



Reference Document
For Session 5 of the Senior Officials' Meeting
June 2019

Energy Sector Progress Report and Work Plan (June 2018–May 2019)

**Senior Officials' Meeting
Central Asia Regional Economic Cooperation
27–28 June 2018
Tashkent, Uzbekistan**

LIST OF ACRONYMS

CAREC	–	Central Asia Regional Economic Cooperation Program
CASA	–	Central Asia South Asia
CAEWDP	–	Central Asia Energy and Water Development Program
CAPS	–	Central Asia Power System
CASAREM	–	Central Asia-South Asia Regional Electricity Market
CDM	–	Clean Development Mechanism
DC	–	direct current
EDM	–	energy data management
ESCC	–	Energy Sector Coordinating Committee
EWP	–	Energy Work Plan
GCF	–	Green Climate Fund
GGGI	–	Global Green Growth Initiative
GHG	–	greenhouse gas
GSPA	–	gas sales and purchase agreement
FASA	–	Financial Advisory Services Agreement
KM	–	Kilometer
kV	–	Kilovolts
MC	–	Ministerial Conference
MTPP	–	Medium-Term Priority Projects
MWh	–	megawatt per hour
NDC	–	Nationally Determined Contribution
PPP	–	public-private-partnership
PVC	–	crystalline photovoltaic cells
SOM	–	Senior Officials' Meeting
SPCC	–	special purpose consortium company
TA	–	technical assistance
TAP	–	Turkmenistan-Afghanistan-Pakistan
TAPI	–	Turkmenistan-Afghanistan-Pakistan-India
TASA	–	Transaction Advisory Services Agreement
TPCL	–	TAPI Company Limited
TPP	–	thermal power plant
TUTAP	–	Turkmenistan-Uzbekistan-Tajikistan-Afghanistan-Pakistan
UNFCCC	–	United Nations Framework Convention on Climate Change (UNFCCC)

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I. EXECUTIVE SUMMARY

1. This progress report describes the Central Asia Regional Economic Cooperation (CAREC) activities undertaken in the energy sector from June 2018 to May 2019.
2. From June 2018 to May 2019, the Energy Sector Coordinating Committee (ESCC) conducted the following meetings:
 - i. 28th ESCC Meeting in Batumi, Georgia (10 September 2018);
 - ii. 3rd Energy Investment Forum in Batumi, Georgia (11–12 September 2018); and
 - iii. 29th ESCC Meeting in Tashkent (10 April 2019)
3. Since the last Senior Officials' Meeting (SOM), the following milestone activities were completed and/or started:
 - iv. CAREC High-Technology Roadmap (completed in September 2018 as part of Technical Assistance [TA] on Leapfrogging of Clean Technology)
 - v. Midterm Review of the CAREC Energy Strategy 2016–2020 (completed in April 2019)
 - vi. New CAREC Energy Strategy 2030 (expected in November 2019)
 - vii. Concept for new electricity interconnection line between Uzbekistan and Afghanistan (ongoing)
4. This progress report also provides detailed updates on the ongoing regional transmission projects in electricity and gas, particularly between Central and South Asia. Additionally, updates on the four regional technical assistance projects under the CAREC umbrella are presented in this report.
5. Upcoming initiatives planned later in 2019 are also outlined in this report, namely (i) organization of the 1st CAREC Energy Ministers Dialogue in September 2019, (ii) organization of the 4th Energy Investment Forum in September 2019, and (iii) conduct of individual country consultations with all CAREC members on the new CAREC Energy Strategy 2030.

II. PRIORITY ACTIONS, PROGRESS AND CHALLENGES IN THE CAREC PROGRAM FOR ENERGY

The following paragraphs outline progress made in the 6-core elements of the CAREC Energy 2016–2020 Strategy currently in force.

Element 1. Developing the Central Asia – South Asia Energy Corridor

6. Cross-border cooperation is an essential element of energy strategy for this region. Regional interdependency is dictated by geographical allocation of resources and strategies used by the central planners of the former Soviet Union to design and develop those resources.

7. The uneven distribution of energy resources is the factor dictating the life of people in the CAREC region. The northern central Asian countries, are rich in natural resources, and almost 100% of the population has access to abundant energy. In the southern part of the region, the scenario is quite the opposite: a large population in Afghanistan and Pakistan, still do not have access to modern form of energy.

8. The Central Asia-South Asia Regional Electricity Markets, or CASAREM, is an initiative within the CAREC framework, for regional cooperation between countries in Central Asia and South Asia. Element 1 of the CAREC Program for the energy sector focuses on a range of CASAREM projects.

9. Within the framework of CAREC, both ADB and the World Bank, as the key development partners, have invested in CASAREM projects: the TUTAP,¹ TAP, TAPI,² and the CASA,³ to meet the growing energy demand in Afghanistan and Pakistan using power import from Central Asia. Some of these projects are being planned and others are under implementation and based on current schedule will be complete by 2025.

^{1,2} TUTAP and TAPI are financed by ADB, Turkmenistan, Uzbekistan, Tajikistan, Afghanistan, Pakistan (being AFG and its contiguous countries) power interconnection.

³ Financed by the World Bank, Central Asia South Asia power interconnection.



