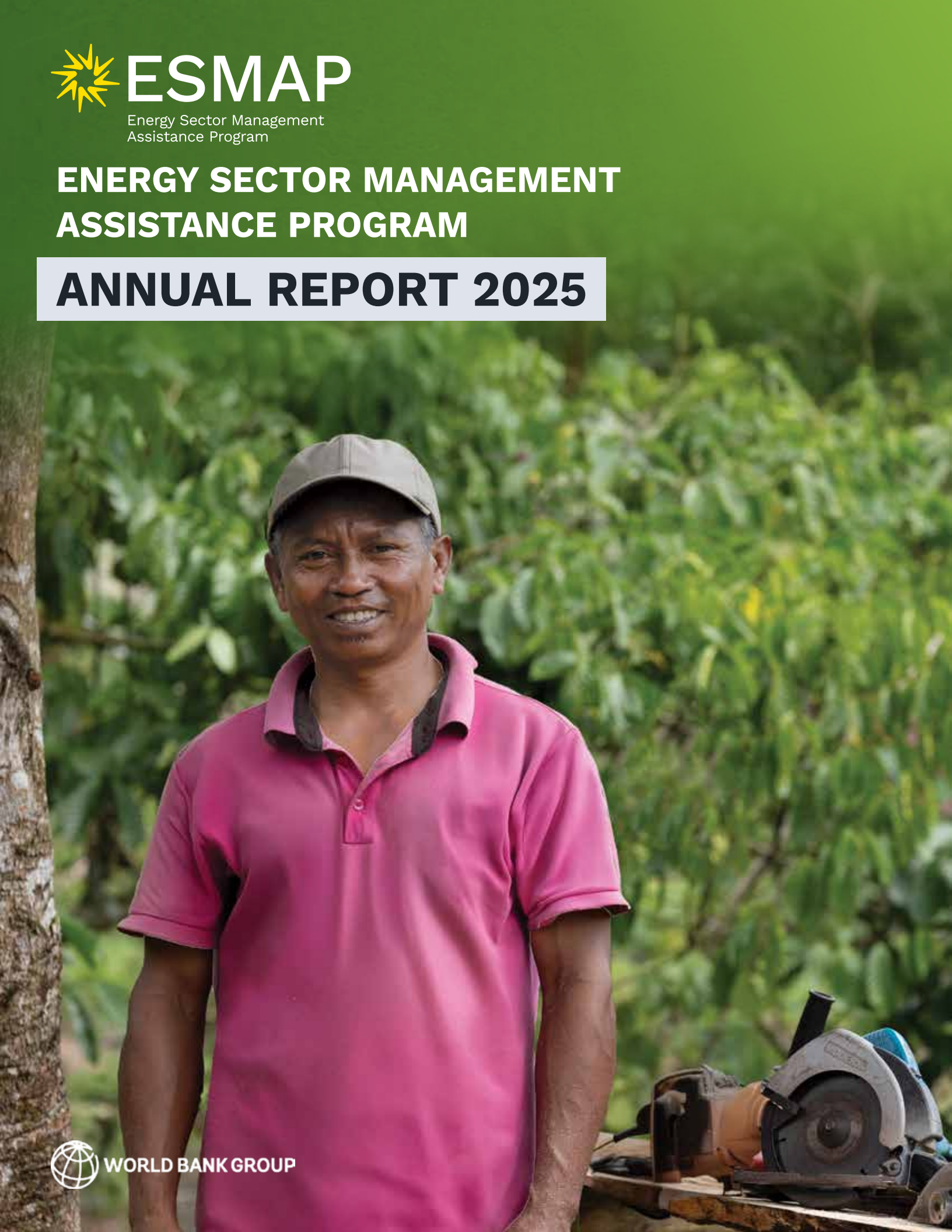
ESMAP
Energy Sector Management Assistance Program

ENERGY SECTOR MANAGEMENT ASSISTANCE PROGRAM

ANNUAL REPORT 2025



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ABOUT ESMAP

The Energy Sector Management Assistance Program (ESMAP) is a partnership between the World Bank and over 20 partners that helps low- and middle-income countries reduce poverty and boost growth through sustainable energy solutions. ESMAP's analytical and advisory services are fully integrated within the World Bank's country financing and policy dialogue in the energy sector. Through the World Bank Group (WBG), ESMAP works to accelerate the energy transition required to achieve Sustainable Development Goal 7 (SDG7) to ensure access to affordable, reliable, sustainable, and modern energy for all. It helps shape WBG strategies and programs to achieve the WBG Climate Change Action Plan targets. Learn more at: https://esmap.org.

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ENERGY SECTOR MANAGEMENT
ASSISTANCE PROGRAM

ANNUAL REPORT 2025

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ESMAP
Energy Sector Management
Assistance Program

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ABBREVIATIONS

ADB	Asian Development Bank
AFD	Agence Française de Développement
AfDB	African Development Bank
AI	artificial intelligence
AMDA	Africa Minigrid Developers Association
AREP	Accelerating Regional Energy Projects (a multi-donor trust fund)
ASCENT	Accelerated Sustainable & Clean Energy Transformation
BESS	battery energy storage system
CAPP	Central Africa Power Pool
CCAC	Climate and Clean Air Coalition
CCF	Clean Cooking Fund (ESMAP initiative)
CCS	Carbon Capture and Storage (ESMAP Initiative)
CCUS	carbon capture, utilization, and storage
CIF	Climate Investment Funds
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
COP	United Nations Climate Change Conference
CRRM	Coal Retirement and Repurposing Model
CTF	Clean Technology Fund
DARES	Distributed Access through Renewable Energy Scale-Up
DRE	distributed renewable energy
EAPP	Eastern Africa Power Pool
EAQIP	Energy Access Quality Improvement Project
ER	emissions reduction
ESP	Energy Storage Partnership (ESMAP initiative)
ESRF	Energy Subsidy Reform Facility (ESMAP initiative)
EU	European Union
FAO	Food and Agriculture Organization (United Nations initiative)
FCV	fragility, conflict, and violence
FIEA	Financial Innovation for Energy Access (ESMAP initiative)
FY	fiscal year
GCF	Green Climate Fund
GDP	gross domestic product
GEP	Global Electrification Platform
GERI	Global Electricity Regulatory Benchmarking Index
GFMG	Global Facility on Mini Grids (ESMAP initiative)
GHG	greenhouse gas

GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
GOGLA	Global Off-Grid Lighting Association
GW / GWh	gigawatt / gigawatt hour
GWEC	Global Wind Energy Council
GWNET	Global Women's Network for the Energy Transition
H4D	Hydrogen for Development Partnership (ESMAP initiative)
HFC	hydrofluorocarbon
HLPF	United Nations High-Level Political Forum
IBRD	International Bank for Reconstruction and Development
IDA	International Development Association
IEA	International Energy Agency
IESP	Integrated Electrification Strategies and Planning (ESMAP initiative)
IFC	International Finance Corporation
ILHC	Improving Livelihoods and Human Capital (ESMAP initiative)
IPP	independent power producer
IRENA	International Renewable Energy Agency
ISA	International Solar Alliance
KEMS	Kyrgyz Republic Electricity Sector Modernization and Sustainability
LPG	liquefied petroleum gas
LURA	Land Use and Repurposing Assets
MARCOT	Energy Markets, Connectivity, and Regional Trade (ESMAP initiative)
MECS	Modern Energy Cooking Services
MDTF	multi-donor trust fund
MIGA	Multilateral Investment Guarantee Agency
MPA	multiphase programmatic approach
Mt	metric ton
MTF	Multi-Tier Framework for Energy Access
MW/MWh	megawatt/megawatt hour
NEP	Nigeria Electrification Project
OECD	Organisation for Economic Co-operation and Development
OIZ	Türkiye Industrial Organized Zone
PUE	productive use of electricity
PV	photovoltaic (solar technology)
RBF	results-based financing
REA	Rural Electrification Agency
REAF	Regional Energy Access Financing Platform
RENEW	Regional Network in Energy for Women
RESPITE	Regional Emergency Solar Power Intervention Project
RETRADE	Regional Energy Transmission, Trade, and Decarbonization

RISE	Regulatory Indicators for Sustainable Energy
ROGEAP	Regional Off-Grid Electricity Access Project
SAAP	Southern African Power Pool
SCADA	Supervisory Control and Data Acquisition system
SCF	Standardized Crediting Framework
SDG	Sustainable Development Goal (United Nations initiative)
SECED	Security and Emission Constrained Economic Dispatch Model
SEforALL	Sustainable Energy for All
SIDS	small island developing state
SME	small and medium sized enterprise
SRMI	Sustainable Renewables Risk Mitigation Initiative (ESMAP initiative)
STEM	science, technology, engineering, and mathematics
TUCSAP	Türkiye Climate-Smart and Competitive Agricultural Growth Project
UNDESA	United Nations Department of Economic and Social Affairs
UNDP	United Nations Development Programme
VRE	variable renewable energy
WAPP	West African Power Pool
WA-REMP	West Africa Regional Electricity Market Program
WASH	Water, Sanitation, and Hygiene
WBG	World Bank Group
WEN	Women's Energy Network
WFP	World Food Programme (United Nations initiative)
WHO	World Health Organization

WORLD BANK REGIONS

AFR	Africa
EAP	East Asia and Pacific
ECA	Europe and Central Asia
LAC	Latin America and the Caribbean
MNA	Middle East and North Africa
SAR	South Asia

All currency is in United States dollars (US$) unless otherwise indicated.

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FOREWORD

There are countervailing forces at work in today's energy space: clean power surpassed a whopping 40 percent of global electricity generation in 2024, driven by record growth in renewables, especially solar. At the same time, soaring demand outpaced such expansion of clean electricity. Rapidly escalating power consumption by data centers and artificial intelligence computing, combined with the use of electric vehicles, heat pumps, and air conditioning during heatwaves, are contributing to the rise in global demand, threatening to keep those without power access disconnected from electricity even longer. This will make reaching the United Nations Sustainable Development Goal 7 (SDG7) of connecting everyone around the world to power or clean cooking devices by 2030 even harder. We now have no more than five years left to provide power to the 50 percent of Sub-Saharan Africa's population who currently do not have it. Moreover, while the energy community has known the importance of energy efficiency, often dubbed the "first fuel" of the clean energy transition, we have not done enough to tap its potential to fast-track affordable and secure power, drive stronger economies, and create jobs.

These challenges and opportunities require agile responses. They call for fresh approaches that push the envelope and allow multilateral financial institutions to take risks in pursuing new paths. The Energy Sector Management Assistance Program (ESMAP) is the energy unit of the World Bank Group tasked to do precisely that. Run by World Bank staff but independently funded by more than 20 donor governments and philanthropies, we explore new ways of helping low- and middle-income countries deploy sustainable energy solutions to boost economic growth and reduce poverty (see www.esmap.org). To strengthen our role as an incubator for innovative approaches, we began implementing our FY2025–2030 business plan in fiscal year 2025 (July 1, 2024, to June 30, 2025), allowing us to address today's energy landscape even more flexibly. Under the new plan's strategy, we integrate our energy work with other vital development areas and are realizing synergies by collaborating with the World Bank's agribusiness, health, and digital infrastructure sectors.

