



# Technical Assistance Report

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Project Number: 49413-001  
Regional—Capacity Development Technical Assistance (R-CDTA)  
February 2017

## Leapfrogging of Clean Technology in Central Asia Regional Economic Cooperation Countries through Market Transformation

(Financed by the Clean Energy Fund under the Clean Energy  
Financing Partnership Facility)

This document will be disclosed to the public in accordance with ADB's Public Communications Policy 2011.

Asian Development Bank

## ABBREVIATIONS

ADB	–	Asian Development Bank
CAREC	–	Central Asia Regional Economic Cooperation
ESCC	–	Energy Sector Coordinating Committee
TA	–	technical assistance

## NOTE

In this report, “\$” refers to US dollars.

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## CAPACITY DEVELOPMENT TECHNICAL ASSISTANCE AT A GLANCE

<b>1. Basic Data</b>		<b>Project Number: 49413-001</b>	
<b>Project Name</b>	Leapfrogging of Clean Technology in Central Asia Regional Economic Cooperation Countries through Market Transformation	<b>Department /Division</b>	CWRD/CWEN
<b>Country</b>	REG	<b>Executing Agency</b>	Asian Development Bank
<b>2. Sector</b>	<b>Subsector(s)</b>	<b>Financing (\$ million)</b>	
✓ Energy	Energy efficiency and conservation		2.00
		<b>Total</b>	<b>2.00</b>
<b>3. Strategic Agenda</b>	<b>Subcomponents</b>	<b>Climate Change Information</b>	
Inclusive economic growth (IEG) Environmentally sustainable growth (ESG) Regional integration (RCI)	Pillar 1: Economic opportunities, including jobs, created and expanded Eco-efficiency  Pillar 4: Other regional public goods	Climate Change impact on the Project	Low
<b>4. Drivers of Change</b>	<b>Components</b>	<b>Gender Equity and Mainstreaming</b>	
Knowledge solutions (KNS)  Partnerships (PAR)  Private sector development (PSD)	Application and use of new knowledge solutions in key operational areas Knowledge sharing activities Pilot-testing innovation and learning Commercial cofinancing Civil society organizations Implementation Official cofinancing Private Sector Promotion of private sector investment	Some gender elements (SGE)	✓
<b>5. Poverty and SDG Targeting</b>		<b>Location Impact</b>	
Geographic Targeting Household Targeting SDG Targeting SDG Goals	No No Yes SDG7	Not Applicable	
<b>6. TA Category:</b>	A		
<b>7. Safeguard Categorization</b>	Not Applicable		
<b>8. Financing</b>			
<b>Modality and Sources</b>		<b>Amount (\$ million)</b>	
<b>ADB</b>		<b>0.00</b>	
None		0.00	
<b>Cofinancing</b>		<b>2.00</b>	
Clean Energy Fund under the Clean Energy Financing Partnership Facility		2.00	
<b>Counterpart</b>		<b>0.00</b>	
None		0.00	
<b>Total</b>		<b>2.00</b>	
<b>9. Effective Development Cooperation</b>			
Use of country procurement systems		No	
Use of country public financial management systems		No	



## I. INTRODUCTION

1. The Central Asia Regional Economic Cooperation (CAREC) Program member countries are committed to a shared vision for the region's energy sector. This vision will enable all member countries to have access to adequate volumes of reliable, affordable, financially sustainable, and environmentally sound commercial energy. It requires the implementation of consistent policies to ensure (i) energy security through balanced development of the region's energy resources, infrastructure, and institutions; (ii) stronger integration of the region's energy markets; and (iii) economic growth through energy trade. Within this framework, the Strategy and Work Plan (2016–2020) for Regional Cooperation in the Energy Sector of CAREC Countries aims to promote new technologies and remove market barriers for the adoption of new technology in the region.<sup>1</sup>

2. CAREC countries are slow in adopting new technologies because of both supply and demand constraints. On the supply side, suppliers of new technologies are not attracted to CAREC countries as a market because the countries are relatively poor and difficult to access, and, in many cases, suppliers are not familiar with the countries. On the demand side, government policies and regulations are not enabling new technologies, as the institutions in these countries lack the capacity and understanding of new technologies. New technology adoption is also affected by the perceived risk, resistance from the incumbents, and the negative image created by substandard new technology products in the nascent market.

