Climate Change

"Without adequate financing and actions, climate change impacts could push an additional 100 million people into poverty by 2030. Trust funds play a critical role in supporting the WBG in implementing the Climate Change Action Plan by helping countries mitigate the impacts of climate change and build resilience to climate shocks."

—John Roome
Senior Director, Climate Change Group

Climate change is a major challenge of our time, placing an increasing number of people and assets at risk, affecting their health and quality of life, and making development less sustainable. In 2016, the United Nations announced that global temperatures had risen 1.2 degrees Celsius above the preindustrial level, making it the hottest year on record. The impact of extreme natural disasters is equivalent to a $520 billion loss in annual consumption globally and forces some 26 million people into poverty each year. The WBG's report *Shock Waves: Managing the Impacts of Climate Change on Poverty* notes that the impact of climate change-related shocks on poverty reduction alone could result in more than 100 million additional people living in poverty by 2030.[25]

The WBG is committed to increasing climate financing to 28 percent of its total portfolio by 2020. The WBG Climate Change Action Plan, adopted in April 2016, lays out concrete steps to meet that commitment. It includes

25 To download a copy of the report *Shock Waves: Managing the Impacts of Climate Change on Poverty,* please visit http://bit.ly/shockwavesm

ambitious targets to be met by 2020, including helping client countries add 30 gigawatts of renewable energy, putting in place early warning systems for 100 million people, and developing climate-smart agriculture investment plans for at least 40 countries.

In helping countries address climate change, the WBG strategy focuses on five priority areas: (i) helping countries integrate climate change into development, achieve their NDCs, and set the stage for further ambition; (ii) accelerating the energy transition; (iii) facilitating the expansion of sustainable infrastructure; (iv) boosting the climate resilience of communities, economies, and ecosystems; and (v) unlocking trillions in climate finance.

Trust fund resources deepen the WBG's engagement in these priority areas, often paving the way for innovative pilot approaches to climate action, facilitating and complementing efforts by IBRD/IDA, and strengthening partnerships.

I. Helping countries integrate climate change into development, achieve their Nationally Determined Contributions, and set the stage for further ambition

The NDCs spell out key actions countries intend to take to address climate change to ensure successful implementation of the national climate pledges in the run-up to and since the Conference of the Parties (COP) 21. The WBG is an implementing partner of the NDC Partnership, a global coalition of 62 developing and developed countries and nine international institutions working together to mobilize technical and financial support for the implementation of NDCs while enhancing sustainable development.

22 climate change mitigation and adaptation projects supported in 18 countries across six regions, leveraging $10.5 million since FY16.

Nationally Determined Contributions Support Facility

CONTRIBUTOR

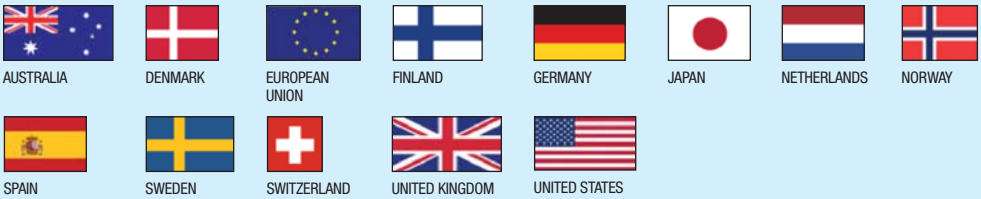
GERMANY

The **Nationally Determined Contributions Support Facility (NDC-SF)** is a BETF promoting technical assistance, capacity building, stakeholder coordination, and targeted investments to enable countries to "move the needle" on the implementation of their climate change commitments. The NDC-SF currently supports 22 climate change mitigation and adaptation projects in 18 countries across six regions, to facilitate coordination across stakeholders under the umbrella of the NDC Partnership, including World Bank teams, implementing partners, multilateral development banks, donors, and countries—at international, regional, national, and local levels. NDC-SF projects mainly support NDC implementation strategy development, upstream climate analytics, investment and business plan preparation, and cross-sectoral coordination enhancements. Initial consultations for some projects have enabled government line ministries to further prioritize actions needed for strengthening the country's NDC and initiate a mapping and gap analysis of donor support to maximize resource allocation and climate finance coordination. Through

its projects, the NDC-SF has leveraged an additional $10.5 million since FY16 by partnering with other climate-related funds, such as the Public-Private Infrastructure Advisory Facility (PPIAF) to fund or co-fund public-private partnership-related projects on transport, energy, and infrastructure. In addition, NDC-SF is leading dialogue with WBG climate-related trust funds to explore synergies, enhance coordination, and financially leverage support for NDC implementation. In addition to the 22 projects, the NDC-SF is coordinating activities related to the Climate Action Peer Exchange initiative to facilitate south-south exchange and a learning exchange forum for finance ministries interested in integrating climate change into fiscal reforms and budgeting.

Box 1: Building Institutional Capacity for Mitigation in China

CONTRIBUTORS



The **Partnership for Market Readiness (PMR)** trust fund provides technical assistance and funds to build institutional capacity of client governments to assess, prepare, and implement carbon pricing instruments in order to scale up greenhouse gas mitigation. Between FY13–FY17, the trust fund supported the Government of China to design and implement key building blocks of the national Emissions Trading System to help achieve its mitigation targets put forward in the country's Intended NDC. Since many aspects of the Emissions Trading System design are closely linked with the country's mid- and long-term mitigation goals, the PMR also provides policy analysis support to China. This support contributed to the development of the country's Intended NDC and provided key indicators, components, and assumptions used for mid- and long-term scenarios. One of the products of this analytical support, a report titled *Pursuing an Innovative Development Pathway—Understanding China's Intended Nationally Determined Contributions*, helped articulate how China's Intended NDC can be a powerful vehicle for innovation and help shift the country toward a new development pathway. PMR also helped organize technical workshops and dialogue to bring together the National Development and Reform Commission, the state-owned Assets Supervision and Administration Commission of the State Council, China's leading state-owned enterprises, and a range of international companies to discuss best industry practices and engage in Emissions Trading System simulations. The objective of the event was to enhance private sector engagement and readiness on emissions trading in China.