For instance, together with the World Bank Group's digital vice presidency and private sector financing arm, the International Finance Corporation (IFC), we are identifying sustainable paths to meet the surging energy demand from data centers, servers, and networks supporting digital operations in low-income countries. We are convening developers, industry experts, and government stakeholders across the energy and digital sectors to identify practical solutions, including coordinated grid planning, better energy market management, and adoption of energy efficiency and grid flexibility measures. The goal is to facilitate growth of the digital economy while enabling energy systems to cope with the higher loads that come with it. Such knowledge sharing may be the first step toward a larger ESMAP program together with partners inside and outside the World Bank Group.

In another interdisciplinary innovation, ESMAP has developed the Rooftop Solar Photovoltaic Mapping Tool, a sophisticated platform that uses high-resolution stereo satellite imagery and solar irradiation data from the Global Solar Atlas to estimate

rooftop solar potential. The tool helps identify those buildings on which solar cells can be installed to generate renewable energy right where it is needed. It is publicly accessible at rooftopsolar.energydata.info.

ESMAP's Clean Cooking Fund has introduced results-based subsidies, combined with training in business development and cookstove technology, to incentivize clean cooking companies to scale up operations, particularly in underserved and hard-to-reach areas. Low-polluting cookstoves using electricity or gas are critical to fighting hazardous air pollution from cooking using open fires fueled by wood, animal dung, or similar materials. The results-based approach rewards companies for verified outcomes—such as the number of households reached—thereby reducing upfront costs for cookstoves and encouraging innovative business models.

Achieving SDG 7—sustainable electricity access for every person around the globe by 2030—is a race between the rising demand for power, particularly in Africa, and the world's collective effort to meet that demand by installing power generation and distribution systems. This is why ESMAP has seeded, and is now driving, key aspects of Mission 300 (M300), the World Bank Group and African Development Bank's transformative program for connecting 300 million Africans to power by 2030. At the core of the initiative are National Energy Compacts developed by close to 30 Sub-Saharan governments. Many of these compacts—which outline how each government plans to accelerate access to electricity and clean cooking, improve energy infrastructure, and raise private sector participation—are based on ESMAP-supported national electrification strategies and least-cost access plans. Now, during implementation, ESMAP supports Sub-Saharan Africa's transformation to cleaner and more resilient energy systems in almost every area of our work. This includes making it more feasible for African nations to generate ever more power through renewable sources, such as wind, solar, or hydropower. For this, ESMAP's Sustainable Renewables Risk Mitigation Initiative (SRMI) assists with robust planning of grid expansion and energy storage capacities, the tendering of renewable energy projects to private companies, and making such projects financially less risky—and hence more likely to move forward—by leveraging climate financing for risk mitigation tools. These efforts reduce costs for national utilities, freeing funds for grid expansion and long-term reliability of power supply.

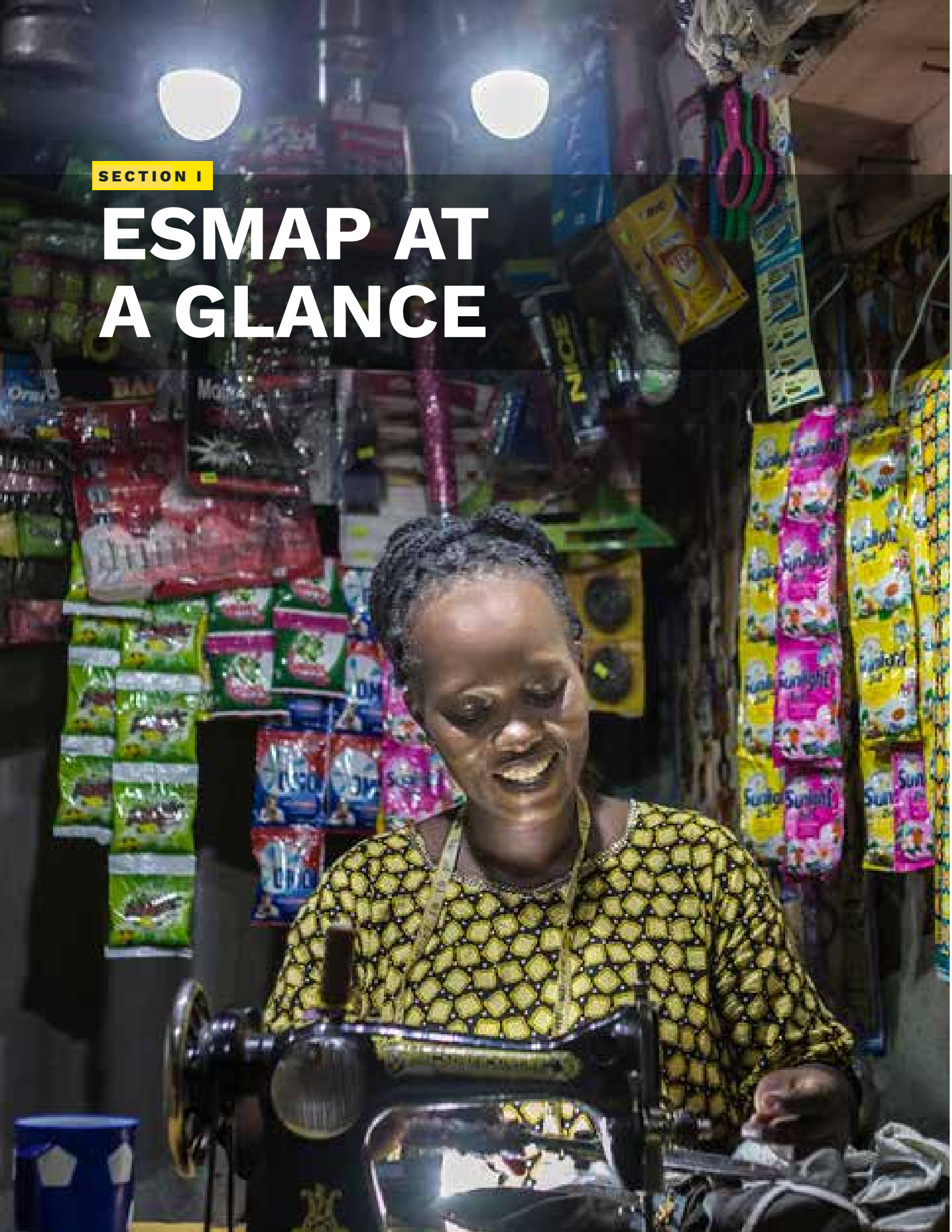
The phenomenal growth of renewable energy cannot hide the fact that more than three-quarters of global energy still comes from fossil fuels. There are only two ways to chip away at the pollution the burning of carbon generates: use energy more efficiently to reduce the need to produce as much initially and transition the energy that is used in heavy industries, transport, and elsewhere to less polluting fuels. As an ESMAP-supported study shows, two-thirds of energy is wasted globally, nearly 5 percent of global GDP. Energy efficiency is the most cost-effective solution, delivering $3 to $5 in returns for every dollar invested, along with benefits like reduced subsidies, increased employment, cleaner air, and better health. In our decarbonization work, we are taking on an ambitious project by developing a roadmap to decarbonize the steel and cement sectors of a 19,000-hectare industrial and port complex on Brazil's northwestern coast, while also supporting better industrial workplace conditions for women.

The work will inform a $1.5 billion World Bank loan package currently under preparation in collaboration with Brazilian development banks. In Rwanda, we assessed how the country's power system can support Kigali's ambitious plan to use mostly electric buses for mass transit.

The energy challenges we face—from surging data center demand to the race for universal access—require new solutions and openness to innovation. ESMAP responds with urgency, strategic curiosity, and cross-sector collaboration. We cannot do this alone. For more than 40 years, ESMAP has relied on our donors' steadfast support, their strategic guidance, technical expertise, and financial contributions. We ask donors to help us reach the ambitious funding targets set out in our 2025–30 business plan. Guided by that plan, and together with our partners, we are helping to shape a future where sustainable energy meets rising needs, creates jobs, and delivers opportunity for all.

Chandrasekar Govindarajalu
ESMAP Practice Manager

Fanny Missfeldt-Ringius
ESMAP Practice Manager



SECTION I

ESMAP AT A GLANCE

ABOUT ESMAP

ESMAP (Energy Sector Management Assistance Program) is a partnership between the World Bank Group and over 20 donors helping low- and middle-income countries deploy sustainable energy solutions to boost economic growth and reduce poverty. ESMAP is managed and staffed by the World Bank Group but funded separately by more than 20 donor governments and philanthropies. We support countries in securing universal energy access by 2030, in line with Sustainable Development Goal 7 (SDG7), while transitioning from fossil fuel energy sources to low-carbon energy solutions such as solar and wind power. ESMAP also helps countries increase their energy sectors' climate resilience. We turn evidence into action by conducting research and aggregating data to make policy recommendations and advising World Bank Group energy projects. We also make donor contributions available as grants for planning and feasibility studies or help mobilize financing from third parties, including the private sector.