3. The technical assistance (TA) will build capacities through targeted training, demonstration projects, and knowledge products.<sup>2</sup> The overall scope of the TA was endorsed by the CAREC Energy Sector Coordinating Committee (ESCC), which will analyze the new technology landscape and develop a technology adoption road map for faster integration of new technology into existing systems in the region. The road map will include analysis of business models, and policy incentives for faster new technology adoption and scale-up.<sup>3</sup>

## II. ISSUES

### A. New Technology and the Electricity Industry

4. **Energy sector facing major changes.** The monopoly facets of electricity generation and distribution that faced very little technological development since Thomas Edison invented electricity some 140 years ago are changing. Renewable energy has become a proven technology for mass adoption, and is competing against fossil fuel generation on price in many developed and developing countries. The International Energy Agency recently reported an unprecedented cost reduction—the average cost of land-based wind-generated electricity decreased by 35% and solar energy fell by almost 80% from 2008 to 2015.<sup>4</sup> The integration of renewable energy can significantly alter the power system paradigms of the CAREC countries—both fossil fuel-rich Central Asia with full electrification and energy-deficit South Asia where a large population still has no access to electricity.

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<sup>1</sup> CAREC. 2015. *Strategy and Work Plan (2016–2020) for Regional Cooperation in the Energy Sector of CAREC Countries*. Ulaanbaatar.

<sup>2</sup> The TA first appeared in the business opportunities section of ADB's website on 20 September 2016.

<sup>3</sup> Categorized as knowledge and support technical assistance under the new staff instructions effective 13 March 2017.

<sup>4</sup> International Energy Agency. 2016. *Next Generation Wind and Solar Power: From Cost to Value*. Paris. <https://www.iea.org/publications/freepublications/publication/NextGenerationWindandSolarPower.pdf>.

5. **Renewables to lower electricity costs.** With recent advances in battery technology and lower prices of solar and wind power, the cost of operating dispersed generation and mini-grids is becoming cheaper than isolated diesel-only generation. If reputable suppliers of solar or wind power and battery providers are attracted to the CAREC region, the cost of local mini-grids with renewable energy could be cheaper and more reliable than local diesel generation especially in far-flung sparsely populated areas connected to the main grid. In remote rural Afghanistan and Pakistan, the solar generation and battery combination could increase electricity access with lower prices, using either a micro-grid for small communities or off-grid DC kits for individual houses at a fraction of the cost and time of expanding the grid.

6. **Smart grid and storage.** Smart grid technology will integrate the power network with information technology and make the network more reliable and responsive to consumer needs. It will be able to monitor and adjust consumers' energy use (and solar generation) through smart meters. Battery-based storage at the community level will be able to reduce the overall load factor, shift demand to off-peak periods, and strengthen the grid without building new power plant distribution lines and transformer capacities as demand for electricity grows. In the medium term, the integration of electric vehicles may also improve reliability through vehicle-to-grid connections.

7. **Old lighting technologies in roads, highways, and public facilities.** In CAREC countries, based on initial observation of lighting sources and old lighting design, energy savings of about 40%–80% are possible. With newer technologies, additional savings of about 50%–75% are possible from the maintenance of street lighting. If forward-looking technology is taken into account, additional savings will be possible: the scope of energy-efficient street lighting has widened from its traditional narrow scope of better equipment to the installation of smart, energy-efficient street lighting. This involves a smart energy management system that dims when lights are not required, and can communicate real-time usage statistics and failures, allowing automatic and quicker repair requests and responses.

