



Central Asia Regional Economic Cooperation Program

Reference Document  
For Session 1 of the Senior Officials' Meeting  
23 September 2015

# **Energy Sector Progress Report and Work Plan**

**Senior Officials' Meeting  
Central Asia Regional Economic Cooperation  
23 September 2015  
Ulaanbaatar, Mongolia**



## I. KEY DEVELOPMENTS

### A. Sector Implementation

1. This progress report describes CAREC activities undertaken in the energy sector since the June 2015 Senior Officials' Meeting (SOM) and 13<sup>th</sup> Ministerial Conference (MC) held in Bangkok, Thailand and Bishkek, Kyrgyz Republic, respectively. During the 20<sup>th</sup> Energy Sector Coordinating Committee (ESCC) Meeting, progress in the implementation of the 2013–2015 Energy Work Plan (EWP) was noted to include: (a) continuation of initiatives to enhance the Central Asia-South Asia energy corridor; (b) technical support activities assessing methodological and technical barriers facing regional power trade in Central Asia; (c) examination of climate change-induced energy sector vulnerabilities; (d) preparation of a Power Sector Financing Roadmap to mobilize funds for investments in energy assets; and (e) capacity development activities in the areas of energy efficiency and regional energy trade. The ESCC has also discussed extensively the draft Energy Strategy which includes the Energy Work Plan for 2016–2020, towards the aim of endorsing it to the SOM/Ministerial Conference.

2. Achievements in the energy sector are currently measured through five indicators, intended to capture the contribution of CAREC's physical infrastructure expansion and rehabilitation operations to energy security, energy efficiency, and the CAREC region's ability to enhance power trade as a result of completed projects. The indicators were first assessed in 2013, and they are expected to be evaluated annually in the CAREC Development Effectiveness Review (DEfR) process. The energy sector output indicators and the energy sector results framework are presented in the following tables:

**Table 1A: Energy Sector Output Indicators**

<b>Indicator</b>	<b>Unit</b>	<b>2013 (Baseline)</b>	<b>2014*</b>	<b>2015</b>	<b>Projected by end of 2015</b>	<b>Progress</b>
Installed or upgraded transmission lines	km	612	1,150			
Increased energy generation capacity	MW	300	600			
Rehabilitated generation capacity	MW	0	520			
New substations	MVA	250	4,200			
Upgraded substations	MVA	400	5,200			

\* Based on data received from AFG, KAZ, MON, PAK and UZB, as of 11 September 2015.

**Table 1B: New Energy Sector Output Indicators**

<b>Indicator</b>	<b>Unit</b>	<b>2014 (Baseline)</b>	<b>2015</b>	<b>2016</b>
Wind Power Installed	MW/ MWH			
Solar Generation Installed	MW/ MWH			
Electric vehicle Adoption*	Nos*			
LED public lighting*	Km of roads*			
Energy Efficiency Savings	MWh			

\* Targets will not be set initially for these indicators. The ESCC will instead monitor progress against these indicators in the coming years and decide whether targets should be set in the future.

**Table 2: Energy Sector Results Framework**

<b>Intervention</b>	<b>Sector Outputs</b>	<b>Sector Outcome</b>
Develop programs to enhance regional energy trade and cooperation	<ul style="list-style-type: none"> <li>• Targeted levels for domestic and cross-border energy projects reached by 2020</li> <li>• Central Asia-South Asia energy corridor developed</li> <li>• Cleaner energy mix</li> <li>• Efficient power systems</li> </ul>	<ul style="list-style-type: none"> <li>• Impact of uneven distribution of energy resources among CAREC countries overcome</li> <li>• Existing energy interrelationships optimized</li> <li>• Emissions reduced</li> <li>• Longer carbonized economy</li> </ul>
Undertake analytical work on the linkages between energy and water resources		
Complete the financial road map and mobilize funds		
Strengthen institutional capacity of CAREC- member countries and share knowledge with them		
Introduce new technology, clean energy, and energy efficiency in Central Asia		

## **B. Priority Actions in the CAREC Program for the Energy Sector (Implementation of the 2013–2015 Energy Work Plan)**

3. The 2013–2015 EWP was formulated to ensure effective and timely achievement of the strategic objectives established in the 2020 CAREC Strategy for Regional Cooperation in the Energy Sector. The EWP consists of six actionable elements designed to target sector-specific operational priorities. Progress implementing the EWP is tracked and reported during the biannual ESCC meetings, and reviewed at the SOMs and MCs. The section below provides updates on the implementation status of the six elements and describes next steps agreed upon during the recent 20<sup>th</sup> ESCC Meeting.

