



THE ASIAN DEVELOPMENT BANK AND THE CLIMATE INVESTMENT FUNDS Country Fact Sheets

ADB Climate Change and Disaster Risk Management Division

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January 2015

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Printed in the Philippines.

Publication Stock No. ARM157511-2

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CONTENTS

FOREWORD	v
ADB ENGAGEMENT IN THE CLIMATE INVESTMENT FUNDS	vi
BACKGROUND	viii
ABBREVIATIONS	x
ADB PORTFOLIO	1
Armenia	
Strategic Climate Fund–Scaling Up Renewable Energy Program in Low-Income Countries	2
Bangladesh	
Strategic Climate Fund–Pilot Program for Climate Resilience	4
Cambodia	
Strategic Climate Fund–Pilot Program for Climate Resilience	8
India	
Clean Technology Fund	15
Indonesia	
a. Clean Technology Fund	18
b. Strategic Climate Fund–Forest Investment Program	21
Innovative Private Sector Climate Investment Fund Financing	
a. Cambodia Private Sector Set-Asides: Strategic Climate Fund–Pilot Program for Climate Resilience	23
b. Dedicated Private Sector Program (Regional)–Clean Technology Fund	25
Kazakhstan	
Clean Technology Fund	29
Lao People’s Democratic Republic	
Strategic Climate Fund–Forest Investment Program	31

Maldives	
Strategic Climate Fund–Scaling Up Renewable Energy Program in Low-Income Countries	33
Nepal	
a. Strategic Climate Fund–Pilot Program for Climate Resilience	35
b. Strategic Climate Fund–Scaling Up Renewable Energy Program in Low-Income Countries	38
Pacific Region	
Strategic Climate Fund–Pilot Program for Climate Resilience	41
Papua New Guinea	
Strategic Climate Fund–Pilot Program for Climate Resilience	44
Philippines	
Clean Technology Fund	47
Solomon Islands	
Strategic Climate Fund–Scaling Up Renewable Energy Program in Low-Income Countries	50
Tajikistan	
Strategic Climate Fund–Pilot Program for Climate Resilience	52
Thailand	
Clean Technology Fund	55
Tonga	
Strategic Climate Fund–Pilot Program for Climate Resilience	60
Vanuatu	
Strategic Climate Fund–Scaling Up Renewable Energy Program in Low-Income Countries	63
Viet Nam	
Clean Technology Fund	65

FOREWORD

Asia and the Pacific, which is home to two-thirds of the world's poor, is exceedingly vulnerable to the negative effects of climate change. Yet the region's greenhouse-gas emissions are undiminished, and instead have increased to almost 40% of the worldwide total.

To reduce poverty and sustain economic growth, the Asian Development Bank (ADB) must work with its developing member countries (DMCs) to ease the adverse impact of climate change and help their vulnerable populations adapt to that impact.

The midterm review of ADB's Strategy 2020 gave renewed emphasis to dealing with the challenges posed by environmental and climate change as an operating and response priority. ADB remains committed to reinforcing its support for climate change adaptation, even as it underwrites clean energy, energy efficiency, and sustainable transport projects.

Through its operations, ADB endeavors to address climate change issues while promoting economic growth. Recognizing the massive amount of financing needed for the transition to the desired level of low-carbon, climate-resilient growth, ADB has mobilized over \$3 billion in climate financing yearly since 2011. It also continues to pursue innovative funding mechanisms through the Global Environment Facility and to administer climate financing on behalf of the Climate Investment Funds (CIFs). ADB's recent accreditation as an implementing entity of the Green Climate Fund should boost climate financing for its DMCs.

As ADB's largest source of external finance (\$1.6 billion), the CIFs allow ADB to invest more in much-needed mitigation and adaptation measures in its DMCs. ADB administers funding for 18 projects and programs under the Clean Technology Fund (\$1.3 billion), 20 under the Pilot Program for Climate Resilience (\$286 million), 6 under the Scaling Up Renewable Energy Program in Low Income Countries (\$78 million), and 2 under the Forest Investment Program (\$31 million). In the process, ADB has gained deeper institutional knowledge and understanding of how large-scale climate financing can help developing countries mitigate and adapt to the adverse effects of climate change.

This publication documents ADB's progress in climate financing through the CIFs. It describes development initiatives under the various windows administered by ADB and highlights approved, as well as planned, projects in the DMCs. Each of these projects supports initiatives that address specific climate change-related challenges.

Showcased here is ADB's commitment to low-carbon, climate-resilient, and green growth for Asia and the Pacific, as its contribution to a better future for the planet.



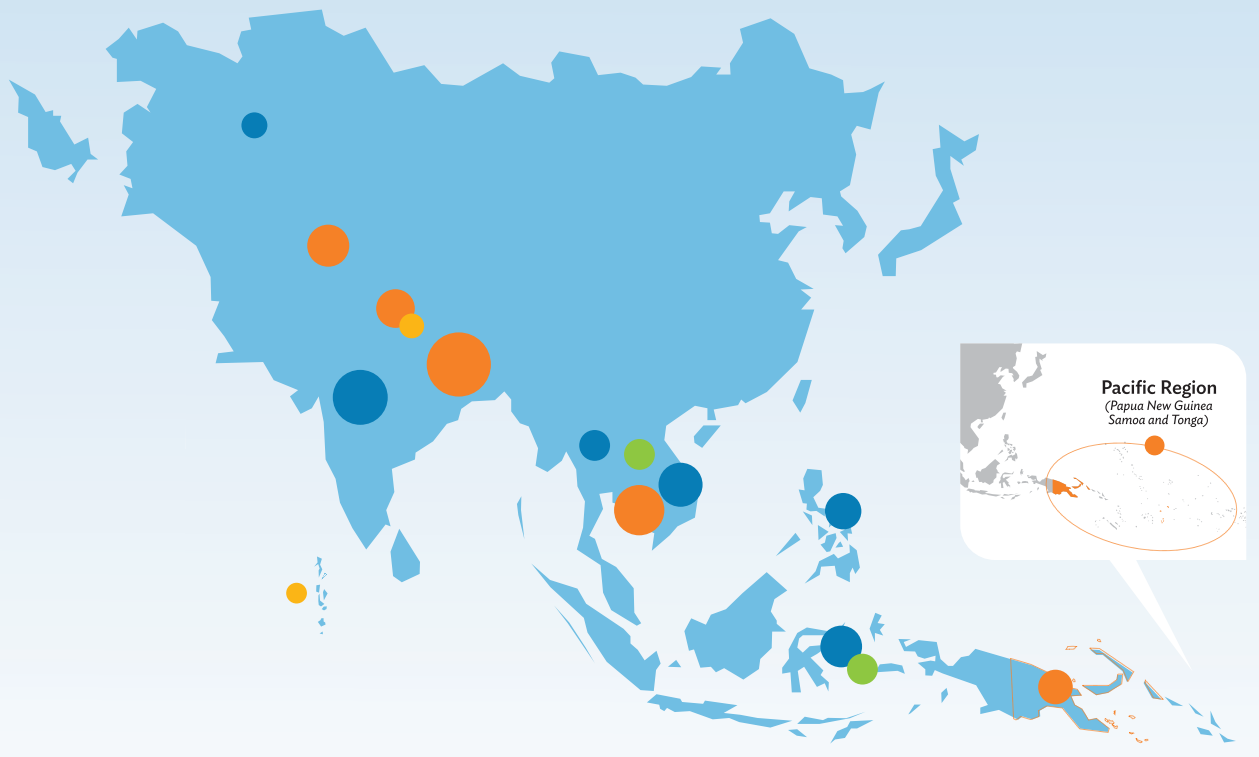
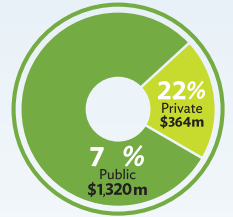
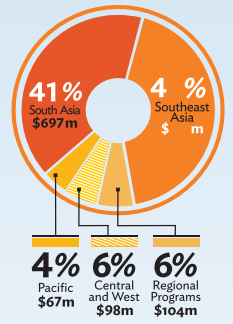
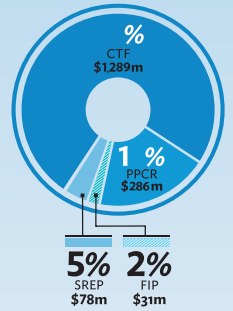
Ma. Carmela D. Locsin
Director General

Sustainable Development and Climate Change Department

CLIMATE INVESTMENT FUNDS AND ADB'S ENGAGEMENT

Total CIF FUNDING for ADB DMCs
\$3.2 billion
\$1.6 billion 53% Total CIF FUNDING administered by ADB

Note: Out of the \$1.6 billion ADB CIF Portfolio, total project funds approved to date is \$1 billion (61%)

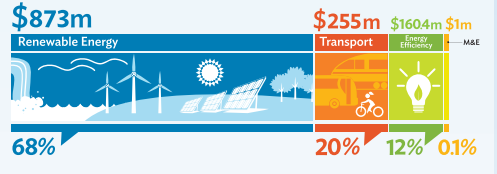
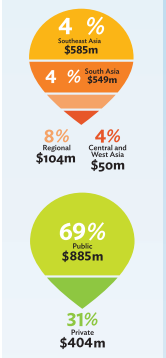


Pacific Region
 (Papua New Guinea, Samoa and Tonga)

CTF CLEAN TECHNOLOGY FUND \$1.2b for 18 projects/programs

In \$ million	# OF CTF PROJECTS/PROGRAMS
\$549	India 5
\$211	Viet Nam 4
\$150	Indonesia 1
\$125	Philippines 2
\$100	Thailand 1
\$50	Kazakhstan 1
\$104	Dedicated Private Sector Programs/Projects 4

Note: Out of the \$1.2 billion CTF funds to be administered by ADB, \$604 million have been approved



AT LEAST 169.5m tCO2e avoided

AT LEAST 1.5m households with access to clean energy

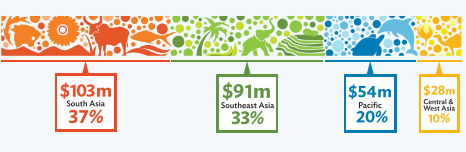
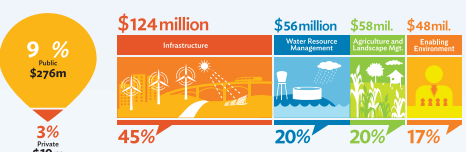
OVER 13,200 jobs created

AT LEAST 941,000 people to benefit from improved public transport

PPCR PILOT PROGRAM FOR CLIMATE RESILIENCE \$286m for 18 projects

In \$ million	# OF PPCR PROJECTS
\$72	Bangladesh 3
\$91	Cambodia 8
\$32	Nepal 2
\$28	Tajikistan 2
\$30	Papua New Guinea 1
\$20	Tonga 1
\$4	Pacific Region 1
\$10	Private Sector Adaptation Projects (Cambodia)

Note: Out of the \$286 million PPCR funds to be administered by ADB, \$250 million have been approved



FIP FOREST INVESTMENT PROGRAM \$31m for 2 projects

In US\$ million	# OF FIP PROJECTS
\$18	Indonesia 1
\$13	Lao PDR 1

FOREST INVESTMENT PROGRAM
 FIP supports developing country efforts to reduce deforestation and forest degradation and promote sustainable forest management that leads to emissions reductions and enhancement of forest carbon stocks (REDD+). Two of the eight FIP pilot countries are Indonesia and Lao PDR, where ADB will administer projects under the approved investment plans.

SREP SCALING UP RENEWABLE ENERGY IN LOW INCOME COUNTRIES PROGRAM \$78m for 6 projects

In \$ million	# OF SREP PROJECTS
\$32	Nepal 2
\$13	Maldives 1
\$19	Armenia 1
\$7	Solomon Islands 1
\$7	Vanuatu 1

Note: Out of \$78 million SREP funds to be administered by ADB, \$25 million have been approved by the Subcommittee

AT LEAST 1.36m tCO2e avoided

Figure is based on expected lifetime avoided tCO2e avoided from (1) Maldives Preparing Clear Islands for Sustainable Energy Development Program, and (2) Nepal South Asia Subregion Economic Cooperation Power System Expansion Project

AT LEAST 35,000 households with access to clean energy

Figure is based on expected number of households to benefit from (1) Maldives Preparing Clear Islands for Sustainable Energy Development Program and (2) Nepal South Asia Subregion Economic Cooperation Power System Expansion Project

SCALING-UP RENEWABLE ENERGY IN LOW INCOME COUNTRIES PROGRAM (SREP)
 The SREP was established to scale up the deployment of the renewable energy solutions and expand renewables markets in the world's poorest countries. ADB also aims to maximize energy for all, especially the rural poor, and founded the Energy for All Program in 2008 to strengthen its investments and increase its energy access project portfolio.



BACKGROUND

The Climate Investment Funds (CIFs) were established in 2008 to support developing countries in their transition to a low-carbon, climate-resilient economic growth path. The CIFs are pools of financial resources that enable developing countries to invest in initiatives that (i) reduce greenhouse-gas (GHG) emissions, (ii) mitigate the negative impact of climate change, or (iii) allow the countries to adapt to that impact. Funds sourced from government, multilateral development banks (MDBs), and the private sector augment and leverage the financial resources pledged to the CIFs by donors.

The CIFs comprise two distinct pools of financial resources that are held in trust until they are deployed: (i) the Clean Technology Fund (CTF), and (ii) the Strategic Climate Fund (SCF).

The CTF finances pilot-testing initiatives that demonstrate, deploy, or transfer low-carbon technologies to recipient developing countries. The SCF, on the other hand, finances country development initiatives that meet the funding criteria for one or more of three separate but related subprograms: (i) the Pilot Program for Climate Resilience (PPCR), (ii) the Scaling Up Renewable Energy Program in Low-Income Countries (SREP), and (iii) the Forest Investment Program (FIP).

The Asian Development Bank (ADB) is participating in 19 investment plans for 17 developing member countries (DMCs), a regional investment plan for the Pacific (PPCR) and a regional mini-grid program under the CTF Dedicated Private Sector Program, and other projects in Cambodia under the PPCR Private Sector Set-Asides. ADB is administering over \$1.6 billion in funding for 46 projects and programs now operating across Asia and the Pacific.

Investment plans and projects in Southeast Asia receive 43% of ADB-administered CIF funding; South Asia, 41%; Central and West Asia, 6%; and the Pacific, the remaining 4% and another 6% for regional programs. Over three-quarters of CIF projects (78%) are in the public sector, and only 22% are in the private sector.

CTF initiatives account for 76% (\$1.3 billion) of ADB's total CIF portfolio. A majority of these CTF projects (68% of all ADB-administered CTF projects) are in renewable energy—mostly solar, some geothermal, and one involving a mix of renewables. The rest of the projects are in the energy-efficiency and sustainable-transport categories.

Southeast Asia receives 45% (\$585 million) of ADB's CTF funding; South Asia, 43% (\$549 million); and Central and West Asia, 4% (\$50 million) and regional programs 8% (\$104 million). India is on top of the list of recipient countries, followed by Viet Nam, Indonesia, the Philippines, Thailand, and Kazakhstan.

Among the SCF initiatives, PPCR projects account for almost 17% (\$286 million) of ADB-administered CIF funds. Most of the PPCR funding (43%) is for infrastructure; the rest are intended for countries that need help with water resource management, environmental conservation (through institutional capacity building and policy and regulatory improvements), and agriculture and land management.

Geographically, South Asia countries get 36% of all the PPCR funding from ADB; Southeast Asia, 35%; the Pacific region, 19%; and Central and West Asia, 10%. ADB has ongoing and planned PPCR projects in Bangladesh, Cambodia, Nepal, Papua New Guinea, Tajikistan, Tonga, and the Pacific region.

The participation of five ADB DMCs— Armenia, the Maldives, Nepal, Solomon Islands, and Vanuatu—in the SREP has been approved and their combined SREP funding is set at \$78 million or about 5% of all ADB-administered CIF funds.

The Maldives has a renewable energy system project linked to an approved ADB electrification project. Nepal's two projects, involving small hydropower facilities and mini- and micro-hydropower generation, are part of a joint effort by ADB and the International Finance Corporation (IFC) to scale up the country's investments in small hydropower projects. The two Pacific island countries—Solomon Islands and Vanuatu—and Armenia have submitted plans for clean-energy generation projects. Bangladesh, Cambodia, and Mongolia are SREP "reserve countries."

Two ADB-sponsored FIP projects together comprise about 2% (\$31 million) of ADB's CIF allocation. One of these is a community-based project in Indonesia that addresses deforestation and forest degradation. The other is aimed at maintaining ecosystem services in the Lao People's Democratic Republic (Lao PDR), as part of an existing ADB initiative in the Greater Mekong Subregion (GMS).

ABBREVIATIONS

ADB	Asian Development Bank
CIF	Climate Investment Fund
CP3	Climate Public–Private Partnership Fund
CSO	civil society organization
CTF	Clean Technology Fund
DMC	developing member country
DSCWM	Department of Soil Conservation and Watershed Management
EBRD	European Bank for Reconstruction and Development
EEEV	energy-efficient electric vehicle
FIP	Forest Investment Program
GHG	greenhouse gas
GMS	Greater Mekong Subregion
GWh	gigawatt-hour
IBRD	International Bank for Reconstruction and Development
IEE	initial environmental examination
IFC	International Finance Corporation
IKM	information and knowledge management
km	kilometer
Lao PDR	Lao People’s Democratic Republic
MRT	mass rapid transit
MW	megawatt
NAPA	National Adaptation Programme of Action
NGO	nongovernment organization
PLN	Perusahaan Listrik Negara (State Electricity Company)
PNG	Papua New Guinea
PPA	power purchase agreement
PPCR	Pilot Program for Climate Resilience
REDD	reducing emissions from deforestation and forest degradation
REDD+	REDD plus conservation, and sustainable management of forests, and enhancement of forest carbon stocks
SCF	Strategic Climate Fund
SPCR	Strategic Program for Climate Resilience
SREP	Scaling Up Renewable Energy Program in Low-Income Countries
TA	technical assistance
tCO ₂ e	tons of carbon dioxide equivalent
TWh	terawatt-hour

ADB PORTFOLIO

ARMENIA



Armenia: Strategic Climate Fund–Scaling Up Renewable Energy Program in Low-Income Countries

Armenia in the South Caucasus region of Eurasia is one of the most densely populated countries in the area, its 3 million people living mostly in the urban areas, particularly in the capital city of Yerevan. Construction, retail services, mining, manufacturing, and agriculture contributed to strong growth in 2002–2008 until the onset of the global financial crisis. Poverty started rising in the late 2000s, and by 2011, 35% of the population was living below the poverty line.

Almost 30% of Armenian households spend more than 10% of their budget on energy. This means that about a third of all Armenians are energy poor. A social assistance program is helping to reduce energy poverty, and in 2011, a lifeline tariff for natural-gas consumption was set for family beneficiaries of the program.

The government understands that the country's economic growth depends on affordable, secure, and sustainable supply of energy, and that its dependence on imported energy makes the economy vulnerable to fluctuations in energy prices. Acknowledging the importance of indigenous renewable resources to energy security and climate-change mitigation, it intends to build domestic renewable-energy industries and thus create jobs. But a number of barriers stand in its way. Among these are the high cost of investment relative to the

low-cost electricity generation mix in the country; low affordability; and lack of experience with renewable-energy technologies. With funding from the Scaling Up Renewable Energy in Low-Income Countries Program (SREP), the government believes these barriers can be lowered or completely removed.

SREP support would enable Armenia to scale up potential renewable-energy technologies that are consistent with its investment plan, and which have been identified through stakeholder consultations and extensive studies as cost-effective to develop and use. The support would help reduce the cost of these renewable-energy technologies.

For geothermal and utility-scale solar photovoltaic power generation, initial projects are expected to reduce resource and performance risks, develop local technical expertise and markets, and push the government to set up policies, such as tariffs, to support renewable energy sources. These would in turn spur the development of electricity service providers and manufacturers of equipment using technologies based on sustainable and renewable energy. The SREP is also foreseen to create a demonstration effect for renewable technologies that are relatively unknown in the country, through direct investments or donor funding for capacity development.

The SREP investment plan was developed with the help of technical experts provided by the World Bank, the European Bank for Reconstruction and Development (EBRD), and the Asian Development Bank (ADB).

PIPELINE: Utility-Scale Solar Photovoltaic Project

Impact: Lower solar installation costs as domestic industry develops, and lower financing costs as lenders become more comfortable with the technology.

Outcome: Utility-scale commercial solar photovoltaic power plants developed, leading to increased private investments in renewable-energy power plants in the country.

The project will finance the development of 40–50 megawatts (MW) of utility-scale solar photovoltaic power plants, the technology for which has become less costly in recent years and is expected to become cost competitive with other technologies. As the first step in putting up one solar plant (or several plants), it is foreseen to encourage private investments in these technologies, showing their commercial potential.