Figure 1. CASAREM Map for Central Asia

- **Turkmenistan–Uzbekistan–Tajikistan–Afghanistan–Pakistan (TUTAP) Power Interconnection Framework**

10. TUTAP, a modular technology initiative, is designed to be built in stages to meet evolving needs, thus facilitating the integration of remote and diverse resources. The first phase (\$35 million) was approved by ADB in 2003 and commissioned in February 2009, providing, since then, an all-year power interconnection (~330 MW maximum) between Afghanistan and Uzbekistan. The power purchase and sales agreement (PPSA) is negotiated every December for the following year. In 2016, 1,500 GWh were imported from Uzbekistan into Afghanistan at approximately 8.5 cents/KWh. The cost of diesel generation in Afghanistan is estimated to be \$0.35/KWh. In 2016, nearly 30% of Uzbekistan power facilities replaced diesel generator sets, and 70% supplied to existing and incremental customers. The cost savings from diesel replacement amounted to \$119.2 million ($\$0.35 - \$0.085 = \$0.265 \times 450\text{GWh}$), while revenue from existing and incremental customers was \$105 million ($\$0.10 \times 1050\text{GWh}$) in 2016. The total cost of this 220-kV line, including the portion in Uzbekistan through till Kabul, was \$95 million in 2008.

11. The second phase (\$47 million) was approved by ADB in 2007 and commissioned in 2011, providing a 300–450 MW power interconnection between Afghanistan and Tajikistan. It has been operational since October 2011, and energy trade volume is agreed and negotiated annually. The current Tajikistan export price is estimated at 4.8 USD cents per kilowatt hour. In 2017, nearly 50% of Tajikistan power facilities (1360 GWh) replaced diesel generator sets and 50% supplied to existing and incremental customers. However, the cost savings from diesel replacement were only \$212.1 million ($\$0.35 - \$0.038 = \$0.265 \times 680\text{GWh}$), while revenue from incremental customers was \$68 million ($\$0.10 \times 680\text{GWh}$) in 2016. The total cost of this line, including a portion in Tajikistan and through Pule Khumri, is estimated to be \$57.5 million.

12. The third phase (\$140 million), approved by ADB in 2012, is currently under implementation for a 300 MW power interconnection between Afghanistan and Turkmenistan. The line will have a capacity to transmit up to 1000 MW of power. Construction of the 500-kV line and three substations in Afghanistan is ongoing since early 2016, while the Turkmenistan portion of the line was completed in mid-2016. The third phase is expected to be completed by 2019. A PPSA between both countries was signed in November 2015 for a 10-year power trade until 2028, from 5.6 USD cents in 2019 increasing up to 7.1 USD cents per kilowatt hour in 2028. As per signed PPA, Turkmenistan energy to Afghanistan will be up to 1,516 GWh and 7.1 USD cents/KWh in 2028. Under a 20% power scenario, replaced generator sets savings will come up to \$84.5 million ($\$0.35 - 0.071 = \$0.279 \times 303 \text{ GWh}$), and 20% exported revenue are estimated at 30 million ($303\text{GWh} \times \$0.1 \text{ export tariff}$). In addition, there is a \$10 million transit fee, and 60% of the power used in Afghanistan will generate revenues of \$91 million ($909 \text{ GWh} \times 0.1 \text{ distribution tariff}$). Annual revenue is estimated at \$215.5 million.

13. The fourth phase (\$200 million) was approved by ADB in December 2015 to extend the Afghanistan-Turkmenistan link through a 500-kV transmission interconnection until Pul-e-Khumri in northeast Afghanistan, where the CASA-100 line from Tajikistan and the Kyrgyz Republic meets the TUTAP line. The contract is under implementation for commissioning in mid-2020.

14. The fifth phase (\$240 million) was approved by ADB in December 2016 to install a 500-MW high-voltage, direct current back-to-back convertor station at Pul-e-Khumri in northern Afghanistan. This convertor station will synchronize Turkmen with Afghan power, allowing Afghanistan to supply power through its unified grid to its eastern and southern provinces, including Kabul. In addition, it will enable complementarity with CASA infrastructure for future power exports to Pakistan and Tajikistan. The procurement for this phase is ongoing, and contract award is expected by the end of 2018.

15. A new project under the TUTAP initiative, namely a 500-kV transmission interconnection between Uzbekistan and Afghanistan is processed by ADB and for consideration in 2019. The project will supply electricity from Uzbekistan into Afghanistan (Surkhan to Khodja Alwan) through a single circuit 500-kV transmission line. A power purchase and sales agreement between the two countries is also being facilitated by ADB.

- **Turkmenistan-Afghanistan-Pakistan (TAP) Power Interconnection Project**

16. TAP is also under discussion among the participating countries, with a potential capacity of 2,000 MW. A new agreement was finalized in May 2017, and countries have agreed to sign a joint ministerial statement and project framework and to initiate project preparatory work. The project concept was earlier endorsed by the three heads of governments in December 2015, and reconfirmed in February 2018 at the ministerial level. TAP would complement the existing TUTAP and CASA power interconnections under the Central Asia South Asia Regional Energy Markets framework.

17. TAP will consist of power transmission infrastructure to enable power trade and exchange among the three countries. The power trade will utilize existing power infrastructure, as well as promote collaboration through new transmission investments. Discussion among the participating countries are ongoing and ADB stands ready to facilitate project preparation and development including (i) prepare analytical studies for systems stability, reliability, and grid interconnection; (ii) project assessment, including project feasibility, technical design; (iii)

coordinate project planning and financing; (iv) facilitate energy trade negotiations; and (v) finalize an implementation roadmap.

