road map programs. The work program identifies specific activities in four key areas: data, modeling, institutional strengthening, and capacity development. Activities would include creating a web-based data portal; defining a shared information system integrating “top-down and bottom-up” data; developing appropriate water conservation analytical tools; developing appropriate multi-country flood management tools; strengthening inter-regional climate change adaptation/mitigation activities; training on global experiences in international data and modeling; and exploring institutional needs, particularly related to International Fund for Saving the Aral Sea.

### **Box 1. Eight Governing Principles for Strengthening Analysis for Water Resources Management**

#### *Cooperation*

- ✓ Balance of regional and national ownership
- ✓ Emphasis on national and regional consultations

#### *Knowledge outputs*

- ✓ Basin modeling addressing regional and national priorities and constraints
- ✓ Presentation of information in user-friendly accessible formats

#### *Open source*

- ✓ Emphasis on open source data, information products and models placed in the public domain
- ✓ “Top down” and “bottom-up” data appropriately integrated

#### *Capacity and institutions*

- ✓ Existing human and technical resources combine with emerging technology
- ✓ Institutional and financial stability

- To sustain operations growth, endorse medium-term priority project list at the Ministerial Conference of 2012, and commence mainstreaming priority projects into national development plans of the CAREC countries.

#### **Action initiated:**

11. The RPMP’s 12-year investment plan contributed to the preparation of an MTPP list for the energy sector (paragraph 3). The draft list was circulated to the CAREC member countries to solicit comments at various stages of preparation. The current MTPP list attached to the EWP includes only projects from ADB and Islamic Development Bank.

#### **Next steps:**

12. 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 MTPP list will be presented to the CAREC 11th Ministerial Conference in October 2012.

- To counter the drop in finance mobilization, step up efforts to explore co-financing opportunities among CAREC governments, multi- and bilateral institutions, other development partners, and the private sector.

**Action initiated:**

13. No action has been initiated.

**Next steps:**

14. Resource mobilization has been identified as one of the six core priority elements in the EWP (Section II. Key Issues for Guidance by the SOM).

- Ensure relevant sector-focused training and capacity-building activities are implemented through the CAREC Institute.

**Action initiated:**

15. In the area of capacity development, the CAREC Institute partnered with the International Energy Agency (IEA) to co-fund the training event IEA Caspian Energy Policy Dialogue and Training, held in Astana, Kazakhstan, 3–5 July. The event was organized by IEA in cooperation with the government of Kazakhstan. Perspectives on energy technology, delivering energy training modules, and best practices in energy efficiency and renewable energy—all priorities in the 2008 Strategy for Regional Cooperation in the Energy Sector of CAREC Countries—were shared in the event. Energy sector focal points of CAREC countries and their alternates participated in the program, in addition to public and private sector participants from Afghanistan, Armenia, Azerbaijan, People’s Republic of China, Georgia, Kazakhstan, Kyrgyz Republic, Mongolia, Pakistan, Tajikistan, Turkmenistan, and Uzbekistan.

16. Under the Regional Dispatch and Regulatory Development Pillar, a SWOT (strengths, weaknesses, opportunities, and threats) analysis of interconnected/isolated operation in the CAPS was undertaken, beginning with a high-level assessment. It recommended short-, medium- and long-term solutions, as well as immediate opportunities for easing constraints or improving combined grid operation. It was confirmed that the economic benefits of energy trade are substantial—in the range of \$2 billion over the next 3 years with no major infrastructure or system investments. In addition, several capacity-building workshops were conducted by the USAID-funded Regional Energy Security, Efficiency and Trade (RESET) project. A capacity-building workshop will be held on 27 September 2012 in Bangkok, covering Operating Competitive Wholesale Markets, together with the governance and information systems necessary to make them work efficiently and transparently, using detailed analysis of the PJM market.

**Next steps:**

17. Capacity development has also been identified as one of the six core priority elements in the EWP (Section II. Key Issues for Guidance by the SOM). The draft CAREC Institute strategy (2013-2017) includes a sector work plan annex, in which the ESCC's training requirements are reflected, as endorsed in the ESCC's September 2011 meeting.

## II. KEY ISSUES FOR GUIDANCE BY THE SOM

18. The following topics of the work plan are proposed for endorsement by the SOM in October 2012.

(i) **Guide the development of the Central Asia-South Asia energy corridor.** The various options to connect Central Asia and South Asia for energy (gas and power) trade need to be carefully analyzed to identify technically and economically feasible solutions. Balancing the energy security concern of the Central Asian countries and the growing energy demand in South Asia poses a great challenge.

(ii) **Study and address regional energy dispatch issues.** Existing issues related to technical, legal, commercial and financial aspects, which continually affect regional energy dispatch, should be analyzed and addressed.

(iii) **Energy–water linkages.** Evidence-based dialogue among countries on energy-water linkages will enable mutually beneficial exploitation of Central Asia's mixed energy resources. Substantial progress can be made toward this goal by identifying and improving the analytical foundations for assessing energy development of thermal, hydropower, and water resources.

(iv) **Steer the mobilization of funds.** There is a need to identify possible financing sources and create an enabling environment to meet the \$35 billion funding requirement over the 10-year RPMP period. Identifying investments from the private sector, bilateral and multilateral agencies, and national budget according to their availability of financing, would be useful for the development of key power projects.

(v) **Guide the development of the MTPP list.** Successful implementation of the core medium-term projects is important for addressing the supply-demand imbalances within the countries. These projects will strength and augment energy infrastructure, by implementing energy efficiency measures and providing a platform for power trade. The MTPP list should be reviewed and updated, as necessary, based on national and regional priorities, and taking into account the prioritization plan outlined in the RPMP.

(vi) **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 the goals of the 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. These requirements should be clearly identified and implemented through possible collaboration of the CAREC Institute with specialist energy agencies, such as the IEA.

### **III. CHANGES TO SECTOR ACTION PLAN**

19. The proposed ESCC EWP 2013–2015 is attached to this progress report. This final version incorporates comments from the ESCC meeting held in September 2012, and requests approval of the CAREC Senior Officials' Meeting in October 2012.