The SREP funds would be used in much the same way that multilateral development bank funds were used to successfully jump-start the small hydropower industry in Armenia nearly a decade ago. The government would onlend the SREP funds at concessional rates to private operators who have made a bid for the solar projects. The private operators would contribute equity and also source loans from commercial banks and from the commercial lending arms of the MDBs.

Project activities include feasibility studies on solar potential and grid interconnection and on economic and financial viability, as well as the provision of transactional advice to the government. The project may involve a single plant or several plants, as multisite solar power development in areas with different solar profiles is often more effective.

Source	Amount (\$ million)
SREP loan, via ADB	17.00
SREP, loan via IBRD	9.00
SREP grant, via IBRD	2.00
Government counterpart funds	7.50
ADB	20.00
World Bank	10.00
Private sector (equity, commercial banks/IFC/EBRD)	63.50
Total	129.00

ADB = Asian Development Bank, EBRD = European Bank for Reconstruction and Development, IBRD = International Bank for Reconstruction and Development, IFC = International Finance Corporation, SREP = Scaling Up Renewable Energy Program in Low-Income Countries.

BANGLADESH



Bangladesh: Strategic Climate Fund–Pilot Program for Climate Resilience

Situated at the northern end of the Bay of Bengal, Bangladesh is acutely vulnerable to flooding and damage caused by typhoons. An increase in average temperature would accelerate glacial melting in the Himalayas and in turn induce more runoff into the Ganges and Brahmaputra rivers, which feed the country's floodplain. On the other hand, increased precipitation would hasten runoff into these rivers as well as into the Meghna River, worsening the damage from flooding. Sea-level rise also threatens to intensify coastal flooding in Bangladesh, as river waters would be backed up farther into the country's extensive floodplain.

Flooding in the agriculture sector of Bangladesh occurs nearly every year, while droughts have affected nearly half of the country's population over the past 50 years. With climate change, these extreme weather events are forecast to intensify, reducing the country's rice output by as much as 17%–28%, and the wheat output by 31%–68%. Tropical cyclones are also expected to increase in strength and, as the sea level rises, would worsen the negative effects of storm surges and coastal flooding. The high mortality rate in coastal and low-lying areas is mostly due to tropical cyclones. According to recent estimates, by 2050, 87%

of the road infrastructure of Bangladesh will have been substantially inundated as a result of climate change. Retrofitting the country's railways, road networks, embankments, and drainage infrastructure to forestall this additional inundation will cost about \$2.7 billion. Not included here is the additional retrofitting required in urban areas and along unprotected riverbanks.

After being invited by the Pilot Program for Climate Resilience (PPCR) Sub-Committee to participate in the program, Bangladesh requested funds to support its efforts to integrate climate risk and disaster resilience into core development planning and implementation. The funds were to be used for technical assistance (TA) projects and investments to further these goals. These same issues were highlighted in Bangladesh's Strategic Program for Climate Resilience (SPCR) of November 2012, which included proposed investments consistent with the National Adaptation Programme of Action (2005), the country's Climate Change Strategy and Action Plan (2009), and ADB's country partnership strategy (2006–2010) and country operations business plan (2009–2011) for Bangladesh.

Three investment projects focused on Bangladesh's coastal zone are proposed under the SPCR: (i) Promoting Climate-Resilient Agriculture and Food Security, (ii) Coastal Embankments Improvement and Afforestation, and (iii) Coastal Climate-Resilient Infrastructure Improvement. Preceding these three projects is a TA project that built institutional capacity and established a knowledge network, which included central climate-change web portal.

ADB is administering both the capacity-building TA and the Coastal Climate-Resilient Infrastructure Improvement Project.

APPROVED: Climate Change Capacity Building and Knowledge Management (Technical Assistance 1)

Impact: Effective mainstreaming of climate-change adaptation into development planning and management.

Outcome: Institutionalized climate-change adaptation information and knowledge management (IKM) system linked to development planning and management.

This TA project will formulate a climate-change adaptation IKM system that is linked to development planning and management for Bangladesh. The country has accumulated a large amount of knowledge and experience that relates to climate change-related extreme weather events, resulting in the formulation and implementation of domestic strategies for improving the climate resilience of local communities. However, the information relating to these strategies has yet to be collected, analyzed, systematized, and disseminated in a format that is easily accessible. This deficiency is partly because Bangladesh institutions that are involved in climate matters have limited capacity to process such information.

Under the TA, institutional arrangements for addressing climate-related issues will be analyzed, and the IKM network will be formulated and implemented to serve relevant ministries and government agencies. In the formulation of this network, the arrangements, protocols, and systems needed to efficiently manage all climate change-related knowledge

Source	Amount (\$ million)
SCF-PPCR grant, via ADB	0.50
Total	0.50

ADB = Asian Development Bank, SCF-PPCR = Strategic Climate Fund-Pilot Program for Climate Resilience.

and information generated in Bangladesh, and to coordinate the country's climate change adaptation program, will be identified. Strengthening the overall institutional capacity of the country to operate and maintain this IKM network is a central feature of this TA, which is designed to incorporate the results of extensive stakeholder consultations.

Project outcomes will consist of generated, systematized, disseminated, and applied information and knowledge relating to climate change. Having this information and knowledge more readily accessible to policy makers is expected to strengthen the country's overall adaptation by bringing climate change into the development planning and management mainstream and allowing potentially disastrous climate impact to be addressed more efficiently over the long term.

Source	Amount (\$ million)
SCF-PPCR loan, via ADB	20.00
SCF-PPCR grant, via ADB	10.00
Asian Development Fund loan	20.00
IFAD loans	59.00
IFAD grant	1.00
KfW grant	8.80
Government counterpart funds	31.20
Total	150.00

ADB = Asian Development Bank, IFAD = International Fund for Agricultural Development, KfW = Kreditanstalt für Wiederaufbau, SCF-PPCR = Strategic Climate Fund-Pilot Program for Climate Resilience.

APPROVED: Coastal Climate-Resilient Infrastructure Project (Investment Project 3, Component 2, Climate Resilient Infrastructure Improvement in Coastal Zone Project)

Impact: Improved livelihoods in rural coastal districts that are vulnerable to climate change.

Outcome: Enhanced climate resilience of coastal infrastructure in 12 rural coastal districts, benefiting the poor and women in particular.

The 12 rural coastal districts of Bangladesh are greatly vulnerable to the impact of climate change and variability. The project will boost the livelihoods of these communities by upgrading rural roads, markets, and disaster shelters to climate-resilient standards, and increasing the capacity of beneficiary-area residents to adapt to climate change. Road connectivity will be improved through the upgrading of 130 kilometers (km) of subdistrict roads under the project, and an additional 407 km of union and village roads under a complementary initiative funded by the International Fund for Agricultural Development.

Market services are expected to improve with the upgrading of 88 growth centers and large markets under the project, and the improvement of 186 community markets under the complementary International Fund for Agricultural Development initiative. Each of those markets and growth centers will have allotted spaces for the market-related activities of women. In addition, 37 boat-landing platforms will be built to climate change-appropriate standards.

Local-government capacity to adapt to climate change will improve in two ways: (i) through the strengthening of systems for knowledge capture and sharing, particularly the geographic information systems of the Local Government Engineering Department, and the establishment of a network to serve all local government agencies concerned with climate change; and (ii) through the training of local-government staff in climate resilience, disaster risk management, and related activities. In a parallel initiative, the German government-owned development bank, Kreditanstalt für Wiederaufbau (KfW), will finance the extension of 15 multipurpose cyclone shelters, the improvement of 10 other shelters, and the upgrading

of 15 km of tracks that provide access to these shelters, thus improving livelihoods in these beneficiary rural coastal districts.

APPROVED: Coastal Towns Environmental Infrastructure Project (Investment Project 3: Coastal Town Infrastructure Improvement Project)

Impact: Increased climate and disaster resilience in vulnerable coastal towns through urban services and infrastructure, benefiting especially the poor and women.

Outcome: Improved well-being in coastal towns.

This project employs an integrated approach to improving urban services to strengthen climate resilience and disaster preparedness in eight vulnerable coastal *pourashavas* (secondary towns) that lack basic urban services and are extremely vulnerable to the negative impact of climate change, and is aimed in particular at women and poor households as beneficiaries. Its major output is climate-resilient municipal infrastructure, including water supply, sanitation, drainage, and transport facilities, in addition to urban roads and bridges, solid waste management, and slum improvements.

Better access to municipal services that have been made more reliable and climate resilient under the project is seen to promote good health among the residents of coastal towns. Local governance will also be strengthened, with increased local capacity for sustainable service delivery, urban planning, and natural disaster preparedness, on top of an overall improvement in climate and disaster resilience.

Because of their extensive experience in managing urban projects supported by ADB, the Department of Public Health Engineering and the Local Government Engineering Department will be the executing agencies for the project.

Source	Amount (\$ million)
SCF-PPCR loan, via ADB	30.00
SCF-PPCR grant, via ADB	10.40
Government counterpart funds	23.10
Asian Development Fund loan	52.00
Sanitation Financing Partnership Trust Fund grant	1.60
Total	117.10

ADB = Asian Development Bank, SCF-PPCR = Strategic Climate Fund-Pilot Program for Climate Resilience.

CAMBODIA



Cambodia: Strategic Climate Fund–Pilot Program for Climate Resilience

Cambodia's vulnerability to the negative impact of climate change is attributed to the economy's reliance on climate-sensitive sectors, such as water resources and agriculture, compounded by the country's limited capacity to adapt to climate-related impact. More than three-quarters of the population derives its livelihood from subsistence or rain-fed agriculture, an important source of food and income for 85% of Cambodians. This livelihood depends heavily on the country's road network. While currently 50,900 km in length, the network is deteriorating rapidly because of increased traffic, extreme weather events, lack of financing for operation and maintenance, poor road maintenance standards, inadequate institutional capacity for road maintenance and management, and poor design and construction.

Cambodia established a National Climate Change Committee in 2006, and completed its National Adaptation Programme of Action (NAPA) to Climate Change in the same year. In 2009, the Strategic National Action Plan for Disaster Risk Reduction (2008–2013) was launched, and in 2013, the government approved the Cambodia Climate Change Strategic Plan (2014–2023).

Despite the impressive progress at the policy level, however, Cambodia’s institutional and technical capacity to mainstream adaptation into development planning is limited. In light of this, the country was one of 18 countries that were selected to participate in the PPCR. Cambodia’s SPCR was endorsed in June 2011. A revised SPCR comprising investment projects in water resources, agriculture, and infrastructure, and also including one TA initiative, was endorsed in February 2014.

The SPCR is fully consistent with the government’s Rectangular Strategy, Phase III (2013–2018), which was approved by the 5th National Assembly on 24 September 2013. Focused on growth, employment, equity, and efficiency, the strategy deals with the rehabilitation and construction of physical infrastructure, and capacity building and human resource development. The revised SPCR also supports the goals set out in the National Policy on Green Growth (2013–2030), the National Strategic Plan on Green Growth (2013–2030), and the Cambodia Climate Change Strategic Plan (2014–2023), and is aligned with the priorities of the NAPA and the Strategic National Action Plan for Disaster Risk Reduction (2008–2013), both of which address numerous issues relating to climate-change adaptation.

The SPCR was developed with support from ADB and the World Bank Group. Its priorities are consistent with ADB’s country partnership strategy (2011–2013) and country operations business plan (2013–2015) for Cambodia.

APPROVED: Provincial Roads Improvement Project: Climate Proofing of Roads in Prey Veng, Svay Rieng, Kampong Chhnang and Kampong Speu Provinces (Component 3, Project 1)

Impact: Improved access to markets, jobs, and social services in four project provinces (Kampong Chhnang, Kampong Speu, Prey Veng, and Svay Rieng).

Outcome: Safe, climate-resilient, and cost-effective road network providing year-round access to the agricultural areas of the project provinces.

Source	Amount (\$ million)
SCF-PPCR loan, via ADB	10.00
SCF-PPCR grant, via ADB	7.00
Asian Development Fund loan	52.00
Technical Assistance Fund	0.50
Government counterpart funds	9.85
Total	79.35

ADB = Asian Development Bank, SCF-PPCR = Strategic Climate Fund–Pilot Program for Climate Resilience.

In 2010, ADB approved the Rural Roads Improvement Project to support climate adaptation measures for provinces around the Tonle Sap Basin, home to a large share of Cambodia’s rural poor. With support from the PPCR, the new project will improve Cambodia’s provincial road network in four provinces—Kampong Chhnang, Kampong Speu, Prey Veng, and Svay Rieng—and assist the Ministry of Public Works and Transport in implementing a rigorous axle load control program and a community-based road safety program in the four provinces. Road design upgrades and planning for disaster management, climate resilience, emergency preparedness, and disaster mitigation and response will also be supported.

The specified project output is the rehabilitation of 157 km of roads in the four provinces, and the construction of a new Cambodia–Viet Nam border-crossing facility at Prey Var in Svay Rieng province. Cambodia’s road infrastructure is expected to be better managed with the addition of weighing stations, following the success achieved with such stations under an earlier ADB pilot project. Social safety measures will likewise be upgraded. The vulnerability of the country’s road network to climate change-related damage will be assessed, and civil works design will undergo appropriate adjustments, climate hazards will be mapped, and

bioengineering and other ecosystem-based measures will be instituted to mitigate the potential damage from climate-related weather events. The upgrading of infrastructure policy making and planning will be part of the output, along with the pilot-testing of a community-based emergency management program in Kampong Chhnang province. The project management capacity of the Ministry of Public Works and Transport, particularly for the construction, maintenance, and management of infrastructure built under the project, will also be improved.

Beneficial impact is expected to be widespread, with a safe, climate-resilient, cost-effective, and climate-proofed road network providing agricultural areas in the four beneficiary provinces with year-round access to markets, jobs, and social services.

Source	Amount (\$ million)
SCF-PPCR grant, via ADB	10.00
Total	10.00

ADB = Asian Development Bank, SCF-PPCR = Strategic Climate Fund-Pilot Program for Climate Resilience.

APPROVED: Mainstreaming Climate Resilience into Development Planning (Component 4)

Impact: Enhanced resilience to climate change in Cambodia, leading to improved livelihoods, especially for vulnerable groups such as women and children.

Outcome: Sustained institutional and technical capacity to integrate adaptation concerns into development.

This TA is closely linked with ADB projects, as well as with the climate-change initiatives of bilateral development partners. It is expected to strengthen the capacity of the government to coordinate individual SPCR investments, and to mainstream adaptation to climate change into national and subnational development planning, and the associated budgeting exercises. The TA will also support the feasibility assessment of proposed projects to be undertaken in fulfillment of Cambodia's NAPA, particularly with regard to securing supplementary funding from sources such as the Adaptation Fund and the Green Climate Fund. The TA, with \$7 million approved in 2012 and \$3 million endorsed as of February 2015, will likewise establish a mechanism for procuring funding for civil society organizations (CSOs) and nongovernment organizations (NGOs).

To strengthen the coordination of SPCR initiatives and provide technical support, a framework will be created to allow the monitoring of SPCR project implementation and ensure consistency among project activities and wide dissemination of lessons learned. The detailed feasibility assessment will extend to unfunded SPCR initiatives proposed under Cambodia's NAPA, to ensure their speedy funding. About 20–30 grant projects will be initiated to establish a mechanism of support for CSOs and NGOs in mainstreaming climate-change adaptation and disaster risk reduction into their operations. Knowledge products will be developed and disseminated through a knowledge management system linked to the web portals of both ADB and its partners.

APPROVED: Greater Mekong Subregion Southern Economic Corridor Towns Development Project (Component 3, Project 2)

Impact: Battambang, Bavet, Neak Loeung, and Poipet towns transformed into economic hubs in the Greater Mekong Subregion (GMS) Southern Economic Corridor.

Outcome: Urban infrastructure improved and climate resilience enhanced in Battambang, Bavet, Neak Loeung, and Poipet.

ADB and the GMS countries have made considerable investments in developing transport corridors throughout the countries that border the Mekong River, including Cambodia, thus greatly increasing the mobility of both people and goods. The towns along the Southern Economic Corridor, linking Cambodia and Viet Nam, have enjoyed increased trade and investment, as they have become marketing and transport hubs for agricultural produce grown in outlying areas and centers for the distribution of goods and services to urban areas. However, inadequate infrastructure and lack of support services now constrain the development of many of these towns.

The present project is phase 1 of a long-term initiative aimed at developing towns along the GMS transport corridors according to the strategic framework of the GMS Economic Cooperation Program (2012–2022) and ADB’s country partnership strategy for Cambodia (2011–2013), and in support of ADB’s Urban Operational Plan (2012–2020) and Water Operational Plan (2011–2020).

To improve economic productivity in the beneficiary towns, the project will upgrade flood mitigation, wastewater treatment, and solid waste management facilities, and thereby reduce the towns’ carbon footprint and improve their overall environmental sustainability. Strategic local economic development plans and urban infrastructure investments, including subprojects that will increase climate resilience, will be implemented and the institutional capacity of provincial and local-government agencies will be strengthened.

APPROVED: Greater Mekong Subregion Flood and Drought Risk Management and Mitigation Project: Enhancement of Flood and Drought Management in Pursat (Component 1, Project 2)

Impact: Reduced economic losses resulting from flood and droughts.

Outcome: Improved capacity and preparedness to manage and mitigate the effects of flood and drought events.

The project entails the upgrading of physical infrastructure to protect it against damage from extreme weather-related events, and the strengthening of the knowledge base relating to flood and drought management, particularly in relation to geographic and topographic features specific to Cambodia, and the availability of such information to policy makers and communities. Floodwater management infrastructure will be developed or upgraded, water availability throughout the dry season

Source	Amount (\$ million)
SCF-PPCR loan, via ADB	5.00
SCF-PPCR grant, via ADB	5.00
Asian Development Fund loan	37.00
Urban Environmental Infrastructure Fund	1.50
Government counterpart funds	6.88
Total	55.38

SCF= Strategic Climate Fund, PPCR= Pilot Program for Climate Resilience, ADB= Asian Development Bank

Source	Amount (\$ million)
SCF-PPCR grant, via ADB	5.80
SCF-PPCR loan, via ADB	4.00
Asian Development Fund loan	35.00
Government counterpart funds	2.95
Total	47.75

ADB = Asian Development Bank, SCF-PPCR = Strategic Climate Fund–Pilot Program for Climate Resilience.

will be improved, and demand for water will be managed better. Members of farmer water user communities will be trained to manage, repair, and improve irrigation schemes; manage irrigation services; resolve conflicts; and diversify their crops. Support for community-based disaster risk management will also be provided. All of these activities are expected to bolster the disaster preparedness and disaster management capability of local communities.

Benefits are expected to be both significant and widespread. More information about climate-related disasters will become more readily available as a result of improvements in flood and drought forecasting. A National Flood Forecasting Center with a meteorological network and data acquisition system will be established; appropriate forecasting equipment will be installed, following an assessment of Cambodia's forecasting capacity and needs; a pilot strategy for disseminating information generated by flood forecasting will be implemented at the local-community level to provide early warning of impending flood disasters; and technical capacity to run the National Flood Forecasting Center will be developed.

Source	Amount (\$ million)
SCF-PPCR loan, via ADB	5.00
SCF-PPCR grant, via ADB	4.50
Asian Development Fund loan (investment)	31.00
Asian Development Fund loan (policy-based)	24.00
Global Agriculture and Food Security Program grant	14.60
Government counterpart funds	8.33
Total	87.43

ADB = Asian Development Bank, SCF-PPCR = Strategic Climate Fund-Pilot Program for Climate Resilience.

APPROVED: Climate Resilient Rice Commercialization Sector Development Program: Climate Proofing of Agricultural Infrastructure and Business-Focused Adaptation (Component 2, Project 2)

Impact: Higher net incomes for stakeholders along the rice value chain.

Outcome: Increased production of high-quality rice in Cambodia while preserving the natural resource base.

This project is part of Cambodia's Agriculture Sector Development Program, which aims to develop a commercial rice value chain across the country. Program interventions will increase resilience to climate change by promoting sound agricultural land-use zoning, mapping soil productivity potential, managing water-use and irrigation facilities to maximize their efficient use, and

mapping risks associated with environmental parameters and climate change. If successful, the program could be replicated within Cambodia and in other Asian countries in Asia.

Project components include the establishment of an appropriate legal and regulatory environment, focused on reforms, to facilitate the commercialization of climate-resilient rice. Another component involves the improvement of agricultural land-use zoning through the establishment of land-use plans for communes based on agro-ecosystem analysis, and the updating of rice ecosystem and soil classification maps to guide the identification of areas suitable for rice cultivation. Support infrastructure for the rice value chain, such as upgraded irrigation systems and facilities for rice production and storage, paddy drying and storage, and seed treatment and storage, will be developed in three major rice-producing provinces (Battambang, Kampong Thom, and Prey Veng).