8. **Energy-efficient public buildings.** When most of the infrastructure in Central Asia was built in the 1970s, central planners focused on delivering energy to meet the demand. Demand reduction and energy efficiency were only considered after the oil crisis in the late 1970s. The public buildings in the region consume more energy than buildings in other parts of the world. A demonstration project in Uzbekistan quantified significant energy savings potential in buildings: 30%–45% from heat energy and 40%–65% overall energy savings. The CAREC countries have identified energy savings in buildings as a key component for constructing better infrastructure in the future.

9. **Electrification of transport.** To improve energy security, oil-importing countries have developed policies to increase the availability of oil or reduce oil demand. However, this has not mitigated their vulnerability to oil price fluctuations. In 2008, when oil prices were at a record high, countries focused on ethanol made from agricultural products like sugar cane and corn to address energy security. Now, there is an alternative. Some countries are looking at electric vehicles as an alternative, with their growing popularity and the fact that these vehicles can run on considerably lower-priced electricity generated by solar power. Most oil-importing countries generate very little electricity using oil, so electric cars and plug-in hybrid electric cars can have an immediate impact on oil imports and energy security. The strategic importance of the electrification of transport comes from a much lower cost per kilometer for electric vehicles compared with the cost of fueling with gasoline or diesel, even when oil prices are low. This is a key strategic issue as the price of electric cars is falling with lower battery prices. Wider deployment of electric vehicles and necessary transformation of transport electrification will not



happen without government intervention, especially in CAREC countries. Globally, governments are providing subsidies to fast-track the adoption of electric vehicles.

10. **Technology modernization.** Bringing in new technology in Central Asia is more complex than in other regions because of the additional challenge of ensuring compatibility between the new and old systems. Most of the infrastructure in Central Asia was built with Russian technology and design in the 1970s during the Soviet Union era. With low investments since the 1990s, the adoption of new technology is more complex and slower than in other regions, where new technologies have gradually been added.

### **B. Slow Adoption of New Technologies**

11. CAREC governments are aware of the slow adoption of new technologies in their countries because of their conservative policy, lack of understanding of the merits of new technology, low supplier interest, and absence of standards to stop the proliferation of poor quality products. CAREC member countries want to address this problem and stop the proliferation of poor quality products. A strategic plan is needed to develop the market and capacities to support new markets. The objective is to avoid the common 5–7-year time lag for the adoption of new technologies, and implement technologies that are cheaper, more efficient, and have smaller carbon footprints.

12. CAREC member countries acknowledge that the technology adoption gap is worsening as new technologies in the energy sector are developing faster than before. New technology owners and suppliers focus on the higher margins from early adopters' niche markets to recover their technology development costs, preventing people from developing countries from assuming technology risks and becoming early adopters. In absence of the right policies, incentives, quality standards, and information to encourage diffusion of new technologies, technology adoption level is less than what is socially desirable and optimum in the CAREC countries. The overall time lag in technology adoption in CAREC, thus is a market failure that needs addressing.

### **C. Technology Leapfrogging**

13. The CAREC ESCC members are thinking outside the linear approach of technology adoption to future-proof today's investments. CAREC member governments plan to jump from yesterday's technology to tomorrow's technology—leapfrogging the mature technologies of today. In rural Afghanistan, India and Pakistan, many people jumped from old analog landlines (or no telephones) to smartphones—leapfrogging digital landlines and analog mobile networks.

14. Leapfrogging technology is a difficult strategy to implement. CAREC member countries must determine what technology is relevant in the medium term from current technology trends. Countries need demonstration projects and understanding of technology trends. The next challenge is to adopt policies and actions that will shorten the lag between the launch of technology in developed countries and its introduction in CAREC countries. The ESCC envisions four key disruptive technologies to lead tomorrow's changes: (i) battery-based energy storage, (ii) solar power, (iii) electric vehicles, and (iv) energy-efficient appliances. CAREC members will need to revise energy planning methods and adjust distribution and transmission systems to cope with these and other disruptive technologies already available in developed countries. Inferior products made from the same technology are slowly becoming available in CAREC countries at significantly higher prices, as smaller niche markets emerge.