Supported China to design the building blocks of a National Emissions Trading System between FY13–FY17 to help achieve its mitigation targets.

Global Facility for Disaster Reduction and Recovery

CONTRIBUTORS

20 countries benefited from technical assistance to integrate climate resilience measures in World Bank projects in FY17.

The **Global Facility for Disaster Reduction and Recovery (GFDRR)** is a global partnership managing a program of $260 million that operates in 80 countries with more than 400 partners worldwide. GFDRR strategically channels financing to activities that either lead to larger development programs or support policy changes that strengthen capacity of institutions to manage risks. Through its resilience to climate change window, GFDRR provides technical assistance, financial support, knowledge, and innovative solutions to help countries vulnerable to climate-related hazards make development strategies, policies, and investments resilient to future climate and disaster risks. In addition, GFDRR provides just-in-time support for integrating climate resilience measures into new and ongoing World Bank operations. In FY17 alone, GFDRR's just-in-time assistance helped integrate climate resilience measures in more than 20 countries, across more than eight sectors.

GFDRR is providing technical assistance in Bangladesh to build the institutional capacity of the Bangladesh Water Development Board to mitigate the impact of storm surges and saltwater intrusion in coastal polders and develop a comprehensive climate resilient coastal embankment management strategy.[26] This support is informing a $400 million IDA *Coastal Embankment Improvement Project* that will help upgrade Bangladesh's coastal embankment system and increase the area protected by polders from tidal flooding and frequent storm surges. The project will also help reduce poverty, as around 8.5 million people will benefit through agriculture development, job creation, and food security.

GFDRR is helping the government in São Tomé and Príncipe improve its capacity for participatory risk planning, monitoring, adaptation planning, and project design activities in vulnerable coastal communities. The support has informed the $4.1 million Adaptation to Climate Change Program financed by FIFs—the Global Environment

26 Coastal polders are low-lying tracts of land enclosed by dikes that form an artificial hydrological entity, meaning there is no connection with outside water other than through manually operated devices.

Facility (GEF) and the Least Developed Countries Fund (LDCF)—with implementation by the WBG. The activities piloted in the first phase will be scaled up in 2018 to include seven additional communities, with cofinancing from GEF, LDCF, and IDA ($12 million) implemented through the West Africa Coastal Areas Resilience Investment Program.[27]

Global Environment Facility

CONTRIBUTORS

The **Global Environment Facility (GEF)** is a FIF, in which the World Bank serves as an IA. The results stories featured below are from activities implemented by the World Bank through IBRD/IDA trust funds. As a financing mechanism for developing countries to finance activities that support major international environmental conventions and international and transboundary waters, the GEF is a unique partnership of 18 agencies—including United Nations agencies, multilateral development banks, national entities, and international NGOs—working with 183 countries.[28] In addition to being an IA, the World Bank will manage a portfolio of $4 billion between 2018–2022 as the trustee for the overall facility. The World Bank's comparative advantage in the GEF is its ability to support innovative and transformational projects across various sectors, including regulatory reform, leveraging investments from the public and private sectors, and working at a

27 The West Africa Coastal Areas Resilience Investment Program is a convening platform that helps countries access expertise and finance to sustainably manage their coastal areas. It was created in response to countries' requests for solutions and financial support to help save the social and economic assets of coastal areas.

28 These conventions include: The United Nations Framework Convention on Climate Change; the United Nations Convention on Biological Diversity; the Stockholm Convention on Persistent Organic Pollutants; the United Nations Convention to Combat Desertification; and the Minamata Convention on Mercury.

national and global scale. Since GEF resources are largely in the form of grants, they can be used to finance activities which governments and the private sector initially perceive as too risky by providing technical assistance, de-risking instruments, and buying down the cost of borrowing, especially for innovative and catalytic initiatives.

With a $1.2 billion climate finance window, programs and projects financed by the GEF are designed to support mitigation activities. From FY13–FY17, the GEF trust fund supported 31 World Bank climate change projects in 19 countries worth a total of $245 million, which in turn helped leverage an additional $2.5 billion. Some of the key initiatives supported by the trust fund enabled support for: (i) adaptation planning; (ii) extension of renewable energy such as photovoltaic, mini-grids, geothermal development, and national renewable energy scale-up; (iii) energy efficiency through energy service companies, bus rapid transit, and city programs; and (iv) land use and forestry through forest conservation, satellite monitoring of forests, land use and forest restoration, and watershed management.

31 World Bank climate change and mitigation projects worth $245 million supported in 19 countries.

The trust fund provided funding to the Amazon Region Protected Areas (ARPA) Program in Brazil to help curtail the threat of deforestation resulting from increasing settlement and expanded agricultural, ranching, logging, and mining operations. ARPA is a key part of Brazil's mitigation and adaptation actions to achieve the ambitious NDC. ARPA grew out of a pledge made by the Government of Brazil in 1998 to triple the area of the Amazon under legal protection. Since its inception in 2003, ARPA has set world-class standards for innovation and cooperation involving multiple sectors of society and has produced extraordinary conservation results ahead of schedule. By investing in sound management of biologically important state and federal lands, ARPA is playing a key role in ensuring that future development in the vital Amazon region can take place on solid environmental footing. With support from ARPA, the Government of Brazil created about 35 million hectares of new protected areas in the Amazon. ARPA is now the largest tropical forest conservation effort in the world. In addition, the program has helped create a $215 million endowment fund to maintain the protected areas for the next 25 years. The current phase of the program, initiated this year with an investment of $241 million from multiple sources, will include another 73 million hectares of forests in Brazil, Colombia, and Peru to reduce carbon dioxide emissions by 300 million tons before 2030.