- **Turkmenistan-Afghanistan-Pakistan-India Natural Gas Pipeline (TAPI) Project**

18. The planned 1,600 km TAPI pipeline stretches from the Turkmen-Afghan border to the Pakistan-India border and will export up to 33 billion cubic meters of natural gas per year from Turkmenistan to Afghanistan, Pakistan, and India over a commercial operations period of 30 years. Once operational, the project will bring multiple benefits to the participating countries: it will allow Turkmenistan to diversify its gas export markets, and enhance the long-term energy security of Afghanistan, Pakistan, and India. Overall, TAPI will have transformational impact on regional cooperation, and boost other initiatives aimed at bringing peace and economic stability to the region.

19. ADB has had a long-term engagement with this project, acting as TAPI Secretariat since 2003 and providing more than \$4 million in TA grants to date. ADB was appointed transaction advisor by the gas companies of the TAPI countries under a transaction advisory services agreement (TASA) signed in November 2013. ADB's role as transaction advisor culminated with the 2015 Shareholders Agreement and the 2016 Investment Agreement.

20. Following the successful conclusion of the TASA, ADB and TAPI Pipeline Company Limited (TPCL) have been discussing how ADB can best assist the project. In September 2017, TPCL informed ADB that it is considering a 2-phase approach. In Phase 1, the TAPI gas pipeline will be constructed with only one compressor station in Turkmenistan. Gas supply will be much lower than originally envisaged, but the initial financing requirements would be significantly reduced. In Phase 2, all the other compressor stations would be constructed for the TAPI gas pipeline to deliver its full contracted amount. TPCL has since adopted the 2-phase approach and accelerated procurement of the necessary goods and services. Funding for Phase 1 is expected to be sourced primarily from export credit agencies.

21. ADB's continued support for TAPI was reaffirmed at the 25th TAPI Steering Committee meeting held in February 2018 in Mary, Turkmenistan. CWRD Director General announced that—subject to satisfactory due diligence—ADB will consider providing sovereign loans/grants to the TAPI countries for their respective equity shares in TPCL. ADB support could also include technical assistance to monitor and strengthen the environmental and social safeguards work being undertaken by TPCL. Following receipt of formal requests for sovereign financing from Turkmenistan and Afghanistan, ADB dispatched missions to both countries and has commenced processing such financing.

- **CASA-1000**

22. The CASA-1000 project is the first step towards creating the Central Asia-South Asia Regional Electricity Market (CASAREM) that will, on a mutually beneficial basis, leverage Central Asia's significant energy resources to help supply South Asia with electricity during summer months. CASA-1000 will put in place the contractual and institutional arrangements, and the transmission infrastructure, to facilitate the export of 1,300 MW of already available summer time surplus electricity from the Kyrgyz Republic and Tajikistan to Afghanistan and Pakistan. CASA-1000 will be compatible with and complement other on-going or planned transmission investments in the four countries. "Open access" mechanisms will allow other interested exporters to use any available transmission capacity, for example, in the winter months. (See Figure 3).

23. The CASA-1000 project catalyzes support of a wide number of multi and bilateral development partners including the World Bank (US\$ 526.5 million), Islamic Development Bank (US\$ 155 million), European Investment Bank (US\$180 million), European Bank for Reconstruction and Development (US\$ 110 million), the US Government (US\$ 11.5 million), the UK Government (US\$ 46 million), and the Afghanistan Reconstruction TF (US\$ 40 million).⁴

24. The participating countries have completed all the main project agreements and procurement for the major infrastructure packages are in the final stages. The contracts for the construction of the HVDC transmission line in Afghanistan were awarded and signed in Kabul in December 2017.



Figure 2. Various ADB Projects in Central Asia

⁴ Exchange rates have changed from the approval date of the financing. Amounts above retain XR at approval date of each financing.

Element 2. Resolving Regional Energy Dispatch and Trade Issues

25. A study on “Regional Power Trade Development in Central Asia” was proposed by the Kazakhstan representative during the 19th Energy Sector Coordinating Committee (ESCC) Meeting in March 2015. The study was supported by the World Bank. The Study estimated the aggregated benefits for the Central Asia countries, and distribution of the benefits for each country, if efficient regional power trade had been pursued during the 2010–2014 period. Results of the study were reported by the World Bank at the April and October 2016 ESCC Meetings. A follow-up presentation was made by the World Bank in the ESCC Dushanbe meeting in May 2017 that highlighted the benefits of regional electricity market, some constraints commonly observed in developing regional electricity markets, design and best practices to address some of these challenges, and suggested next steps for development of a regional electricity market in Central Asia.

26. On the side of the subsequent ESCC meeting in Ashgabat in March 2018, development partners (ADB, USAID, UNDP, and World Bank) held a meeting to coordinate regional energy activities in Central Asia. At the meeting, Energia Coordination and Dispatch Center (CDC Energia) requested support from ADB to introduce SCADA system in order to be able to execute its role more effectively using state of the art technology, and ESCC members supported it. USAID also suggested a framework for regional energy market development in Central Asia, part of which was underpinned by earlier presentations made by the World Bank. Also, Central Asia Power System Donor Coordination Meeting was held in Almaty in April 2018 to foster coordinated support for a renewed Central Asia Power System and to develop a plan of action for the coordinated approach with host country governments

27. For the next steps, given the importance of CDC’s role in coordinating regional power flow within and expected increase in electricity trade after reconnection of Tajikistan back into CAPS, ADB is studying possibilities of supporting CDC’s request through a regional technical assistance (TA). This TA is envisaged to support the increase in regional power trade between Afghanistan, Kazakhstan, the Kyrgyz Republic, Tajikistan, Uzbekistan and Turkmenistan not only through (i) introduction of the energy data management (EDM) system at CDC to enable a safe increase of energy flow within CAPS; but also through (ii) identifying and offering technical solution to any technical bottlenecks to the regional power trade, which may occur in any of the CAPS countries; and (iii) facilitating the power trade within CAPS, expanding CAPS membership and exploring additional potential energy markets to increase potential for power trade.