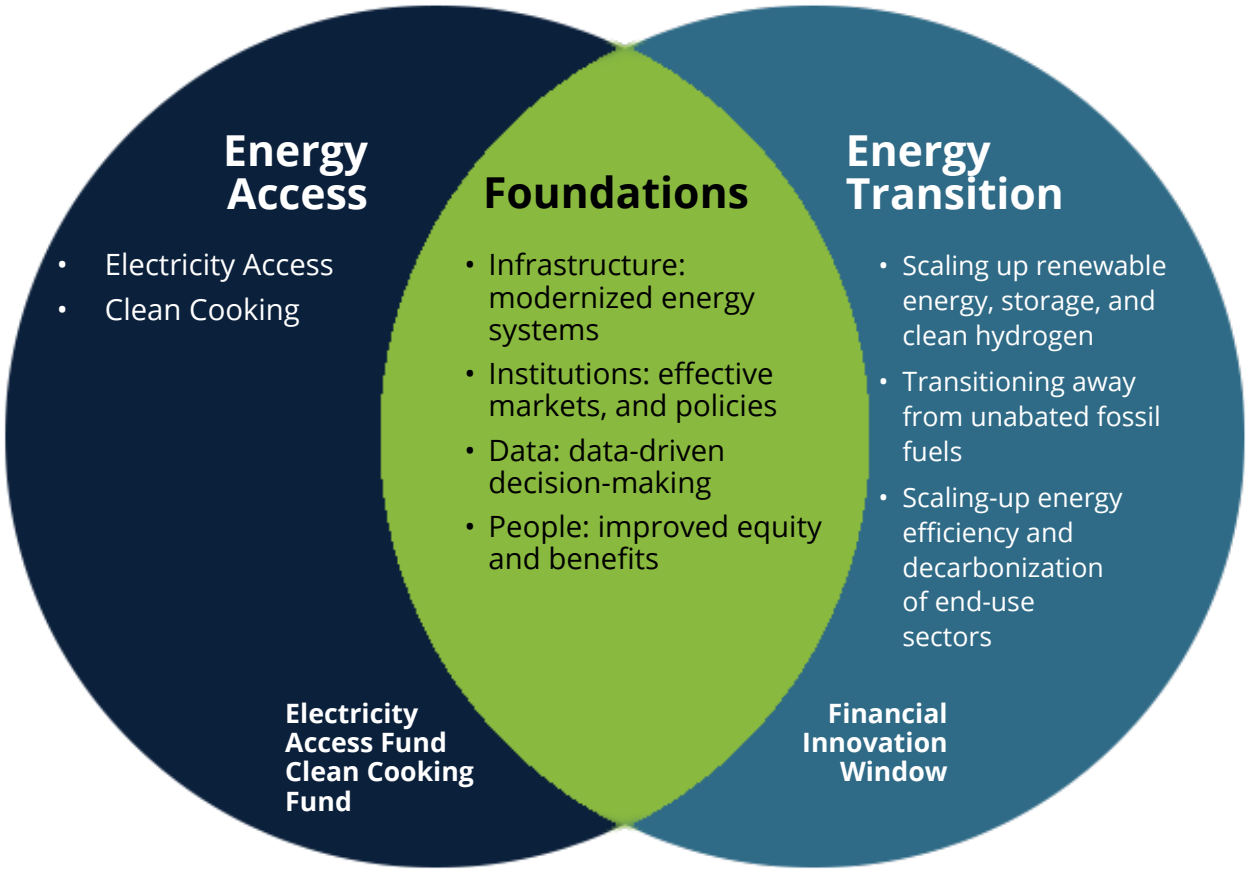
HOW ESMAP WORKS

- ESMAP carries out the following program activities:
- Provide grants and technical assistance to countries through the World Bank Group operational units.
- Monitor an active portfolio of about $441.3 million (as of June 30, 2025) supporting 390 activities globally.
- Deliver key global knowledge products for country engagements.
- Develop external partnerships with international organizations, research and development institutions, and industry associations.
- Collaborate across the World Bank Group Regional Energy units and other sectors, such as agriculture, health, water, gender, transport, environment, and urban development.
- Inform $12.7 billion in World Bank financing in FY2025.
- Help mobilize $4.5 billion in external financing in FY2025, including $1.3 billion from the private sector and $3.2 billion from other cofinanciers, including multilateral development banks.

ESMAP 2025–30 BUSINESS PLAN STRUCTURE

ESMAP is implementing a multiyear business plan (FY2025–30) structured around nine workstreams organized under three focus areas: Energy Access; Energy Transition; and Foundations for Decarbonized Energy Systems (Figure 1). The focus areas and workstreams are consistent with the World Bank Group's mission of creating a world free of poverty on a livable planet.

Figure 1: ESMAP's Areas of Focus



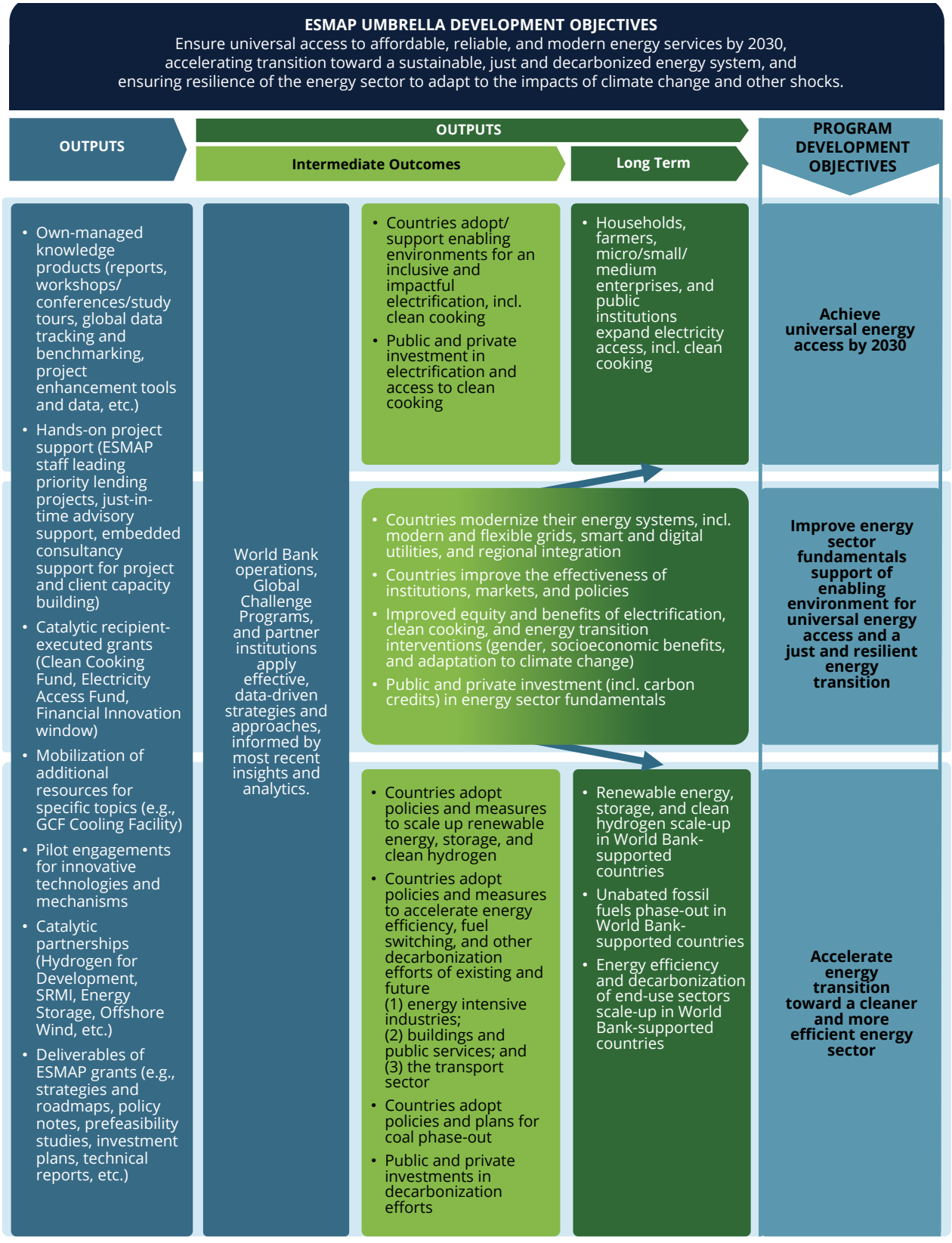
ESMAP BUDGET

The overall base budget target for the ESMAP business plan FY2025–30 is $1.1 billion, of which about $690 million is estimated to be for Bank-executed activities (primarily advisory services and analytics) and about $450 million for recipient-executed grants (primarily co-financing IBRD/IDA operations).

ESMAP THEORY OF CHANGE

ESMAP updated its Theory of Change to better achieve our new objectives. This Theory of Change (Figure 2) shows how foundational intermediate outcomes—such as supportive government policies and strategies, public and private investments, data-driven decision making, and informing the World Bank and other partner institutions in their energy sector interventions—enable higher-level results across programs.

Figure 2: ESMAP Theory of Change



CONTENTS OF THE ANNUAL REPORT

Section I of the annual report articulates how ESMAP advanced its business plan in FY2025 (July 1, 2024, to June 30, 2025) amid a difficult global context: anemic economic growth, the lasting effects of the COVID-19 pandemic, crushing debt burdens, rising fragility and conflict, and the devastating climate shocks and extreme weather (World Bank 2024).

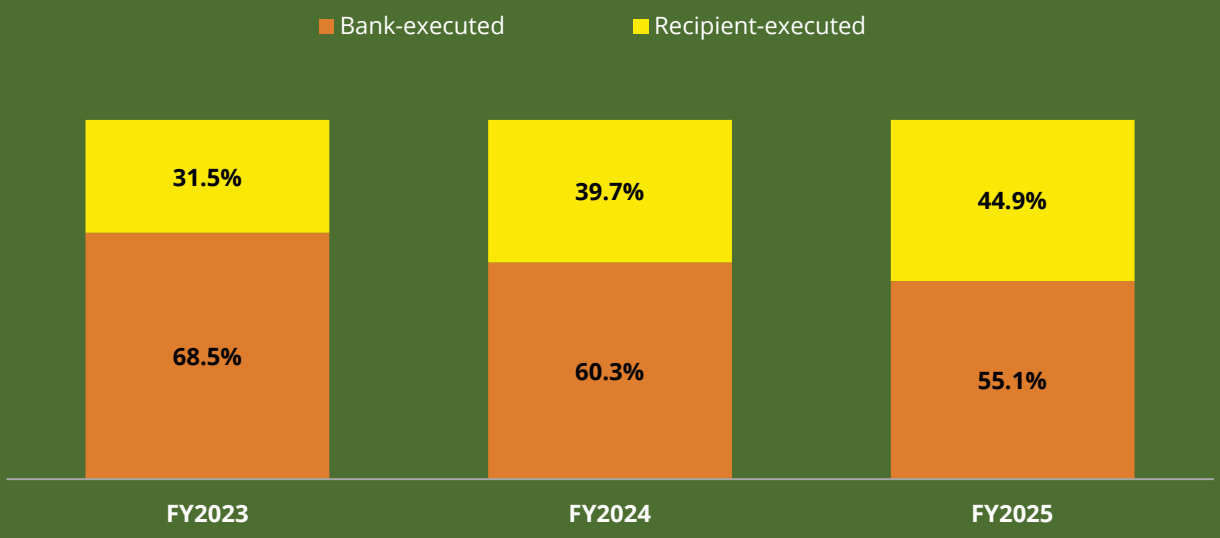
Section II follows the structure of the business plan, reporting on ESMAP activities within each focus area and its workstreams. Section III contains a financial review, including a breakdown of lending activities by region and thematic area.

BY THE NUMBERS

As of June 30, 2025, ESMAP's active portfolio totaled $441.3 million[1] and supported 390 activities in more than 108 countries across all regions, as well as global and regional activities. Of those, 104 activities were completed in FY2025. This report highlights their results and the impacts of the active portfolio.

The composition of the active portfolio during FY2023–25 (Figure 3) shows that the share of recipient-executed projects[2] continued to grow in FY2025, from $80.3 million in FY2023 to $164.3 million in FY2025. In FY2025, ESMAP approved 15 recipient-executed activities, for a total of $54.7 million. This growth aligns with the FY2025-30 Business Plan, which in its base case funding scenario aims for steady growth in Bank-executed activities, along with a near doubling of recipient-executed grants compared to the previous Business Plan. Direct access to grant funds helps increase client commitment and build their capacity to effectively implement World Bank projects, and it enables investment in innovation. This approach underpins the Clean Cooking Fund, where components are integrated into larger operations, and the Financial Innovation Window by being able to de-risk energy transition investments.

Figure 3: Share of Recipient-Executed Grants, Active Portfolio Comparison FY2023–25 (US$ million)



In FY2025, ESMAP extended $122.54 million[3] in support of the three thematic focus areas of its FY2025–30 Business Plan. Of this amount, $99.54 million was committed in new grants, with 47 percent toward Energy Transition work, 36.7 percent toward Energy Access, 10.1 percent toward Foundations, and 6.1 percent to Annual Block Grants (Figure 4). The FY2025 allocation distribution aligns closely with the Business Plan's budget shares for Energy Access and Energy Transition, while the 10.1 percent allocation for Foundations is below the target 17 percent budget share in the Business Plan.

1. Includes 15 grants ($32 million) under ESMAP's five associated trust funds and 10 recipient-executed grants ($43.6 million) pending Board approval of the associated lending project.
2. Recipient-executed projects are implemented by a third-party recipient, typically a government, for which the World Bank provides implementation support. These are active recipient-executed activities in FY2025.
3. Committed in new grants ($99.54 million) and additional funds for ongoing ESMAP grants ($23 million).