### **Element 1: Developing the Central Asia – South Asia Energy Corridor**

4. **Action Initiated.** Central Asia–South Asia Regional Electricity Market (CASAREM) has two complementary initiatives: (i) Central Asia–South Asia Electricity Transmission and Trade Project (CASA-1000) supported by the World Bank; and (ii) Turkmenistan-Uzbekistan-Tajikistan-Afghanistan-Pakistan Interconnection Project (TUTAP) supported by the ADB. Recent progress for each initiative is discussed below.

5. **CASA-1000.** As of late March 2015, the CASA-1000 financing agreements are as follows: The World Bank (\$526.5 million), Afghanistan Reconstruction Trust Fund (\$40 million), US Government (\$15 million) and European Investment Bank (EUR 140 million). There is a remaining financing gap of 25%, which is anticipated to be filled through financing from the Islamic Development Bank, the European Bank for Reconstruction and Development, other bilateral sources and additional World Bank funds.

6. The procurement of converter stations and operator for the CASA-1000 project; High Voltage DC line for Afghanistan and Owners' engineers are progressing. The CASA-1000 project is scheduled to be completed in the winter of 2017–2018. It has been noted that Uzbekistan is not participating and is opposing the CASA-1000 project.

7. In the 20<sup>th</sup> ESCC, World Bank reported on the progress of the different segments of the CASA 1000 project, i.e., commercial agreements, financing status, procurement, and institutional arrangements. On the implementation side, there remain challenges pertaining to security.

8. **TUTAP.** The Tajikistan-Afghanistan and Uzbekistan-Afghanistan 220kV interconnections are operational and are currently supplying the Afghanistan network with 650 GWh from Tajikistan and 1500 GWh from Uzbekistan. Implementation of the Turkmenistan-Afghanistan 500 kV interconnection, which will initially operate at 220 kV, has begun.

9. 900 GWh and 1600 GWh are expected to be supplied to Afghanistan by 2019 and 2025, respectively. The Turkmenistan component of the line is under construction and is estimated to be completed in 2019. Bids for the Afghanistan component of the line are under evaluation, and contracts are expected to be awarded within 2015.

10. An addendum to the Afghan Power Sector Master Plan was conducted to address concerns about the impact of CASA-1000 and TUTAP on the Afghanistan power system configuration. The addendum considered the impact of CASA-1000 on future development needs of Afghanistan. It also considered the impact of interconnection with Turkmenistan, a

correction to the capacity rating of Tajikistan-Afghanistan line, and the options for Afghanistan to synchronize with neighboring countries. The findings of the addendum concluded that TUTAP and CASA-1000 complement each other, resulting in higher financial returns.

11. It was emphasized in the 20<sup>th</sup> ESCC that the arrangements with Afghanistan and the project is progressing generally well. It was confirmed that Afghanistan has a critical transit role in CASAREM and to bridge regional cooperation and promote energy security between Central and South Asian countries. To this effect, ADB is implementing projects to construct interconnections in Afghanistan with Central Asian countries and to strengthen Afghan transmission network. On-going construction of 500-kv transmission ring in northern Afghanistan will expand energy cooperation between Tajikistan, Uzbekistan and Turkmenistan into Afghanistan with onward exports to Pakistan.