28. The cluster knowledge sharing technical assistance “*Regional Cooperation on Increasing Cross-Border Energy Trading within the Central Asian Power System*” was approved on

29 November 2018. The first subproject “*Modernization of Coordinating Dispatch Center Energiya*” was approved on 28 January 2019, while the second subproject “*Provision of Solutions to Bottlenecks to the Regional Power Trade*,” was approved on 28 February 2019. The recruitment of the consultant is currently ongoing for both approved subprojects.

Element 3. Managing Energy-Water Linkages

29. The third funding phase of the Central Asia Energy and Water Development Program (CAEWDP) was launched in January 2018. CAEWDP is a multi-donor trust fund, with current contributions from SECO/Switzerland. The third funding phase now includes Afghanistan. Under the new funding phase, two new activities have been launched: (i) Capacity Development for

Regional Cooperation in Power System Planning and Operations that focuses on the institutional development of the Coordinating Dispatch Center (CDC) and the associated national dispatch centers that operate in the Central Asia Power System (see previous section), and (ii) Small and Medium Hydropower Development.

30. In 2017, the World Bank has finalized the Energy Vulnerability to Climate Change Study. Recommendations resulting from the study include: mainstreaming of robust decision making (RDM) on climate change within government strategies and plans for the energy sector; improving monitoring and forecasting; developing climate change-resilient engineering design and operation of hydropower plants, transmission and distribution; diversifying energy supply using investments in small-scale renewables; building institutional capacity and knowledge networks; and enhancing regional collaboration and cooperation.

31. Moving forward and building on earlier studies and initiated activities, the World Bank continues to engage with countries to identify policy priorities and investment opportunities to strengthen water and energy security in the region.

Element 4. Mobilizing Financing for Priority Projects

32. The CAREC region's energy infrastructure investment needs (excluding PRC) amount to \$1.15 trillion between 2016–2030. As public funds will not suffice to cover these requirements, private investments are needed to fill the gap. In order to attract investments to the CAREC region, the 3rd flagship CAREC Energy Investment Forum was held in Batumi in September 2018 and focused on “Financing High Technology for CAREC”. The forum tackled success stories and in-depth discussions on the four disruptive technologies, namely solar power, electric vehicles, energy efficiency and energy storage.

Element 5. Capacity Development and Knowledge Management

- **Increasing Participation of Women in the Energy Sector**

65. In 2017 the ESCC agreed to increase participation of women in CAREC meetings and trainings. As a result, the CAREC Secretariat changed the policy for nominating ESCC meeting participants: Instead of only two delegates, CAREC member countries can now nominate three delegates under the condition that the third delegate is a woman. This increased the number of female participants by 30% since 2016. Increasing women participation is consistent with the ADB's gender target under the Strategy 2030.

- **Knowledge Products: Video Blogs and Social Media**

66. The “CAREC New Technology Monthly” is a newsletter prepared by ADB focusing on major technology trends happening around the globe. The newsletter is a response to the call of CAREC member countries to come up with a knowledge sharing platform on technology trends. The newsletter contains web links on latest global newsmakers in English and Russian. To date, 33 editions have been released.

Element 6. Promoting and Prioritizing Clean Energy Technology

- **Access to Electricity with New Off-Grid Solar Technology in Central Asia (RETA:9168)**

67. Installation of 260 units of solar off-grid kits were completed for Afghanistan, Kyrgyz Republic, and Tajikistan. Monitoring activities for pilot countries were also completed. The consulting firm has submitted a draft Final Report and is now being reviewed by ADB.

68. Initial gains made by the pilot project has resulted to expression of continued interest to expand to other areas were made know to ADB. Specifically, the Islamic Government of Afghanistan has formally asked ADB to fund solar off-grid kits in the border areas which are not connected to the national grid. As a response, ADB is preparing a concept note for the project which would cover 55 districts that includes 468,000 Households and 3.2 million people as beneficiaries.