15. **Adoption of new technologies as a strategy.** The ESCC identified this market failure as a developmental challenge. The adoption and use of new and efficient energy technologies and increased integration of energy markets is a key pillar of the CAREC energy sector strategy and work plan (footnote 1). The ESCC has requested the Asian Development Bank (ADB) to

finance a regional TA to support technology leapfrogging. The proposed TA will bring the capacity, knowledge, and skills for innovative approaches and planning.

### III. THE CAPACITY DEVELOPMENT TECHNICAL ASSISTANCE

#### A. Impact and Outcome

16. The impact of the project is aligned with increased energy security among CAREC countries through the promotion and use of new technologies. This is aligned with the Strategy and Work Plan (2016–2020) for Regional Cooperation in the Energy Sector of CAREC Countries (footnote 1). The outcome will be new technology applied to energy systems in CAREC countries.

#### B. Methodology and Key Activities

17. The TA will support market transformation by enabling right policies, incentives, standards, and knowledge through the following four outputs and key activities:

- (i) **Central Asia Regional Economic Cooperation new technology road map developed.** This will reconfirm and prioritize commitments for new technologies, update the new technology vision to a more detailed new technology road map, and create a viable work plan and time line to be adopted by CAREC countries during the CAREC Senior Officials' Meeting (SOM) in 2017.
- (ii) **Links among Central Asia Regional Economic Cooperation countries toward a unified regional market for investment and new technologies strengthened.** This will organize the second Energy Investment Forum as a follow-up to the first event in Islamabad in October 2016, and publish information and proceedings on the CAREC website.
- (iii) **Market adoption potential of new technologies demonstrated.** This will conduct consultations and ensure the completion of the potential pilot project (including size and location) in CAREC countries, complete the design and technical specifications for pilot demonstration projects, implement pilot projects, establish a monitoring and reporting mechanism, and evaluate and assess the scalability of pilot implementation (including social acceptability and financial sustainability).
- (iv) **Capacity building on new technologies and electric vehicles developed.** This will develop a CAREC-wide communication and outreach strategy, including branding, distributing communication plans across CAREC countries for country-level implementation, and creating a CAREC new technology project database.

18. The TA will achieve its outcome of new technology applied to energy systems in CAREC countries.

#### C. Cost and Financing

19. The TA is estimated to cost \$2,000,000, which will be financed on a grant basis by the Clean Energy Fund<sup>5</sup> under the Clean Energy Financing Partnership Facility and administered by ADB. The participating CAREC governments will provide counterpart support in the form of counterpart staff, office accommodation, secretarial assistance, and other in-kind contributions.

#### D. Implementation Arrangements

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<sup>5</sup> Financing partners: the governments of Australia, Norway, Spain, Sweden, and the United Kingdom.

20. ADB will be the executing agency for the TA and will work closely with the country focal persons for the ESCC. The TA will be implemented over 24 months from January 2017 to December 2018.

21. ADB will oversee and lead the implementation of the TA, and will work closely with the CAREC coordinators in ADB resident missions in the pilot countries. A no objection will be secured from each DMC in whose territory TA activities will be undertaken, at the latest before the commencement or financing of any TA activity in such territory. The Energy Division of ADB's Central and West Asia Department and its team of consultants will organize internal seminars and workshops that will include other ADB staff members as resource persons. ADB will engage all consulting services following its Guidelines on the Use of Consultants (2013, as amended from time to time).

22. ADB will recruit several individual technical experts and an international consulting firm to develop the new technology road map. ADB will recruit 11 person-months of international individual experts to form the international technology team and about 25 person-months of national consultants to coordinate ESCC meetings, communications, and in-country coordination. The individual consultants are justified since a consulting firm may not have key experts on new technologies, and to keep the design-and implementation-related activities of the pilot projects in separate teams. The consulting firm will deliver 31 person-months of consulting services (17 person-months of international and 14 person-months of national consulting inputs) following ADB's quality- and cost-based selection method with a 90:10 ratio and using a simplified technical proposal.