II. Accelerating the energy transition

The WBG strives to focus on the greatest potential reductions in greenhouse gas by slowing down the growth of coal-fired power plants in emerging economies. To support the shift to renewable energy, which is increasingly cost competitive, the WBG helps develop enabling policy and business environments, strengthen electricity grids, and de-risk investments. The WBG is also helping to accelerate the phaseout of hydrofluorocarbons and support energy efficiency measures.

Balkans Renewable Energy Program

CONTRIBUTOR

AUSTRIA

The **Balkans Renewable Energy Program (BREP)** trust fund supported IFC's renewable energy projects in Serbia, Albania, and other parts of the Western Balkans where IFC advised the governments on ways to improve country regulatory frameworks. In Serbia, this paved the way for the development of a renewable energy market and a pipeline of IFC investments. The Western Balkans region holds great potential for renewable energy generation, but banks, regulators, and local entrepreneurs often lack the experience and capacity to successfully leverage it. Between FY13–FY17, 150 renewable projects worth approximately $123 million were commissioned through BREP. IFC also arranged $65 million in financing for the Belgium-based energy group Elicio to develop one of Serbia's first sizable wind farms to be operationalized by 2019. The initiative is expected to reduce greenhouse gas emissions equivalent to taking more than 26,000 cars off the road every year. IFC is also advising the city of Belgrade on their first Waste2Energy project, with 40 percent of the private partner's revenues generated from the sale of renewable energy produced by the plant. This was made possible through the off-take agreement developed by the Ministry of Energy with the assistance of the WBG under BREP. In the next few years, the overall program in Serbia is expected to facilitate more than $800 million in investments, including over $200 million invested and mobilized by IFC.

150 renewable energy projects worth $123 million commissioned in the Western Balkans between FY13–FY17.

Energy Sector Management Assistance Program

CONTRIBUTORS

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BELGUIM

CANADA

DENMARK

EUROPEAN UNION

FINLAND

FRANCE

GERMANY

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LUXEMBOURG

NETHERLANDS

NORWAY

ROCKEFELLER FOUNDATION

SWEDEN

SWITZERLAND

UNITED KINGDOM

UNITED NATIONS DEVELOPMENT PROGRAM

UNITED NATIONS ENVIRONMENT PROGRAM

The Energy Sector Management Assistance Program **(ESMAP)** is a global MDTF that provides analytical and advisory services to low- and middle-income countries to achieve

environmentally sustainable energy solutions for poverty reduction and economic growth. ESMAP's main thematic areas include energy access, renewable energy, and energy efficiency, while the cross-cutting areas address broader energy sector issues of subsidy reforms, governance markets, and planning, and provide knowledge as a global public good through the Sustainable Energy for All Knowledge Hub. The advisory services provided and knowledge generated by the program help leverage lending, shape policy, increase client capacity, and promote innovation.[29]

"More than 30 years after ESMAP's establishment . . . ESMAP objectives and programs continue to be highly relevant to global and regional challenges in the energy sector and to the needs and priorities of their client countries."

[ESMAP is] ". . . playing an important role in incrementally improving the existing country situation, whether directly through tangible outcomes, or indirectly by opening the door for other interventions to support longer term impacts."

—External Evaluation, ICF Consulting Limited, ESMAP Business Plan Period, FY14–16

ESMAP's work on renewable energy aims to increase the WBG's investment pipeline to achieve the 28 percent climate co-benefits target and support client countries in creating the right climate for commercial investments to achieve the NDCs. The recent emphasis on solar power is generating strong demand from clients in designing and launching a solar auction. In addition, ESMAP has developed the Global Solar Atlas, making available high quality solar maps, poster maps, and geographic information system layers for 146 countries.[30] To date, the initiative has helped 13 countries obtain an initial assessment of their wind and solar power resources, resulting in improved data for planning and private sector development. The Global Solar Atlas has set a new standard for conducting and publishing resource assessment studies adopted by donors, and has become a lead data provider for the International Renewable Energy Agency Global Atlas on renewable energy. ESMAP also mobilized $235 million through the Climate Investment Funds (CIF) and the Clean Technology Fund (CTF) to support the development of a pipeline of geothermal exploration investment projects expected to leverage at least $1.5 billion in public and private capital. It helped triple the share of multilateral financing for early geothermal development stages from 6 percent in 2012 to 29 percent of the total geothermal investments in 2017, amounting to a third of the total multilateral investment in the sector. The technical studies on Variable Renewable Energy Integration conducted in the Philippines and Seychelles informed power sector planning strategies and key policy decisions to enable the scale-up of renewables, while the Solar Technologies Technical Assistance Program helped prepare two World Bank lending operations in India, the $100 million IBRD *Shared Infrastructure for Solar Parks Project* and the $300 million IBRD *Transmission for Power Evacuation from Solar Parks.*

29 For example, the Energy Storage Market Report prepared by ESMAP in FY17 shows that energy storage technology will become more accessible in emerging markets in the coming decade, enabling a significant scale-up of renewable energy as a clean source of electricity generation.

30 Since its launch in June 2017, around 60,000 visitors have visited the Global Solar Atlas website.

ESMAP is also supporting sustainable and resilient cities implementing 23 urban energy efficiency technical assistance programs for national and local governments in more than 50 cities in 28 countries. Between FY14–FY16, the trust fund built the foundation for urban energy efficiency planning and investments through city-level diagnostics using the Tool for Rapid Assessment of City Energy (TRACE) in 70 cities globally, informing investments in energy efficiency.[31] This contributed to the $100 million IBRD *Mexico Municipal Energy Efficiency Project* to enhance street lighting, water, and buildings in 32 cities. The project was triggered by a series of city energy diagnostics using ESMAP's tool to highlight sectors with the most significant potential for energy efficiency enhancements and suggest measures that could be implemented to realize that potential. ESMAP paired the tool with a technical assistance program to help cities through the city energy diagnostics process. ESMAP also helped put in place a $100 million public-private partnership to upgrade streetlights in Belo Horizonte, the sixth largest city in Brazil, through technical assistance combined with the tool's diagnostics.