The upgrading of all support services relating to the climate-resilient rice value chain will entail upgrading the availability and quality of commercial rice seed, formulating and disseminating extension materials, strengthening the operational and managerial capacity of mill managers and operators, and improving access to credit among farmers, traders, and

millers. Weather-indexed crop insurance, which will help minimize the risk borne by farmers in the face of climate change and unpredictable weather patterns, will be provided on a pilot basis in the three beneficiary provinces, to determine the marketability of such insurance and its suitability for other provinces. The capacity of project personnel to efficiently manage and implement project-related activities and coordinate them with other ongoing initiatives will also be improved. An initial environmental examination of the project has confirmed that any adverse impact is likely to be minimal. All subprojects will be implemented in accordance with the environmental assessment procedures stipulated in ADB's environmental assessment and review framework.

PIPELINE: Promoting Climate-Resilient Agriculture in Koh Kong and Monduliri Provinces (Component 2, Project 1)

Impact: Less seawater intrusion into agricultural areas; coasts protected from a rise in sea level; improved water supply and irrigation; and improved mechanisms for coping with climate impact.

Outcome: Improved resilience of agriculture in Koh Kong and Monduliri provinces to climate change, leading to food security.

Biodiversity-rich ecosystems in Koh Kong and Monduliri provinces of Cambodia face several challenges, which account for the persistent poverty of residents, and risks to both agricultural and forest ecosystems and livelihoods of farming and forest-dependent communities.

This project provides additional financing for the GMS Biodiversity Conservation Corridors Project (Cambodia component), funded by ADB, with the overall objective of increasing the resilience of Cambodia's agriculture sector to climate change.

Financed entirely with funds from PPCR resources, the project will construct flood protection dikes on a pilot basis to protect the rice-growing lands of selected communes from an expected rise in sea level; improve rainwater harvesting systems and boost the resilience of community water supplies in the face of climate change; make agriculture more resilient by introducing drought- and flood-tolerant crop varieties, small-scale irrigation facilities, and water conservation technologies; and diversify the income sources of the communities, in anticipation of climate-induced crop failures, through sustainable forest management.

The following specific output is expected: stronger institutions and communities for biodiversity corridor management; restored, protected, and well-maintained biodiversity corridors; support for livelihoods and small-scale infrastructure; and project management and support services.

PIPELINE: Flood-Resilient Infrastructure Development in Pursat and Kampong Cham (Component 3, Project 3)

Impact: Mainstreaming of adaptation into urban planning; enhanced climate resilience of urban regions.

Outcome: Improved resilience of urban infrastructure to floods, and generally to climate change.

Source	Amount (\$ million)
SCF-PPCR grant, via ADB	8.00
Total	8.00

ADB = Asian Development Bank, SCF-PPCR = Strategic Climate Fund-Pilot Program for Climate Resilience.

This project forms part of ADB's Sustainable Urban Development in the Tonle Sap Basin Project, with the overall objective of improving the resilience of urban infrastructure in selected towns to floods. To achieve this, the project will mainstream climate-change adaptation into urban infrastructure planning in Pursat and Kampong Chang provinces, and improve the resilience of urban areas to the negative effects of climate change by fortifying riverbanks, strengthening solid waste disposal, improving other sanitation facilities, and minimizing the impact of floods.

Project interventions involve building the capacity of Ministry of Public Works and Transport staff to mainstream climate resilience into urban and peri-urban environmental infrastructure planning and maintenance, mapping the vulnerability of infrastructure selected for rehabilitation, identifying and prioritizing adaptation approaches, making infrastructure more climate resilient, and enhancing socioeconomic benefits.

These interventions are expected to increase awareness of climate-change issues and determine how they can be included in engineering designs. Decisions and plans will then be guided more by scientific input and assessments. The application of adaptation measures appropriate to the identified vulnerability and impact falls within the scope of the project.

A project that takes into account the effects of climate change early on in project design will be more resilient and cost-effective than a retrofitted project, and will have substantial positive employment and gender impact in the rural communities.

Source	Amount (\$ million)
SCF-PPCR grant, via ADB	9.00
SCF-PPCR loan, via ADB	7.00
Total	16.00

SCF = Strategic Climate Fund, PPCR = Pilot Program for Climate Resilience, ADB = Asian Development Bank

PIPELINE: Climate Resilience of Rural Infrastructure in Kampong Cham Province as Part of Rural Roads Improvement Project (Component 3, Project 4)

Impact: Improved access to markets, jobs, and social services in nine provinces.

Outcome: Enhanced connectivity even during extreme climate events such as floods and cyclones; climate-resilient development of remote rural communities through support for their efforts to increase food security, produce clean energy, and develop green tourism.

This project aims to increase the resilience of rural roads in the project area to the negative impact of climate change. This objective will be achieved through improvements in road access to remote rural communities, and through interventions that will reduce the risk of damage from flooding. Communities in Kampong Cham Province living on a cluster of five islands in the Mekong River will benefit from improved access to markets, jobs, and social services in nine provinces, even during extreme weather-related events such as floods and cyclones, and from improvements in food security, production of electricity from renewable sources of energy, and environment-friendly tourism.

India's long-standing reliance on imported fossil fuel to generate electricity exposes the national economy to unexpected increases in world energy prices and to escalating costs as the population grows. While more than a quarter of the population lacks access to electricity, electrifying the rest of the economy by burning imported fossil fuels would still raise the country's energy import bill by a considerable amount.



India: Clean Technology Fund

Electricity in India is generated mainly from coal, but growth in hydropower generation capacity in recent years has helped moderate the costs of further electrification. Hydropower generation capacity has not increased fast enough, however, and the country still relies greatly on coal imports for power generation.

The government has responded to these challenges by attempting to hasten the expansion in electricity generation capacity, and changing the mix of fuels used to generate electricity in a way consistent with sustainable economic growth. The Integrated Energy Policy (2006) promotes investment in electricity generation powered by renewable-energy sources. Besides slowing down the growth in India's energy import bill, expanded use of renewable energy helps the country fulfill its commitment to reduce greenhouse-gas (GHG) emissions by 20%–25% compared with 2005 levels, by the year 2020.

Invited to apply for CTF funding, the Government of India drafted a CTF investment plan in association with ADB, the International Bank for Reconstruction and Development (IBRD), and key national stakeholders. The plan is fully consistent with India's Integrated Energy

Policy (2006), as it emphasizes investments in the expansion and upgrading of the country's hydropower facilities, the development of solar and wind electricity generation capacity, and the improvement of energy efficiency. CTF resources amounting to \$775 million support the investment plan and are expected to attract nearly \$30 billion in additional private sector financing in solar and wind-powered electricity generation capacity.

The CTF investment plan, approved in November 2011, includes social and economic development initiatives that should deliver significant climate-change benefits. Low-emission sustainable-development initiatives, such as the Rajasthan Renewable Energy Transmission Investment Program to be administered by ADB, will be financed in a later phase of the plan. Funds are being reprogrammed to accommodate CTF funding for projects that have not yet been approved.

Source	Amount (\$ million)
CTF loan, via ADB	198.00
CTF grant, via ADB	2.00
ADB loan (ordinary capital resources)	300.00
Government counterpart funds	300.00
Total	800.00

ADB = Asian Development Bank, CTF = Clean Technology Fund.

APPROVED: Rajasthan Renewable Energy Transmission Investment Program (Facility Concept) (Rajasthan Solar Park)

Impact: Improved energy security through the avoidance of coal consumption of about 3.1 million tons per year, the accelerated development of gigawatt-scale renewable-energy capacity, and support for large private sector investments in new renewable-energy capacity.

Outcome: Annual energy savings of 8,000 gigawatt-hours (GWh), equivalent to an annual reduction in GHG emissions of 5.4 million tons of carbon dioxide equivalent (tCO₂e), or 135 million tCO₂e over 25 years; transmission system to be constructed will benefit more than 1 million households and businesses.

India's Rajasthan state has aggressively invested in electricity generation capacity powered by renewable-energy sources. By the end of 2011, the state's solar energy generating capacity was 45 MW, and its wind-powered generating capacity had reached 1,767 MW. Given Rajasthan's favorable geographic location for both solar and wind-powered electricity generation, the state government, through its renewable-energy plan, looks forward to increasing its electricity generation capacity from these two sources to 8,000 MW by 2018.

The program will support this goal by developing an in-state transmission network that will evacuate and transmit at least 4,300 MW of new renewable-energy capacity over a 5-year period. The program is implemented through a multitranches financing facility, which comprises a series of three project loans with a total investment of \$800 million, including \$200 million from the CTF.

The objective of the first project is the construction of electric power transmission facilities to feed electricity generated from renewable sources in western Rajasthan into the state and national grids. Nearly 600 km of transmission lines will be constructed, and several power transmission substations will be upgraded. The second project, to be implemented in 2014, and the third project, to be implemented in 2015, will further increase transmission capacity. The private sector is expected to step up investments in electricity generation from renewable-energy sources in Rajasthan, unconstrained by insufficient transmission capacity.

The TA associated with the first project will improve the project management capacity of government staff, assist in planning for the expansion of the relevant infrastructure, support community development initiatives that benefit households living near the project facilities, fund studies that will look into the integration of renewable-energy sources into the overall electric power generation and transmission system, and improve asset accounting.

The TA will also fund the services of experts who will supervise the construction of project-financed facilities, and prepare investments for financing under subsequent initiatives. These experts will demonstrate the ability of public–private partnerships to accelerate the construction of facilities and reduce costs, while addressing all relevant barriers to the application of solar-powered electricity generation technology.

Finally, operational frameworks will be developed for conducting environmental impact assessments, implementing involuntary resettlement programs necessary for project construction, and addressing the concerns of indigenous peoples in relation to project implementation.



Indonesia: Clean Technology Fund and Strategic Climate Fund–Forest Investment Program

a. Clean Technology Fund

Indonesia is the world's third-largest emitter of GHGs because of its dependence on fossil fuels for its expanding energy needs and because of rapid deforestation. The irony is, Indonesia has 40% of the world's geothermal potential, but it has developed only about 4% of this. The country's National Energy Policy (2006) recognizes the potential long-term gains from replacing fossil fuels with geothermal energy sources in electricity generation and calls for an increase in the percentage share of energy derived from geothermal sources; from less than 5% as of 2011, the National Energy Council (Dewan Energi Nasional, or DEN) has recommended an increase in percentage share to 17% by 2020, and to 30% by 2050.

In response to these recommendations, the government formulated the Indonesia Geothermal Electricity Finance Program (2013). Its purpose is to promote the use of renewable sources of energy, particularly private sector–financed geothermal electricity generation. The government, together with ADB, IBRD, International Finance Corporation (IFC), and key national stakeholders, drafted a climate investment plan for the country

in 2010, which was revised in 2013. The overall goal of the plan to mobilize financing from the public and private sectors is seen to ease the constraints that hinder the country from achieving its renewable-energy and energy-efficiency potential.

The CTF Trust Fund Committee approved the CTF investment plan in March 2010, with \$400 million in CTF cofinancing for its implementation. The plan emphasizes the expansion of geothermal-driven electricity generation capacity, and the broadening of the array of financing instruments available for geothermal electricity generation, energy efficiency, and small-scale renewable energy projects. A joint multilateral development bank mission in early 2013 led to the updating of the CTF investment plan in April 2013, in line with the government's goal of expanding private sector financing for renewable-energy projects. A revised investment plan is now being drafted and funds are being reprogrammed to accommodate CTF funding for projects that have not yet been approved.

Increasing the allocation of CTF resources dedicated to private sector-led investments in low-carbon development initiatives is consistent with the government and CTF objective of leveraging commercial financing for climate-related investments. The fact that the initiatives under the revised climate investment plan will more than double the output of geothermal energy, the quantity of greenhouse gases abated, and the amount of total energy produced shows the efficiency of this approach.

APPROVED: Private Sector Geothermal Programs

Impact: Improved energy security through the displacement of future coal-fired power generation capacity, and the offsetting or displacement of diesel and gasoline (petrol) generator sets; increased investments in renewable energy following the demonstration of a viable business model for geothermal energy companies in the private sector.

Outcome: A 750 MW increase in geothermal-sourced electricity generation capacity; ADB is evaluating multiple prospective private sector geothermal projects over the next 3 years, ranging from 30 MW to more than 300 MW per project, totaling 750 MW. Achieving this target would reduce GHG emissions by 4.4 million tCO₂e yearly. One million households are expected to benefit from the program, which will generate direct and indirect employment for about 4,000 persons. Substantial health and environmental benefits from the incremental decrease in air pollution resulting from the program are likewise foreseen.

In principle, Indonesia's geothermal resources offer the potential for transitioning to low-carbon development. However, exploring, verifying, and developing geothermal energy sources presents many geologic and technical risks, and operating geothermal-source electricity generation facilities over the long term is likewise fraught with difficulties. Capitalizing on a country's geothermal energy potential is more challenging than backing the development of any other form of renewable energy. Indonesia's Private Sector Geothermal Energy Program comprises several private sector geothermal projects that are to be implemented over 3 years and face common development and financing barriers. The program will facilitate commercial lending and the financial close of geothermal power projects undertaken by the private sector and state-owned enterprises borrowing without the

Source	Amount (\$ million)
CTF loan, via ADB	150.00
ADB loan	350.00
Government counterpart funds	400.00
Private sector loan	1,100.00
Bilateral loan	600.00
Total	2,600.00

ADB = Asian Development Bank, CTF = Clean Technology Fund.

benefit of a government guarantee. Two subprojects have so far been approved: the Sarulla Geothermal Power Development Project and the Rantau Dedap Geothermal Power Project (Phase 1).

Source	Amount (\$ million)
CTF loan, via ADB	80.00
ADB (private sector) loan	250.00
Japan Bank for International Cooperation	533.60
Canadian Climate Fund for the Private Sector in Asia, under the Clean Energy Financing Partnership Facility	20.00
Private sector loan (commercial banks)	784.80
Total	1,668.40

ADB = Asian Development Bank, CTF = Clean Technology Fund.

APPROVED: Sarulla Geothermal Power Generation Project

A subproject under Indonesia's Private Sector Geothermal Energy Program, this initiative will expand geothermal electricity generation capacity by about 320 MW. It will finance the design, construction, operation, and maintenance of three new power plants connected by a 20 km transmission line that will in turn connect with a transmission line to be built by the State Electricity Company (PLN), Indonesia's national electric power company. Slated to be the largest single-contract geothermal power project in Indonesia, this project will pioneer a new business model and will demonstrate the potential of Indonesia's geothermal resources.

Due diligence for the project will identify any existing or potential negative environmental or social impact, which will be addressed accordingly. The project will comply with all national regulatory requirements that relate to environmental and social protection, and responsible resource development. Assistance will be provided to vulnerable women adversely affected by land acquisition necessary for project construction. Similarly, assistance in finding jobs will be provided to women and all adversely affected indigenous peoples. The latter groups are expected to fill 20%–30% of the permanent unskilled and semiskilled positions necessary for plant operation.

An annual reduction of 1.3 million tCO₂e in annual GHG emissions is foreseen as a result of the project. Electricity produced by the project will benefit 500,000 households. The construction of the three power plants will employ 1,600 persons, while their operation will create about 100 permanent jobs.

Source	Amount (\$ million)
CTF loan, via ADB	50.00
Private sector loan (commercial banks)	123.50
Total	173.50

ADB = Asian Development Bank, CTF = Clean Technology Fund.

APPROVED: Rantau Dedap Geothermal Power Project (Phase 1)

The 240 MW Rantau Dedap Geothermal Development Project is an ideal opportunity for ADB and the CTF to be instrumental in developing the next generation of greenfield geothermal projects in Indonesia by pilot-testing an innovative, early-stage financing product. The project is located southwest of Palembang in South Sumatra. Phase 1 constitutes the initial geothermal resource exploration, involving the drilling of wells to better ascertain steam reservoir characteristics and capacity. If phase 1 is successful, a separate phase 2 will follow to complete the drilling of additional steam production and injection wells and power plant construction. Phase 2 will be financed through a traditional limited-recourse, long-term project financing structure.

The project has been prioritized under the PLN's long-term power development plan and the second 10,000 MW accelerated development program launched by the Government of

Indonesia in 2010 (Fast Track Program 2). Phase 1 development began within the framework of a 35-year geothermal mining license (IUP), a 30-year power purchase agreement (PPA) with the PLN, and a 20-year guarantee from the Ministry of Finance, as stipulated in a business viability guarantee letter signed in 2012. Overall, the project benefits from strong contractual arrangements with creditworthy parties, including the Government of Indonesia.

b. Strategic Climate Fund–Forest Investment Program

Indonesia’s National Action Plan for Reducing Greenhouse Gas Emissions (2009), its national reducing emissions from deforestation and forest degradation plus conservation, sustainable management of forests, and enhancement of forest carbon stocks (REDD+) strategy, its Forest Management Unit program, and its recent tenure reforms are far-reaching initiatives that seek to make the country’s forestry sector compatible with two overall development objectives: sustainable economic growth and social equity. This transformation now needs to be operationalized. However, there are several constraints, such as low institutional capacity for forest management at the local level, lack of institutional capacity for spatial planning, a business climate that is not conducive to investment in sustainable forestry and community forestry initiatives, weak implementation capacity on the part of local communities, and poor access to forest resources.

The FIP seeks to relax these constraints on REDD+ implementation, and to increase provincial and local capacity to implement REDD+. The plan incorporates themes such as institutional development for sustainable forest and natural resource management, investments in forest enterprises and community-based forest management, and community capacity building and livelihood development. ADB will administer a project that addresses the second theme.

Indonesia’s National Action Plan for Reducing GHG Emissions and its national REDD+ strategy both have ambitious national targets for reducing GHG emissions, to be accomplished by addressing the drivers of deforestation and by increasing forest carbon stocks, thus emphasizing the formulation of subnational action plans in priority provinces. West Kalimantan, a key forested province and the fifth-largest contributor among the provinces to Indonesia’s carbon emissions, has been selected by the government as a target province under the REDD+ program. The key drivers of deforestation and forest degradation in West Kalimantan are commercial logging, conversion of forestlands to agricultural use, coal and gold mining, and uncontrolled fires.

PIPELINE: Community-Focused Investments to Address Deforestation and Forest Degradation.

Impact: Reduction of 17.7–22.1 million tCO₂e in GHG emissions over the project’s 5-year implementation period.

Outcome: Improved provincial REDD+ strategy, community-focused REDD+ pilot programs in at least two areas in West Kalimantan, and harmonized national and subnational policies relating to the improvement of Indonesia’s carbon stock.

Source	Amount (\$ million)
SCF–FIP grant, via ADB	17.50
Total	17.50

ADB = Asian Development Bank, Strategic Climate Fund–Forest Investment Program.

The project is focused on the REDD+ strategy in two districts that contain natural forests of significant conservation value, both of which are threatened with deforestation and degradation. It is expected to improve local governance through the reform of local-government policies and institutions, the provision of positive incentives for promoting conservation, the dismantling of incentives that encourage deforestation, and oversight of REDD+ payments through transparent, accountable mechanisms that are free from political interference.

The project will provide institutional development assistance by assessing and mapping the status of the forests concerned, establishing a grievance and redress mechanism, pilot-testing an information system relating to district safeguards, training relevant government officials, and pilot-testing incentive schemes. It will also undertake sustainable forest management activities that include the provision of incentives, community forest tenure, and open-access production forests; support community capacity development and livelihoods by compiling local knowledge, creating a fund that supports community REDD+ projects, and providing extension services as appropriate; and harmonize national and subnational policies relating to carbon stock improvement.

Slowing down deforestation and forest degradation, and promoting sustainable and equitable forest and land management, will decrease emissions and could also reduce poverty, improve the quality of life of indigenous peoples and local communities, protect indigenous peoples' rights, and improve the conservation of biodiversity and other ecosystem services.



INNOVATIVE PRIVATE SECTOR CLIMATE INVESTMENT FUND FINANCING

a. Cambodia Private Sector Set-Asides: Strategic Climate Fund–Pilot Program for Climate Resilience

The PPCR has over \$75 million in concessional funds set aside for innovative programs and projects in the private sector. This financing can cover private sector activities aimed at reducing a country’s risk and exposure to the negative impact of climate change.

ADB is administering two such projects in Cambodia.

APPROVED: Rainwater Harvesting and Drip Irrigation for High-Value Crop Production (Spice Value Chain Development)

Impact: Demonstration of rainwater-harvesting ponds and drip-irrigation networks for farms, and establishment of a line of credit to local farmers for the construction and purchase of these systems.

Source	Amount (\$ million)
SCF-PPCR loan, via ADB	5.00
Total	5.00

ADB = Asian Development Bank, SCF-PPCR = Strategic Climate Fund–Pilot Program for Climate Resilience.

Outcome: More resilient agriculture sector in the Tonle Sap Lake floodplain as a result of leapfrogging from traditional to efficient irrigation and crop-watering techniques.

This project introduces drip irrigation and improved rainwater-harvesting technologies to a demonstration farm in Battambang Province in Cambodia to disseminate climate-resilient farming methods to local farming communities. Farmers already use the facility to learn about new agricultural practices and technologies for growing high-value crops such as organic spices. The knowledge gained will help farmers cultivate the surrounding land better. By using drip irrigation fed from harvested rainwater, farmers will be able to irrigate their land throughout the year without having to extract water from irrigation canals, lakes, rivers, or groundwater reserves.