23. Individual consultants or the consulting firm will procure equipment for the pilot. ESCC-related equipment will be retained by the secretariat. All procurement under the TA will be done in accordance with ADB's Procurement Guidelines (2015, as amended from time to time).

24. ADB may establish partnerships with renowned technology service providers or universities. The guiding principles for this partnership will *include* the following:

- (i) TA proceeds will not finance the staff costs, capitalization, or ordinary operating expenses of partner(s), and will only finance the eligible individual's transportation and daily subsistence allowance.
- (ii) Partner(s) will not engage consultant(s) or resource person(s) using the TA proceeds—all consultants and/or resource persons to be financed by ADB using the proceeds for the assignments envisaged and/or proposed in the partnership agreement will be engaged directly by ADB.
- (iii) Capacity building and training for electric vehicles and batteries will be conducted in partnership with Tesla Energy, Hydro Tasmania, Australian Renewable Energy Association, and Argonne National Laboratory.
- (iv) The project team will continue its work to establish partnerships with large electric car companies, electric or hybrid bus companies, and technical and innovation laboratories of reputable universities for the pilot project.
- (v) Companies partnering with ADB for the pilot project will not be excluded from bidding for the project if the new technology pilot project results in an investment for ADB.

#### **IV. THE PRESIDENT'S DECISION**

25. The President, acting under the authority delegated by the Board, has approved ADB administering technical assistance not exceeding the equivalent of \$2,000,000 to be financed on a grant basis by the Clean Energy Fund under the Clean Energy Financing Partnership Facility for Leapfrogging of Clean Technology in Central Asia Regional Economic Cooperation Countries through Market Transformation, and hereby reports this action to the Board.

**DESIGN AND MONITORING FRAMEWORK**

<b>Impact the TA is Aligned with</b>			
Increased energy security among CAREC countries through the promotion and use of new technologies (Strategy and Work Plan [2016–2020] for Regional Cooperation in the Energy Sector of CAREC Countries) <sup>a</sup>			
<b>Results Chain</b>	<b>Performance Indicators with Targets and Baselines</b>	<b>Data Sources and Reporting Mechanisms</b>	<b>Risks</b>
<b>Outcome</b> New technology applied to energy systems in CAREC countries	1. At least two additional investment projects involving new technology included in the ADB-supported country investment plans of the CAREC region by 2019 (2016 baseline: <5)	1. National energy plans for CAREC countries	Change in political (government) circumstances may alter the priority ranking of new technology.  There may be a lack of new technology suppliers interested in CAREC, especially in small economies.  New technology might not be socially acceptable because of negative perception.
<b>Output</b> 1. CAREC new technology road map developed  2. Links among CAREC countries toward a unified regional market for investment and new technologies strengthened  3. Market adoption potential of new technologies demonstrated	1. New technology road map detailing the new technology vision <sup>a</sup> endorsed and adopted by participating CAREC countries during the CAREC SOM in 2018  2. At least 250 participants from CAREC countries (investors, policy makers, suppliers) attended the Energy Investment Forum in 2017 in Kazakhstan (2016 baseline: 240)  3a. New technology projects are designed, procured, and installed by 2017 (one project), and 2019 (three projects) (2016 baseline: 1)	1. TA report; minutes of the SOM in 2018 published on the CAREC website  2. CAREC energy sector progress report and work plan presented to the SOM in 2017 and published on the CAREC website  3a–d. CAREC Energy Sector Progress Report and Work Plan published on website; media coverage of pilot projects in countries	Countries change their prioritization of new technologies.           Pilot projects may not produce financially sustainable results.  Localizing new technologies is not possible because of unforeseen economic circumstances.

Results Chain	Performance Indicators with Targets and Baselines	Data Sources and Reporting Mechanisms	Risks
	<p>3b. 10 electric vehicles installed by participating countries by 2019 (2016 baseline: 0)</p> <p>3c. Governments of participating CAREC countries have replaced LED lighting in public areas by 2019 (2016 baseline: 0)</p> <p>3d. 50 e-trikes are operating in Afghanistan by 2018 or 100 by 2019 (2016 baseline: 0)</p>		
4. Capacity building on new technologies and electric vehicles developed	4. CAREC new technology communication platform and training plan developed by 2018 (2016 baseline: 0)	4. CAREC Energy Sector Progress Report and Work Plan published on website	CAREC member countries change their prioritization of new technologies and decide not to participate in activities.