12. **TAPI.** The TAPI gas pipeline, which has Turkmenistan, Afghanistan, Pakistan and India as the four participating countries is a natural gas pipeline project, which is geopolitically significant to spur economic growth in energy starved South Asia. TAPI envisages construction of a 1,600-km route (estimated cost of \$10 billion in 2010 prices) would follow the ancient trading route from Central to South Asia, extending from the eastern gas field in Turkmenistan along the highway through Herat, Helmand and Kandahar in Afghanistan, to Quetta and Multan in Pakistan, and on to Fazilka in India.

13. The Steering Committee for the TAPI pipeline hopes to begin construction on the project in 2015; however a consortium leader must be selected before this can occur. A consortium leader was expected to be named after the February 2015 meeting of the TAPI steering committee; however this announcement has since been delayed. Pending the selection of a consortium leader, the pipeline could be operational by 2018. In the 20<sup>th</sup> ESCC meeting, it was reported that ADB, as transaction advisor, is facilitating the selection of the consortium leader. It was decided that Turkmen gas will be the lead sponsor and work is progressing.

14. **Next Steps.** World Bank and ADB will continue to provide updates in the next ESCC meeting.

## **Element 2: Resolving Regional Energy Dispatch and Trade Issues**

15. **Action Initiated.** A study on “Regional Power Trade Development in Central Asia” that will help promote power trade in Central Asia by evaluating the current condition of the power market models, pricing rules, and tariff regulation mechanisms in the power sector was initiated. The study will also analyze existing power sector agreements among the Central Asian countries, including international infrastructure projects and trans-boundary trade mechanisms, and examine international best practice for establishing power markets. The study will build on the results of the 2010 study on regional trade completed by Mercados and the 2012 regional power sector master plan completed by Fichtner.

16. A working group on regional market arrangements, comprised of the head of the Central Dispatch Center and three power sector representatives from each Central Asian country (except Uzbekistan), has been established to support the study. The first meeting took place in May 2015 in Almaty, supported by WB. The meeting agreed on the Terms of Reference for the study.

17. **Next Steps.** The World Bank hired AF Mercados to prepare the study. The consultant developed a draft model for computing financial benefits from trade for each Central Asian country and presented it to the countries in July. According to World Bank, the consultant will present a finalized model and a set of hypothesis to the Working Group in September, and thereafter will do modeling and prepare a study report by end November. During the 20<sup>th</sup> ESCC, the Central Asian countries were requested to share with AF Mercados the missing information on their respective power sectors expediently. The outcomes of the study will be discussed with the Central Asian countries and presented at the next ESCC meeting.

### **Element 3: Managing Energy-Water Linkages**

18. **Action Initiated.** The World Bank has initiated several activities, including a study on energy sector vulnerability to climate change, energy-water modeling training and establishment of a Central Asia energy-water knowledge data portal and network.

19. The Energy Vulnerability to Climate Change Study aims to support Central Asian countries in understanding climate change-induced energy sector vulnerabilities and building resilience to these vulnerabilities through the development of coordinated adaptation policies. The study will run hydrologic and economic models, which are specific to Central Asia and are thus well suited to articulate changes in the components of water flow (glacier melt, snow, and precipitation) and provide insight into energy sector adaptation policies. Using the models and other resources, the study will consolidate a vulnerability assessment of the impacts, risks and adaptive capacity of the energy sector. The results of assessment will provide guidance for decision-makers on options for investments in and management of power generation, transmission, and distribution assets, with a focus on challenges and opportunities for effective regional coordination of climate change adaptation.

20. **Next Steps.** The World Bank will present the outcomes of the study in the next ESCC meeting. The completion of the draft report is slated in November-December and will be finalized a month after its presentation in ESCC.

### **Element 4: Mobilizing Funds for Building Energy Assets**

21. **Action Initiated.** The October 2013 CAREC SOM endorsed ADB's proposed technical assistance (TA) to develop the CAREC Power Sector Financing Roadmap for CAREC member countries. The TA aims to assess the capacity and willingness of CAREC countries to finance power infrastructure from their own resources, and from other potential sources of financing, for both national and cross-border projects. The project concept was approved and funding of US\$1.5 million was sourced from ADB and the People's Republic of China. The TA was approved in September 2014, and CAREC members have now been informed of the required inputs from countries for TA implementation.