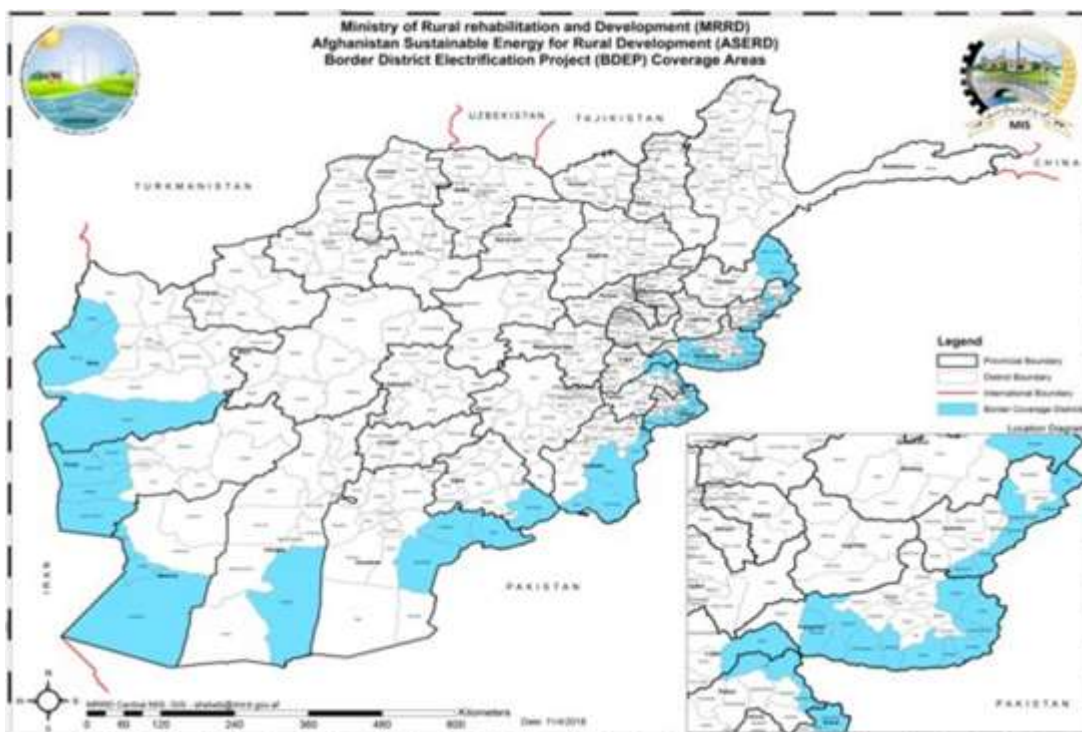


Figure 3. Proposed Coverage for the Afghanistan Border Electrification Project
Source: Ministry of Rural Rehabilitation and Development – Afghanistan, 2019

- **Leapfrogging of Clean Technology in Central Asia Regional Economic Cooperation Countries through Market Transformation (RETA 9299)**

69. Supply and demand constraints have resulted to the slow adoption of new technologies by CAREC countries. Suppliers of new technology are not attracted to CAREC countries as markets because they perceive these countries to difficult to access and an unfamiliar. From the demand side, government policies and regulations are not enabling new technologies due to a lack of institutional capacities and understanding of new technologies. In order to open up Central Asian Markets to new technologies, a CAREC High-Technology Roadmap was adopted

that looks into how major disruptive technologies, particularly solar power, electric vehicles, energy efficiency, and energy storage can be.

70. The technical assistance (TA) aims to build capacities through targeted training, demonstration and knowledge projects. The TA was approved and became effective on 13 February 2016 and is financed by the Clean Energy Fund under the Clean Energy Financing Partnership Facility for the amount of \$2 million. The project has financed the 3rd Energy Investment Forum (Batumi, September 2018) the last CAREC ESCC Meeting (Tashkent, April 2019).

- **Regional Cooperation on Renewable Energy Integration to the Grid (RETA:9365)**

71. The TA aims at assisting the countries in dealing with the specific problem of renewable energy intermittency and tries to provide technical, regulatory, operational and capacity building solutions to the participants. The scope of the TA includes seven Central Asian countries (Afghanistan, Kazakhstan, Kyrgyz Republic, Pakistan, Tajikistan, Turkmenistan, and Uzbekistan) as these are geographically connected and have historically shared electricity, keeping their legacy-sharing protocols and/or mechanisms.

72. Overall, the TA establishes three regional renewable energy scenarios (2020, 2025, and 2030) and identifies the necessary capacity reserve requirements on a regional, as well as on a national level to mitigate intermittency from renewable energy. In this context, it specifically looks at how much costs can be saved if countries cooperate regionally (i.e. share or procure the capacity reserves from their neighbors) as opposed to a no-cooperation situation. It also analyzes which investments in grid/capacity are needed in each of the three renewable energy scenarios.

73. To date, the TA finalized the 2020 scenario. The main take-away of this scenario is that hydropower reserves in Tajikistan and the Kyrgyz Republic are sufficient to balance intermittent renewable energy in the entire region with no additional infrastructure investments needed by 2020. By selling/procuring these hydropower reserves, the countries can save up to USD140 million as compared to a scenario in which each country uses its own reserves.

74. Moreover, the TA successfully gathered all necessary data to establish realistic hypothesis for the 2025 and 2030 scenarios. This will allow to do the final calculations and identify potential benefits of regional cooperation and infrastructure needs in the mentioned periods. After completion of all scenarios, a Roadmap leading up to 2030 containing all necessary steps to be taken to integrate renewable energy into the grid (including regional agreements, necessary infrastructure expansion and legal requirements) will be provided.

75. The TA is currently also conducting a pilot project in Kazakhstan that involves testing of a forecasting tool to better determine the availability of intermittent solar and wind energy. The test phase will be completed by mid-2019 and experience as well as lessons learned from implementing the tool will be shared with all countries.

76. Another major outcome of this TA is the completion of a model grid code for Uzbekistan to connect small solar and wind energy (less than 2MW) to the distribution grid. The code was shared with all remaining countries to serve as an example of how to set technical standards of renewable energy equipment.

77. Overall, six out of seven foreseen capacity building workshops were successfully held. The last workshop is preliminarily scheduled for end of 2019 and will present all final deliverables to the TA participants (and possibly also a wider community).