Globally, 137 new grants were established to support 80 activities in 46 countries and 57 global and regional activities. Sub-Saharan Africa received the largest share of new grants, with 54 percent of total grant amounts, and 10 percent of funds were allocated to global and regional activities. Figure 5 presents the amount of new grants by region and thematic focus area.

Of the new single-country grants established in FY2025, most funds (61 percent) benefit low-income (IDA) countries, and 23 percent benefit fragile and conflict situations (Figure 6).

Figure 4: Share of Recipient-Executed Grants, Active Portfolio Comparison FY2023–25 (US$ million)

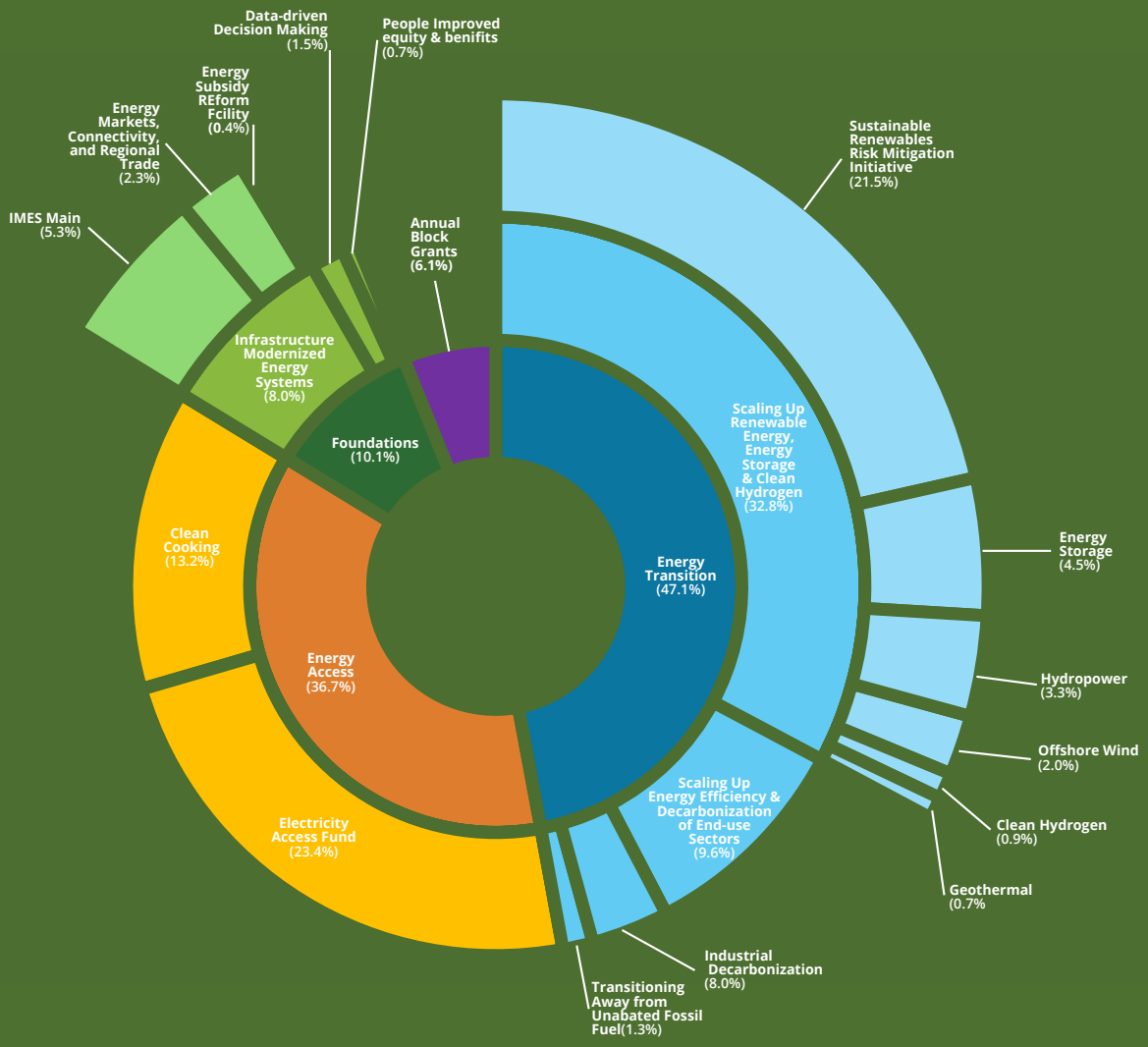


Figure 5: Total ESMAP Grant Volume by Thematic Focus Area for New Activities, by Region, FY2025 (US$, million)

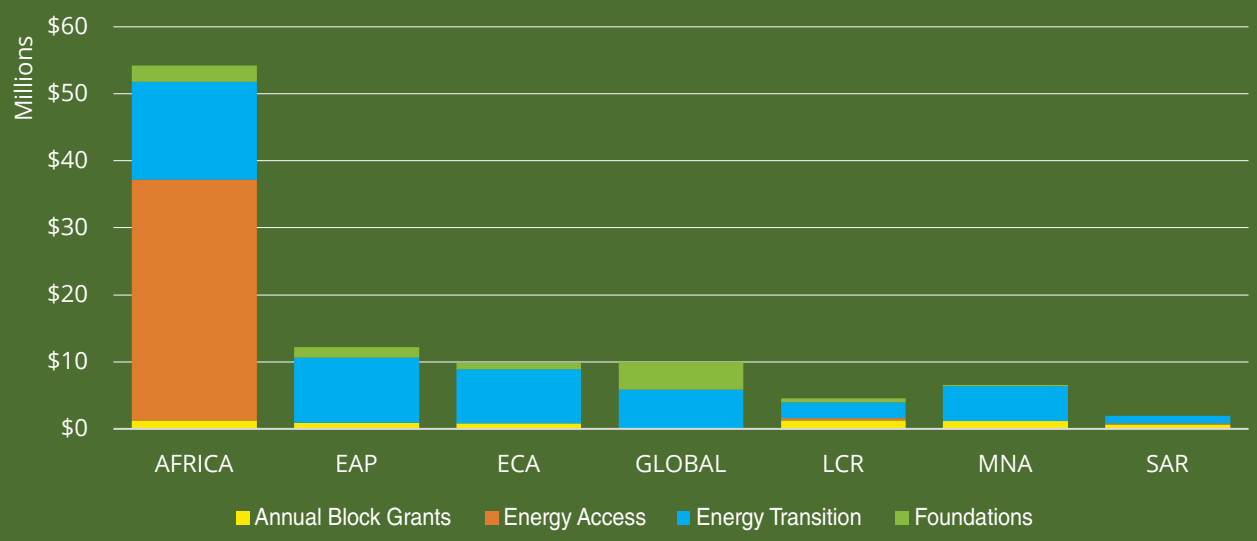
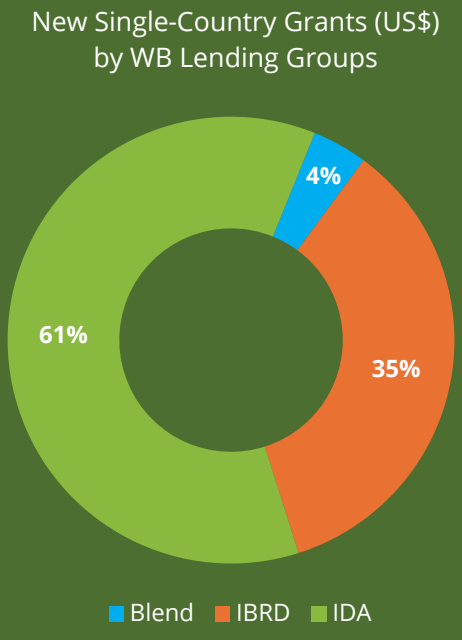
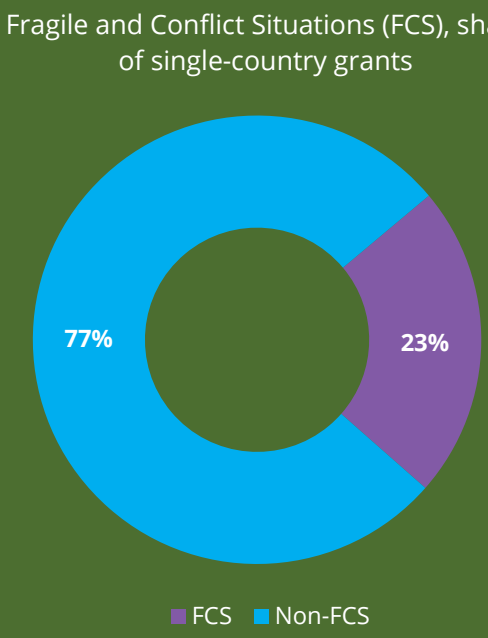


Figure 6: Country Profile of New ESMAP Grants





SECTION II

OUR IMPACT

EXPECTED RESULTS
FY2025

Based on World Bank financing and additional financing projects informed by ESMAP in FY2025

$12.7 BILLION
in World Bank development financing informed[4]

$5.5 BILLION
in Public Financing mobilized[5]

$3.2 BILLION
external financing mobilized[6]

$222 MILLION
mobilized in climate finance[7]

26 MILLION
people provided with access to electricity[8]

10.6 GW
of renewable energy capacity enabled[9]

5.45 $MtCO_2eq$
of net GHG emissions reduced per year[10]

0.3 MILLION MWh
projected lifetime energy and fuel savings is to be achieved[11]

ACTUAL RESULTS
FY2025

As reported in FY2025 by World Bank financing projects informed by ESMAP grants

21 MILLION
people provided with access to electricity

1.1 MILLION
people provided with access to clean cooking solutions

5,552 MW
of renewable energy capacity enabled

CUMULATIVE ACTUAL RESULTS
SINCE FY2021

58 MILLION
people provided with access to electricity

2 MILLION
people provided with access to clean cooking solutions

86,752 MW
of renewable energy capacity enabled

4. Volume of IDA/IBRD commitments of World Bank projects (at Board Approval) informed by ESMAP in FY2025.
5. Public financing includes contributions made by recipient governments' borrowing agencies to ESMAP informed World Bank lending projects .
6. Co-financing (multilateral and bilateral development banks, climate finance, philanthropies) mobilized by World Bank projects informed by ESMAP.
7. Financing mobilized by ESMAP-informed World Bank lending projects through entities including Global Environment Facility, Green Climate Fund, Clean Technology Fund, and Canada Clean Energy and Forest Climate Facility Trust Fund.
8. Number of people expected to gain access to electricity through ESMAP informed World Bank projects in FY2025.
9. Gigawatts (GW) the generation capacity of renewable energy to be enabled with direct support, indirect support, and/or enabling policy support through operations supported by the World Bank and informed by ESMAP.
10. Annualized estimations of net greenhouse gas (GHG) emissions are typically calculated as the difference between project emissions (aggregated over the economic lifetime of the project), and the emissions of a baseline scenario (aggregated over the same time horizon) for eligible World Bank projects. Emissions values are estimated ex-ante (i.e., during project preparation) at the project-level using approved GHG accounting methodologies.
11. Energy savings and lifetime fuel savings, achieved through energy efficiency measures that are directly attributable to operations supported by the World Bank. Projected savings are calculated against a baseline or business-as-usual scenario in the absence of the project. Savings are defined as savings for the lifetime of the intervention projected in the year it is completed.