22. The consultants, engaged to develop the CAREC Power Sector Financing Roadmap assessed, inter alia, regional power sector investment and development plans, legal and institutional frameworks, and financing sources for power projects and potential power sector PPP projects, and will complete the study in early 2016. The CAREC countries are expected to provide counterpart support for the Power Sector Financing Roadmap such as quick access to data, office accommodations and counterpart staff, including a designated focal point for the Study from each CAREC country.

23. **Next Steps.** In the 20<sup>th</sup> ESCC, the draft list of investment projects in each country was highlighted. The consultants reported that they will, in the coming weeks, complete country-level studies and then commence country visits for additional data collection to finalize the list of priority projects and identify financing options for each project. The study was requested to not attempt to repeat analysis that has already been done (and efforts already underway) on sectoral reform. It was also suggested that an important criterion for prioritizing projects should be the predicted benefits to the region as a whole rather than benefits to any particular country. The consultants agreed with these suggestions. In addition, recommendations were made on how to undertake the analysis and present the results in the forthcoming drafts. The consultants agreed to consider how best to implement the recommendations

#### **Element 5: Implementation of Energy Sector Priority Projects**

24. **Action Initiated.** During the 17<sup>th</sup> ESCC meeting, it was agreed that the ESCC Secretariat will consolidate inputs from CAREC member countries to come up with a priority project list that will be compiled and regularly updated, based on the national investment plans of the member countries. This document will be an ESCC working document, and will not be discussed at the higher levels of the Overall Institutional Framework (OIF) of the CAREC program. Aggregate figures will be derived from the list to capture the contribution of CAREC's physical infrastructure expansion and rehabilitation operations to energy security, energy efficiency, and the CAREC region's ability to enhance power trade as a result of completed projects. The updating exercise shall be an annual ESCC activity for monitoring purposes.

25. The list of priority projects needs to be updated to cover a period up to 2020, in order to support monitoring of energy sector output indicators, activities that will be conducted under the Financing Roadmap, and the implementation of the new Energy Work Plan (2016–2020).

26. **Next Steps.** ADB will hold an investors' forum coinciding with the next ESCC meeting in 2016 to showcase the priority projects of the CAREC countries.

#### **Element 6: Capacity Building and Knowledge Management**

27. **Action Initiated.** In the 20<sup>th</sup> ESCC, the various technology presentations done in the CAREC Workshop on New Technologies in Tokyo, Japan on 27-29 July 2015 were highlighted. The presentations covered areas such as promotion of energy efficiency and renewable energy development, policy of thermal power plants, smart community and battery energy storage system, among others. During the brainstorming session held at the end of the workshop, the discussion with the countries on the latest available technologies they have been shown led to the formulation of a list of proposed projects (Appendix 1).

28. Participants of the 20<sup>th</sup> ESCC attended three training sessions (Forecasting, Regulation and Off-Grid Electrification Kits) and participated in the International Greentech and Eco Products Exhibition and Conference Malaysia 2015, including the 3<sup>rd</sup> E-Mobilia, a workshop on electric vehicles. After the training sessions and workshops, the ESCC participants confirmed their respective countries' interest in the proposed projects that were initially discussed in Tokyo and updated the list.

29. **Next Steps.** The ESCC participants requested ADB to finance pilot new technology projects discussed during the brainstorming sessions covering smart home with energy efficient appliances, rooftop solar on public office buildings, electric vehicles for public use, off-grid DC solar electrification kits and LEDs on public office buildings and street lighting. They

also requested that the proposed ADB technical assistance include training on thermal power plants and energy forecasting models. The meeting supported that ADB and WB establish a CAREC regional regulators network and provide capacity development support for the regulators. Specifically, the participants requested that some form of training for the regulators be part of every ESCC meeting.