The project supports the company Akay Cambodia and its investments across the spice value chain, with Akay acting as off-taker for local produce, exporting processed products to international markets. PPCR funds will be used to establish demonstration drip-irrigation systems and rainwater-harvesting ponds at the Akay-owned model farm, and to provide local farmers with capital for installing their own rainwater ponds and drip-irrigation systems and for purchasing high-quality seeds, plants, fertilizers and pesticides.

The project activities are expected to kick-start the adoption of rainwater-harvesting and drip-irrigation technologies in the country and help diversify agriculture, which has been traditionally dominated by rice farming. The financially sustainable, road-tested private sector agribusiness model to be introduced by the project promotes export-oriented, high-revenue-generating agricultural activities based on the principles of climate resilience, environmental sustainability, and the pursuit of mutual benefits by local communities and agribusiness developers.

By providing capital for these technologies and onlending to farmers, the project will demonstrate that improving and modernizing water management practices can increase agricultural revenues by delivering better crop yields at lower cost, while protecting crops against drought and other negative effects of climate change. The business model, once shown to be successful, is likely to be replicated by farmers, financiers, and agribusiness owners elsewhere in Cambodia.

Source	Amount (\$ million)
SCF-PPCR loan, via ADB	5.00
Total	5.00

ADB = Asian Development Bank, SCF-PPCR = Strategic Climate Fund-Pilot Program for Climate Resilience.

PIPELINE: Integrated Climate-Resilient Rice Value Chain Community Project

Impact: Increased rice production and value; improved access to extension services and affordable loans for rice farmers.

Outcome: Reduced climate vulnerability of at least 50,000 smallholder farmers in the Battambang and Pursat provinces of Cambodia.

The project is being developed with the project sponsor, Baitang, suitably positioned to deploy the additional resources. It covers aspects of the rice value chain, from production to postharvest and marketing, thus providing support for the rice value chain while addressing climate risks, reducing wastage, increasing agricultural productivity, and creating an efficient and sustainable financial system. It contributes to the objectives of Cambodia's Rice Policy

and is aligned with the country’s Strategic Program for Climate Resilience (2011), Climate Change Strategic Plan (2014–2023), and National Adaptation Programme of Action to Climate Change. The project also builds on the following ADB programs and projects: Climate-Resilient Rice Commercialization Sector Development Program, Poverty Reduction and Smallholder Development Project, Water Resources Management Sector Development Program, and Flood Damage Emergency Reconstruction Project.

More specifically, the project will augment paddy-drying equipment; provide microcredit to smallholder farmers to enable them to procure agricultural input and related extension services; increase the farmer members of the integrated paddy-farming communities set up by rice exporter Baitang (Cambodia) to 50,000 households; and construct climate-proofed warehousing and storage facilities for farmers, millers, and traders.

As a result, the project will facilitate cross-sector improvements in water, agriculture and natural resources, and rural infrastructure development; draft a focused, practical investment plan and work for the inclusion of smallholders and farming communities; protect businesses and livelihoods from the negative effects of climate variability and change by introducing innovative climate-resilient infrastructure; increase community resilience by providing financial resources to support the introduction of climate-resilient technologies and the strengthening of production skills to overcome the adverse effects of climate change; improve food, water, and energy security; facilitate the collection and marketing of rice produce to eliminate middlemen and exploitative traders; and, finally, promote private sector participation in climate-risk management in Cambodia.

b. Dedicated Private Sector Program (Regional)–Clean Technology Fund

The Dedicated Private Sector Program was created to channel CTF funds directly into private sector investments. It finances initiatives that deliver significant development impact and result in rapid, large-scale financing of CIF-relevant projects with funds leveraged from private sector sources, to achieve long-term reductions in GHG emissions; result in significant positive impact, including co-benefits in sectors other than the environment; and demonstrate proven implementation potential.

Under ADB, the program will deploy \$35 million in investment capital for the use of several private sector companies over a period of about 3 years, and will be supported by a \$3.5 million TA advisory program, administered in collaboration with ADB’s Energy for All Partnership.

PIPELINE: Renewable Energy Mini-Grids and Distributed Power Generation

Impact: Expanded access to electricity in rural areas of India, Indonesia, and the Philippines.

Outcome: Renewable-energy off-grid and mini-grid systems installed and operated through investments in private sector companies and impact funds.

Source	Amount (\$ million)
CTF loan, via ADB	30.00
CTF grant, via ADB	5.00
Total	35.00

ADB = Asian Development Bank, CTF = Clean Technology Fund.

About half of all Asians—306 million living in India, 66 million in Indonesia, and 16 million in the Philippines—lack access to electricity and depend mainly on biomass, candles, and kerosene to meet their lighting, cooking, and energy needs. Compared with those that have access to modern energy sources, the energy poor generally have lower levels of literacy and education. Their incomes, as well as their access to modern health-care and communication facilities, are also substandard by comparison. Escape from this state of recurrent poverty requires access to electricity.

The initiative is intended to catalyze the expansion of access to electricity in rural areas of India, Indonesia, and the Philippines that now lack access to national electricity grids, by relaxing the constraints faced by the private sector in installing and operating renewable-energy mini-grids. These constraints include insufficient capital investment in mini-grids; private sector perceptions of unacceptable levels of risk, such as the relatively low rates of return on large-scale investments; the relatively high transaction costs of financing for small-scale projects; and the up-front capital costs of investing in mini-grids, which are relatively high compared with the capital costs of other types of investments.

The project is foreseen to increase the output of renewable energy; reduce GHG emissions; demonstrate the profitability of private sector investment in electricity generation powered by renewable sources of energy, so that the technology can be scaled up and replicated across the region; provide lighting for homes and schools that now lack lighting; clean up indoor air; lead to better-equipped health clinics; provide electricity to drive water pumps that increase agricultural output; improve sanitation facilities; increase the number of small and medium-scale enterprises; and expand income-generating opportunities.

GHG emissions will be reduced as a result, even as more jobs are directly created. Conservative estimates place the project's replication and scale-up potential at 600 MW of new electricity generation capacity from renewable-energy sources. The increase would make electricity accessible to an additional 30 million people. Once it is fully scaled up, the project could reduce annual GHG emissions by about 37.5 million tCO₂e over its life, or by 1.9 million tCO₂e per year.

Source	Amount (\$ million)
CTF loan, via ADB	30.00
Total	30.00

ADB = Asian Development Bank, CTF = Clean Technology Fund.

PIPELINE: Utility Scale Renewable Energy: Geothermal (Indonesia, Philippines)

Impact: Scaled-up development of geothermal energy in Indonesia and the Philippines.

Outcome: Support for geothermal resource validation through the mitigation of drilling risks for geothermal projects in both countries.

The program is expected to have a transformational effect on one of the most competitive sources of renewable energy by unlocking development and contributing to the scaled-up deployment of geothermal technology. The Utility-Scale Geothermal Subprogram has the potential to drive down the levelized cost of geothermal technology below that of alternative fossil-fuel base-load technologies by reducing the resource risk, investors' risk perception, and the cost of renting drilling rigs and hiring drilling professionals and contractors. The project would reduce the resource risk by accumulating and disseminating knowledge of successful risk-mitigation strategies in drilling operations, including technical

improvements. The improvements in drilling techniques achieved under the project and the development of risk-mitigation and risk-sharing strategies and instruments, leading to lower premiums for debt and capital, would reduce investors’ risk perception. Finally, the construction of new drilling rigs and the increase in the number of drilling professionals and contractors as demand for their services grows would lower rental and hiring costs.

A proposed expansion of the program would include Indonesia and the Philippines, where potential Dedicated Private Sector Program support areas have already been identified. Indonesia, which has 40% of the world’s global geothermal resources, is confident that additional CTF funds would mitigate risks and support other private sector developers in the market. ADB expects all \$150 million of approved program funds under Indonesia’s CTF Investment Plan (2010) to be used for the private sector. In the Philippines, ADB is in discussions with two separate private sector firms that are developing geothermal sites in the northern Luzon and eastern Visayas regions but are unable to get funding for the exploration and resource verification stages of their projects.

PIPELINE: Mezzanine Financing for Climate Change Program (Bangladesh, Cambodia, India, Indonesia, Lao PDR, Maldives, Mongolia, Nepal, Philippines, Tajikistan, Thailand, Viet Nam, and the Pacific Region)

Source	Amount (\$ million)
CTF loan, via ADB	35.00
Total	35.00

ADB = Asian Development Bank, CTF = Clean Technology Fund.

Impact: Establishment of mezzanine financing as a third tier for climate investments in Asia and other emerging markets, between debt and equity instruments, to increase the impact of public and private financing and deepen the financial markets for addressing the climate investment gap in CIF pilot countries (Bangladesh, Cambodia, India, Indonesia, the Lao PDR, the Maldives, Mongolia, Nepal, the Philippines, Tajikistan, Thailand, Viet Nam, and the Pacific Region).

Outcome: Maximized mobilization of co-investment for low-carbon development, increased supply of renewable energy, and increased energy efficiency through the program, which is targeted at climate-change mitigation technologies with significant potential to reduce GHG emissions.

CTF funds would be employed through a mezzanine financing facility for cofinancing alongside the MDBs’ climate equity investments, thereby expanding the scope and range of potential investments, and catalyzing financial closure for projects that would ordinarily face gaps in funding. The program would facilitate investment in projects where commercial lenders are typically discouraged by technology or sector risk, in the case of middle-income developing countries, or by country and political risk, in the case of lower-income developing countries. Besides these benefits, the extended scope and reach of the mezzanine facility would make the climate equity investment programs more attractive to potential investors, and thus improve both fund-raising and deployment prospects.

The co-investment between the proposed \$30 million CTF-funded mezzanine “sidecar” facility and ADB’s Climate Public-Private Partnership Fund (CP3) equity investments would take the form of subordinated debt for projects that require a small amount of concessional financing to reach financial close. After receiving ADB Board approval and reaching its first financial close of \$400 million in 2014, the CP3 expects to raise \$600 million more from commercial capital, institutional investors, and bilateral agencies in the succeeding

18 months. The mezzanine financing facility is seen to be a valuable, catalytic addition to the CP3 equity investment program, enhancing and amplifying the impact of the combined investment program by creating a combination of market instruments to better address financing needs.

Mezzanine finance will be deployed for individual investments according to the principle of minimum concessionality. It will be considered on a case-by-case basis to catalyze investments that would not otherwise occur.

Source	Amount (\$ million)
CTF loan, via ADB	5.00
Total	5.00

ADB = Asian Development Bank, CTF = Clean Technology Fund.

PIPELINE: Renewable Energy Mini-Grids and Distributed Power Generation Program, Phase 2

Impact: Market transformation through the removal of financial and other barriers to private sector-led mini-grid development, and the demonstration of viable commercial business models, to catalyze an increase in the size of the market.

Outcome: Through the establishment of renewable-energy mini-grids and distributed power generation systems, expanded access to clean, reliable, and affordable energy resulting in, improvements in the lives of people and benefits such as improved health, better education, and opportunities for income generation.

This program seeks to catalyze growth in access to electricity by addressing barriers to the private sector-led development of renewable-energy mini-grids and distributed power generation. Phase I of the program (India, Indonesia, and the Philippines), approved by the Trust Fund Committee in 2013, is focused on the incubation of private sector-led development, the pilot-testing and validation of successful business models, and the distillation of lessons learned. The proposed phase 2, an expansion of the program, will promote replication and scale-up across a broader range of CIF countries, on the basis of these successful, “road-tested” business models and other lessons learned. The countries listed for participation include non-CTF countries: Bangladesh, Cambodia, the Maldives, Nepal, and the Pacific Region.

As proposed, phase 2 will use a combination of investment, TA, and advisory services to develop renewable-energy off-grid and mini-grid solutions in the target countries and thus expand the number of customers with access to modern energy, mobilize investments from the private sector to mainstream mini-grid development, and demonstrate private sector business models that can be replicated and scaled up across the region.

The investment component will deliver a combination of senior debt, subordinated debt, guarantees, and equity investments ranging in size, depending on project structure, financing requirements, and anticipated development impact. CTF funds will be deployed as investment capital, either alongside ADB investments or on a stand-alone basis. Resources will be used to finance gaps in project financing or in a company’s plans to scale up implementation, partially mitigate credit risks of project sponsors or perceived risks of other lenders, guarantee short- or medium-term loans to bridge timing gaps between capital expenditure needs and the payment of government subsidies, and, as lower-cost loans, help mitigate the high up-front capital costs of renewable-energy systems.



Kazakhstan: Clean Technology Fund

Central Asia's largest economy, Kazakhstan, has extensive fossil fuel reserves, which are the country's primary source of income. As fossil fuels support more than 87% of Kazakhstan's primary energy consumption, the country is unsurprisingly the largest GHG emitter in Central Asia. Kazakhstan's energy-related activities account for 85% of annual GHG emissions, which have steadily increased since 2000, and eventually reached 208 million tCO₂e in 2007. Air and water pollution are likewise growing concerns.

In response, Kazakhstan has committed to reducing GHG emissions and has defined a goal of reducing the carbon intensity of the local economy by 50% over 2015–2020. The government has issued a set of explicit energy-sector priorities, with which Kazakhstan's CTF investment plan is consistent.

Submitted in 2010 to the CTF Trust Fund Committee, Kazakhstan's original CTF investment plan was drafted by the government in coordination with the EBRD, IBRD, IFC, and key national stakeholders. After revisions in the original plan based on the Trust Fund Committee's recommendations, the new plan was approved in May 2013 with CTF financing

of \$200 million. These funds are expected to leverage \$819 million more in funding from the public and private sectors for investment projects that could dramatically reduce Kazakhstan’s GHG emissions. Two projects in particular will receive CTF funding: (i) the Renewable Energy Development and Municipal Energy Efficiency Project, and (ii) the Karaganda District Heating Modernization Project. ADB will administer the latter project. Subject to approval, another initiative will be funded under the second project.

Source	Amount (\$ million)
CTF loan, via ADB	50.00
ADB	110.00
Government counterpart funds	90.00
Total	250.00

ADB = Asian Development Bank, CTF = Clean Technology Fund.

PIPELINE: Municipal Energy Efficiency and District Heating Modernization

Impact: Creation of enabling environment for future energy-efficiency projects and accelerated market penetration of advanced district-heating system design and operations.

Outcome: A reliable, safe, and energy-efficient district-heating distribution network for Karaganda district, providing heat supply to about 800 buildings and benefiting about 56,000 households. The project will create energy savings of 3,600 GWh and reduce GHG emissions by 500,000 tCO₂e yearly.

The term “district heating” refers to a network heating system powered by a central source that delivers heat to a number of buildings located close to one another. Unfortunately, district heating uses an outdated and inefficient technology. Heat losses average 26% of the total amount of heat generated.

The proposed project will modernize the oldest operating area of Karaganda’s district-heating system. It will be the first large-scale district heating modernization project in intermediary cities. The project design, which is consistent with international best-practice benchmarks, translates into higher costs for automated controls, instrumentation, and metering. The upgraded district-heating system will be the first in Kazakhstan to achieve ISO 50001 compliance. The pioneering nature of the project imposes first-mover risks. Concessional finance is needed to cover the additional costs and risks, including technology transfer. The project will have a powerful demonstration effect, as the design can be replicated in the rest of Karaganda’s district-heating system and in several other cities. It will have a catalytic impact in accelerating and deepening the market penetration of advanced district-heating system design and operations. The final scope and design of the project will be confirmed during the project preparation and feasibility study stages.

The project will inject concessional financing into a critical yet often-overlooked sector suffering from years of underinvestment because of artificially low tariffs and substantial distribution heat losses. It will improve the financial, operational, and technical performance of the implementing agency, with very high demonstration potential.

LAO PEOPLE'S DEMOCRATIC REPUBLIC



Lao People's Democratic Republic: Strategic Climate Fund–Forest Investment Program

The Lao People's Democratic Republic (Lao PDR) has considerable forest, water, and mineral resources, all of which can be used for cultural development, environmental protection, and economic growth. However, the country's forest area has declined dramatically, from 70% of the land area in 1940, to 49% in 1982, and to only 40%, or about 9.5 million hectares, by 2010. While the forestry sector regulatory framework has undergone significant reform since the mid-1990s, the government still has limited capacity to operationalize this reform within the context of a developing political system.

The FIP investments in the Lao PDR are aimed at reducing emissions from deforestation and forest degradation, while facilitating adaptation to the negative impact of climate change. The plan's four themes are consistent with the Lao PDR's goal of attaining 70% forest cover by 2020, and with the way in which this goal relates to the REDD+ strategy. These four themes are: (i) protecting forests to ensure a sustainable supply of ecosystem services, (ii) promoting smallholder forestry, (iii) scaling up participatory sustainable forest management, and (iv) creating an environment that facilitates the achievement of these three objectives. An ADB-administered project is proposed to address the first of these four themes.

Source	Amount (\$ million)
SCF-FIP grant, via ADB	13.33
Total	13.33

ADB = Asian Development Bank, SCF-FIP = Strategic Climate Fund-Forest Investment Program.

PIPELINE: Protecting Forests for Sustainable Ecosystem Services

Impact: Reduction of GHG emissions by 8 million tCO₂e over an 8-year period, positively affecting the environment by conserving biodiversity and other ecosystem services with payments-for-ecosystem-services mechanisms.

Outcome: Improved livelihood opportunities for residents, reduced poverty, economic development of forest-dependent communities of all ethnic origins, and increased gender equality.

The project, which is replicable elsewhere in the Lao PDR, comprises four activities, which build on ongoing ADB-supported initiatives consistent with the Lao PDR's REDD+ strategy. Among the activities is the pilot-testing of participatory sustainable forest management or forest comanagement in two or three protected forest areas, and of village and smallholder forestry schemes in beneficiary towns of the Greater Mekong Subregion Biodiversity Conservation Corridors initiative. Other activities involve implementing the Lao PDR's REDD+ framework; identifying forests with significant conservation value that lie outside state forest areas; and formulating payments-for-ecosystem-services mechanisms that will ensure the protection of those forests.



Maldives: Strategic Climate Fund—Scaling Up Renewable Energy Program in Low-Income Countries

The Maldives is one of the lowest-lying countries in the world and is particularly vulnerable to a rise in sea level. The elevation of more than 80% of the country's total land area of 300 square kilometers, is less than 1 meter above mean sea level. The Maldives depends entirely on imported oil as its primary source of energy and is therefore very much exposed to fluctuations in the global price of oil. Each of the country's islands has its own electricity generation and distribution systems, all using diesel generators. Although renewable-energy initiatives—including incentives for the development of solar-diesel hybrid systems—are in place, their impact has been minimal.

The Maldives was selected for SREP financing in July 2010; following this, the country prepared an investment plan that embraces SREP objectives. These include demonstrating the social and environmental viability of low-carbon development trajectories in the energy sector through a carbon-neutral policy that will result in a switch from fossil fuel to renewable sources of energy by 2020. Under the plan, this transformation will be achieved through large-scale generation of electricity using solar, wind, and waste-driven energy sources, in addition to hybrid systems. Such a transformation would also

support socioeconomic development and contribute to poverty reduction and sustainable development. The Maldives' plan was endorsed by the SREP Sub-Committee in October 2012.

Source	Amount (\$ million)
SCF–SREP grant, via ADB	12.40
Asian Development Fund grant	38.00
Islamic Development Bank	10.00
European Investment Fund	40.00
Government counterpart funds	14.00
Total	114.40

SCF = Strategic Climate Fund, SREP = Scaling Up Renewable Energy Program in Low-Income Countries, ADB = Asian Development Bank

APPROVED: Preparing Outer Islands for Sustainable Energy Development Project.

Impact: An increase in the country's renewable-energy supply mix to 25% by 2022, from less than 1% in 2009. The reliable and high-quality supply of energy will improve social services, such as community health centers and schools, while creating livelihood and employment opportunities. The program will likewise produce direct public health and environmental benefits by reducing emissions of pollutants such as black carbon. It will also reduce the country's annual GHG emissions by about 80,000 tCO₂e.

Outcome: Provision of 21 MW of new solar capacity, 27.6 GWh of annual electricity output, and 7 MWh of energy storage. About 4,600 households will benefit from increased access to electricity in the first five subprojects. The number of beneficiaries will increase as the program covers more islands.

Because of the relatively high cost of imported fuel, in some locations in the Maldives, electricity generated from solar and wind energy sources is less expensive than that generated from diesel.

The Preparing Outer Islands for Sustainable Energy Development Project will transform existing mini-grids through investments in renewable energy and in energy management and control systems, and improvements in storage and distribution networks. The program has two main outputs: renewable energy-ready mini-grid systems developed for the outer islands, and development of the capacity of the Ministry of Environment and Energy, the State Electricity Company, and Fenaka (the centralized utilities corporation) to implement renewable energy mini-grids.