ESMAP, in close collaboration with IFC's Excellence in Design for Greater Efficiency program (EDGE), aims to promote green buildings by focusing on disseminating key knowledge on the certification program through a global knowledge platform and by rolling out the program in South Africa, resulting in the green building certification for about 450,000 square meters, of which 220,000 square meters have been certified at the post construction stage.[32, 33] In Panama, ESMAP supported the development of appliance labeling standards and green building codes so that improved energy efficiency performance codes could be adopted nationally. In addition, ESMAP partnered with the Global Alliance on Buildings and Construction launched at COP22.[34] The alliance mobilizes stakeholders in the sector to scale up climate actions through appropriate policy development, thereby accelerating implementation of the NDCs. ESMAP's role in this concerted global effort focuses on helping developing countries realize the huge potential for their individual building and construction sectors while reducing global emissions, by sharing experiences and lessons learned on energy efficiency integration with other building-related sustainability aspects.

70 cities globally used a diagnostic tool to conduct energy efficiency assessments that helped inform energy-related investments between FY14–FY16.

31 TRACE is a decision support tool designed by ESMAP to help cities quickly identify underperforming sectors, evaluate their improvement and cost-saving potential, and prioritize sectors and actions for energy efficiency interventions. The tool covers municipal sectors such as transport, municipal buildings, water and waste water, public lighting, solid waste, and power and heat.

32 Supported by the State Secretariat for Economic Affairs (SECO) IFC Global Advisory Services Trust Fund.

33 Buildings use about 35 percent of the world's energy and account for 70 percent of greenhouse gas emissions in urban areas. Energy and resource efficient building solutions are crucial to avoid locking countries into inefficient, greenhouse gas-intensive, and expensive development.

34 COP22 is the 22nd yearly session of the COP to the 1992 United Nations Framework Convention on Climate Change.

III. Facilitating the expansion of sustainable infrastructure

The WBG, as part of its cascade approach to development finance, maximizes financing by leveraging the private sector and optimizing the use of scarce public resources, while continuing to promote good governance and ensuring environmental and social sustainability.[35] Because climate change will take a heavy toll on the infrastructure of poorer countries, the WBG builds capacity to integrate climate change considerations into the planning and design of long-term investments.

Carbon Partnership Facility

CONTRIBUTORS

ENDESA | E.ON | EUROPEAN UNION | ITALY | NORWAY | SPAIN | SWEDEN

45,000 old taxis replaced since FY13, comprising half of Cairo's taxi fleet, that were exposing residents to 20 times the acceptable level of air pollution daily.

The **Carbon Partnership Facility (CPF),** a MDTF, uses scaled up programmatic approaches to enable carbon finance to support initiatives aimed at moving toward low-carbon economies. In Egypt for example, the prospect of carbon finance (up to $700,000) helped the Ministry of Finance develop a first-of-its-kind program with the Ministry of Interior (traffic police), the WBG, commercial banks, and local car companies called the Vehicle Scrapping and Recycling Program. Given that the average taxi in Egypt is 32 years old, Cairo residents are exposed to 20 times the acceptable level of air pollution daily, according to the World Health Organization. The program uses carbon finance, a form of results-based financing, to provide incentives for the replacement and disposal of older taxis. The program monitors greenhouse gas emission reductions that, once verified by an independent third party, result in the issuance of Certified Emission Reductions. These can then be used for compliance by entities with greenhouse gas emission targets under the Kyoto Protocol. Monitoring consists of an annual survey on the distance traveled by the new taxis, multiplied by the amount of petrol or compressed natural gas consumed to obtain the total greenhouse gas emissions. Since FY13, the program has replaced 45,000 taxis, half of Cairo's fleet. Revenue from Certified Emission Reductions supports the ministry's subsidy to replace vehicles, contributing to sustainable development by reducing urban air pollution and traffic accidents associated with older vehicles, and supporting local automobile components and vehicle assembly industries. The program has improved livelihoods and avoided loss of employment by lowering the replacement and maintenance costs of new vehicles for taxi drivers. The program will now expand to include other cities and hybrid and electric vehicles.

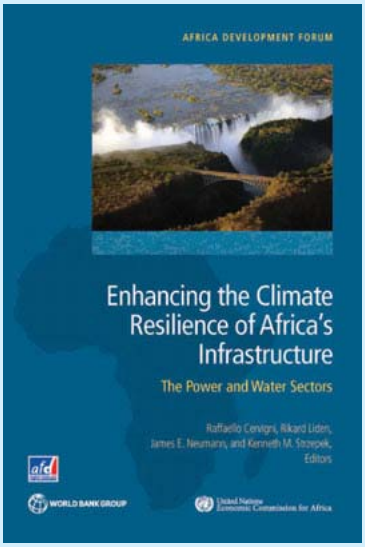
35 The WBG cascade approach follows these steps: (i) prioritize cost-effective commercial financing; (ii) where commercial financing is not cost-effective or viable due to perceived risks or market failures, focus support on addressing these market failures through reforms to strengthen country and sector policies, regulations, and institutions; (iii) where risks remain high and raise the cost of commercial capital beyond that which can be afforded by project or corporate revenue generation, explore the potential for lowering the financing cost by deploying concessional and public resources in risk-sharing instruments; and (iv) where commercial financing is not cost-effective or viable despite sector reform and risk mitigation, apply public and concessional resources.

Box 2: Impacts of Failure to Include Climate Change in Infrastructure Programs in Africa

CONTRIBUTORS

FINLAND NORWAY

The Trust Fund for Environmentally and Socially Sustainable Development (TFESSD) supported the WBG publication *Enhancing the Climate Resilience of Africa's Infrastructure: The Power and Water Sectors* in FY16. The report reaffirms the need to invest in infrastructure in Africa to sustain growth and eradicate extreme poverty. It evaluates the impacts of climate change on hydropower and irrigation expansion plans in Africa's seven major river basins (Congo, Niger, Nile, Senegal, Upper Orange, Volta, and Zambezi) and four power pools (Central, Eastern, Southern, and West African) and outlines an approach to reduce climate risks through proper planning and design processes. The report concludes that failure to integrate climate change in the planning and designing of power and water infrastructure could, in scenarios of drying climate conditions, result in losses of hydropower revenues between 5 and 60 percent (depending on the basin), and increase consumer expenditure for energy up to three times the corresponding baseline values. In wet climate scenarios, business-as-usual infrastructure development could lead to foregone revenues in the range of 15 to 130 percent of the baseline, to the extent that the larger volume of precipitation is not used to expand the production of hydropower.