SPOTLIGHT ON PARTNERSHIPS:
WORKING TOGETHER FOR SUSTAINABLE SOLUTIONS

ESMAP's success in advancing sustainable energy solutions is deeply rooted in its partnership-driven approach, which leverages extensive collaboration, technical expertise, and strategic alliances with a wide range of global stakeholders.

ESMAP Is a Partnership

ESMAP stands as a robust partnership platform, built on a collaborative foundation involving over 20 partners and a long history of working with the World Bank Group regions, governments, energy-focused organizations and the energy industry. It unites a broad network to collectively address sustainable energy challenges.

ESMAP Secures and Maintains Strategic Partnerships

The program actively secures and sustains high-impact strategic partnerships with organizations such as the International Energy Agency (IEA), the International Renewable Energy Agency (IRENA), Sustainable Energy for All (SEforAll), the Global Energy Alliance for People and Planet (GEAPP). Notable outcomes of these collaborations include the annual *Tracking SDG7* report, the joint ESMAP-GOGLA Off-Grid Solar biennial forum, and the joint ESMAP-Africa Minigrid Developers Association (AMDA) biennial Mini Grid Action Learning Event. ESMAP's partnership approach has been independently evaluated as highly effective, routinely meeting or exceeding its results targets.

ESMAP Creates New Partnerships

ESMAP continually fosters new partnerships to drive innovation and accelerate renewable energy solutions. Key examples include the Energy Storage Partnership (ESP) and the Hydrogen for Development (H4D) partnership. Both bring together governmental and private sector entities to share best practices and develop new tools. Thanks to the ESP, ESMAP has mobilized more than $961 million for battery storage projects, resulting in 6 GWh of committed capacity across 33 countries.

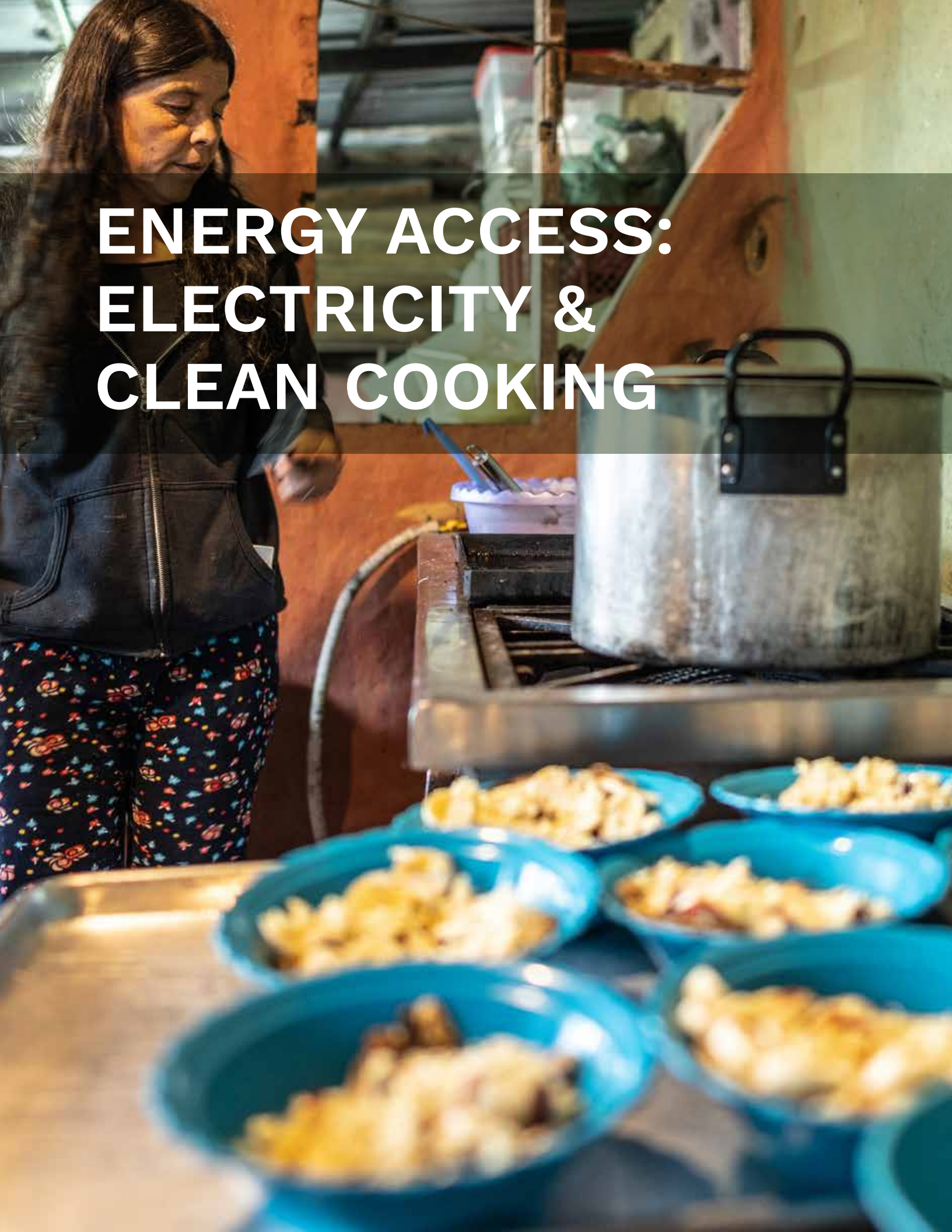
Global Off-Grid Lighting Association (GOGLA)	ESMAP's partnership with GOGLA has been a key driver of innovation, investment, and visibility in the off-grid solar sector. Together, they coproduce the Off-Grid Solar Market Trends Report (MTR), a biannual flagship publication that provides critical data and insights shaping global energy policy and investment. The 2024 edition of the report highlighted sector trends across households, businesses, and public institutions. ESMAP also supported GOGLA in cohosting in October 2024 the 8th Global Off-Grid Solar Forum, the sector's most influential gathering, which hosted 1,640 attendees from 76 countries. In addition, through the Community of Champions events, ESMAP and GOGLA have fostered high-level policy dialogue, cross-sector collaboration, and government capacity building for integrated and inclusive off-grid energy planning.
Sustainable Energy for All (SEforAll)	ESMAP's partnership with SEforALL has been pivotal for advancing the global clean cooking and energy access agenda through strategic partnerships, technical leadership, and high-level advocacy. In collaboration with the CCF and the IEA, SEforALL co-led the development of the G20 Clean Cooking Roadmap, securing clean cooking as a priority in the Rio de Janeiro Leaders' Declaration on October 31, 2024. Building on this momentum, ESMAP participated in March 2025 in the SEforALL Forum in Barbados, where it hosted a booth showcasing its activities and team members contributed as speakers across multiple sessions. In parallel, ESMAP experts have worked in synergy with SEforALL to advance public institutions electrification in target countries, most recently in Madagascar. By partnering with WHO, UNDP, WFP, and others, SEforALL continues to integrate clean cooking and energy access solutions into global policies, institutions, and financing frameworks. In addition, ESMAP collaborates with SEforALL on the Mini Grid Partnership, a key global forum hosted by SEforALL since 2018 that brings together mini grid funders (public and private), development institutions, regulators (represented by the African Forum for Utility Regulators and Club-ER), developers (represented by the Africa Minigrid Developers Association (AMDA), and governments to accelerate the deployment of sustainable mini grids.

Africa Minigrid Developers Association (AMDA)	ESMAP has served as a key early partner of AMDA, which was conceived and initially launched on the margins of the first ESMAP Mini Grid Action Learning Event (ALE), in 2018. Since then, ESMAP's partnership with AMDA has had a catalytic effect on the global mini grid sector. Together, the partners have brought a new level of data, insights, regulatory clarity, best practices, and capacity building to mini grid developers, financiers, development partners, and other key players in the sector. ESMAP and AMDA lead their partnership under an ongoing framework agreement, which covers joint work on data collection and market intelligence, technical advisory support to mini grid developers, networking, communications, and advocacy. In 2025, ESMAP again partnered with AMDA to organize the flagship 8th ESMAP ALE, which was held in Lusaka, Zambia, in April. The ALE, which has grown into the biggest global forum for mini grid stakeholders, convened over 300 participants from the government, private sector, development partners, and academia to discuss key current issues and challenges facing the sector.
Tracking SDG7	Along with the IEA, IRENA, the UN, and WHO, ESMAP is a custodian agency in tracking the SDG7 targets. Every year, the custodian agencies publish Tracking SDG7: The Energy Progress Report. The report provides the most comprehensive look available at the world's progress toward global energy targets on access to electricity, clean cooking, renewable energy, and energy efficiency. The 2025 edition informed Mission 300 (see Spotlight, page 20).
Japan International Cooperation Agency (JICA)	At the 9th Tokyo International Conference for African Development, ESMAP collaborated with JICA and other partners to organize a side event on energy access and Mission 300 in Africa. The event featured high-level government speakers and key private sector players to explore how Japan's experience and technologies can contribute to the Mission 300 agenda. ESMAP also facilitated a series of knowledge exchanges on energy access between the World Bank Group, JICA, and Japanese private sector players in preparation for the event.
The United Nations Department of Economic and Social Affairs (UNDESA) and the World Health Organization (WHO)	ESMAP's partnership with WHO and UNDESA has strengthened the integration of energy access with health and socioeconomic data, ensuring a more holistic understanding of impacts. In response to growing data limitations, a new approach paper will be developed to improve the quality of global energy access tracking. The partnership will be central to shaping this effort. At the Energy Now SDG7 Action Forum in New York, ESMAP, in collaboration with WHO, UNDESA, and UNDP, advanced global dialogue on clean cooking through the event The Global Clean Cooking Roadmap: Advances and Challenges. Organized by UN-Energy, the forum brought together hundreds of energy leaders and stakeholders to foster partnerships and share solutions. WHO contributed health-focused insights, emphasizing the importance of clean cooking for public health, while UNDESA highlighted its role in aligning clean cooking efforts with sustainable development priorities. Their engagement helped elevate clean cooking on the global agenda during the UN General Assembly high-level week.