The project supports solar–diesel hybrid mini-grid installations on 160 outer islands with a solar capacity of about 21 MW. These systems will replace diesel generator sets that currently have a total capacity of 20 MW, thus increasing the Maldives' percentage share of electricity generated from renewable-energy sources, resulting in a more reliable supply of energy.



Nepal: Strategic Climate Fund-Pilot Program for Climate Resilience and Strategic Climate Fund-Scaling Up Renewable Energy Program in Low-Income Countries

a. Strategic Climate Fund-Pilot Program for Climate Resilience

Relative to many other Asian countries, Nepal is significantly vulnerable to the negative impact of climate change, with a climate ranging from subtropical conditions at an elevation of 60 meters above sea level, to arctic conditions at elevations exceeding 8,800 meters. The communities that inhabit Nepal's remote rural areas are poor and entirely dependent on natural resources for their livelihood, making them extremely vulnerable to climate change. The water sector faces particularly unique challenges. Rising average temperatures resulting from climate change are causing glaciers to retreat and snow cover to melt. Such outcomes make water discharge patterns uncertain, giving rise to long-run concerns about water availability, particularly in remote communities. Climate change thus directly or indirectly causes floods and droughts that destroy agricultural crops, displace people, adversely affect livestock, deposit sediment on agricultural lands, and diminish the supply of water for drinking and sanitation. These outcomes make women much more vulnerable than men because of their traditional roles, which include fetching water, gathering firewood and fodder, and tending agricultural lands.

While Nepal's institutions currently lack the capacity to address all of the challenges caused by present and future climate change, the government has recognized that resilience is an appropriate national goal. Nepal's National Adaptation Programme of Action (2010) comprises 43 climate-change adaptation options clustered into nine priority profiles. Several of these call for interventions relating to soil and water conservation, watershed management, improvements in water storage, scaling up of multiple-use water systems, and ecosystem management. Formerly, water management in Nepal was based on administrative divisions rather than geographic boundaries. Through its Integrated Water Resources Management Policy, currently in preparation, the Department of Soil Conservation and Watershed Management (DSCWM) recognizes that land management at the watershed scale is necessary for effective water management, and that such an approach would increase the capacity of watersheds to provide water for local residents.

Nepal's SPCR was drafted under the leadership of the government and in coordination with ADB, members of the World Bank Group (IBRD, IFC), and key national stakeholders. Several multistakeholder consultations have been convened since September 2009. In March 2010, ADB approved small-scale TA for an assessment of both the risks of local communities being adversely affected by climate change and their capacity to adapt to the effects. Broad-based consultations were conducted at both the national and local levels under this initiative. A second joint programming mission, in which government, NGOs, local government agencies, and CSOs participated, was fielded in November 2010 to review the findings of the SPCR preparatory team, and to reach agreement regarding the SPCR-supported projects that were to be given priority.

Nepal's SPCR supports projects that will improve the resilience of watersheds in mountainous regions, and reduce the vulnerability of communities and ecosystems to climate-related hazards, particularly through initiatives funded by the private sector. It has the following components: Building Climate Resilience of Watersheds in Mountain Eco-Regions; Building Resilience to Climate-Related Hazards; Mainstreaming Climate Change Risk Management in Development; Building Climate-Resilient Communities through Private Sector Participation; and Enhancing the Climate Resilience of Endangered Species.

Two of these components—Building Climate Resilience of Watersheds in Mountain Eco-Regions (BCRWME) and Mainstreaming Climate Change Risk Management in Development (MCCRMD)—are administered by ADB. The BCRWME project will address the unreliable and insufficient supply of freshwater in communities dependent on watersheds in mountain eco-regions. The MCCRMD project will support the integration of climate-change risk management into Nepal's infrastructure investments, development programs, and policy making.

Source	Amount (\$ million)
SCF-PPCR grant, via ADB	7.16
Nordic Development Fund grant	0.60
Total	7.76

ADB = Asian Development Bank, SCF-PPCR = Strategic Climate Fund-Pilot Program for Climate Resilience.

APPROVED: Mainstreaming Climate Change Risk Management in Development (Technical Assistance 1)

Impact: Increased resilience to climate variability and climate change.

Outcome: Safeguards against the effects of climate change incorporated in the government's infrastructure development programs and policies.

The TA project was designed after consultations with stakeholders from government, NGOs, academic institutes, and development partners during the preparation of Nepal's SPCR. Its key activities build on the country's ongoing and completed climate-change initiatives, as well as an earlier ADB TA project aimed at strengthening the institutional capacity of the SPCR focal agency, the Ministry of Science, Technology and Environment. The TA project's strategy addresses priorities identified in Nepal's National Adaptation Programme of Action, the findings of the SPCR assessment, and consultations with participating sector departments.

The overall focus is on infrastructure: irrigation, flood protection, roads, water supply and sanitation, and urban development. Eight districts from across the country were selected for case studies on integrating climate-change risk management into development planning. The case studies inform a vulnerability assessment and adaptation planning process using climate threat profiles downscaled to each district and tools designed for each infrastructure sector. The field assessments are synthesized to guide national sector departments in the reform of policies, procedures, and design standards to address the impact of climate change. These tools will be incorporated into an overall climate-change risk management framework. The government departments concerned will then use these tools in screening future development projects for their ability to address impact and significant risks in the project areas concerned. Department staff will be trained to apply vulnerability assessment and adaptation planning tools and implement the identified reforms. These activities will ultimately result in the use of the tools and mechanisms for screening climate-change risk in future projects.

The TA project is also undertaking training, research, and education activities to enhance knowledge about climate resilience among diverse stakeholders including local government planners, researchers, and university and secondary-school teachers and students. Finally, the TA project is assisting the Government of Nepal in improving coordination and developing a common results management framework across its various climate-change programs.

APPROVED: Building Climate Resilience of Watersheds in Mountain Eco-Regions

Impact: Improved climate resilience in Nepal mountain communities.

Outcome: Access to more reliable water resources for communities in selected climate-vulnerable mountain watersheds.

Source	Amount (\$ million)
SCF-PPCR grant, via ADB	23.54
Nordic Development Fund grant	4.63
Total	28.17

ADB = Asian Development Bank, SCF-PPCR = Strategic Climate Fund–Pilot Program for Climate Resilience.

SPCR support is critical for increasing the resilience of water resources and mountain ecosystems. This project will improve the management of water catchments, and build or upgrade water storage infrastructure in six districts in the West Seti Subbasin of the Karnali River Basin in the Himalayas. The Lower West Seti and Budhi Ganga watersheds were selected because of their high degree of vulnerability to climate-change impact, with their collective population of nearly half a million living on subsistence income. The mountain slopes in this area average nearly 30 degrees and most of these settlements are accessible only on foot.

The project design is based on techniques formulated by the DSCWM, lessons learned from the experience of international NGOs and research organizations, international and

national experience in watershed management, and links with Nepal's local action plans for adaptation. It supports, strengthens, and facilitates the scaling up of interventions that build long-term resilience to the negative impact of climate change in the country.

Major output consists of improvements in the management of water catchments and the upgrading of water storage infrastructure. To achieve these, about 100 subprojects managed by the beneficiary communities will be implemented. In consultation with communities, the project will formulate and implement water catchment management plans to stabilize gullies and hillsides, build water collection structures, and construct water storage ponds. Information relating to water conservation methods and water-saving agricultural techniques will be provided to beneficiary communities. At the national level, DSCWM's watershed management and planning capacity will be strengthened to ensure that water and land management at the local level is both integrated and socially inclusive.

Experience in improving water resource access and reliability in all six beneficiary districts will be shared through a knowledge management plan, allowing knowledge gained in the project to be widely disseminated and replicated in other country-level programs, and communicated to stakeholders at all levels in Nepal and at international forums on climate-change adaptation. The capacity of all project management and implementing units to coordinate activities related to the project with those of other government agencies and NGOs will be strengthened.

Ultimately, the project will improve catchment management in beneficiary communities, and will construct or upgrade existing water storage infrastructure, thus improving the availability and reliability of water supply for 45,000 households. It will also facilitate the joint management of water and land by local communities and the government, with a view to making watershed management integrated and socially inclusive in serving beneficiary communities, improving the resilience of Nepal's mountain communities, and allowing knowledge gained through the project to be replicated elsewhere in Nepal and beyond.

b. Strategic Climate Fund–Scaling Up Renewable Energy Program in Low-Income Countries

The power generated by the Nepal Electricity Authority, with its total installed capacity of 706 MW, is supplemented by purchases of electricity from India. However, the availability of electricity falls short of what is required to meet demand, resulting in the current energy crisis. The inevitable forced load shedding has reached 12–16 hours per day during the dry season. More than 80% of the country's population lives in the rural areas and only 56% of all households have access to electricity, some through networks not connected to the national grid. Households that lack access to electricity depend largely on kerosene for lighting, while some consumers rely on diesel or gasoline generators. Dependence on traditional biomass—wood in particular—to meet energy requirements has resulted in accelerating deforestation, which in turn leads to erosion and environmental pollution. Nepal's inadequate supply of energy is a major constraint on economic growth and poverty reduction, especially with energy demand projected to grow by 7% yearly until 2020.

The government has established the National Rural and Renewable Energy Program in response to the situation. This program gives priority to the development of electricity generation facilities powered by renewable-energy sources, both on- and off-grid. However,

although the country appears to have substantial solar and wind resources capable of producing electricity, its hydropower potential has remained largely undeveloped.

The SREP Investment Plan for Nepal, which was developed in consultation with partner MDBs and approved by the SREP Sub-Committee in November 2011, forms part of the National Rural and Renewable Energy Program. The objectives of this plan are to leverage complementary credit, grant, and private sector equity cofinancing for developing electricity generation facilities powered by renewable energy; scale up access to renewable sources of energy; reduce poverty in a socially inclusive and gender-neutral manner while mitigating climate-change impact; and ensure sustainable operations through TA and institutional capacity building.

ADB's country partnership strategy for Nepal (2013–2017), which is consistent with the programs of the World Bank and other donors, includes large-scale energy infrastructure improvements in hydropower, grid expansion, and energy-efficiency components, as well as the expansion of small-scale off-grid and mini-grid systems that generate electricity from renewable sources.

Nepal's SREP investment plan has two components: (i) on-grid small-scale hydropower development, to be led by the private sector; and (ii) off-grid mini and micro electricity generation initiatives, to be led by the public sector. ADB will administer projects under both components.

APPROVED: Mini and Micro Initiatives: Off Grid Electricity, South Asia Subregional Economic Cooperation Power System Expansion Project (Private Sector Component 2)

Impact: Increased access to electricity from renewable-energy sources in rural areas of Nepal and improved power exchange across the border; improved income and welfare of rural communities engaged in activities relating to agriculture, education, health, and rural enterprise.

Outcome: Installation of up to 4.3 MW of mini hydroelectric power plants and up to 0.5 MW of mini-grid-based solar or wind systems producing about 25,228 MWh of renewable energy yearly, providing more than 30,500 rural households with access to electricity.

This project, component 2 of Nepal's SREP investment plan (Mini and Micro Energy Initiatives: Off-Grid Electricity), will have the following output: transmission system expansion and upgrading; distribution system expansion and upgrading; off-grid renewable-energy development, with SREP funding; and capacity building, also with SREP funding.

An SREP grant will support the development of mini-grid-based renewable-energy systems in off-grid, rural communities, including the installation of up to 4.3 MW of aggregated mini hydroelectric power plants and up to 0.5 MW of aggregated mini-grid-based solar or solar-wind hybrid systems. The introduction of small-scale wind power is a first step in the development of Nepal's wind resources at progressively larger scales. The renewable-energy mini-grid scale will be tailored to community needs. Subprojects will be developed by rural

Source	Amount (\$ million)
SCF-SREP loan, via ADB	11.20
ADB	5.00
Community contributions	8.47
Government counterpart funds	3.25
Total	27.92

ADB = Asian Development Bank, SCF-SREP = Strategic Climate Fund-Scaling Up Renewable Energy Program in Low-Income Countries.

communities on the basis of their ability and willingness to pay, and in line with the available incentives provided through the National Rural and Renewable Energy Programme.

The physical investments will be reinforced and supplemented by capacity-building support provided to the Alternative Energy Promotion Centre, such as project management support, institutional capacity enhancement, and parallel livelihood development activities in the project area. The capacity development component will facilitate the overall expansion of mini-grid installations and the scaling up of the average size of installations. The scope of capacity development will be tailored to project implementation needs, and will include procurement assistance, training in operation and maintenance for renewable-energy plant operators, and activities aimed at building brand awareness and consumer engagement in communities to be served by these investments.

Source	Amount (\$ million)
SCF-SREP loan, via ADB	9.50
SCF-SREP grant, via ADB	0.50
Total	10.00

ADB = Asian Development Bank, SCF-SREP = Strategic Climate Fund-Scaling Up Renewable Energy Program in Low-Income Countries.

PIPELINE: Small Hydropower Development (Private Sector Component 1, Project 2)

Impact: Mobilization of private sector investments in Nepal's small hydropower sector through support for local financial institutions and actions taken to address market barriers.

Outcome: Increased production of renewable energy from small hydropower facilities, more people with access to renewable electricity, and increased private financing of small hydropower projects.

This program is part of a joint effort by ADB and IFC to scale up private sector investment in small hydropower projects. The present SREP-supported program will provide financing and advisory services to local financial institutions and technical service providers to develop a portfolio of technically feasible and financially viable small-scale hydropower projects. The program will also support conferences, seminars, and media campaigns to raise public awareness and disseminate information regarding small-scale hydropower facilities.



Pacific Region: Strategic Climate Fund–Pilot Program for Climate Resilience

The Pacific island states are some of the smallest countries on earth. Located in the world's largest ocean, these are generally geographically remote countries with fragile environments and small, widely dispersed populations, resulting in significant development challenges. The degree of vulnerability to natural hazards for most of these countries is extreme, as they are prone to a variety of natural disasters, predominantly weather and climate related. These events often adversely affect both the lives and the livelihoods of local residents, as well as the national economy overall. Residents of these countries' low-lying atolls and islands are particularly susceptible to a rise in sea level. Subsistence agriculture and fishing support large portions of their economies, which are often at significant risk of damage from natural disasters. While the long-term goal of most Pacific island countries is rapid, sustained, broad-based economic growth, this objective must somehow occur within the context of a small, narrowly focused economy that is vulnerable not only to natural disasters but also to external shocks of human origin such as widely fluctuating prices of fuel and imported food.

There is deep concern in the Pacific region that climate change will exacerbate disaster risk, which will in turn place an additional burden on humanitarian and development systems. The negative impact of climate change on these countries heightens the vulnerability of Pacific island households, with extreme weather-related events now more frequent than in past decades. These events include a wide array of disasters such as droughts, floods, coastal erosion, rising sea levels, and increases in average air and sea temperature and in the frequency and intensity of tropical cyclones. Women are particularly vulnerable owing to their traditional responsibilities of ensuring food supply, and maintaining a degree of health for the household to which they belong.

Because of this vulnerability, the PPCR Sub-Committee invited the Pacific region to prepare a collective SPCR. A draft SPCR was prepared under the leadership of the governments of three pilot countries—Papua New Guinea, Samoa, and Tonga—and in coordination with ADB, IBRD, and other development partners, as well as key stakeholders in the region. It builds on existing cooperative frameworks for addressing climate change-related risks. Each of these three countries is also preparing a national-level SPCR.

Approved by the PPCR Sub-Committee on 30 April 2012, the SPCR has the overall objective of mainstreaming adaptation to climate change and disaster risk reduction into national, sectoral, and local planning and development initiatives. A particular focus of the regional SPCR is the improvement of institutional capacity in the Pacific island countries to plan and coordinate initiatives that will increase their climate resilience.

The regional SPCR has three components: (i) Mainstreaming Climate Change Adaptation and Disaster Risk Reduction into National and Local Development Policies, and Planning; (ii) Identifying and Applying Practical Climate Change Adaptation and Disaster Risk Reduction Knowledge and Experience [the second component]; and (iii) Building Pacific Island Countries' Capacity to Respond to Climate Change Risks. ADB will administer the first and third components, which will be implemented by the Secretariat of the Pacific Regional Environment Program under a regional TA initiative.

Source	Amount (\$ million)
SCF-PPCR grant, via ADB	3.69
Total	3.69

ADB = Asian Development Bank, SCF-PPCR = Strategic Climate Fund-Pilot Program for Climate Resilience.

APPROVED: Implementation of the Strategic Program for Climate Resilience

Impact: Increased resilience of Pacific developing member countries (DMCs) to climate variability and climate change.

Outcome: Improved capacity of Pacific DMCs to respond to climate-change impact and related natural disasters.

The Pacific regional SPCR has three complementary components, to be administered by ADB (components 1 and 3, to be implemented under a regional TA initiative) and the World Bank (component 2), and delivered through the agencies and mechanisms of the Council of Regional Organizations in the Pacific. The TA for the first and third components has two major objectives: to mainstream climate-change adaptation and disaster risk reduction into national and local development planning and policy making, and to improve the capacity of Pacific island countries to respond to climate change-related risks, thus increasing the resilience of Pacific island countries.

ADB's Pacific Department is the executing agency for the TA, and thus has overall responsibility for coordinating, supervising, and implementing all TA-related activities. ADB has in turn engaged the Secretariat of the Pacific Regional Environment Program in Apia, Samoa, to provide program management services.

An advisory panel will guide the program in conjunction with agencies of the Council of Regional Organizations in the Pacific. A coordination secretariat to be established at the Pacific Islands Forum Secretariat in Suva, Fiji, will serve as the advisory panel's secretariat. It will coordinate the implementation of the various components of the regional SPCR, and national and regional SPCR programs.

PAPUA NEW GUINEA



Papua New Guinea: Strategic Climate Fund–Pilot Program for Climate Resilience

Papua New Guinea (PNG) comprises the eastern half of the island of New Guinea, as well as 4 other large islands and 600 smaller ones, some of which are low-lying islands. Climate change will affect all sectors of the PNG economy, with its semisubsistence rural economy supporting more than 85% of the population. The country's coastal areas will suffer inundation, loss of wetlands, and flooding, as well as damage to reefs, mangroves, and fisheries, all of which will ultimately result in the displacement of entire communities. In some cases, smaller islands, including some of the country's barrier islands, will be completely submerged. Coastal infrastructure, including roads, marine installations, and urban settlements, will likewise be damaged. Changing weather patterns and increasing average temperatures will threaten the food security of a significant portion of the country's population that relies on subsistence agriculture for its livelihood.

Both bilateral and multilateral donors as well as international NGOs have provided PNG with a significant amount of development assistance, much of which addresses the impact of climate change. However, the combined resources of PNG and these development

assistance providers remain inadequate to meet the challenges the country faces as a result of its vulnerability. PNG's overall level of knowledge and awareness of climate change, as well as its institutional capacity and tools for addressing the crisis, is still limited. There is little understanding of the risk of negative climate-change impact at the local-community level, and there is limited institutional capacity at the national level to integrate the management of the risk of negative climate-change impact into overall development planning. What is needed to address these constraints—but is currently lacking nationwide—is a systematic approach that is based on building resilience to the risk of climate-related disasters.

Following an invitation to PNG to participate in the Pilot Program for Climate Resilience, ADB approved technical assistance for the design and formulation of an SPCR in support of the implementation of climate change-related initiatives included in PNG's Vision 2050, Development Strategic Plan (2010–2030), Medium-Term Development Plan (2011–2015), Public Investment Program (2014–2018), and Climate Compatible Development Strategy (2010). All of these strategies are aimed at safeguarding PNG's development investments against the negative impact of climate change, by improving access to resources, knowledge, and tools that relate to climate-change impact and ensuring that the country's entire infrastructure is climate resilient. These measures are necessary for sustaining social development, food security, and poverty reduction.

PNG's SPCR comprises a single investment project with three components: (i) Building Climate Resilient Communities; (ii) Addressing Climate Change Risks to Food Security; and (iii) Climate Resilient Infrastructure. ADB will provide funding for a project preparatory grant to support the formulation of the investment project and will implement this grant.

PNG's SPCR identifies five target provinces: Bougainville, East New Britain, Manus, Milne Bay, and Morobe. All of these provinces comprise small, low-lying coral islands or atolls. The small communities that inhabit these islands have the following characteristics: relatively high population density, geographic remoteness, poor transport and communication links, weak or no access to government services, limited areas suitable for food production, and significant dependence on marine resources for both food and livelihood. Many of these communities suffer from a complete lack of potable groundwater. Communities with significant vulnerability to the negative impact of climate change have been identified on nearly 200 islands within the five target provinces.

Stakeholder participation during the preparation of PNG's SPCR was extensive. It took the form of focus-group discussions with key stakeholders, a series of consultative workshops at the national level, semistructured interviews with representatives of NGOs and Office of Climate Change and Development communications staff, and a household survey of vulnerable communities in the Central Province. An environmental assessment and review framework has been formulated to guide environmental assessments at each project site. The project will not require the resettlement of any households, and none of the residents of the beneficiary communities is a member of any group of indigenous people.