TFESSD-supported publication on the impacts of climate change on infrastructure in Africa

Study published in FY16 warned that failure to reduce climate risks in the design of power and water infrastructure projects could result in a 5 to 60 percent loss of hydropower revenues in dry scenarios, and a 15 to 130 percent loss in wet scenarios.

To download a copy of the report, please visit: http://bit.ly/EnhancingClimateResilience

Pacific Partnership

CONTRIBUTORS


AUSTRALIA


NEW ZEALAND

Through the **Pacific Partnership,** the governments of Australia and New Zealand supported IFC in creating a market for off-grid solar energy in Papua New Guinea, the largest fragile and conflict-affected state (FCS) in the Pacific.[36] In Papua New Guinea, about 80 percent of the population has no access to electricity. By providing business connections, market intelligence, and consumer education, IFC's Lighting Papua New Guinea Program is helping global solar manufacturers enter and develop the local Papua New Guinea market. IFC advised seven global and local solar manufacturers and distributors, as well as a telecom company, on how to grow the off-grid solar market in Papua New Guinea in a sustainable way, by promoting quality-assured products and by tapping into the power of the private sector. As a result, more than 1.3 million people, or 16 percent of the country's population, have gained access to phone charging and energy services since 2014. Over the next two years, Lighting Papua New Guinea Program is expected to provide a further 300,000 people with access to Pay-As-You-Go and other smart solar products. For most of these people, this will be the first time they have had access to Pay-As-You-Go products, banking, or credit services.

1.3 million people, more than 16 percent of Papua New Guinea's population, gained access to phone charging and energy services since 2014.

Sustainable Logistics Trust Fund

CONTRIBUTOR


NETHERLANDS

The **Sustainable Logistics (SUSLOG)** trust fund provides grants for activities that help guide developing country governments, rural producers, the private sector, and donors to put in motion processes for strengthening logistics in three thematic areas. These areas include: (i) green supply chains aimed at developing transport corridors and logistics services that minimize the carbon footprint and greenhouse gases associated with the delivery of goods; (ii) agro-logistics to strengthen food security programs and improve the competitiveness of agricultural exports by sustainably reducing logistics costs and

36 This includes two trustee level trust funds: (i) New Zealand Ministry of Foreign Affairs and Trade—IFC East Asia and Pacific Partnership; and (ii) Australia Department of Foreign Affairs and Trade—IFC Global Advisory Services Trust Fund.

expanding market access for rural producers; and (iii) urban distribution and port-city development with a focus on addressing urban congestion resulting from retail distribution of goods and improving the sustainable design and operation of port cities.

Under the green supply chain thematic area, the trust fund provided a grant to help revive the green inland water transport system in Africa to inform policy makers to tackle water transport and intermodal logistics issues in the region. The work aimed to provide broad guidance to formulate an adequate regulatory framework in both inland water and road sectors to achieve green transport and logistic services.

The grant from the SUSLOG trust fund helped conduct detailed surveys, including traffic counts and shippers' interviews, to understand the current modal split among selected lake ports around the Tanzanian side of Lake Victoria. While institutional frameworks related to lake and road transportation were also reviewed, actual emissions from road and lake transport were measured. The three technical reports were prepared on: (i) shippers' modal preferences; (ii) institutional framework and policy recommendations; and (iii) emission calculations of modal shift. It was found that the current modal split was 80 to 20 for truck and lake transport. This is explained mainly by price differential and frequency. The lake demand is affected favorably by lower ferry prices but adversely by less frequency of ferry services. Tighter regulations are recommended to promote more efficient vessels, which would result in lowering prices and increasing frequency. This will also contribute to emission reduction. Based on actual ferry and truck operations, lake transportation can be 4 to 53 percent greener than road transport. The findings were used to inform policy makers and support the design and preparation of the $81 million IDA *Lake Victoria Transport Program* approved in FY17, aimed at facilitating the sustainable movement of goods and people in the Lake Victoria region (including Tanzania, Rwanda, and Uganda) and strengthening the institutional framework for transport safety.

$81 million IDA Lake Victoria Transport Program approved in FY17 was informed by analytical work on sustainable movement of goods and people in the Lake Victoria region highlighting that lake ferry transportation can be between 4 to 53 percent greener than road transportation.

Box 3: Designing Solutions for the "Floating Runway" in Tuvalu

CONTRIBUTOR

JAPAN

Re-design of Funafuti Airport Runway in Tuvalu was informed by a study on the impact of sea level rise on coastal pavement infrastructure.

Tuvalu, comprised of three reef islands and six coral atolls, is often referred as the "canary in the coal mine" when it comes to climate change. With the average height of the island less than three meters above sea level, Tuvalu could be one of the first countries to experience effects of sea level rise. The fourth smallest country in the world, Tuvalu, has a runway that takes up one-third of the main island and plays a key role in connecting the country to the world.

Funafuti International Airport had its runway resurfaced in 2015 as part of the $11.75 million IDA World Bank *Tuvalu Aviation Investment Project.* However, within six months after completion, the runway began to exhibit distresses. The pavement began to "blister" and vent cracks formed, which led to pavement "heaving" (lifting and breaking). Given that coral is porous and the up and down movement of tides pushes air and moisture toward the surface with nowhere to go, it eventually forces its way through the surface and creates what feels like a "floating runway." It became clear that a challenge such as this had to be fully understood so the country could quickly adapt and find new and affordable solutions to keep its aviation and transport infrastructure safe and sound.