Modern Energy Cooking Services (MECS)	ESMAP and Loughborough University partnered in an eight-year UK Aid-funded program, MECS, to accelerate the global shift to modern cooking services. This collaboration played a significant role in FY2025, including joint work with AFREC, Sustainable Scaling: Meeting the Clean Cooking Challenge in Africa and the collaboration and technical co-leadership on Roadmap for the Brazil G20 Presidency's Clean Cooking Strategy. The partnership's work provided inputs to the Brazilian Presidency of COP30. The partnership also has facilitated ongoing knowledge exchange, supporting initiatives in Tanzania, Uganda, Malawi, and Nepal by informing World Bank operations with lessons learned, pilots' results, and research results in e-cooking implementation. MECS has been successful in sharing insights, piloting new approaches, and promoting scalability for World Bank project design. MECS recently added CLASP as a key partner.
Sustainable Renewables Risk Mitigation Initiative (SRMI)	Launched in 2018, SRMI brings together the World Bank Group's ESMAP, the AFD, IRENA, International Solar Agency (ISA), and SEforALL with the ADB, AfDB, EBRD, and GIZ joining in 2023 to expand its reach and impact. SRMI supports countries in building pipelines of bankable renewable energy projects by addressing critical risks, unlocking private investment, and maximizing socioeconomic benefits. A flagship example of this collaboration is the Effective Renewable Energy Tendering in Africa program, which engaged 63 participants from 12 Sub-Saharan African countries to strengthen institutional capacity, improve tender design, and accelerate renewable energy deployment across the continent.
Energy Storage Partnership (ESP)	ESP was launched by the World Bank in 2019 to drive energy storage innovation in developing countries. Starting with 29 members across national laboratories, development agencies, industry, and philanthropies, the ESMAP-hosted ESP has grown to 59 partners. ESP has expanded its base and impact thanks to the collective efforts and shared vision of its partners. They have worked to foster technical cooperation and training, crucial for accelerating the spread of energy storage systems—including battery storage and Long Duration Energy Storage—while facilitating knowledge sharing and exchange between partners and client countries. ESP is enabling countries such as Guinea-Bissau and São Tomé and Principe, with little access to cutting-edge technologies, to learn from countries such as China and India, at the forefront of battery storage technologies.
The Hydrogen for Development Partnership (H4D)	H4D is a global initiative driving the deployment of renewable hydrogen in emerging markets and developing countries through collaboration, capacity building, and knowledge sharing. With 54 members, including research institutions, policy bodies, and industry leaders, H4D focuses on five key areas: technology, enabling frameworks, financing, socioeconomics, and industrial applications. In FY2025, H4D hosted 11+ webinars, led a North-South exchange in Tokyo, and published insights on social licensing to operate for renewable energy. H4D also released two Live Wire papers on decarbonizing fertilizers and hydrogen safety, and a bilingual guidebook on policies and regulations governing the import of hydrogen and derivatives in the EU.

Offshore Wind Development Program and the Global Wind Energy Council (GWEC)	The ESMAP-IFC Offshore Wind Development Program and GWEC form a strategic partnership to accelerate offshore wind deployment in emerging markets. GWEC, representing the wind energy sector in over 80 countries, brings global industry expertise to support ESMAP's mission of unlocking offshore wind potential in low- and middle-income nations. In 2025, this partnership delivered knowledge sharing through reports such as Making Offshore Wind Work and The Strategic Value of Community Benefits, alongside regional workshops and webinars in Asia Pacific, Europe, and Latin America. These initiatives provided technical assistance, policy guidance, and financing strategies to help governments develop bankable offshore wind projects.
SDG7 Gender Data Partnership	Following representation at the United Nations General Assembly/SDG7 Forum 2024 and side discussions with UN agencies and civil society, a coalition of partners was established to develop a 2025 High-Level Political Forum Policy Brief on Gender Equality. It was the result of collaboration between the SDG7 custodian agencies (IEA, IRENA, ESMAP/World Bank, UNSD, WHO), UN Women, and the co-conveners of the Gender & Energy Compact (UNIDO, ENERGIA, SEforALL, GWNET) and was guided by the UNDESA-led multi-stakeholder SDG 7 Technical Advisory Group. The policy brief highlights the critical interlinkages between SDG7 (affordable and clean energy) and SDG5 (gender equality) and offers a strategic global framework for embedding gender indicators into energy sector planning and implementation. The brief aimed to contribute to the final review of SDG5 at the 2025 High-Level Political Forum (HLPF) and will be an input to the review of SDG7 at the HLPF in 2026. It was launched as a side event during the intergovernmental HLPF in July 2025, with follow-up technical discussions aimed at the UN General Assembly/SDG7 Forum in September 2025.
Women in Energy Networks • **WePOWER** • **RENEW MENA** • **WEN-Africa**	WePOWER, RENEW MENA, and WEN-Africa are regional networks supported by ESMAP and dedicated to increasing women's participation and leadership in the power sector workforce. The networks continue to expand both in scale and independence, totaling more than 100 member organizations. In calendar year 2024 alone, WePOWER partners implemented 5,891 gender-focused initiatives, reaching 72,678 girls and women. That same year, RENEW MENA implemented 363 activities benefiting 4,541 females. For WEN-Africa, the youngest of the networks, the first half of 2025 saw a milestone achievement, with partners collectively implementing 695 activities that reached over 18,000 female beneficiaries. In recognition of its significant regional impacts, both RENEW MENA and WePOWER received an award, in FY2024 and FY2025, respectively, from their respective World Bank Regional Vice Presidencies.

The Regulatory Energy Transition Accelerator (RETA)	RETA, launched at COP26, is a global platform bringing together over 60 regulators and networks to accelerate the energy transition. The World Bank through ESMAP has joined RETA as a founding partner. A highlight of the partnership is the joint work with IEA and IRENA on three technical guidelines on institutional architecture, transmission pricing, and grid codes for cross-border power trade—an agenda of strategic importance to the World Bank in the energy sector. In 2025, ESMAP published the transmission pricing guidelines, with key findings highlighted at the RETA Roundtable in June, reinforcing the vital role of regional integration in promoting energy access, affordability, and sustainable development. See the RETA website for more details.
Green Climate Fund (GCF)	The GCF Cooling Facility, managed by ESMAP and the World Bank Climate Finance Unit, supports countries in adapting to the impacts of a rapidly warming world through low-carbon efficient cooling solutions. The facility, approved in October 2021, mobilizes $157 million with a multisector and multicountry financing mechanism to help address the key sustainable development challenge of providing access to cooling while minimizing negative climate impacts of increased demand for cooling. The facility supports projects in nine countries across various regions, in a range of cooling areas in grid or off grid contexts: (1) space cooling and cool/green surfaces (including passive cooling strategies); and (2) refrigeration, cold chains, and logistics (including refrigeration, storage, and distribution activities, along with associated equipment and logistics). SRMI-Resilience, the second phase of the SRMI Facility, approved March 16, 2023, mobilizes $160 million and aims to support the energy transition in nine developing countries by increasing access to affordable, reliable, modern, and sustainable electricity. The project will help these countries—least-developed countries, small island developing states, and Africa states—develop their energy transition programs and uphold solid procurement processes needed to crowd-in private investments for future renewable infrastructure. The project is an example of how developing countries can level market disadvantages and bring in private sector financing for cleaner and more sustainable energy sources.
Climate Funds	ESMAP partners with energy-focused climate funds to mobilize and scale up climate finance, accelerating the energy transition in developing countries. This includes collaboration with major funds such as the Climate Investment Funds—through flagship programs like Renewable Energy Integration and the Industrial Decarbonization Program—as well as the Green Climate Fund, the Global Environment Facility, and the Canada–World Bank Clean Energy and Forests Climate Facility (CCEFCF).
Climate and Clean Air Coalition (CCAC)	Air pollution is taking a heavy toll on people and economies around the world. ESMAP presented an effective roadmap for achieving cleaner air, through its global flagship report *Accelerating Access to Clean Air for a Liveable Planet*. ESMAP focused on highlighting the contribution of residential cooking and heating to poor ambient air quality. In this ongoing effort, ESMAP and CCAC share an effective partnership. CCAC is a voluntary partnership of over 200 governments, intergovernmental organizations, and nongovernmental organizations targeting mitigation and adaptation actions within countries and sectors.



ENERGY ACCESS: ELECTRICITY & CLEAN COOKING

Access to modern, reliable, and affordable energy is essential for ending poverty and driving inclusive growth. Yet, while global electricity access increased from 87 percent in 2010 to 92 percent in 2023, 666 million people still lack access. Progress also remains highly uneven: Sub-Saharan Africa faces the steepest challenge, accounting for 85 percent of the global access deficit, while access in fragility, conflict, and violence situations (FCV) has worsened in recent years, with the number of people without electricity increasing from 422 million in 2021 to 427 million in 2023 (World Bank 2025).

The pace of adding new connections must accelerate to achieve universal access by 2030, and Mission 300—the World Bank Group and African Development Bank (AfDB)-led effort to electrify 300 million people in Africa by 2030—has injected fresh momentum into meeting this goal. Closing the gap requires recognition of the diverse geographies that still face energy access deficits, which include remote areas, rapidly expanding peri-urban populations, and grid-connected but underserved communities. Addressing their varied needs demands sustained, targeted, and context-specific interventions that combine grid, mini grid, and off-grid renewable energy solutions. Decentralized renewable energy (DRE) systems are particularly critical in these contexts, providing the least-cost, fastest, and most resilient path to reach remote and FCV populations, where grid expansion remains prohibitively expensive. For communities near the grid, DRE can also support grid expansion and bolster grid performance.

More also remains to be done to provide the global population with clean cooking: about 2.1 billion people cook using open fires or inefficient stoves fueled by kerosene, wood, animal dung, crop waste, or coal. This generates harmful household air pollution, leading to an estimated 3.2 million deaths per year in 2020, including over 237 000 deaths of children under age 5 (WHO 2024). In addition to affecting individuals' health, these practices also have environmental repercussions, contribute to climate change, and intensify gender inequality.

Noticeable advancements have been made in expanding access to clean cooking appliances powered by greener energy sources, including solar power, biogas, ethanol, and cookstoves using liquefied petroleum gas (LPG). Globally, these solutions now account for 71 percent of primary cooking fuels, reflecting an increase from 62 percent in 2020. There are clear synergies between the deployment of new electricity access solutions and access to clean cooking. Unfortunately, this also means that, as for access to electricity, progress in access to clean cooking has been uneven.

The number of people without access to clean cooking has continued to rise, at a level of 14 million people yearly in Sub-Saharan Africa due to population growth and economic challenges. Clean cooking has gained political momentum and become more visible to policymakers. However, funding for the solution has not yet substantially changed.

ESMAP ENERGY ACCESS PROGRAM

ESMAP plays a critical role in the World Bank's global effort to close the electricity access gap and accelerate progress toward SDG7—which also lays the groundwork for progress across multiple SDGs, including improved health services, educational outcomes, economic development, and climate resilience. Through its Energy Access Program, ESMAP provides technical assistance, data, implementation support, and catalytic financing to help governments design least-cost electrification plans, attract private investment, and implement innovative delivery models for both electricity and clean cooking.

Among wide-ranging global efforts to expand sustainable energy access, ESMAP has been a driving force behind Mission 300 (see Spotlight on Mission 300, pp. 20-28), supporting the implementation of this goal through its Electrifying

Africa platform. In FY2025, Electrifying Africa supported activities focused on productive uses of energy, household access surveys, tariff and utility reforms, digitalization, gender equality, and capacity building—helping countries translate their commitment to universal access into national action.

ESMAP also advanced global knowledge and innovation through its own-managed analytical work and flagship initiatives—including the *Tracking SDG7* and the *Off-Grid Solar Market Trends* reports, the E-Waste Management Toolkit, the Distributed Renewable Energy Atlas, and the End User Subsidy Lab. These resources informed policy and investment decisions, helping countries scale up least-cost and inclusive energy access solutions.

ENERGY ACCESS WORK STREAMS

In FY2025, ESMAP shifted to a beneficiary-focused strategy for its energy access initiatives, aiming to more effectively address the diverse needs of various target groups. A move from technology-led interventions, this approach centers on people and the energy services they need, ensuring that energy investments deliver measurable social, economic, and environmental impact.

- **Energy Access for Households** | Expanding affordable and reliable access through grid, mini grid, and off-grid systems.
- **Energy Access for Income Generation** | Enabling productive uses of energy to support livelihoods, small businesses, and job creation.
- **Energy Access for Human Capital Development** | Delivering reliable power to schools, health centers, and essential services.