### Key Activities with Milestones

#### 1. CAREC new technology road map developed

- 1.1 Reconfirm and prioritize commitments for new technologies (Q1 2017)
- 1.2 Update the new technology vision to a more detailed new technology road map (Q2 2017)
- 1.3 Create a viable work plan and time line to be adopted by CAREC countries (Q3 2017)

#### 2. Links among CAREC countries toward a unified regional market for investment and new technologies strengthened

- 2.1 Organize Energy Investment Forum (Q3 2017)
- 2.2 Publish information and proceedings on the CAREC website (Q4 2017)

#### 3. Market adoption potential of new technologies demonstrated

- 3.1 Consult with CAREC governments and finalize the potential pilot projects (including size and location) in CAREC countries<sup>b</sup> (Q2 2017)
- 3.2 Complete the design and technical specification for pilot demonstration projects (Q2 2017)
- 3.3 Implement pilot projects (Q3 2017 to Q4 2019)
- 3.4 Establish the monitoring and reporting mechanism (Q3 2017)
- 3.5 Evaluate and assess scalability of the new technologies (including social acceptability and financial viability) (Q4 2017)

#### 4. Capacity building on new technologies and electric vehicles developed

- 4.1 Develop a CAREC-wide communication and outreach strategy, including branding (Q1 2018)
- 4.2 Distribute communication plans across CAREC countries for country-level implementation (Q3 2018)
- 4.3 Create CAREC new technology projects database (Q4 2018)

<p><b>Inputs</b></p> <p>Clean Energy Fund under the Clean Energy Financing Partnership Facility: \$2,000,000</p> <p>Note: The participating CAREC governments will provide counterpart support in the form of counterpart staff, office accommodation, secretarial assistance, and other in-kind contributions.</p>
<p><b>Assumptions for Partner Financing</b></p> <p>Not applicable</p>

ADB = Asian Development Bank, CAREC = Central Asia Regional Economic Cooperation, LED = light-emitting diode, Q = quarter, SOM = Senior Officials' Meeting, TA = technical assistance.

<sup>a</sup> CAREC. 2015. *Strategy and Work Plan (2016–2020) for Regional Cooperation in the Energy Sector of CAREC Countries*. Ulaanbaatar.

<sup>b</sup> Reference to the CAREC Energy Workshop on New Technologies held 27–29 July 2015 in Tokyo, Japan.

Source: Asian Development Bank.

**COST ESTIMATES AND FINANCING PLAN**  
(\$'000)

Item	Amount
<b>Clean Energy Fund<sup>a</sup> under the Clean Energy Financing Partnership Facility</b>	
1. Equipment <sup>b</sup>	
a. Efficient building initiatives	150.0
b. LED public lighting	150.0
c. Demonstration of electric vehicles	250.0
d. Equipment for efficient ESCC meeting and coordination <sup>c</sup>	50.0
<b>Subtotal (1)</b>	<b>600.0</b>
2. Consultants	
a. Remuneration and per diem	
i. International consultants	504.0
ii. National consultants	146.0
<b>Subtotal (2)</b>	<b>650.0</b>
3. Study tours, training, and workshops on new technology <sup>d</sup>	
a. Energy Investment Forum	100.0
b. Capacity development for electric bus fleet	50.0
c. Training on forecasting, planning, and visit to battery manufacturing and micro-grid installations	100.0
d. Demonstration of electric vehicles and storage trends at ACEF 2017	50.0
e. ESCC meetings	300.0
<b>Subtotal (3)</b>	<b>600.0</b>
4. Contingency	<b>150.0</b>
<b>Total</b>	<b>2,000.0</b>

ADB = Asian Development Bank, ACEF = Asia Clean Energy Forum, ESCC = Energy Sector Coordinating Committee, LED = light-emitting diode, TA = technical assistance.