## II. KEY ISSUES FOR GUIDANCE BY THE SOM

30. **Endorsement of the Energy Strategy and the Energy Work Plan (EWP) 2016–2020.** Instead of having two separate documents, the Energy Strategy and the EWP has become one, with the latter as an appendix of the former. The draft Strategy maintains the three strategic components from the 2008 Strategy (Investment Measures for Regional Cooperation, Capacity Building and Knowledge Sharing, and Policy Measures) but has been amended to: 1) show stronger linkages to the EWP, and 2) focus on a narrower set of policy measures more relevant to the challenges currently faced by the CAREC member countries and their priorities.

31. The EWP, as agreed in the ESCC March meeting has six (6) elements; which are the same as in the 2013-2015 EWP, but includes a new element, “Promoting clean energy technologies and energy efficiency”. The draft Strategy reflects a similar change in focus.

32. One of the elements in the 2013-2015 EWP, “Developing the Central-South Asia Corridor” was changed to “Developing E-CASAREM (East-Central Asia-South Asia Regional Energy Market)” to better reflect the wider geographical scope of CAREC’s energy sector activities. Financing of US\$1.75 million is being processed for the support of the East Asia Super Grid project.

33. The 20<sup>th</sup> ESCC endorsed the Energy Strategy and the EWP 2016-2020 (Please refer to the attached document). The draft has been revised to include the following comments at the ESCC:

- a. Information on linkages between Pakistan and other CAREC countries (Appendix B and C) and TA activity details in Pakistan (Appendix A);
- b. In the 19<sup>th</sup> ESCC meeting, there was plan to produce selection criteria for projects, which is missing in the current draft. ADB clarified that the criteria will be developed after the long list of projects are developed through the work of the consultants (PwC) for the CAREC Power Sector Financing Roadmap; and
- c. The Energy Strategy will clearly state that CAREC’s support on regulation is not limited to clean energy, but for wider issues of regulation.

### Appendix 1. Proposed Investment Projects by Each Country

(Based on brainstorming session on 29 July in Tokyo and updated on 9 September in KL)

Project No.		AFG	AZE	KAZ	KGZ	MON	PAK	TAJ	TKM	UZB
<b>A. Supply Side</b>										
1	Solar powered micro-grid for remote areas	✓			✓			✓		
2	Adoption of clean coal technologies in power generation			✓		✓	✓			
3	Improve efficiency of solar industry / establish new industry					✓			✓	
4	Solar off-grid to reduce demand from diesel	✓			✓	✓	✓	✓		
5	Recycling of municipal waste for power generation	✓		✓			✓	✓		✓
<b>B. Electric Vehicle and Storage</b>										
6	Battery based on grid storage for reliability improvement of renewable energy			✓		✓		✓		✓
7	Electric vehicles (bus, cars, motorcycles and scooters) pilot for government fleet and public transport	✓	✓	✓			✓	✓	✓	✓
<b>C. Demand Side and Distribution Efficiency</b>										
8	Demand responses through smart meters and diversified tariffs									✓
9	LEDs for public lighting and offices	✓	✓		✓		✓			
10	Distribution efficiency and loss reduction			✓	✓		✓	✓		✓
11	Improve load dispatch systems and distribution control with SCADA	✓			✓	✓		✓		✓
12	Reduce heat losses in office buildings by retrofitting				✓	✓				

- ✓ Proposed in Tokyo on 29 July 2015 and confirmed in KL on 9 September 2015 (AZE and TKM did not participate in KL)
- ✓ Proposed on 9 September 2015 in KL; For AZE and TKM, proposed in Tokyo on 29 July 2015

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(Based on brainstorming session on 29 July in Tokyo and updated on 9 September in KL)

Project No.	AFG	AZE	KAZ	KGZ	MON	PAK	TAJ	TKM	UZB
<b>B. Electric Vehicle and Storage</b>									
7	✓	✓	✓			✓	✓	✓	✓
Electric bus	✓		✓			✓	✓		✓
Electric cars	✓		✓			✓	✓		✓
Electric motorcycles							✓		
Electric scooters							✓		

- ✓ Proposed in Tokyo on 29 July 2015 and confirmed in KL on 9 September 2015 (AZE and TKM did not participate in KL)
- ✓ Additional information provided on 9 September 2015 in KL; For AZE and TKM, proposed in Tokyo on 29 July 2015