ESMAP CLEAN COOKING FUND

At the 2019 UN Climate Action Summit, ESMAP launched the Clean Cooking Fund (CCF)—the first such fund to increase investments in the clean cooking sector, with a funding ambition of $500 million. The fund aims to scale up public and private investments by co-financing with multilateral development banks, catalyzing technology and business innovation, and linking incentives to verified results. In FY2024, ESMAP launched CCF 2.0, which replicates and expands technical support for the timely design and implementation of projects, develops new replicable instruments for hard-to-reach populations with no or low income, and coordinates resources to bridge the gap between the clean cooking knowledge ecosystem and demand in the field.

The CCF provides:

- **Upstream support** by integrating clean cooking into World Bank strategy documents, such as Energy Compacts, Country Climate and Development Reports, and Systematic Country Diagnostics that guide Country Partnership Frameworks.
- **Midstream support** by providing data, tools, technical advice, and operational design.
- **Downstream support** by co-financing World Bank lending operations.

ESMAP ENERGY ACCESS KEY ACHIEVEMENTS FY2025

- 26 million people are expected to gain access to electricity through ESMAP-supported projects
- 1.1 million people gained access to clean cooking solutions through World Bank projects informed by ESMAP
- 645,000 people are expected to gain access to clean cooking by 2030 through CCF-co-financed operations in Malawi, under the ASCENT Regional Platform
- 1.5 million* people benefited from targeted interventions aiming to reduce gender inequalities, including efforts to boost women's access to economic opportunities, because of ESMAP-financed operations support
- $32.4 million was allocated across 19 country grants focused on energy access initiatives by ESMAP
- 29 National Energy Compacts were launched with ESMAP support under Mission 300
- 400 health facilities and schools gained access to electricity in Sierra Leone
- 6 analytical publications were produced, including the *Off-Grid Solar Market Trends Report 2024* and *Off-Grid E-Waste Management Toolkit*
- ESMAP co-created the Brazil Presidency Clean Cooking Roadmap and the African Commission Report *Sustainable Scaling: Meeting the Clean Cooking Challenge in Africa*
- Major knowledge-sharing events were convened: the Off-Grid Solar Forum and Expo (Nairobi) and the Mini-Grid Action Learning Event (Lusaka)

* Calculated by the World Bank Outcomes Measurement Department using gender-tagged World Bank energy projects informed by ESMAP.

SPOTLIGHT ON MISSION 300

ESMAP: THE STRATEGIC ENGINE BEHIND MISSION 300

Sometimes it is the people or organizations in the background that make all the difference. For Mission 300, the World Bank and African Development Bank initiative to connect 300 million people in Africa to electricity by 2030, ESMAP is one of those influential actors behind the scenes. For more than 20 years, ESMAP has been conceiving, championing, and implementing game-changing solutions that transform millions of lives by closing the energy access gap.

Today, ESMAP is championing delivery of concrete solutions that make a difference on the ground. Take mini grids: small, localized electricity networks—often powered by renewable energy—that generate, distribute, and manage power reliably for underserved communities and businesses. ESMAP has been pivotal in advancing mini grids—shaping cutting-edge knowledge, derisking innovation, and driving implementation. For example, the *Mini Grids for Half a Billion People Handbook* provides a practical toolkit to help implement smart regulations, make projects bankable, and mobilize financing at scale. In places like Nigeria, where interconnected mini grids are redefining what is possible, ESMAP's experts support World Bank teams at every project stage—from design and tendering to execution and scale-up—turning knowledge into action and partnerships into electrification for millions.

> *"Mission 300 would not exist without ESMAP. ESMAP has been a critical enabler of Mission 300 and plays a central role by providing technical expertise, grant funding, data, and innovative solutions to expand energy access across Africa."*
>
> **Ousmane Diagana**, Vice President for Western and Central Africa

Incubating Mission 300: Building the Foundation

ESMAP's longstanding commitment to energy access has shaped the DNA of Mission 300. Moving from defining concepts and working closely with governments in support of national electrification strategies and least-cost access plans, to mobilizing financing for projects and promoting innovative solutions. A causal example is ESMAP's game-changing Multi-Tier Framework, which defines how the quality of energy access that populations are enjoying is measured today. By moving beyond the traditional binary categorization of people either having or not having access to power, it assesses energy access across multiple tiers, capturing the quality, reliability, capacity, and affordability of the energy services households receive.

Funding the Change

Through the generous support of its donors, ESMAP has financed Mission 300 projects and funded technical assistance. ESMAP is one of the top sources of external financing for Mission 300, having provided $71 million (October 2025) in co-financing for World Bank investment projects. In addition, through the Electrifying Africa Program, ESMAP plans to channel $52 million by the end of FY2027 to activities that are linked to and promote the Mission 300 agenda. So far, ESMAP has committed $32.7 million to support advisory and analytical work as well as lending operations in Africa. By 2027, ESMAP, through the Electrifying Africa program plans to enable new or improved electricity access for over 150 million people.

One of the World Bank's largest energy access initiatives to date is ASCENT—Accelerating Sustainable and Clean Energy Access Transformation. The project is designed to accelerate access to sustainable, clean energy for 100 million people in up to 20 countries across Eastern and Southern Africa by 2030. It leverages $5 billion in IDA financing and mobilizes an additional $10 billion from public and private partners. ESMAP prepared the way for this first-of-its-kind $15 billion regional program by providing $15 million from its Electricity Access Fund and $4 million from its Clean Cooking Fund. Of this, about $12 million is allocated to launch a regional Results-Based Fund jointly with the regional African Trade and Development Bank to attract private investment and expand access in remote areas. IFC's Zafiri $300 million investment facility—long-term equity financing for distributed renewable energy companies that serve remote communities—also benefited from an additional $5 million in seed funding from ESMAP. These investments have accelerated project preparation, program support, investment leveraging, and on-the-ground implementation across the continent.

These and other tangible results delivered by ESMAP contribute to Mission 300. The Uganda Electricity Access Scale-Up Project (EASP)—which received ESMAP support to design a results-based financing program with

end-user subsidies, is a great example. Approved in March 2022, and as of October 2025, EASP has connected approximately 1.8 million people via off-grid solar and 800,000 via grid connections; supported over 2,300 productive uses of electricity, mostly solar water pumps and solar refrigeration for farmers and micro, small, and medium enterprises, ensuring job creation and increasing income in areas outside the grid and mini grid networks; and reached approximately 810,00 people through 172,000 clean cooking solutions, such as electric pressure cookers (EPCs) and liquefied petroleum gas (LPG) stoves. ESMAP supported the design of EASP's innovative performance-based electricity service model to crowd in private investment to electrify public institutions such as health centers and schools. To date, 45 schools have awarded contracts to three private providers, who install and operate solar systems and are compensated quarterly based on remotely monitored key performance indicators. This model is expected to provide reliable, sustainable electricity service to schools and health facilities.

Moreover, a $4.35 million ESMAP grant provided technical assistance to start the $750 million Nigeria Distributed Access through Renewable Energy Scale-up (DARES) project—a transformative initiative led by the Nigerian government in partnership with the World Bank and other development partners. It is designed to significantly expand access to clean, reliable electricity across Nigeria, especially in underserved and rural communities.

Comprehensive Support: Beyond Financing

While ESMAP's financial support is critical, the program's support extends beyond dollar contributions. ESMAP offers technical assistance through its own staff and a roster of sector-leading experts who work together with World Bank country task teams and governments to design and scale projects based on global best practices. Its expertise helps countries craft impactful electrification plans, accelerating progress toward universal access.

ESMAP's support to African countries on electrification strategies, least-cost plans, policy reforms, and other technical assistance achieved major milestones with the announcement of 12 National Energy Compacts at the Africa Energy Summit in January 2025 and the launch of 17 additional National Energy Compacts at the United Nations General Assembly in September 2025. These compacts outline each country's roadmap to achieve energy access goals by 2030, including clean cooking and renewable energy generation components. All compacts share a common structure focused on policy reforms in five priority areas: (1) expanding generation and transmission at a competitive cost; (2) promoting regional integration; (3) scaling last-mile access; (4) enabling private sector participation; and (5) improving utility financial viability. These reforms are critical to building trust in the energy sector and catalyzing private investment.

For clean cooking, upstream work—such as national strategy support, market assessments, and inputs from Country Climate and Development Reports—has been instrumental in shaping countries' clean cooking commitments.

Furthermore, ESMAP through its Sustainable Renewables Risk Mitigation Initiative (SRMI) has been systematically supporting the expansion of power generation in a clean, reliable, and resilient manner through renewable energy competitive tenders, and in so doing, helping reduce the costs to utilities and improving their financial viability in the long run. Lower generation costs allow utilities to expand the grid and improve the reliability of power supply.

A Knowledge Hub for Innovation

As a global knowledge hub, ESMAP produces cutting-edge research, distills market data, and provides practical insights that drive innovation in the energy sector. ESMAP's reports and studies are widely recognized for their rigor and relevance, guiding policymakers and practitioners in designing effective energy access strategies. ESMAP publishes the *Off-Grid Market Trends Report* every two years, which, due to close cooperation with off-grid companies, provides a clear picture of the state of investments in the sector. In collaboration with the International Energy Agency (IEA), the International Renewable Energy Agency (IRENA), the United Nations Statistics Division, and the World Health Organization (WHO), ESMAP funds and publishes the *Tracking SDG7* report, which presents the state of electrification worldwide.

Innovation is at the center of ESMAP's work.

ESMAP has also pioneered tools and strategies such as geospatial mapping for least-cost electrification planning like the Global Electrification Platform and the End User Subsidy Lab. The lab has helped countries introduce results-based financing to incentivize private solar companies to scale up operations, particularly in underserved and hard-to-reach areas.

In FY2025, ESMAP, in collaboration with IFC, funded the Distributed Renewable Energy Atlas, a publicly accessible and interactive platform offering comprehensive data on settlements in 58 countries. Designed for easy navigation, it empowers users to make informed investment decisions by providing detailed insights into communities' potential suitability for the deployment of distributed renewable energy solutions. For example, it was used to inform ASCENT mini grid, off-grid, and grid electrification data, including (un)electrified populations, technology mix, investment needs, and equity and debt estimates. Similarly, it is used for the Regional DARES project under preparation.

Donor Contributions: The Core of Success

Donor contributions are vital to Mission 300's success. ESMAP works closely with its donors, ensuring that every dollar is used effectively and transparently. The program's ability to attract and manage donor funding has been central to its achievements. With ESMAP's direct, long-term support, the World Bank portfolio of projects with distributed renewable energy components has grown from millions to billions over the past decade.

A Call to Action: Channeling Support through ESMAP

With ESMAP's instrumental support, Mission 300 is on track and has enabled electricity access for 32 million people, as of October 2025.

Energy access not only supports households—it also means electrifying schools, health centers, and other public services and strengthening human capital for tomorrow's workforce. These efforts go beyond access; they are the bedrock for creating job opportunities and fostering sustainable development across Africa.

ELECTRIFYING AFRICA

Approved in April 2023, Electrifying Africa is an ESMAP-funded program dedicated to accelerating the expansion of electricity access throughout Sub-Saharan Africa. The program is designed to address the longstanding barriers that are keeping 666 million Africans without electricity connection.