- **Floating Solar (RETA:9564)**

78. In August 2018, ADB approved a TA of \$3.0 million from the Clean Energy Fund under the Clean Energy Financing Partnership facility on floating solar photovoltaics (FPV) in the countries of Azerbaijan, Kyrgyz Republic, and Afghanistan. The TA will pilot test high technology, enabling the countries to leapfrog in knowledge and capacity and increase readiness for private sector participation in large-scale, land-based, and floating solar development. The TA will also address critical challenges and vulnerabilities such as (i) insufficient technical and institutional capacity, (ii) limited financial resources, (iii) tariffs below cost recovery, and (iv) energy insecurity due to reliance on a single type of energy source.

79. In late 2018, ADB fielded a mission to kick-off the TA and to conduct a regional inception and capacity building workshop on Floating Solar Energy Development. The Mission brought together solar stakeholders from the three pilot countries of Azerbaijan, Afghanistan, and the Kyrgyz Republic to discuss the TA implementation and the required technical, financial, and safeguards due diligence. It also built knowledge and capacity in floating solar technology, financing, and policy and in developing, designing, installing, and operating floating PV plants. The implementing agencies for this regional TA are the Ministry of Energy of Azerbaijan, OJSC Electric Power Plants (EPP) of the Kyrgyz Republic and Da Afghanistan Breshna Sherkat (DABS) of Afghanistan and all were represented during the mission and inception workshop.

80. In March 2019, ADB conducted an inception mission to Afghanistan and met with relevant stakeholders to discuss TA priority actions and implementation matters such as technical requirements for the pilot and site considerations. A workshop on FPV development

was held and attended by various local and international public and private organizations as well as donor agencies. The main topics under discussion were the projects under implementation and planning in Afghanistan, followed by the current regulatory framework. ADB presented the FPV TA and the potential for FPV across the CAREC region. The TA international consultant presented the global FPV landscape, the FPV components and systems, and the environmental and social safeguards for FPV projects. The participants posed numerous questions, suggestions, and comments on several issues including (i) capacity development needs, (ii) FPV potential for rural applications, (iii) operations and maintenance for FPV projects, (iv) participation of the private sector, and (v) potential scale-up options.

81. Ongoing work in Azerbaijan and Afghanistan is continuing including pilot design, capacity development assessment and site selection.

III. SECTOR WORK PROGRAM/PLAN 2019

- **Midterm Review of CAREC Energy Strategy and Workplan 2016–2020**

164. The 29th ESCC Meeting held on 10 April 2019 in Tashkent, Uzbekistan, endorsed the Midterm Review of the CAREC Energy Strategy and Work Plan 2016–2020. The document takes stock of the achievements made under the 2016–2020 strategy and highlights global changes, new dynamics and risk factors that emerged on the world energy scene since its adoption. The review concluded that regional strategic priorities may need to change in the new CAREC Energy Strategy 2030 to be released at the end of 2019 given the significant developments on the global energy scene in recent years (such as e.g., global climate change commitments, rapid decrease in renewable energy costs, substantial private sector investment needs, etc.).

- **New CAREC Energy Strategy 2030**

165. Given the expiry of the CAREC Energy Strategy and Workplan 2016–2020, the process for developing a new Energy Strategy up to 2030 has commenced at the start of 2019. The new CAREC Energy Strategy 2030 is scheduled to be presented to the 2019 Ministerial Conference for final endorsement. Preliminary building blocks of the new strategy were presented to the 29th ESCC meeting on 10 April 2019 which endorsed the general direction of the strategy.

166. The main building blocks include:

- (i) **Better energy security through regional interconnections.** Regional interconnections should help energy flow from countries in excess supply to those in high demand. With a growing regional gas and electricity grid, cooperation of network operators will become increasingly important and shall be institutionalized. This is expected to help maximize energy security for all and increase trust among CAREC members.
- (ii) **More investments through market liberalization reforms.** Vertically integrated value chains still prevail in a large number of CAREC countries with underdeveloped market structures and inefficient pricing signals. Market liberalization shall gradually be introduced to allow for competition, lower subsidies and overall higher quality of service in the region.
- (iii) **Enhanced climate mitigation for a future proof energy system.** The reality of climate change is challenging governments around the world to take mitigating action. For CAREC to stay ahead of the curve, energy efficiency and clean energy solutions shall be the main drivers to reduce carbon emissions given the high energy intensity levels in the region. Creating public awareness for energy saving is key in this process.

167. A number of cross-cutting pillars will also form part of the strategy focusing on enhancing the role of the private sector, fostering women in energy and creating new knowledge products and peoples' networks. Country consultations are foreseen to allow member countries to individually comment on the draft before adoption.

- **4th Energy Investment Forum (EIF)**

168. The 4th Energy Investment Forum, titled *“Breaking the Investment Barrier in Central Asia – Bringin Business to Energy Markets in Transition”* will be held on 20–21 September 2019 in Tashkent, Uzbekistan and aims at attracting investors to the CAREC region. It will be the first EIF to include a large number of CAREC Energy Minsters, a B-2-B platform and a start-up competition.

- **1st Energy Ministers Dialogue**

169. In 2019, a CAREC Energy Ministers Dialogue will be organized for the first time to discuss regional priorities and strategic regional issues in relation to the CAREC energy sector. This meeting will be a closed-door meeting before the official opening of the 4th EIF on 20 September 2019 in Tashkent. The CAREC Energy Ministers Dialogue is considered timely given the common energy market challenges the Ministers face and will send a clear message that the region is working as one to promote a sustainable power sector development. A Ministerial Declaration shall be signed at the end of the meeting.