With support from the **Quality Infrastructure Investment Partnership (QII)** trust fund, which provides financial support for project preparation and implementation to improve quality dimensions in infrastructure investment projects, a study on *"Implications of Sea Level Rise on Coastal Pavement Infrastructure for the Funafuti Airport Runway (Tuvalu)"* was conducted to find out about the impact of groundwater and tides on coastal pavement infrastructure to fully understand reasons behind the "heave" and "float" in the runway. This study also provided options for repairing the runway and identified potential risks of similar issues arising in other projects. The results of the study found that traditional construction designs of roads and pavements are insufficient for climate resiliency in low-lying coastal areas subject to rising sea levels, high tides, and heavy rainfall. Future designs in similar conditions must incorporate ways to alleviate the water pressure on paved surfaces. The findings from the study are being used to inform design solutions and guidelines for future airfield investment projects in similar low-lying Pacific atoll environments, and investment options are being identified for addressing potential climate-influenced failures at Funafuti airport, including the $8.8 million IDA additional financing for the *Tuvalu Aviation Investment Project*. The plan is to test several different potential solutions and then construct the most cost-effective one.

The Tuvalu example clearly demonstrates that climate change will be placing new and unexpected stresses on transport infrastructure.

To download a copy of the report, please visit: http://bit.ly/SeaLevelRise1

IV. Boosting the climate resilience of communities, economies, and ecosystems

The WBG helps countries better manage water and other natural resources, develop climate-smart agriculture, support sustainable forest management that supports livelihoods and economic growth, and expand climate-responsive social protection. A comprehensive approach to disaster risk management can protect lives, livelihoods, and assets.

BioCarbon Fund

CONTRIBUTORS

AGENCE FRANCAISE DE DEVELOPPEMENT

CANADA

ECO-CARBONE

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IRELAND

ITALY

JAPAN IRON AND STEEL FEDERATION

JAPAN PETROLEUM AND EXPLORATION CO., LTD.

LUXEMBOURG

SPAIN

OKINAWA ELECTRIC POWER COMPANY

SUMITOMO CHEMICAL

SUMITOMO JOINT ELECTRIC POWER CO., LTD.

SUNTORY HOLDINGS, LTD.

SYNGENTA FOUNDATION FOR SUSTAINABLE AGRICULTURE

TOKYO ELECTRIC POWER COMPANY HOLDINGS, INC.

ZEROEMISSIONS CARBON TRUST, SOCIEDAD ANONIMA

The equivalent of 180,000 tons of carbon dioxide captured, generating additional income for 30,000 smallholder farmers in Kenya between FY13–FY17.

The **BioCarbon Fund (BioCF)** is a public-private sector trust fund initiative that combines financial returns from the sale of emission reductions (i.e., carbon credits) with increased local incomes and other indirect benefits from sustainable land management practices. Generating multiple revenue streams is crucial to rural communities that otherwise have limited sources of income. Lack of diversification of agricultural practices in the Nyanza and Western provinces of Kenya due to years of unpredictable rainfall, droughts, and soil degradation increased food insecurity. The *Kenya Agricultural Carbon Project,* with support from the BioCF, promotes sustainable agricultural land management practices on 45,000 hectares of land. The project is the first agricultural land management initiative to issue carbon credits. Between FY13–FY17, the project captured more than 180,000 tons of carbon dioxide equivalent, generating additional income and improving the livelihoods of about 30,000 smallholder farmers. The project improved food security through increased crop yields, helped revitalize the farmers' land through agroforestry practices

and harvesting in ways that produce natural nitrogen fertilizers in the soil that benefit the longevity of the land, and empowered women farmers (traditionally not allowed to own land) to actively engage in the project and adopt diverse land practices.

The trust fund also supported the implementation of the $9.6 million Soil Conservation Project and the Community Forestry Initiative in Moldova. These initiatives helped increase national forest cover from 3 to 8 percent, improve biodiversity, reduce greenhouse gas emissions by 1.2 million tons, restore more than 28,000 hectares of degraded lands, generate employment, enable reinvestment of carbon revenue in community development, and strengthen sustainable connections between communities and their land. In addition, the sale of emission reductions from afforestation and reforestation activities in the project area helped establish legally binding institutional arrangements and stakeholder relationships between the government agency, Moldsilva, and the local councils representing the rural communities participating in the projects.

Ethiopia's Productive Safety Net Program

Eight million food insecure people in Ethiopia received cash and food transfers in FY14 that reduced food insecurity and distress asset sales by 50 percent.

CONTRIBUTORS

CANADA
EUROPEAN UNION
IDA
IRELAND
NETHERLANDS
SWEDEN
UNICEF
UNITED KINGDOM
UNITED STATES
WORLD FOOD PROGRAMME

The **Ethiopia's Productive Safety Net Program (PSNP)** is a MDTF that provides financial support to the Ethiopia government's safety net program, along with other funding sources. The program is aimed at reducing food insecurity, vulnerability, and building community resilience to crises and shocks by providing safety net transfers in exchange for participation in public works directly to those households with no able-bodied adult members.

Public works focus on integrated community-based watershed development activities such as soil and water conservation measures, rangeland management (in pastoral areas), and the development of community assets such as roads, water infrastructure, schools, and health care centers. In FY14, PSNP provided cash and food transfers to eight million chronically food insecure people residing in 300 woredas (districts), in exchange for public works. Through these efforts, the PSNP made significant strides in reducing food insecurity. The food gap among the participating households dropped from three months in 2006 to 1.6 months in 2014. The distress asset sales were also reduced by 50 percent. Despite experiencing two droughts, households living in the highland regions of Ethiopia did not witness a decline in their food security levels due to the safety net transfers (received payments for two or more years), while households receiving safety net transfers for four or five years experienced an increase in their livestock holdings.