Source	Amount (\$ million)
SCF-PPCR grant, via ADB	30.00
Total	30.00

ADB = Asian Development Bank, SCF-PPCR = Strategic Climate Fund–Pilot Program for Climate Resilience.

PIPELINE: Building Resilience to Climate Change in Papua New Guinea

Impact: Design and construction of coastal infrastructure in an enabling policy environment; improved mobility of people and connectivity, facilitating the exchange of goods and services; increased economic activity supporting the livelihood and social needs of the communities; enhanced capacity to manage climate-change risks.

Outcome: Improved climate resilience.

First, the project will increase the resilience of 40 particularly vulnerable communities in the project area by formulating training materials, mapping areas vulnerable to negative climate-change impact, and planning for the management of climate-related disasters; training government officers in vulnerability assessment and mapping, formulating risk assessment measures, and planning emergency preparedness programs; developing a central database with vulnerability maps for use in future planning, and formulating an early-warning system for climate-related disasters; establishing a climate-resilient land-use plan; creating a trust fund that will support the implementation of climate-change adaptation measures and building the capacity of local communities to use this fund; and improving the management of health risks that result from climate change.

Second, climate change-related risks to food security will be addressed through the pilot-testing of initiatives that can be scaled up and replicated elsewhere. These initiatives include developing training materials, building capacity, assessing the agricultural production potential of areas subject to climate-related impact, planning agricultural output in a way that minimizes negative impact, implementing postharvest measures that address climate threats, preparing land-use plans, mapping of marine resources as appropriate, and planning for the management of all climate-related risks.

Third, the project will establish an environment that facilitates planning for climate-resilient infrastructure, including the design, construction, and maintenance of selected infrastructure ports and jetties and associated works. A variety of activities will be carried out for this purpose, including the following: developing appropriate strategies for the PNG Ports Corporation and related provincial and district government agencies; formulating risk models and vulnerability assessments for each site; appropriately revising building and operational codes, formulating training materials for government staff; devising a cost-benefit analysis of climate change-related risks to PNG Ports Corporation assets; formulating materials to increase awareness of climate-change impact; applying and demonstrating the climate-proofing of infrastructure on a pilot basis; and setting up mechanisms to finance the retrofitting of port infrastructure to improve resilience.

Finally, the project will formulate a strategic framework for managing PNG's climate-change program and ensuring that climate-change adaptation programs are successfully integrated into the work of government agencies as appropriate. An SPCR program management unit in the Office of Climate Change and Development will manage not only the present project but also parallel projects funded by ADB's development partners. The project will also pilot-test and demonstrate a risk-based framework for increasing the resilience of vulnerable communities and sectors, which can in turn be replicated in other communities, sectors, and, through the regional SPCR, in other Pacific island developing countries.



Philippines: Clean Technology Fund

In 2010, the transport sector consumed 66% of all fuel imported into the Philippines and accounted for nearly one-third of total GHG emissions. As motorcycles and motorized tricycles are the most inexpensive motorized mode of transport, they now comprise more than 52% of the country's entire motor vehicle fleet and are considered responsible for 80% of air pollution in Metropolitan Manila.

The Philippines relies heavily on imported fuel. In 2010, the country's oil import bill reached \$8.78 billion. The results of preliminary models suggest that if, by 2015, electric vehicles accounted for at least 7% of all motor vehicles, the country could reduce its volume of oil imports by 6%. Further, if this percentage share were to rise to 15% by 2030, the volume of oil imports would fall by more than 40%. Besides reducing the country's oil import bill, these shifts in the composition of the motor vehicle fleet would significantly reduce GHG emissions and result in other economic benefits.

Energy-efficient electric vehicles (EEEVs) could reduce overall energy consumption by up to 50% and GHG emissions by up to 60%, compared with vehicles using internal combustion engines. The electric vehicle policy being prepared by the government would exempt all EEEVs from import taxes for 9 years, and would provide other incentives to encourage the electric vehicle industry in the Philippines.

Following an invitation to apply for CTF funding, the government formulated a CTF investment plan in coordination with ADB, IBRD, IFC, and key national stakeholders. The benchmark level of funding used in formulating this plan was \$250 million in CTF financing. The funds were to be used to support public and private sector investment in energy-efficient transport; energy efficiency in the industrial sector; and expansion of electricity generation facilities powered by renewable sources of energy.

A revision of the plan refocused the proposed CTF funding on an EEEV project and a revised solar energy development project. These changes gave the original plan a more direct focus, which was to promote the development and use of the country's renewable-energy sources, increase energy efficiency, and encourage the use of sustainable transport. CTF resources are thus to be used directly to accelerate investment in the electric vehicle industry and in renewable-energy systems. In August 2012, the CTF Trust Fund Committee endorsed the Philippines' revised climate investment plan. The \$250 million in CTF funding that has been approved is expected to leverage \$2.5 billion in additional funding. ADB will administer the country's revised climate investment plan.

Source	Amount (\$ million)
CTF grant, via ADB	5.00
CTF loan, via ADB	100.00
ADB loan (ordinary capital resources)	300.00
Government counterpart funds	99.00
Total	504.00

ADB = Asian Development Bank, CTF = Clean Technology Fund.

APPROVED: Market Transformation through Introduction of Energy-Efficient Electric Vehicles

Impact: Sustainable transport and energy security as a result of the development of nontradable domestic renewable-energy resources as transport fuel; accelerated growth of the electric vehicle industry in the Philippines through the demonstration of new technology and business models.

Outcome: Reduction of GHG emissions by more than 250,000 tCO₂e through the introduction of 100,000 e-trikes; reduction of air pollution in areas where the e-trikes are deployed; creation of about 10,000 jobs (the number will increase as the industry grows).

Following the success of the ADB-funded EEEV pilot project in Manila, the government is now expanding the geographic coverage of the project to the entire country. An important feature of the expanded project is the economic incentives it provides to encourage the early adoption of EEEVs as the most cost-efficient means of establishing a sustainable domestic e-vehicle industry. The overall objective of the project is to replace 100,000 gasoline-fueled tricycles with three-wheeled plug-in electric vehicles or e-trikes that use rechargeable batteries.

This project delivers immediate benefits. With e-trikes accommodating up to seven passengers, compared with only four in the case of tricycles driven by internal combustion engines, the project will immediately increase access to motorized transport.

Electric transport vehicles in addition to e-trikes are likely to be used even after the project, at least some of them replacing transport vehicles powered by internal combustion engines. The widespread adoption of e-trikes will likewise increase the income of drivers by reducing maintenance and fuel costs. It will also generate upstream employment in the e-trike manufacturing subsector. Although these vehicles are mostly assembled locally, some parts will be produced in the country. Finally, over the long term, the project could lead to the establishment or upgrading of vehicle safety and efficiency standards.

PIPELINE: Solar Energy Development Project

Impact: Increased energy security, foreign-exchange savings, and protection against global price fluctuations through the use of nontradable domestic energy sources; improvement of sector efficiency through the entry of more players and choices into the market, reducing the cost of technology and improving technology credibility through the actual operation of rooftop systems.

Outcome: Net reduction of about 0.03 million tCO₂e per year as a result of the installation of at least 40 MW of rooftop solar photovoltaic systems.

The goal of this project is to support the establishment of 40 MW of solar-powered electricity-generating capacity, which will be installed at commercial establishments, government offices, and residences. The project will demonstrate the viability of solar energy technology through the operation of rooftop systems, at a unit cost that is expected to fall over time. Analysis of the project's benefits suggests that for each solar rooftop system established, at least 10 more systems will be installed over the long term because of the project's demonstration effect.

Source	Amount (\$ million)
CTF loan, via ADB	20.00
Government counterpart funds	20.00
ADB	80.00
Total	120.00

ADB = Asian Development Bank, CTF = Clean Technology Fund.

SOLOMON ISLANDS

A silhouette of a woman with her hair in a bun, looking out over a town in the Solomon Islands. The background shows buildings and a street under a bright sky.

Solomon Islands: Strategic Climate Fund—Scaling Up Renewable Energy Program in Low-Income Countries

Solomon Islands comprise about 996 islands in the South Pacific with an economy made up of a mixed subsistence-based sector, on which the majority depends, and a small monetized sector controlled by large-scale commercial enterprises. The country's population as of 1999 is estimated to have been about 515,870 with 80% living in rural areas, and 20% residing in the urban areas. A decade into the new millennium, the total population grew by about 2.3% per year with the urban population growing even more rapidly at 4.7% per annum, indicating a higher energy demand from urban areas.

The country is almost entirely dependent on imported refined petroleum fuels for its electricity generation, transport, and lighting needs. The installed grid generates a capacity of 28 MW using 100% diesel. Generation capacity outside Honiara, the capital city, is 6.9 MW; Honiara accounted for 90% of the total energy generated in 2012. As of 2009, 11.8% of households in Solomon Islands were connected to the electricity grid, 0.7% owned generators, and 8.7% were supplied with energy from solar sources—for a total household electrification rate of 21.2%.

The country has a National Energy Policy Framework (2007), which is currently (2013) being revised to set broad policy directions for the industry. The latest draft of this revised framework includes a renewable energy target of 50% installed capacity by 2020. The implementation of the draft revised National Energy Policy Framework is supported by the draft Renewable Energy Investment Plan (REIP), where the country outlines key investments in renewable energy.

The World Bank Group and ADB conducted joint missions to the islands in August 2012 and August 2013. The SREP Sub-Committee approved the country's SREP Investment Plan in June 2014.

PIPELINE: Solar Photovoltaic Development

Impact: Economic benefits from increased solar generation through reduced importation of fossil fuels, improved energy security, and reduced tariff volatility due to partial conversion of the national grid to renewable energy; reduced GHG emissions.

Outcome: Increased grid-connected solar power generation following the construction of 2 MW of trial grid-connected solar power; increased energy access through a private sector-led household solar system rollout benefiting 2,000 households in rural areas; and enabling environment and strengthened institutional and human resource capacity.

Given the country's solar irradiation, estimated at 5.5–6.5 kilowatt-hours per square meter per day, and the likelihood that stand-alone solar and home systems will put an end to land acquisition and resettlement issues common in the islands, there is significant potential for the expansion of both grid-connected and distributed solar generation in the country. The proposed project will address barriers to private sector entry into solar development in the country, design electricity generation system models, and conduct outreach to potential private sector investors.

The first component will increase grid-connected renewable-energy capacity by supporting the construction of 2 MW of grid-connected solar generation at four locations on the Solomon Islands Electricity Authority (SIEA) grid. System modeling for solar power integration and training for staff of the Solomon Islands Electricity Authority will be implemented to ensure sustainability. The model will be readily replicable for use in connecting rooftop solar systems to the grid at commercial scale.

The second component—the scale-up of household solar power—will involve developing a private sector fee-for-service model for rural households that install, own, operate, and maintain household solar systems. Under the project, the model will be designed, capacity-building assistance will be provided to the private sector, and equipment costs will be partially subsidized. Ownership of the household solar systems will remain with the private sector and households will pay an up-front fee for service delivery to cover operation and maintenance costs and partial asset depreciation, to help address issues of irregular income generation in the rural areas, the need for regular external maintenance, and difficulties with tariff collection in remote locations. Households who pay for electricity services are more likely to better manage and address issues related to their use of electricity consumption rather than if they were given the services for free.

Source	Amount (\$ million)
SCF-SREP loan, via ADB	6.80
ADB	6.50
Private sector	1.00
Government counterpart funds	2.50
Total	16.80

ADB = Asian Development Bank, SCF-SREP = Strategic Climate Fund-Scaling Up Renewable Energy Program in Low-Income Countries.

TAJIKISTAN



Tajikistan: Strategic Climate Fund–Pilot Program for Climate Resilience

Tajikistan, among the countries in Central Asia, is one of the most vulnerable to climate change. Increases in average temperature have significantly reduced the country's snow cover in the past few decades, resulting in more frequent avalanches, droughts, landslides, rockfalls, and violent winds, which destroy land, crops, and infrastructure, and sometimes even lead to loss of human life. Future climate change is likely to worsen these conditions by altering the timing of snowmelt, thus adversely affecting the country's water supply and disrupting both agricultural production and availability of electricity, particularly since hydropower is the source of virtually all electricity generated in the country. Glacial lake outburst floods and consequent destabilization of mountain slopes will likewise affect a number of economic sectors, in addition to the localized negative impact on human life and property.

Overlapping, and sometimes conflicting, mandates of government, inadequate coordination among agencies, meager flows of financial resources, and weak resource allocation mechanisms all constrain the government's ability to address climate-related problems. Furthermore, government plans and policies—including those of the National

Development Strategy (2010–2015), the Poverty Reduction Strategy (2010–2012), and the National Action Plan for Climate Change Mitigation (2003)—are weakly linked to the government’s poverty reduction goals to the economy’s productive sectors. Finally, climate change–related policies and initiatives do not undergo any monitoring and evaluation.

Tajikistan is one of the nine countries invited to participate in the PPCR. The country’s PPCR program was designed under the leadership of the government and in coordination with ADB, EBRD, members of the World Bank Group (IBRD, IDA, IFC), and key stakeholders in Tajikistan. The assessments and consultations conducted in advance of the formulation of the PPCR identified a number of issues that must be addressed if climate-change impact is to be minimized. These issues include inadequate data and information concerning climate change and its likely impact; lack of resources for maintaining equipment needed for managing climate-related disasters; and inadequate technical capability on the part of government staff to address climate change–related risks. Knowledge of climate-change risk management and of the means of making physical infrastructure more resilient to climate impact is weak. Building codes, land-use planning laws, and public awareness programs reflect the need for resilience only minimally, if at all. Tajikistan’s PPCR addresses these issues in a straightforward manner.

The SPCR was approved on 10 November 2010. At the request of the SPCR Sub-Committee, a revised version of the document, which clarified several aspects of the original plan, was prepared.

The revised SPCR has six components: (i) building institutional capacity to improve climate resilience; (ii) improving the delivery of weather, climate, and hydrological services; (iii) developing climate science and modeling programs; (iv) upgrading the climate resilience of the country’s energy sector; (v) expanding agricultural output and achieving sustainable land management; and (vi) building climate resilience in the Pyanj River Basin. Initiatives (i) and (vi) of Tajikistan’s SPCR have been approved by ADB.

APPROVED: Building Capacity for Climate Resilience

Impact: Increased resilience to climate variability and climate change.

Outcome: Safeguards against the adverse effects of climate change incorporated in national development programs and policies.

This TA project will enhance the Tajikistan government’s abilities to plan climate adaptation in vulnerable sectors and populations at both the national and local levels. Main activities include (i) establishing a climate modeling facility in the State Hydrometeorological Agency (Hydromet); (ii) training Hydromet experts in climate modeling and impact assessment; (iii) developing a national strategy for climate-change adaptation, and local adaptation plans for the five most vulnerable districts; and (iv) improving monitoring, evaluation, and reporting systems for PPCR projects, along with periodic updating on the PPCR website. As of February 2015, procurement plans for the facility and the training plans were being finalized. The strategy is to be finalized by the end of 2015 by incorporating inputs from relevant stakeholders. Surveys will be

Source	Amount (\$ million)
SCF-PPCR grant, via ADB	6.00
Total	6.00

ADB = Asian Development Bank, SCF-PPCR = Strategic Climate Fund–Pilot Program for Climate Resilience.

conducted in the five districts to assess suitable climate-change adaptation measures and local adaptation plans will be developed. Knowledge and information management systems have been developed through monitoring and evaluation workshops and NGO roundtables.

Consistent with targets, the number of households that suffer economic losses from droughts, floods, and landslides will be reduced by 20% by 2022 compared with the 2011 baseline. This projection is based on the outcome of climate-proofing projects through national policies and development programs.

Information relating to climate change will be made available to users at both the national and local levels. The project will support the integration of climate-change risks into overall national development planning and the implementation of development projects. PPCR-funded initiatives will be monitored through a single reporting system. The TA will support the sustainability of the PPCR secretariat beyond the end the project period.

Source	Amount (\$ million)
SCF-PPCR grant, via ADB	21.55
Government counterpart funds	0.87
Participating financial institutions	0.28
Total	22.70

ADB = Asian Development Bank, SCF-PPCR = Strategic Climate Fund-Pilot Program for Climate Resilience.

APPROVED: Building Climate Resilience in the Pyanj River Basin

Impact: Improved livelihoods of Pyanj River basin communities vulnerable to climate variability and change.

Outcome: Reduced adverse effects of climate variability and climate change in 59 villages in the Pyanj River basin.

The Pyanj is the largest of Tajikistan's five principal river basins and is also the country's breadbasket. Most of the agricultural land is located in the area. The basin's population of 1.27 million is already experiencing extreme climate-related weather events, and in some parts of the basin, avalanches, droughts, floods, landslides, rock falls, and violent winds disrupt social and economic life, damage houses and other infrastructure, and erode the productivity of agricultural land. Elsewhere in the basin, droughts, floods, and mudflows occur every year. The basin's water and irrigation infrastructure is in disrepair, as the government's capacity to plan for, and maintain infrastructure is weak, leading to rapid out-migration of males and the predominance of female-headed households.

This project is consistent with ADB's country partnership strategy for Tajikistan (2010–2014) and is included in ADB's country operations business plan (2013–2014). The design of the project, which was approved by ADB's Board of Directors in July 2013, incorporates lessons learned from previous ADB interventions in the country.

Achieving the project objectives will entail climate-proofing infrastructure, including irrigation systems and household water supply systems, in beneficiary *jamoats* (municipalities) through climate-resilient operations and maintenance guidelines, practices, and training activities. To be able to provide micro-credit and micro-deposit facilities to beneficiary households for the purpose of promoting climate resilience, participating financial institutions must increase their institutional capacity to provide such facilities, local residents must become more familiar with financial matters, and the feasibility of a credit insurance scheme must be assessed. Two Tajikistan-regulated microfinance institutions have been selected to participate in the first phase of microfinance activities.



Thailand: Clean Technology Fund

Thailand's stellar economic growth in recent decades has led to a corresponding increase in energy demand and, hence, in GHG emissions. Over 1996–2001, industrialization and expanding demand for motorized transport together accounted for 86% of Thailand's total growth in energy demand, and were a major cause of the 10% increase in the energy intensity of Thailand's economy over the period. Thailand imports more than 60% of the total primary energy it consumes, and fossil fuels make up more than 90% of the country's base energy supply. While petroleum-based fuels predominate in the transport sector, most electricity generation relies on natural gas sourced domestically from the Gulf of Thailand and imported from Myanmar.

Ensuring sustainability in the face of Thailand's expanding demand for energy requires significant low-carbon investments in the power and transport sectors. From the perspective of economic efficiency, these investments should focus on solar and wind-powered electricity generation.

The government's Alternative Energy Development Plan (2012–2021) notes that Thailand's potential solar-powered electricity generation capacity is an estimated 50,000 MW. But the

pace of growth of investments in solar-powered electricity generation has been somewhat disappointing. In addition to lack of experience in this subsector, the 10-year duration of the feed-in solar-powered electricity tariff is largely responsible for this outcome. Given the level of risk assumed by the private sector in investing in solar-powered electricity generation at an early stage of development of the industry, such an incentive is insufficient to drive investment at a scale required for the efficient exploitation of the country's significant solar-powered electricity generation potential.

Similarly, Thailand's potential for wind-powered electricity generation is vast. The Ministry of Energy's Department of Alternative Energy Development and Efficiency has continually assessed the country's wind potential since 1975 through the use of 70 monitoring stations. The results of this long-term assessment are positive, as noted in the government's Alternative Energy Development Plan (2012–2021).

The invitation from the CTF Trust Fund Committee specified the need for a country investment plan that would increase the percentage share of alternative energy in total energy supply from 7% in 2010 to 20% by 2022. Endorsed in December 2009, Thailand's original CTF investment plan included several public sector projects in Bangkok and its immediate environs. However, since public sector financing at attractive rates had already become available, these initiatives were financed with public sector funds.

As a result, the major emphases of Thailand's revised plan, which was endorsed in February 2012, include the engagement of the private sector, and the removal of financial barriers to the scale-up of renewable energy projects. The revised plan features a portfolio of renewable-energy initiatives geared to reducing GHG emissions and accelerating private sector investment in utility-scale renewable-energy projects.

Source	Amount (\$ million)
CTF loan, via ADB	100.00
Total	100.00

ADB=Asian Development Bank, CTF=Clean Technology Fund.

APPROVED: Private Sector Renewable Energy Investments

Impact: Diversification of energy mix and increased participation of the private sector and scale-up of its investments in renewable energy, thus helping the country progress toward its clean energy targets.

Outcome: Renewable-energy electricity generation facilities with a total capacity of 520 MW installed and in operation; annual GHG emissions reduced by an estimated 1 million tCO₂e.

This program corresponds to an ADB program for scaling up private sector investment in solar, wind, and waste-to-energy electricity generation using a combination of CTF and ADB resources to finance renewable-energy projects at specific locations in Thailand. ADB is currently engaging the private sector in a number of renewable energy projects that are at various stages of project preparation.