Note: The TA is estimated to cost \$2 million, of which contributions from the Clean Energy Fund under the Clean Energy Financing Partnership Facility are presented in the table above. The participating governments will provide counterpart support in the form of security, counterpart staff, office accommodation, secretarial assistance, domestic transportation, and other in-kind contributions. The value of government contribution is estimated to account for 33.3% of the total TA cost.

<sup>a</sup> Financing partners: the governments of Australia, Norway, Spain, Sweden, and the United Kingdom. Administered by the ADB.

<sup>b</sup> Includes any one or all of the following: electric vehicle pilot projects for government fleet and public transport, and efficient lighting.

<sup>c</sup> Includes cost of computers, software, master interpreter unit, equipment and other services for innovation in ESCC coordination to the highest efficiency level, and set a new benchmark.

<sup>d</sup> Includes cost of hiring resource person(s). Resource persons can be from ADB or outside of ADB.

Source: Asian Development Bank estimates.

## OUTLINE TERMS OF REFERENCE FOR CONSULTANTS

1. The project will be supported by individual consultants and a consulting firm. The Asian Development Bank (ADB) will recruit key experts as individual consultants who, as a team, will develop the detailed design of the pilot projects and capacity building programs. The consulting firm will procure equipment and implement the pilot projects and capacity building programs. The project will require 67 person-months of consulting services (28 person-months for international and 39 person-months for national).

### A. Individual Consultants

2. A team of individual consultants will design the pilot projects, and work on the first draft of the new technology road map, which will involve 11 person-months of international and 25 person-months of national consulting services. The international experts will work directly with the project team from the Energy Division of the Central and West Asia Department of ADB.

3. **Energy storage expert** (international, intermittent, 3 person-months). The expert will have a degree in engineering, finance or business, or equivalent, with at least 3 years of direct involvement in energy storage projects and a good understanding of price and technology trends. The expert will

- (i) confirm viability, scope, and sustainability of the energy storage-related projects in the new technology vision;
- (ii) analyze the new storage technology trends and policies adopted by other countries to attract key suppliers of storage technology;
- (iii) identify proven projects for scale-up and interested regional investors;
- (iv) develop outline concept projects for pilot testing of storage technology;
- (v) recommend capacity building and training programs for Central Asia Regional Economic Cooperation (CAREC) countries,
- (vi) contribute to drafting the energy storage-related sections of the first draft of the CAREC new technology road map, consult CAREC governments, and submit a final draft; and
- (vii) recommend future actions and technology needs.

4. **Electric vehicle expert** (international, intermittent, 3 person-months). The expert will have a degree in engineering, finance or business, or equivalent, with at least 3 years of direct experience in developing a technical and business case for electric vehicles. The expert will

- (i) confirm viability, scope, and sustainability of the electric vehicle-related projects (e-bikes, e-trikes, cars, and electric buses) in the new technology vision;
- (ii) analyze the electric vehicle trends and policies adopted to fast-track their adoption, including their potential for tackling climate change in the CAREC countries;
- (iii) identify potential private entrepreneurs and investors;
- (iv) identify proven projects that may be relevant in the CAREC region;
- (v) develop outline concept projects and cost estimates for the electric vehicle pilot testing;
- (vi) recommend capacity building and training programs;
- (vii) contribute to drafting the electric vehicle-related sections of the first draft of the CAREC new technology road map, consult CAREC governments, and submit a final draft; and
- (viii) recommend future actions and training needs.



5. **Communications expert** (international, intermittent, 5 person-months). The expert will have a degree in communications or a related field, with at least 3 years of direct experience in social media and communications. The expert will

- (i) coordinate with the technical experts and the consulting firm, and develop concepts and ideas to promote new technology in the CAREC region;
- (ii) working closely with the team, develop content, generate ideas, and disseminate ideas and updates to project stakeholders;
- (iii) maintain and monitor communication platforms; and
- (iv) develop branding and a marketing and communication strategy.