The economic benefits of the assets created through the public works are high. To date, over one million people have benefited from the soil and water conservation activities, generating new livelihood activities, increasing crop yield, and increasing income level in the target communities. The public works impact assessment estimates that on average a 9 percent increase in crop yields could be attributed to public works, particularly for soil and water conservation activities.[37] More significantly, the soil samples from the PSNP public works sites identified by Cornell University highlight a 300 percent increase in carbon sequestration rates, indicating a marked improvement in soil fertility.

Tewodros Emiru/World Bank

The PSNP provided cash and food transfers to eight million chronically food insecure people covering 300 districts in Ethiopia.

37 While this figure was considerably higher in many watersheds, crop yield fell in some cases due to frequent droughts.

Lessons learned from PSNP clearly demonstrate opportunities for integrating environment and climate change mitigation and adaptation into formulating and implementing social protection programs. By incorporating environmental and climate change considerations, Ethiopia's PSNP has increased resilience, improved food security, and reduced deforestation through land restoration and natural resources management, and is now known as one of the largest climate change adaptation programs in Africa.

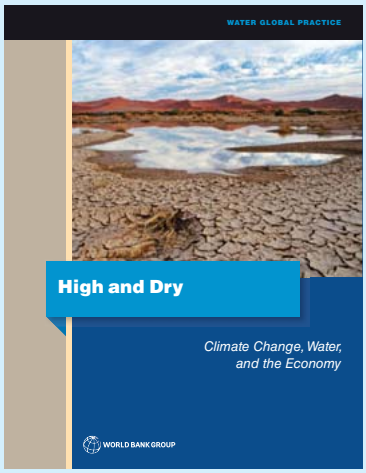
Box 4: Climate Change and Water Security

CONTRIBUTORS

AUSTRIA DENMARK NETHERLANDS SWITZERLAND UNITED KINGDOM

Report published in FY16 quantified that water scarcity due to climate change could cost some regions up to 6 percent of their GDP.

The **Water Partnership Program (WPP)** trust fund provided funding for the development of the report *High and Dry: Climate Change, Water and the Economy*, published in FY16. The report provides a quantifiable account of the effects of climate change on actual and future risks related to water. It suggests that bad water management policies can aggravate the adverse impacts of climate change, while good policies can steadily neutralize them. In fact, water scarcity under a changing climate could cost some regions up to 6 percent of their GDP. This flagship report is informing policy and decision making in the water sector and has received worldwide recognition in more than 146 news outlets globally, including *The Guardian*, the *Financial Times,* and *Reuters.*



WPP's High and Dry report quantifies the negative impact of climate change on water scarcity

To download a copy of the report, please visit http://bit.ly/HighandDryC

V. Unlocking trillions in climate finance

The WBG fosters strong partnerships with private sector partners to expand green finance approaches and help countries adopt global best practices for putting a price on carbon.

Pilot Auction Facility for Methane and Climate Change Mitigation

CONTRIBUTORS

CLIMATE CENT FOUNDATION | GERMANY | SWEDEN | SWITZERLAND | UNITED STATES

The **Pilot Auction Facility for Methane and Climate Change Mitigation (PAF)** is a FIF, in which the World Bank serves as an IA. The results stories featured below are from activities implemented by the World Bank through IBRD/IDA trust funds. PAF is an innovative climate finance mechanism developed by the WBG that pioneers the use of auctions to allocate scarce public resources and leverages private sector financing to stimulate investment in projects that reduce greenhouse gas emissions. It does this by piloting the auction of tradeable put options, which guarantee a floor price for qualifying emission credits.

Since 2014, the PAF trust fund has hosted three pilot auctions to address methane and nitrous emission reductions. These auctions attracted a total of 60 bidders from 24 countries. A total of 24 bidders, including multinationals, carbon aggregators, and sponsors of greenhouse gas-reducing projects in WBG client countries, won price guarantees for $20.6 million tons of emission reductions. PAF's success has been partly due to the strength of the initial concept, which was requested by the G8 Methane Finance Study Group, convened by the WBG, and informed by academics. The trust fund also incentivized collaboration across the WBG operational units and identified the strong demand for a guaranteed price for emission reductions in the current carbon markets context. Environmental Finance awarded PAF its Carbon Deal of the Year (March 2016) and *MTN-I,* a leading bond market publication, awarded the WBG's Capital Markets team its Editor's Award for issuing put options as a specialized bond. Building on the pilot phase, the WBG is expanding the PAF into a broader Climate Auctions Program and is exploring how to use auctions to help countries implement their goals under the Paris Climate Agreement.

Three auctions held for methane and nitrous emission reductions since 2014, attracted 60 bidders from 24 countries, of which 24 bidders won price guarantees for $20.6 million tons of emission reductions.

Pacific Disaster Risk Finance and Insurance

CONTRIBUTOR

JAPAN

The **Pacific Disaster Risk Finance and Insurance (PDRFI)** trust fund assessed the viability of market-based sovereign catastrophe risk transfer instruments for Pacific Island countries to reduce the financial vulnerability to natural disasters, such as earthquakes, tsunamis, and tropical cyclones. A sovereign catastrophe risk model was developed through the Pacific Catastrophe Risk Assessment and Financing Initiative (PCRAFI) and accepted by the international reinsurance market. This enabled the creation of a regional risk pool and a pilot catastrophe risk insurance program, creating cost efficiencies for Pacific Island countries with estimated premium reductions of up to 50 percent by approaching the market together. Capacity building in disaster risk finance also ensured that mechanisms beyond insurance were used by country governments to reduce the financial impacts of disasters. Furthermore, regional collaboration was vital to leverage the expertise held within the regional organizations and led to the creation of the Pacific Risk Information System, the largest collection of geospatial risk information for Pacific Island countries.

A payout of $1.3 million made to Tonga, equivalent to more than half of the national reserves, following the devastation caused by Tropical Cyclone Ian that struck the island in 2014.

Scott McLennan/Australia Department of Foreign Affairs and Trade

Corrugated iron litters the streets of Lifuka Island, Tonga.