One constraint faced by such initiatives is the degree of risk inherent in investing in new technologies. The risk is greatest for the first investor, since at the initial stage, the profitability of the investment is unproven. This program provides CTF funding to cover a portion of the capital cost of initial investment in the renewable-energy subsector, and extends the duration of the loan beyond that which commercial banks would provide. In view

of the significant capital costs associated with investing in renewable-energy generation, both purposes of CTF funding significantly reduce the perceived level of risk faced by an initial investor in the renewable-energy subsector.

ADB has approved four CTF-supported projects under Thailand’s Private Sector Renewable Energy Program: two solar-power projects (the Provincial Solar Power Project and the Central Thailand Solar Power Project) and two wind-power projects (the Theppana Wind Power Project and the Subyai Wind Power Project).

APPROVED: Provincial Solar Power Project

The project involves the development of a 32 MW solar photovoltaic plant (with off-take from the Provincial Electricity Authority) and is seen to generate over 60,000 MWh of electricity per year. The project is expected to reduce emissions by 38,400 tCO₂e per year for 25 years, or by 0.96 million tCO₂e over its life.

The project is part of the corporate strategy of one of Thailand’s petroleum refining companies, Bangchak Petroleum, to become carbon neutral. It contributes to accelerating and expanding private investment in clean-energy infrastructure in Thailand. Successful project implementation and viable returns are expected to attract other private investors to solar energy projects.

The project’s environmental and social impact has been assessed; measures for avoiding, minimizing, and mitigating negative environmental and social impact and for compensating those adversely affected by the project have been incorporated into the initial environmental examination (IEE) report on the project. The institutional capacity of Bangchak Solar Energy—the company that will construct and operate the facilities—and its commitment to manage the project’s social and environmental impact post assessment have been deemed adequate. This impact is described in the environmental management plan that is included in the IEE report.

Public participation in the design and formulation of the project as required by ADB was ensured through public hearings and information dissemination activities targeted at a wide range of stakeholders.

APPROVED: Theppana Wind Power Project

The other private sector project under Thailand’s Private Sector Renewable Energy Program is the first wind-power project financed by ADB in Southeast Asia. It entails the construction of a 7.5 MW wind-powered electricity generation plant with three wind turbines, each with a capacity of 2.5 MW. The project is expected to generate over 14,000 MWh of electricity per year. It will reduce annual GHG emissions by 10,800 tCO₂e. Its construction will employ more than 250 persons.

The construction site is in Chaiyaphum Province, about 500 meters above sea level. The developer is the Electricity Generating Public Company, a company privatized in 1992.

Source	Amount (\$ million)
CTF loan, via ADB	12.60
ADB	25.20
Private sector loan	25.20
Total	63.00

ADB=Asian Development Bank, CTF=Clean Technology Fund.

Source	Amount (\$ million)
CTF loan, via ADB	4.00
ADB	4.54
Private sector loan (Thai commercial banks)	4.54
Total	13.08

ADB=Asian Development Bank, CTF=Clean Technology Fund.

The project is a public–private partnership, under Thailand’s very-small-power-producer program, which uses renewable energy from private sector power plants with a capacity of up to 10 MW to provide clean electricity to the grid. The project will be developed and managed by Theppana, a special-purpose company incorporated in Thailand that is 90% owned by the Electricity Generating Public Company, Thailand’s first independent power producer and now the second-largest independent power producer in the country.

Source	Amount (\$ million)
CTF loan, via ADB	35.00
ADB	52.00
Private sector loan	72.00
Total	159.00

ADB = Asian Development Bank, CTF = Clean Technology Fund.

APPROVED: Central Thailand Solar Power Project

This private sector project aims to install solar photovoltaic-powered electricity generation facilities with a total capacity of 57 MW. This combined capacity will comprise six separate facilities of 9.5 MW capacity each, to be installed at three sites in Nakhon Pathom and Suphan Buri provinces. The project is expected to generate over 100,000 MWh of electricity per year. It will diversify the energy mix of Thailand’s economy, and will reduce annual GHG emissions by 68,300 tCO₂e. It will likewise

employ at least 50 permanent staff members, and will attract private sector investors to the solar energy production subsector. Implementation arrangements include six standard power purchase agreements (PPAs) with the relevant provincial electricity authority. These PPAs are automatically renewable every 5 years. The project is part of the long-term growth strategy of the Electricity Generating Public Company, which emphasizes expanding investments into renewable energy to strengthen its business in independent power generation in Thailand. The project is being developed as a public–private partnership under Thailand’s very-small-power-producer program, which uses renewable energy from private sector power plants with a capacity of up to 10 MW to provide clean electricity to the grid.

As with the Thailand Provincial Solar Power Project, the potential adverse environmental and social impact of the Central Thailand Solar Power Project were identified in the IEE report on the project, and measures for mitigating these were built into the project design. The institutional capacity of Solarco—the implementing company—and its commitment to manage the project’s social and environmental impact are deemed adequate. These are described in the environmental management plan included in the IEE report.

Source	Amount (\$ million)
CTF loan, via ADB	30.00
ADB	53.00
Private sector loan	129.00
Total	212.00

ADB = Asian Development Bank, CTF = Clean Technology Fund.

APPROVED: Subyai Wind Power

The project entails the construction and operation of an 81 MW power plant, comprising 32 wind turbines, each with 2.5 MW capacity, in Chaiyaphum Province. It is expected to produce at least 120,000 MWh of wind power delivered to the off-taker per year. This will reduce GHG emissions by at least 65,000 tCO₂e yearly. The project will employ up to 250 people during construction.

The project’s successful implementation and demonstration of viable returns is also expected to catalyze private sector investments in wind-energy projects, and broadly help accelerate the expansion of private investments in clean-energy infrastructure. Wind energy will help diversify the country’s energy mix and will reduce reliance on imported fossil fuels, thus strengthening energy security.

The project will enter into a PPA with the Electricity Generating Authority of Thailand for up to 90 MW under the small-power-producers program. The PPA is automatically renewable every 5 years and, in addition to the wholesale tariff, includes an adder incentive of B3.5 per kilowatt-hour applicable for 10 years from the date of commercial operation. The project will be constructed under a fixed-price, date-certain, turnkey engineering, procurement, construction arrangement on a joint and several basis. The scheduled commercial operation date under the PPA is December 2016.



Tonga: Strategic Climate Fund–Pilot Program for Climate Resilience

All of Tonga’s key economic sectors will ultimately be adversely affected by climate change with environmental, economic, and social consequences, as these impacts are substantial. Of particular concern is the impact on agricultural output, the supply of potable water, and coastal infrastructure. Over the past few decades, rainfall levels in Tonga have become more variable, causing localized flooding and El Niño–related droughts, as well as higher ocean temperatures than previously recorded. These have resulted in turn in coral bleaching, and a rise in sea level estimated at 6 millimeters per year on average, contributing to coastal erosion and damage to infrastructure and property. More frequent and intense tropical cyclones and storm surges have likewise led to significant economic losses.

Tonga’s national strategy for addressing climate change, the Joint National Action Plan on Climate Change Adaptation and Disaster Risk Management (2010–2015), was the first strategy for addressing climate change to be formulated by any Pacific island country. However, operationalizing this plan has been constrained by a number of factors. The National Infrastructure Investment Plan, which outlines the government’s plans for major economic infrastructure initiatives over 2013–2023, stresses the integration of

climate-change adaptation and disaster risk management into overall development planning and investments. Both of these documents use the results of existing studies to broadly assess the degree of vulnerability of Tonga’s socioeconomic infrastructure to climate-change impact and natural disasters. These assessments are valuable in that they facilitate the identification of economic sectors that should receive priority in infrastructure climate-proofing investments under the second phase of Tonga’s SPCR.

Following an invitation by the PPCR Sub-Committee, Tonga prepared the first phase of its SPCR under an ADB-financed TA initiative, focusing on the overall design of the SPCR and on strengthening the government’s institutional capacity to plan for climate-change adaptation. In consultation with numerous stakeholders, the government identified several barriers to an effective response to the challenge of climate change: the limited availability of trained and qualified experts capable of mainstreaming adaptation and disaster risk management into the activities of local communities and national agencies; lack of appropriate information, tools, and legislative frameworks for formulating and implementing climate-change adaptation strategies; and difficulties in gaining access to financing for adaptation. Also under this phase, government staff and other stakeholders were trained to assess the degree of risk of climate-related impact, and Tonga’s capacity for adaptation.

Approved by the PPCR Sub-Committee in April 2012, Tonga’s SPCR comprises several phased interventions that will help put the country on a climate-resilient development trajectory. Both ADB’s Pacific Approach (2010–2014) and its country operations business plan (2013–2015) for Tonga emphasize the need to upgrade Tonga’s capacity to adapt to climate change and to manage the risk of natural disasters. Several ADB-financed development initiatives in Tonga have also helped identify what the country needs to improve its capacity to mainstream climate-change adaptation and disaster risk reduction into overall government operations.

The TA that supported the preparation of the Climate Resilience Sector Project—phase 2 of Tonga’s SPCR—identified cyclones and storm surges as having the greatest potential to damage Tonga’s infrastructure, particularly along the coast, over the short term. On the other hand, more intense rainfall, drought, limited access to safe drinking water, and increased incidence of water- and vector-borne diseases pose the greatest risk of climate-related economic damage over the long term. However, climate change is relatively gradual and predictable, and the increasing severity of climate-related impact can therefore be managed through appropriate investments in climate-resilient infrastructure, capacity building, and small-scale financing, all of which are included in phase 2 of Tonga’s SPCR.

APPROVED: Climate Resilience Sector Project
(Implementation of the SPCR)

Impact: Increased resilience of vulnerable communities in Tonga to climate variability and change, and disaster risk.

Outcome: Strengthened capacity of government and communities to finance, develop, monitor, and implement investments to improve ecosystem resilience and climate-proof critical infrastructure.

Source	Amount (\$ million)
SCF-PPCR grant, via ADB	19.25
Government counterpart funds	3.88
Total	23.13

ADB = Asian Development Bank, SCF-PPCR = Strategic Climate Fund–Pilot Program for Climate Resilience.

The implementation of phase 2 of Tonga's SPCR will increase the resilience of vulnerable communities to climate-related disasters through five output categories.

First, climate resilience will be mainstreamed into development planning through the upgrading of the climate-related skills of government officers and the provision of university scholarships for this purpose; the integration of climate change-related issues into relevant laws; the standardization and dissemination of methodologies for community-based adaptation activities; and the improvement of methods currently used in managing freshwater resources.

Second, climate-related data will be upgraded. This entails upgrading coastal monitoring and data dissemination systems, including early-warning systems for weather events.

Third, funding will be provided for establishing the Tonga Climate Change Trust Fund, which will support adaptation to climate change among residents of vulnerable communities, particularly women.

Fourth, investments will be made in climate-resilient infrastructure, especially in coastal areas. This will entail the establishment of marine management areas in Vava'u, the rehabilitation of 126 hectares of mangroves to protect the shoreline from storm surges and high waves, the upgrading of several kilometers of coastal access roads, and the improvement of coastline protection through the upgrading of buildings and drainage facilities in five schools.

Finally, project resources will support project management and implementing units in project monitoring, evaluation, and knowledge management. Government agencies will receive appropriate operational support.



Vanuatu: Strategic Climate Fund–Scaling Up Renewable Energy Program in Low-Income Countries

Vanuatu is an archipelago of 82 volcanic islands in the South Pacific, only 65 of them inhabited and extending about 1,300 km north to south. It has a population of about 270,000 as of 2014, with about 28% living on the main island of Efate; the rest live in the rural areas.

Energy access is low: only a third of households have electricity and almost half of those with electricity are not connected to the grid. Among the 65 inhabited islands, only four have grid systems, covering only part of each island. The grids are operated under local concession arrangements, each one covering generation, distribution, dispatch, billing, and settlement for consumers within its area. The vast majority of customers are off-grid. They use solar systems or diesel generators, or in the rural areas, mostly rely on kerosene, gas, or candles for lighting.

On-grid electricity generation is primarily from diesel, with smaller contributions from hydropower, wind power, coconut oil-powered diesel generator units, and solar photovoltaic energy. This high reliance on diesel is detrimental to Vanuatu's economy. The development of more renewable-energy sources such as hydropower has significant potential to reduce generating costs and allow the cost-effective expansion of the grid, particularly in remoter

areas. Reduced generation costs combined with increased capacity will allow the expansion of the distribution grids. Maximizing renewable-energy utilization is important to the Vanuatu economy. It would (i) reduce fossil-fuel imports; (ii) lower the cost of power generation and place downward pressure on power tariffs, thereby supporting the private sector and reducing household expenditure; and (iii) improve energy security. Utilization of renewable energy also reduces GHG emissions, which contribute to global warming.

The Government of Vanuatu has set a target in its National Energy Roadmap of achieving 100% energy access by 2030, a major portion of which will come from renewables, and is tapping \$14 million from the CIF's SREP toward achieving this target. The SREP Investment Plan (2014), developed by the Vanuatu government, ADB, the World Bank, and key stakeholders, is expected to leverage more funds from public and private sector investments.

Source	Amount (\$ million)
SCF-SREP loan, via ADB	7.00
ADB	5.00
Government counterpart funds	1.90
Total	13.90

ADB = Asian Development Bank, SCF-SREP = Scaling Up Renewable Energy Program in Low-Income Countries.

PIPELINE: Small Hydro Power

Impact: Economic benefits through a reduction in fossil-fuel imports, lower cost of power generation, improved energy security, and minimized tariff volatility (as a result of the partial conversion of the national grid to renewable energy). The grid extension will directly benefit new peri-urban customers by (i) replacing kerosene lighting with a cheaper form of energy, thereby freeing household funds; (ii) enabling household

income generation; (iii) improving children's education; and (iv) reducing indoor health and safety issues associated with the burning of kerosene.

Outcome: Increased supply of renewable electricity through the installation of 0.7 MW of grid-connected hydropower, which will benefit about 2,000 households in Malekula and Espiritu Santo.

The project will construct hydropower generation facilities on Malekula (Brenwe Hydropower) and Espiritu Santo (Sarakata hydropower extension) to displace diesel generation. It will also potentially extend the distribution grid to an estimated 450 households in Malekula and up to 1,500 households in Espiritu Santo. Hydropower has been assessed to be the least-cost baseload generation option for the Malekula and Espiritu Santo grids.

The project supports the government's Priorities and Action Agenda (2006–2015) and is also aligned with the government's action document Planning Long, Acting Short (2009–2012), which targeted more widely available electricity at a fair price on top of new investments in renewable electricity. The project is consistent with the National Electricity Policy Framework (2007) and the Vanuatu National Energy Roadmap (2014), and is included in ADB's country partnership strategy (2010–2014) and country operations business plan (2014–2016) for the country.



Viet Nam: Clean Technology Fund

ADB has supported the reform of Viet Nam's electricity generation sector since 1994. It has done so mainly through a series of TA initiatives with a total of \$2.48 billion in financing. Two ADB-financed projects have resulted in recommendations for providing a sector loan to support Viet Nam's continued progress in modernizing the electricity generation sector.

Private vehicles—motorcycles are widely used—dominate the urban transport sector. But the government is intent on significantly expanding the role of public transport, in the interest of economic growth and less environmental degradation over the long term. The government is similarly committed to mitigating the negative impact of climate change by placing the urban transport sector on a low-carbon development trajectory and encouraging energy efficiency, thus reducing the level of GHG emissions. Through modernization, the government is also taking steps to reduce the energy intensity of the national economy, and to increase the reliability of electricity supply. Demand for electricity is forecast to grow from 120 terawatt-hours (TWh) in 2012 to 330 TWh in 2020, and possibly to 700 TWh by 2030. To meet this projected demand, energy generation capacity needs to increase from 26.5 gigawatts in 2012 to 75 gigawatts by 2020.

In response to an invitation from the CTF Trust Fund Committee, the government formulated an investment plan in coordination with several MDBs. This investment plan was initially endorsed by the committee in December 2009, and approved, following revisions, in October 2013.

ADB, which supports the improvement of Viet Nam's urban transport infrastructure and the promotion of public transport, in its country partnership strategy (2012–2015), will administer four projects under Viet Nam's investment plan. Two of these projects will further develop mass rapid transit (MRT) lines in Ha Noi and Ho Chi Minh City. A third project will improve the energy efficiency of the electricity grids in the two cities. A related TA initiative will assist the government in improving its national framework for coordination, capacity building, and monitoring and evaluation of investments that mitigate the adverse effects of climate change.

Source	Amount (\$ million)
CTF loan, via ADB	98.95
ADB loan	297.20
Agence Française de Développement	143.00
Direction Générale du Trésor	325.00
European Investment Bank	95.00
Government counterpart funds	579.60
Total	1,538.75

ADB = Asian Development Bank, CTF = Clean Technology Fund.

APPROVED: Sustainable Transport (Ha Noi): Ha Noi Metro Rail System Project (Line 3: Nhon–Ha Noi Station Section) and Strengthening Sustainable Urban Transport for Ha Noi Metro Line 3

Impact: Integrated and sustainable public transport system; improved energy security from fuel savings of about 21 million liters per year; and strengthened urban transport policies and regulations encouraging a modal shift in public transport.

Outcome: Competitive metro rail services along the project corridor and improved integration of Metro Rail System Line 3 stations with other public and private modes of transport. The project will increase access to low-carbon mobility services with an estimated daily demand of 157,000 passengers per day in 2018,

and progressively increasing to 458,000 passengers per day by 2038; reduce GHG emissions by about 663,000 tCO₂e over the 20-year life of the project, or by an average of 33,150 tCO₂e per year; reduce the rate of traffic accidents and injuries; and provide substantial public health benefits and direct and indirect employment opportunities.

The Ha Noi Metro Sustainable Urban Transport Program comprises two investment operations: (i) Ha Noi Metro Rail System Line 3: Nhon–Ha Noi Station Section (Project 1), which will develop a new double-track metro rail line in Ha Noi, including stations and depot facilities, and electrical and mechanical systems; and (ii) Strengthening Sustainable Urban Transport for Ha Noi Metro Rail System Line 3 (Project 2), which will implement sustainable transport measures for the effective and sustainable use of Metro Rail System Line 3.

Project 1 will result in an operational Metro Rail System Line 3 and the enhanced capacity of the Ha Noi Metropolitan Railway Management Board. Project 2, on the other hand, will install accessibility features at Metro Rail System Line 3 stations, integrate the public transport system that serves five districts of Ha Noi and introduce innovative public transport services and measures to support the efficient use of Ha Noi Metro Rail System Line 3, and develop public transport policy.

Pedestrian subways and footbridges, bus stops and feeder links, dedicated taxi stands, park-and-ride facilities for two-wheeled vehicles, and waiting areas for other public transport service providers will be constructed. A station access management system will also be installed to facilitate the efficient flow of people and traffic around the metro stations. Enforcement measures will be improved to ensure clear pedestrian access and smooth traffic flow and to manage private-vehicle parking around the metro stations. Public transport policy, including systems and strategies related to station parking, public transport ticketing, and pricing of public and private transport, will be developed. Capacity development and training of transport agencies in Ha Noi will also be part of project activities.

APPROVED: Sustainable Transport (Ho Chi Minh City):
Sustainable Urban Transport for Ho Chi Minh Mass Rapid Transit Line 2

Impact: Integrated and sustainable public transport system; improved energy security as fuel consumption in the public transport sector drops by a projected 18 million liters per year; and strengthened urban transport policies and regulations encouraging a modal shift in public transport.

Outcome: Integrated and improved public transport system serving six districts of Ho Chi Minh City. The project is expected to increase the share of public transport in total urban transport services from 7% in 2013 to 15% in 2022, and to 30% by 2038; increase daily demand by 83,824 passengers by 2018; and reduce GHG emissions by 600,000 tCO₂e over the project's useful life, as well as local pollutant emissions, with substantial public health benefits. The poorest 60% of the city's households will comprise the majority of the project beneficiaries.

The project will help integrate MRT Line 2 into Ho Chi Minh City's public transport network and improve public access to MRT Line 2 by constructing infrastructure and facilities at all stations; upgrading connections between the MRT and other modes of public transport to improve access; and supporting the reform of public transport policy and regulation.

Gender-sensitive, accessible pedestrian subways and footbridges, bus stops and feeder links, dedicated taxi stands, park-and-ride facilities for two-wheeled vehicles, and waiting areas at sites served by non-MRT public transport providers will be constructed. A public transport information system providing real-time bus and train arrival information will be installed for MRT Line 2 and linked to the city's bus control center. This system will complement the improvements to be made in the citywide bus network with World Bank support.

An urban transport pricing policy framework will be drawn up and policies for parking at MRT Line 2 stations and for traffic management will be formulated to ease vehicle flow in areas around the stations. The project will also have capacity development and training components.