6. **Technical assistance coordinator** (national, intermittent, 25 person-months). The coordinator will

- (i) coordinate with the Energy Sector Coordinating Committee (ESCC) focal persons from each country and development partners;
- (ii) organize meetings, workshops, and training in multiple locations (in multiple countries);
- (iii) manage the consultant contracts (logistics, travel, reports, and information);
- (iv) prepare multimedia presentations and draft reports, including editing;
- (v) maintain a contacts database, with possible support in maintaining social media accounts;
- (vi) develop the system and process enhancements in facilitating effective information exchange between ADB, development partners, and CAREC member countries, as well as supporting other consultants and the sector team toward implementing the energy work plan, 2016–2020; and
- (vii) facilitate ESCC progress reports and related ESCC meeting materials.

## B. Consulting Firm

7. A consulting firm will be recruited following ADB's Guidelines on the Use of Consultants (2013, as amended from time to time) through quality- and cost-based selection with a 90:10 ratio using a simplified technical proposal. The consulting firm will implement the pilot projects and capacity building programs, with 31 person-months of consulting services (17 person-months for international and 14 person-months for national).

8. **Project manager** (international, 10 person-months). The manager will

- (i) prepare a technical assistance (TA) implementation plan, covering regional coordination and the TA time schedule;
- (ii) develop and undertake project monitoring and evaluation during implementation;
- (iii) lead the implementation of the project and the preparation of the project documents and report; and
- (iv) identify any problem areas during project implementation, proposing remedial actions and promptly reporting any outstanding issues to the ADB project head.

9. **Building efficiency expert** (international, 3 person-months; national, 2 person-months). The expert will

- (i) confirm viability, scope, and sustainability of the building efficiency-related projects from the new technology vision;
- (ii) analyze the technology and policy trends targeting building efficiency and their potential for tackling climate change in the CAREC countries;
- (iii) identify potential private entrepreneurs and investors;
- (iv) identify proven projects that may be relevant in the CAREC region;

- (v) recommend capacity building and training programs; and
- (vi) recommend future actions and training needs.

10. **Standards expert** (international, 2 person-months; national, 2 person-months). The expert will have a degree in engineering and at least 5 years of experience in developing countries, preferably in Central Asia. The expert will

- (i) provide inputs in developing the standards for new technologies in the CAREC region;
- (ii) design and implement procedures to test the social acceptability of the new technology;
- (iii) coordinate with other similar activities in the country, identify negative aspects, and suggest improvements; and
- (iv) recommend actions to harmonize the standards of the selected equipment.

11. **Efficient lighting specialist** (international, 2 person-months). The specialist will

- (i) confirm viability, scope, and sustainability of the lighting efficiency-related projects included in the new technology vision;
- (ii) analyze the technology and policy trends targeting lighting efficiency and their potential for tackling climate change in the CAREC countries;
- (iii) identify potential private entrepreneurs and investors, including energy service companies;
- (iv) identify proven projects that may be relevant in the CAREC region;
- (v) recommend capacity building and training programs; and
- (vi) recommend future actions and training needs.

12. **National technology coordinator** (national, 10 person-months, intermittent). The coordinator will

- (i) conduct field visits to the project sites and collect all necessary data from the users, and transmit this to the international consultants;
- (ii) design the delivery and distribution of new technologies to pilot sites;
- (iii) conduct regular field visits of the pilot sites for the entire TA duration;
- (iv) implement workshops and training in all pilot sites;
- (v) collect and monitor feedback data from users at pilot sites, process and analyze the data, and prepare regular reports on the data feedback and send this to project headquarters;
- (vi) train local partners in the basic maintenance of the technologies;
- (vii) provide maintenance support as required;
- (viii) coordinate the replacement of faulty equipment with the TA coordinator;
- (ix) implement the delivery of faulty equipment;
- (x) develop and design plans (policy needs) for local industry development; and
- (xi) design and implement procedures to test the financial and social acceptability of new technologies.