On January 11, 2014, Tropical Cyclone Ian made landfall on Tonga with devastating force on the island of Ha'apai. The cyclone intensified to Category 5 a day earlier, which led the prime minister of Tonga to declare a state of emergency in advance of its landfall. The cyclone damaged and destroyed more than 1,000 buildings in Ha'apai, and caused significant damage to infrastructure and agriculture across the worst affected islands. More than 2,000 people sought refuge in evacuation centers. Following the event, a request for a calculation report was sent to AIR Worldwide (the company that developed the probabilistic risk models that underpins the insurance program) to run the model and estimate the ground up losses to determine whether a payout was due. The calculation report generated by AIR Worldwide notified the reinsurance counterparties that the modeled loss was large enough to trigger a payout for Tonga under the policy. A payout of $1.3 million was made to Tonga, equivalent to more than the country's 2013 contingency budget, and more than half of the reserves of the Tonga National Reserve Fund.

The payout from Tropical Cyclone Ian was the first to successfully demonstrate the use of insurance as a rapid disbursement mechanism for disaster response. The entire process, from the calculation report to receipt of funds in Tonga, was executed in less than 10 days. The rapid insurance payout to Tonga from PCRAFI minimized the liquidity impact on the government's budget. The immediate infusion of cash allowed the

Government of Tonga to quickly start emergency response efforts, including paying for fuel costs required to transport relief to affected populations in remote areas.

The trust fund paved the way for increased donor engagement with more than $41 million contributed to the PCRAFI Program MDTF, which established a regional catastrophe insurance platform, the Pacific Catastrophe Risk Insurance Company (PCRIC), and a five-year capacity building program for Pacific Island countries.

Australia's Department of Foreign Affairs and Trade IFC Global Advisory Services Trust Fund

CONTRIBUTOR

AUSTRALIA

The **Australia's Department of Foreign Affairs and Trade (DFAT) IFC Global Advisory Services trust fund** supports advisory services focused on private sector development, with an emphasis on access to finance, private sector participation in infrastructure, the ability to address climate change, and support to small and medium enterprises through improvements in investment climate and access to global supply chains.

One of the initiatives under this trust fund is the DFAT-IFC South Asia Sustainable Development Partnership, which aims to create a market for solar power in India. India has set an ambitious goal to generate 100 gigawatts of solar energy by 2022. However, solar power has historically been more expensive than coal-fired energy, making it hard to reach this goal. The project helped the Government of Madhya Pradesh State to structure and tender the 750-megawatt Rewa Ultra Mega Solar Park in FY17, one of the biggest single site solar projects in the world. As transaction advisor, IFC played a strategic role in advising the government how to structure the public-private partnership, balance public and market risks, and create a competitive auction process. IFC also helped develop a unique power scheduling arrangement that enabled the Delhi Metro Rail Corporation to take energy straight from the solar park to power its rail service.

At 4.4 cents per kilowatt-hour, this project delivered the lowest tariffs to date for a solar project in India. For the first time in this market, solar energy will be as cheap as coal-generated power. This is expected to have an enormous ripple effect and help create new markets for large solar projects across India and the region. It is expected to mobilize $550 million in private investment, avoid a million tons of greenhouse gas emissions per year, and help India move closer to its 100 gigawatt solar energy goal by 2022. In addition, the solar park will sell about one-fourth of its energy to Delhi Metro, helping meet about 80 percent of the daytime energy requirements of its trains, and set a new model for distributors of renewable power.

750-megawatt Rewa Ultra Mega Solar Park in India, one of the biggest single site solar projects in the world, was brought to the market in FY17, and is expected to mobilize $550 million in private investment in solar energy projects and avoid a million tons of greenhouse gas emissions per year.

Box 5: Quick Disbursing Risk Insurance Program for Central America and the Caribbean

CONTRIBUTORS


CANADA


EUROPEAN UNION


GERMANY


UNITED STATES

In 2014, the **Central American and Caribbean Catastrophe Risk Insurance Program (CARICOM)** and the Council of Ministers of Finance of Central America and the Dominican Republic (COSEFIN) started exploring options to share disaster risks across subregions and reduce financial vulnerability to geophysical and climate-related events. The World Bank, with support from donors, worked in close coordination with CARICOM and COSEFIN and identified the expansion of the Caribbean Catastrophe Risk Insurance Facility (CCRIF) as the best option.

To support the expansion, the CARICOM MDTF was established with the objective of improving the affordability of high quality sovereign catastrophe risk transfers associated with earthquakes and climate risks for COSEFIN and CARICOM, and enhancing their capacity for developing and implementing disaster risk financing and insurance strategies.

Nine insurance payouts totaling $31 million made in FY17 to six member countries for natural disasters, all within 14 days from the occurrence of the event.

The CCRIF, established in 2007, is the first multi-country risk pool in the world and was the first sovereign catastrophe risk transfer instrument to successfully develop parametric policies backed by both traditional and capital markets. CCRIF was initially designed as a regional catastrophe fund for CARICOM member countries, but it was restructured in 2014 into a Segregated Portfolio Company (SPC) and renamed CCRIF-SPC. The new structure, which allows for segregation of risk, has facilitated the development of new products and the expansion to new geographic areas. In 2015, CCRIF-SPC signed a memorandum of understanding with COSEFIN enabling its member countries to join the CCRIF-SPC. It currently offers sovereign catastrophe risk transfer associated with earthquake, tropical cyclone, and excess rainfall to the CARICOM and COSEFIN. CCRIF-SPC's parametric insurance mechanism allows it to provide rapid payouts to help members finance their initial disaster response, mitigating the short-term cash flow problems small developing economies suffer after major natural disasters, and maintaining basic government functions after a catastrophic event. CCRIF-SPC provides coverage to 15 CARICOM member countries and one COSEFIN member country, and has since its inception in 2007, made 22 payouts for hurricanes, earthquakes, and excess rainfall (all within 14 days from the occurrence of the event) to 10 member governments worth $69 million. Of that total, nine payouts worth $31 million were paid to six member countries in FY17.