IV. MAIN SECTORAL DELIVERABLES FOR 2019 MINISTERIAL CONFERENCE AND KEY ISSUES FOR GUIDANCE BY THE SOM

Deliverable	Description	Requested Guidance from SOM
Mid-Term Review of CAREC Energy Strategy and Workplan 2016–2020	The Midterm Review of the CAREC Energy Strategy and Workplan 2016–2020 was endorsed by the 29th ESCC meeting in April 2019 in Tashkent and will be presented as 2019 deliverable to the Ministerial Conference. For a description of the document, please see section III) above.	Document finalized. No further guidance needed.
New CAREC Energy Strategy 2030	The main building blocks of the strategy were endorsed by the 29th ESCC meeting in April 2019 in Tashkent. Individual country consultations with all CAREC member countries are planned for July to receive detailed feedback from CAREC members. Upon completion of the country consultation, a final version will be prepared for endorsement by the Ministerial Conference. For a description of the document, please see above.	Advice on which authorities to consult during individual country consultations appreciated
4th Energy Investment Forum	Please see description in Section III) above.	
1st Energy Ministers Dialogue	Please see description in Section III) above.	

V. ANNEX – KEY INDICATORS MONITORED

(AS OF MAY 2019)

Disclaimer:

Below are various energy data submitted to the CAREC Energy Secretariat by CAREC member countries. Not all countries have provided their latest updates. Therefore, the statistics may occasionally not reflect the current situation accurately.

1. Afghanistan

Table 1. Afghanistan Traditional Energy Sector Outputs Indicators, 2013–2019

Indicator	Unit	2013 Baseline	2014	2015		2016	2017	2018	2019
Transmission lines installed or upgraded transmission lines	Km	-	-	-	>220 kv	1,662	1,802	1,949	1,949
					> 132 kV	120.0	120.0	120.0	120.0
					> 110 kV	1,200.0	1,240.0	1,381.0	1,381.0
					> 35 kV	131.2	131.2	131.2	131.2
Increased energy generation capacity	MW	555.22	555.22	555.22		603.7	595.2	596.0	610.2
Rehabilitated generation capacity	MW	-	-	-		-	25.0	25.0	-
New substations	MVA	1,250	1,382	1,422		1,490.0	1,575.0	1,786.3	2,549.3
Upgraded substations	MVA	20	40	20		20.0	20.0	110.0	41.0**

Note: *Data available as of May 2019

** New and Upgraded Substations included under 2019 are those at its final stages of test and commissioning and will be energize in this year.

Table 2. Afghanistan New Energy Sector Outputs Indicators, 2014–2019

Indicator		Unit	2014 Baseline	2015	2016	2017	2018	2019
Wind power installed	Capacity	MW net	0.1	0.1	0.1	0.4	0.4	0.4
	Generation	MWh	0	0	0	1180	generation sum with solar	generation sum with solar
Solar power installed	Capacity	MW net	1.349	1.349	1.349	3.379	3.379	18.4
	Generation	MWh	892	1148	1348	2688.2	3038	1265.8***
Electric vehicle adoption		Nos.	0	0	0	0		
LED public lighting*		Km of roads	0	0	0	0		
		No. of units	0	0	0	0		
Energy Efficiency Savings**		MWh	0	0	0	0	12,800.0	

Note: *LED Street light: 4Kw/Km, 80 watt for each tower, 40m distance between two tower, 80watt = 9600 lumen, tower night 9 meter or 11 meter two tower in both side of street.

**In 2018 around 5MW savings were recorded and for 2019, there is a plan to save 3MW more.

*** Until June 2019.

2. Azerbaijan

Table 3. Azerbaijan Traditional Energy Sector Outputs Indicators, 2013–2019

Indicator	Unit	2013 Baseline	2014	2015	2016	2017	2018	2019
Transmission lines installed or upgraded transmission lines	Km	7,490.8	3,302.4	1,718.2	1,592.7	1,267.8	7.7	28.2
Increased energy generation capacity	MW	830.3	2.8	24.4	1.6	2.5	16.5	-
Rehabilitated generation capacity	MW				24.3	18.0	230.0	130.0
New substations	MVA	61.3	880.0	750.0	400.0	20.0	80.0	80.0
Upgraded substations	MVA	1,365.0	2,111.5	793.5	2,252.5	153.5	55.0	-

Table 4. Azerbaijan New Energy Sector Outputs Indicators, 2014–2019

Indicator	Unit		2014	2015	2016	2017	2018	2019
			Baseline					
Wind power installed	Capacity	MW net	66.0	66.0	66.0	66.0	66.0	66.0
	Generation	1000 MWh	2.3	4.6	22.8	22.1	85.7	29.8
Solar power installed	Capacity	MW net	28.0	31.1	32.3	35.0	35.0	37.0
	Generation	1000 MWh	2.9	4.6	35.3	37.2	39.3	8.4
Electric vehicle adoption		Nos.						
LED public lighting		Km of roads						
		No. of units						
Energy Efficiency Savings		1000 MWh						

3. People's Republic of China

Table 5. People's Republic of China Traditional Energy Sector Outputs Indicators, 2013–2019