Source	Amount (\$ million)
CTF loan, via ADB	49.00
ADB loan	10.00
Government counterpart funds	6.00
Total	65.00

ADB = Asian Development Bank, CTF = Clean Technology Fund.

Source	Amount (\$ million)
CTF grant, via ADB	1.00
Total	1.00

ADB = Asian Development Bank, CTF = Clean Technology Fund.

PIPELINE: Monitoring and Evaluation Technical Assistance

Impact: Improved national framework for coordination, capacity building, monitoring and evaluation of investments in climate-change mitigation.

Outcome: Increased investments in climate-change mitigation.

This TA will strengthen the government's national framework for coordinating, monitoring, and evaluating investments that mitigate the adverse impact of climate change, while strengthening the capacity of relevant government agencies to perform those functions. Funds provided under the TA may also be used for assessing the impact of investments on mitigation, and for disseminating lessons learned from implementing Viet Nam's CTF investment plan. These assessments and lessons learned are expected to assist the government in scaling up investment in sectors to which it has assigned priority.

Source	Amount (\$ million)
CTF loan, via ADB	60.40
ADB loan	200.00
Government counterpart funds	100.00
Other	100.00
Total	460.40

ADB = Asian Development Bank, CTF = Clean Technology Fund.

PIPELINE: Grid Energy Efficiency

Impact: Rehabilitation, expansion, and further development of the electric power grid in Ha Noi and Ho Chi Minh City; application of smart-grid technology to improve system efficiency and reduce GHG emissions.

Outcome: Increased capacity and reliability of power supply in both cities; reduction of about 6,500 tCO₂e in annual GHG emissions in Ha Noi by an estimated 6,500 tCO₂e, and in Ho Chi Minh City by an estimated tCO₂e.

This project is consistent with the overall modernization of Viet Nam's electricity generation sector; with the country's National Power Development Plan (2011–2020), with Orientation Towards 2030; and with the investment plans of the executing agencies. It is included in ADB's country partnership strategy (2012–2015).

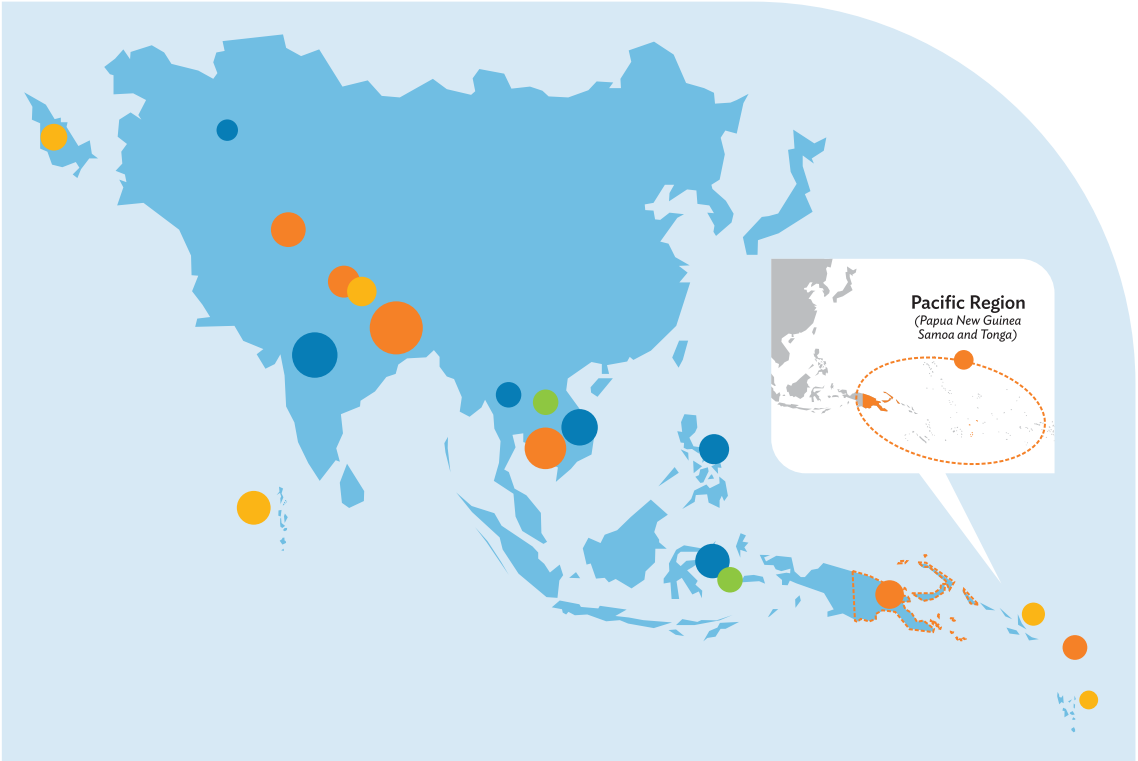
Sustainable electricity supply, the major output of the project, will meet Viet Nam's expanding national demand for electricity, by upgrading both the reliability and the efficiency of power generation and transmission systems in both cities. The project will reduce power distribution losses by an estimated 1.1% by 2020 in Ha Noi, and an estimated 0.6% in Ho Chi Minh City by the same year.



Total CIF FUNDING for ADB DMCs **\$3.2 billion**

\$1.6 billion **53%** Total CIF FUNDING administered by ADB

Note: Out of the \$1.6 billion ADB CIF Portfolio, total project funds approved to date is \$1 billion (61%)

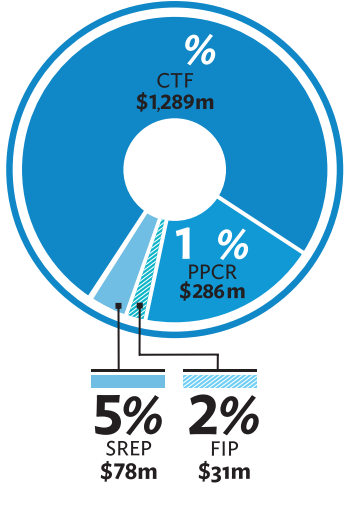
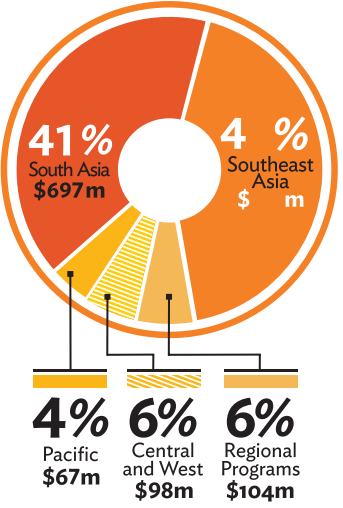
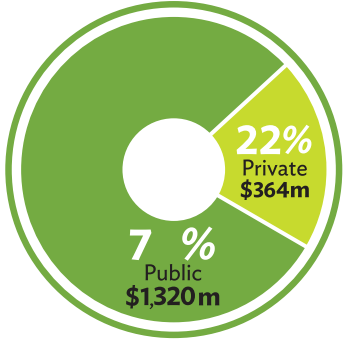


CTF CLEAN TECHNOLOGY FUND		\$1.2b for 18 projects/programs
in \$million	# OF CTF PROJECTS/PROGRAMS	
\$549	India	5
\$211	Viet Nam	4
\$150	Indonesia	1
\$125	Philippines	2
\$100	Thailand	1
\$ 50	Kazakhstan	1
\$104	Dedicated Private Sector Programs/Projects	4

PPCR PILOT PROGRAM FOR CLIMATE RESILIENCE		\$286m for 20 projects
in \$million	# OF PPCR PROJECTS	
\$72	Bangladesh	3
\$ 91	Cambodia	8
\$ 32	Nepal	2
\$ 28	Tajikistan	2
\$ 30	Papua New Guinea	1
\$ 20	Tonga	1
\$ 4	Pacific Region	1
\$ 10	Private Sector Adaptation Projects (Cambodia)	

FIP FOREST INVESTMENT PROGRAM		\$31m for 2 projects
in \$million	# OF FIP PROJECTS	
\$ 18	Indonesia	1
\$ 13	Lao PDR	1

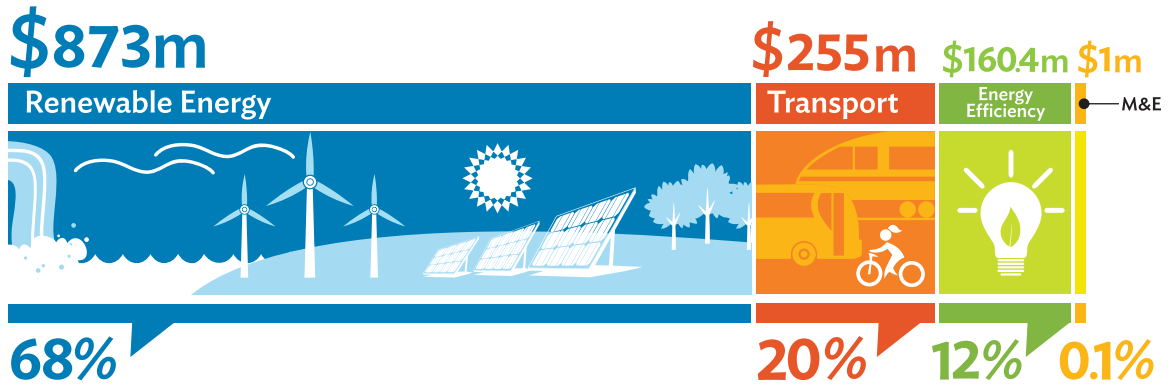
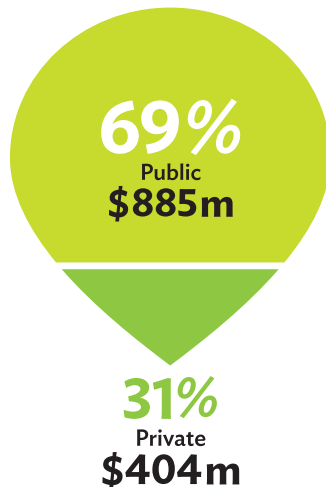
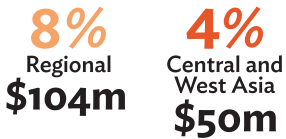
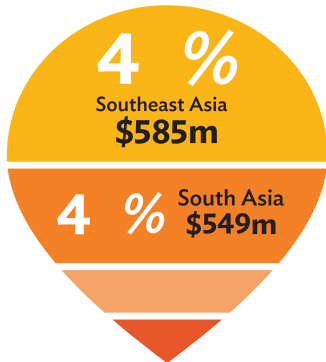
SREP SCALING UP RENEWABLE ENERGY IN LOW INCOME COUNTRIES PROGRAM		\$78m for 6 projects
in \$million	# OF SREP PROJECTS	
\$ 32	Nepal	2
\$ 13	Maldives	1
\$ 19	Armenia	1
\$ 7	Solomon Islands	1
\$ 7	Vanuatu	1





CTF CLEAN TECHNOLOGY FUND		\$1.2b for 18 projects/programs
in \$million		# OF CTF PROJECTS/PROGRAMS
\$549	India	5
\$211	Viet Nam	4
\$150	Indonesia	1
\$125	Philippines	2
\$100	Thailand	1
\$ 50	Kazakhstan	1
\$104	Dedicated Private Sector Programs/Projects	4

Note: \$738 million have been approved by the Trust Fund Committee



AT LEAST 169.5m tCO2e avoided

Figure is based on project lifetime expected tCO2e avoided from (i) Rajasthan Renewable Energy Transmission Investment Program; (ii) Sarulla Geothermal Power Project; (iii) Market Transformation through Introduction of Energy Efficient Electric Vehicles Project; (iv) Thailand Renewable Energy Investments; (v) Sustainable Urban Transport for Ho Chi Minh City MRT Line 2; and (vi) Sustainable Urban Transport for Ha Noi Metro Line 3 Project

AT LEAST 1.5m households with access to clean energy

Figure is based on expected number of households to benefit from energy access from the (i) Rajasthan Renewable Energy Transmission Investment Program; and (ii) Sarulla Geothermal Power Generation Project

OVER 13,200 jobs created

Figure is based on expected job creation from (i) Indonesia Geothermal Investments; (ii) Market Transformation through Introduction of Energy Efficient Electric Vehicles Project; and (iii) Thailand Renewable Energy Investments

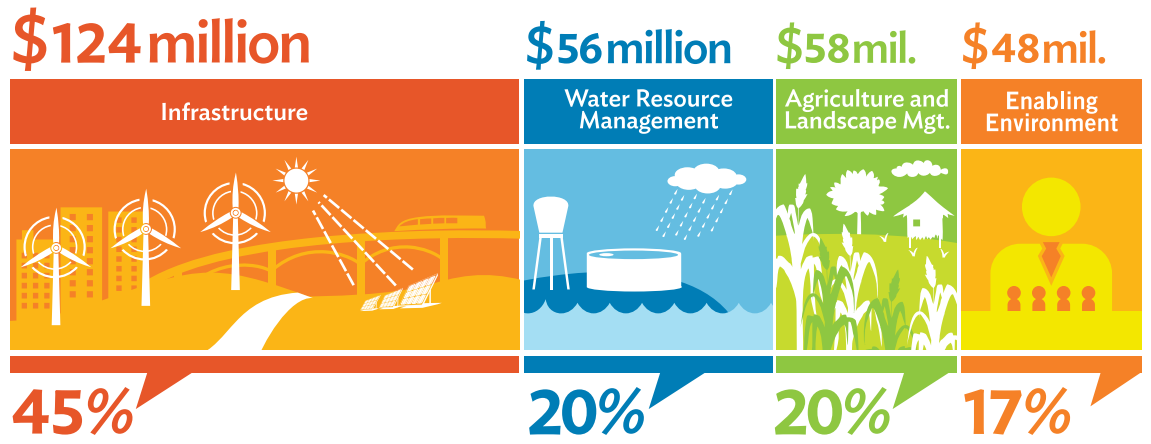
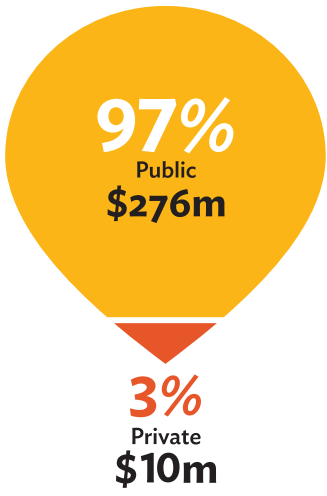
AT LEAST 941,000 people to benefit from improved public transport

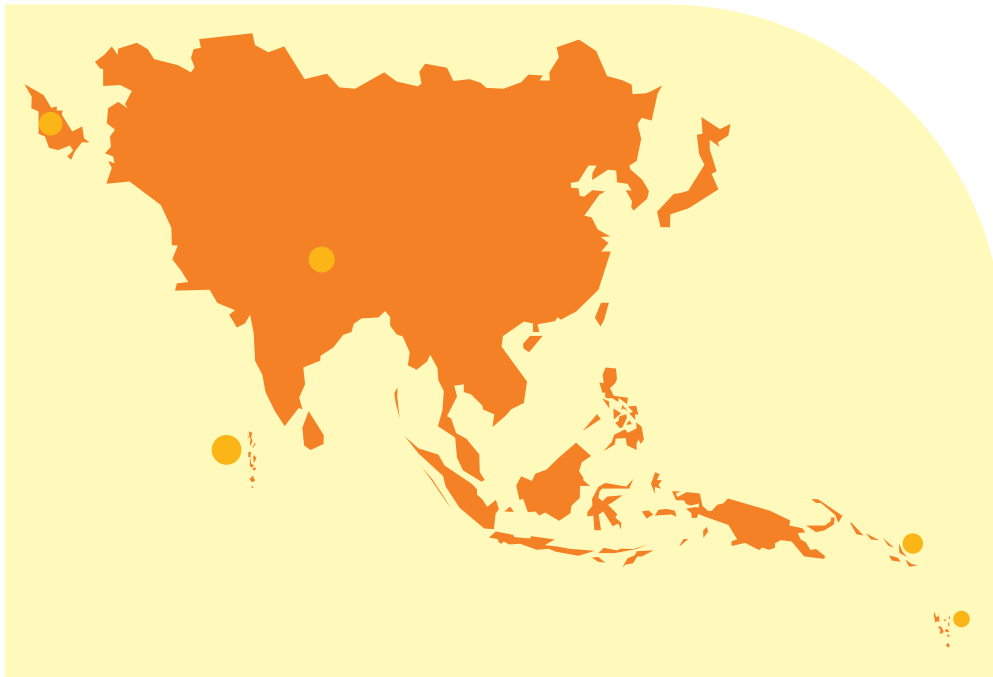
Picture is based on the number of people expected to benefit from the (i) Market Transformation through Introduction of Energy Efficient Electric Vehicles Project, (ii) Sustainable Urban Transport for Ho Chi Minh City MRT Line 2, and (iii) Sustainable Urban Transport for Ha Noi Metro Line 3



PPCR		\$286m	
PILOT PROGRAM FOR CLIMATE RESILIENCE		for 18 projects	
in \$million		# OF PPCR PROJECTS	
\$72	7 Bangladesh	3	
\$91	6 Cambodia	8	
\$32	5 Nepal	2	
\$28	4 Tajikistan	2	
\$30	3 Papua New Guinea	1	
\$20	2 Tonga	1	
\$4	1 Pacific Region	1	
\$10	Private Sector Adaptation Projects (Cambodia)		

Note: Out of the \$286 million PPCR funds to be administered by ADB, \$230 million have been approved





SREP SCALING UP RENEWABLE ENERGY IN LOW INCOME COUNTRIES PROGRAM		\$78m for 6 projects
in \$million	# OF SREP PROJECTS	
\$ 32	Nepal	2
\$ 13	Maldives	1
\$ 19	Armenia	1
\$ 7	Solomon Islands	1
\$ 7	Vanuatu	1

Note: Out of \$78 million SREP funds to be administered by ADB, \$25 million have been approved by the Subcommittee

SCALING-UP RENEWABLE ENERGY IN LOW INCOME COUNTRIES PROGRAM (SREP)

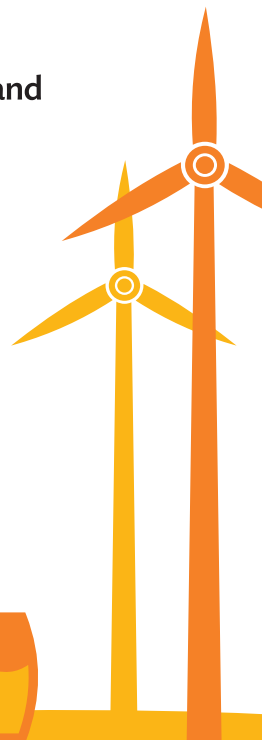
The SREP was established to scale up the deployment of the renewable energy solutions and expand renewables markets in the world's poorest countries. ADB also aims to maximize energy for all, especially the rural poor, and founded the Energy for All Program in 2008 to strengthen its investments and increase its energy access project portfolio.

AT LEAST 1.36m tCO2e avoided

Figure is based on project lifetime expected tCO2e avoided from (i) Maldives Preparing Outer Islands for Sustainable Energy Development Program; and (ii) Nepal South Asia Subregional Economic Cooperation Power System Expansion Project

AT LEAST 35,000 households with access to clean energy

Figure is based on expected number of households to benefit from (i) Maldives Preparing Outer Islands for Sustainable Energy Development Program; and (ii) Nepal South Asia Subregional Economic Cooperation Power System Expansion Project





FIP FOREST INVESTMENT PROGRAM		\$31m for 2 projects
in \$million		# OF FIP PROJECTS
\$ 18	Indonesia	1
\$ 13	Lao PDR	1

FOREST INVESTMENT PROGRAM

The FIP supports developing-country efforts to reduce deforestation and forest degradation and promote sustainable forest management that leads to emission reduction and enhancement of forest carbon stocks (REDD+). In two of the eight FIP pilot countries, Indonesia and Lao PDR, ADB will administer projects under the approved investment plans.



The Asian Development Bank and the Climate Investment Funds

Country Fact Sheets

Through the Climate Investment Funds, ADB is participating in 19 investment plans for 17 developing members, a regional investment plan for the Pacific (PPCR) and regional programs under the Clean Technology Fund Dedicated Private Sector Program, as well as other projects in Cambodia under the PPCR Private Sector Set-Asides. This publication documents the development initiatives under the various Climate Investment Funds windows that ADB administers, highlighting approved projects as well as those in the pipeline for ADB members.

About the Asian Development Bank

ADB's vision is an Asia and Pacific region free of poverty. Its mission is to help its developing member countries reduce poverty and improve the quality of life of their people. Despite the region's many successes, it remains home to the majority of the world's poor. ADB is committed to reducing poverty through inclusive economic growth, environmentally sustainable growth, and regional integration.

Based in Manila, ADB is owned by 67 members, including 48 from the region. Its main instruments for helping its developing member countries are policy dialogue, loans, equity investments, guarantees, grants, and technical assistance.



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