Indicator	Unit	2013 Baseline	2014 ¹	2015 ²	2016	2017	2018	2019
Transmission lines installed or upgraded transmission lines	Km	550,898	581,043	617,291	645,428	1,697		
Increased energy generation capacity	MW	98,874	112,537	135,438	132,156	5,482		
Rehabilitated generation capacity	MW	662	1,901	1,789	785	225		
New substations	MVA	196,665	243,152	224,047	241,762	870		
Upgraded substations	MVA	2,098	13,274	6,235	3,265	206		

Table 6. People's Republic of China New Energy Sector Outputs Indicators, 2014–2019

Indicator	Unit	2014						
		Baseline	2015	2016	2017	2018	2019	
Wind power installed	Capacity	MW net	96,635	131,221	148,942			
	Generation	MWh	156,042,142	190,285,259	237,528,613			
Solar power installed	Capacity	MW net	25,042	42,228	77,924			
	Generation	MWh	23,475,006	40,888,052	61,463,512			
Electric vehicle adoption		Nos. ¹	53,500	2,478,205	-			
LED public lighting ¹		Km of roads ¹	-	3,642	5,333			
		No. of units	-	-	-			
Energy Efficiency Savings		MWh	80,000	85,000	100,000			

4. Georgia

Table 7. Georgia Traditional Energy Sector Outputs Indicators, 2013–2019

Indicator	Unit	2013 Baseline	2014	2015	2016	2017	2018	2019 1Q
Transmission lines installed or upgraded transmission lines*	Km	2,477	2,477	2,510	2,580	2,765	2,772	2,892
Increased energy generation capacity	MW	32.1	134.5	235.35	180.38	189.02	54.13	55.84
Rehabilitated generation capacity	MW							
New substations**	MVA				900	660	-	250
Upgraded substations**	MVA				188	-	-	663

* - 220-500 kV lines only

** - 220/110 and 500/220 kV Substations only

Table 8. Georgia New Energy Sector Outputs Indicators, 2014–2019

Indicator	Unit	2014 Baseline	2015	2016	2017	2018	2019 1Q	
Wind power installed	Capacity	MW net	-	-	20.7	20.7	20.7	20.7
	Generation	MWh	-	-	9,026	87,751	84,278	2,143
Solar power installed	Capacity	MW net						
	Generation	MWh						
Electric vehicle adoption		Nos. ¹	36	51	31	794	281	
LED public lighting¹		Km of roads ¹						
		No. of units						
Energy Efficiency Savings		MWh						

5. Kyrgyz Republic

Table 9. Kyrgyz Republic Traditional Energy Sector Outputs Indicators, 2013–2019

Indicator	Unit	2013 Baseline	2014	2015	2016	2017	2018	2019 (Q1)
Transmission lines installed or upgraded transmission lines	km	89.3	324.6	-	164.0	380.0	339.0	-
Increased energy generation capacity	MW	52.0	21.0	130.0	310.0	69.9	211.5	-
Rehabilitated generation capacity	MW	333.0	667.0	63.0	63.0	9.2	125.0	-

Table 10. Kyrgyz Republic New Energy Sector Outputs Indicators, 2014–2019

Indicator	Unit	2014 Baseline	2015	2016	2017	2018	2019	
Wind power installed	Capacity	MW net	52.8	71.8	98.2	112.4	121.5	227.0
	Generation	MWh	17.4	82.8	262.0	339.0	401.9	154.4
Solar power installed	Capacity	MW net	5.0	57.1	57.3	58.8	209.0	250.0
	Generation	MWh	2.6	14.6	86.8	114.3	142.3	58.8

6. Pakistan

Table 11. Pakistan Traditional Energy Sector Outputs Indicators, 2013–2019

Indicator	Unit	2013 Baseline	2014	2015	2016	2017	2018	2019 (Q1)
Transmission lines installed or upgraded transmission lines	km	500kV	5,024	5,077	5,113	5,127	5,618	5,917
		200 kV	8,230	8,547	9,632	10,063	10,478	10,981
Increased energy generation capacity	MW	20,850	22,104	22,849	23,247	28,072	32,525	35,961
Rehabilitated generation capacity	MWA	500kV	15,750	15,750	16,950	18,150	20,850	22,350
		200 kV	18,231	19,674	23,914	24,040	29,110	31,240

Table 12. Pakistan New Energy Sector Outputs Indicators, 2014–2019

Indicator	Unit	2014 Baseline	2015	2016	2017	2018	2019	
Wind power installed	Capacity	MW net	106	256	306	782	985	1,235
	Generation	MWh	263	458	786	1,735	2,118	2,918
Solar power installed	Capacity	MW net	-	100	400	400	400	400
	Generation	MWh	-	26	207	635	664	627
Electric vehicle adoption		Nos.	-	-	-	-	-	-
LED public lighting		Km of roads	-	-	-	-	-	-
		No. of units	-	-	-	-	-	-
Energy Efficiency Savings		MWh	-	-	-	-	-	-

7. Tajikistan

Table 13. Tajikistan Traditional Energy Sector Outputs Indicators, 2013–2019

Indicator	Unit	2013	2014	2015	2016	2017	2018	2019
Transmission lines installed or upgraded transmission lines	Km	-		85.3	77.2	158.3	228.0	
Increased energy generation capacity	MW	5,205.0	100.0		300.0		400.0	
Rehabilitated generation capacity	MW	-					45.0	
New substations	MVA	-		346.0	282.0	32.0		
Upgraded substations	MVA	-				250.0	300.0	250.0

Note: This table provides data for 500/220 kV and 110 kV transmission lines, as well as 220 kV and 110 kV substations.