- Electrifying Africa is specifically structured to address key challenges, such as:
- Developing comprehensive electrification strategies and implementation plans
- Bridging policy and regulatory gaps to attract greater private sector investment
- Enhancing the financial viability and operational performance of power utilities
- Strengthening institutional capacity among implementing agencies
- Promoting affordability and increasing access to finance for households and businesses
- Fostering cross-sector collaboration and improving donor coordination

Over 60 percent of its activities contribute to the current World Bank Group project portfolio, with nearly 30 percent supporting new lending preparation.

Since FY2024, the Electrifying Africa program has provided $32 million in catalytic grants to boost energy access in Sub-Saharan Africa.

The Relationship Between Electrifying Africa and Mission 300

Electrifying Africa was a precursor to Mission 300, laying the foundation for its ambitious goals. While Mission 300 provides an overarching strategic framework for accelerating electrification in Sub-Saharan Africa, Electrifying Africa serves as an enabling platform to operationalize Mission 300.

Ways in which Electrifying Africa supports Mission 300 include:

Supplying technical assistance and analytical insights, enabling countries to develop effective, actionable plans for expanding electricity access. Financing and facilitating the development of Mission 300 Compacts and National Energy Compacts—structured roadmaps for achieving universal access

- Supporting the Mission 300 tracker progress portal to systematically measure connections and progress

ESMAP, through Electrifying Africa, was a key partner in the delivery of the Mission 300 Africa Energy Summit, held in Dar es Salam, Tanzania, in January 2025.

MISSION 300 IN NIGERIA: AN INTERVIEW WITH ASHISH SHRESTHA

Insights from the Co-Task Team Leader of the Nigeria DARES Project

> *I serve as co-task team leader on the Nigeria Distributed Access through Renewable Energy Scale-up Project, known as DARES. This initiative stands as one of the single largest contributors to Mission 300, with a bold objective: to provide 16.2 million Nigerians with new electricity connections and to improve access for another 1.3 million by the end of 2028. Our vision is to transform the energy landscape by deploying distributed renewable energy (DRE)—think interconnected mini grids, isolated mini grids, mesh grids, standalone solar systems, and productive use of energy appliances for critical needs like water pumping and cooling.*

> *To achieve these goals, we engage the private sector by providing results-based grant financing to DRE companies that mobilizes over $1 billion in private capital. While IDA provides the core funding, much of the project preparation—an essential but often overlooked stage—is financed by ESMAP, which has contributed $4.35 million for preparatory work.*

> *This preparation is crucial. It covers a wide range of activities: from comprehensive market assessments to the design of subsidy programs, geospatial analyses, and cost benchmarking. These elements, all supported by donor funding, ensure the government can avoid using IDA funds for analytics and advisory support, freeing up those resources for investments. It is fair to say that without ESMAP, DARES would not have existed.*

“As one of two co-task team leaders, I officially dedicate 50 percent of my time to managing the project, though in reality, the work demands far more. DARES is not just a single project—it’s a mosaic of initiatives, each with its own teams and objectives. I oversee groups focused on mini grids, solar home systems, productive use of energy, and electrification of public institutions. Each team has a designated lead, and we coordinate through weekly meetings to ensure all components progress in harmony.

“A central tool for our project management is the Odyssey platform. This digital environment streamlines critical processes: soliciting applications, technical and financial modeling, processing subsidy claims, and overseeing disbursement of funds. Additionally, we have developed the DRE Atlas—a geospatial platform launched in June—which helps map out the potential for deployment of distributed renewable energy. A customized instance of the DRE Atlas has become a cornerstone for government planning and strategic decision making in Nigeria.

“We are now about 10 months into implementation and are starting to see the results on the ground, with about half a million people provided with new electricity access through solar home systems and 313 mini grid projects actively under development. Results have not yet reached the scale that we envision, as the early part of a program like this involves extensive due diligence and onboarding the private sector participants that will be responsible for electricity service delivery. Setting up the systems for verifying outputs, such as integration with smart meters and customer relationship management software of companies, and disbursing funds are also prerequisites for rolling out a results-based financing program. With these in place, we believe that we will soon see a rapid scale up in the pace of electrification under DARES. The DRE companies involved are eager to deliver. “Looking ahead, we are optimistic. One hundred nineteen mini grid developers and 31 standalone solar companies have already been accredited into the program, a positive sign that the private sector sees real opportunity in our model.

“Looking ahead, we are optimistic. One hundred nineteen mini grid developers and 31 standalone solar companies have already been accredited into the program, a positive sign that the private sector sees real opportunity in our model. Another positive sign is the preponderance of emerging indigenous companies in the pipeline, which suggests a growing domestic capacity and appetite for renewable energy solutions.”

THE CRITICAL ROLE OF ESMAP IN MISSION 300: AN INTERVIEW WITH TATIA LEMONDZHAVA

Insights from the Co-Task Team Leader of the Regional DARES Program

> *Let me begin by saying that virtually all of ESMAP's energy access work is now intertwined with Mission 300. Through every initiative we undertake—whether it's providing grants to support lending operations or our ongoing technical advisory—the ultimate goal is to help realize Mission 300's vision. Our team has assembled a dynamic roster of world-leading mini grid expert consultants, each one directly involved in both our pipeline and our ongoing projects. Their expertise is pivotal: they provide hands-on advisory support to projects, which can encompass everything from review of technical design, to support with conceptualizing implementation arrangements, providing feedback on draft regulations, facilitating dialogue with key public and private-sector stakeholders, and many other critical tasks. With the support of our consultants, and our own in-house expertise, we are able to work hand-in-hand with our lending*

> *Knowledge creation is also a cornerstone of our approach. This fiscal year alone, we've produced and are preparing several publications that directly support Mission 300. For example, we recently released a report called Mini Grid Solutions for Underserved Customers: New Insights from Nigeria and India, co-authored by Ashish Shrestha and two of our leading mini grid experts—Bernard Tenenbaum and Chris Greacen. This study is particularly significant because it brings forward real-world experiences from the very cutting edge of knowledge on interconnected mini grids in Nigeria—an area at the core of our energy access work. Reports like this solidify ESMAP's reputation as a thought leader and innovator, especially on topics like mini grids, where we're very much at the frontier of innovation.*

“Personally, I’m proud to be co-leading the Regional DARES project, which stands as a flagship pipeline under Mission 300. The scope and ambition here are considerable. We’re talking about a $450 million multi-phased program designed to create regional economies of scale and draw in private sector interest from companies who might otherwise overlook smaller markets. In the first phase, we’re working with Benin, Central African Republic, Chad, Guinea, Liberia, and Sierra Leone. Once the project is launched, which we hope will be within the year, our aim is to bring electricity access to 9 million people across these initial countries.

“In the second phase, the program will expand to include countries like Côte d’Ivoire, Cameroon, The Gambia, Guinea-Bissau, Ghana, Mauritania, Congo, and Senegal. The real ingenuity of Regional DARES is its multi-phased, regional approach. By pooling demand and fostering a larger market, we can attract companies with the promise of significant regional tenders—tenders that allow them to leverage their own operating models and economies of scale. This is a compelling way to encourage investment in markets that are often considered too small or risky on their own.

“Our approach also incorporates innovative concepts such as technology-neutral tenders. The goal here is to let companies propose whatever technology they believe is best suited for each local context, whether that’s mini grids, standalone solar systems, or a blend of both. This flexibility means solutions can be tailored to the unique needs of each community.

“Currently, every preparatory step under Regional DARES is supported by ESMAP, primarily through our special vehicle, Electrifying Africa. With ESMAP funding, I’m also procuring several additional consulting contracts to support project implementation down the line.

“It’s also important to mention that ESMAP’s support extends beyond World Bank operations to key sector partners. This is the case, for example, for the Africa Minigrid Developers Association (AMDA), where ESMAP is one of the earliest and largest funders. AMDA is the only industry association for mini grids on the Sub-Saharan continent, and their role as a market convener and sector advocate cannot be overstated. We’ve championed AMDA since their inception at our first Mini Grid Action Learning Event in 2018; their leadership, comprised of Africans representing both African and international companies, ensures the sector’s voice is authentic and impactful.

“Another crucial partner is the African Forum for Utility Regulators, which has become increasingly active in shaping mini grid regulations. We’ve worked closely with them to help them peer review and subsequently socialize important tools, such as the Mini Grid Regulatory Tool and the Mini Grid Tariff Tool—resources that are now being integrated across our projects and within Mission 300 teams.

“Finally, ESMAP is an integral member of the Mini Grid Partnership and the Mini Grid Funders Group—two major global platforms where the sector’s most important stakeholders collaborate. Through these networks and our own direct interventions, ESMAP continues to play a critical, catalytic role in advancing energy access across Sub-Saharan Africa, always with Mission 300 at the forefront of our agenda.”

ENERGY ACCESS FOR HOUSEHOLDS

Reliable household electricity access is the foundation for inclusive growth and social development. Yet, hundreds of millions of people—largely living in hard-to-serve areas and facing acute affordability constraints—still live without it. To address this, ESMAP supports World Bank clients in designing and implementing least-cost national electrification strategies that integrate grid and off-grid renewable solutions, often using results-based financing and end-user subsidies, which directly reduce the upfront cost for low-income consumers.

In FY2025, ESMAP-supported operations expanded electricity access to an estimated 21 million people globally, mobilizing more than $450 million in private capital for household electrification. These programs demonstrate how combining DRE solutions with grid expansion can deliver faster, more inclusive progress, particularly in remote, fragile, or underserved areas.

ESMAP's analytical tools—such as the Distributed Renewable Energy Atlas, the Multi-Tier Framework, and the End User Subsidy Lab—continue to guide governments in identifying least-cost pathways, targeting subsidies, and improving the quality and reliability of electricity access. This integrated approach strengthens the link between energy access and poverty reduction, ensuring that national electrification strategies translate into sustainable and equitable outcomes.

Delivering Impact and Expanding Opportunities

ESMAP's support for household electrification is helping countries close the access gap at scale through data-driven planning, public-private partnerships, and financing innovation. In FY2025, programs initiated in FY2025 and informed by ESMAP are expected to deliver new or improved electricity access to approximately 26 million[12] additional people.

FY2025 RESULTS: HOUSEHOLD ELECTRIFICATION

- 26 million people are expected to gain access
- 21 million people[a] gained access to electricity and 1.1 million[b] were provided with clean cooking access through ESMAP-supported operations
- $450 million[c] in private capital mobilized for household electrification
- 276,000 people[d] connected in Sierra Leone through grid and mini grid expansion

a Number of people who actually gained access to electricity in FY2025, through World Bank financed operations approved in the past years and informed by ESMAP
b Number of people who actually gained access to clean cooking solutions in FY25, through World Bank financed operations approved in the past years and informed by ESMAP
c Amount of private capital expected to be mobilized through the ASCENT
d Number of people expected to gain access to new or improved electricity service in Sierra Leone

12 Includes results from Energy Access grants informing World Bank lending operations (15.8 million) and Energy Transition grants informed World Bank lending operation (approx. 10.1 million)

ASCENT | ADDRESSING BARRIERS TO HOUSEHOLD ELECTRIFICATION

Approved in FY2024 under the World Bank's ASCENT Multiphase Programmatic Approach (MPA), Regional Energy Access Financing Platform (REAF) is addressing one of the main barriers to household electrification in Eastern and Southern Africa by tackling the persistent lack of affordable capital for distributed renewable energy and clean cooking companies.

Implemented by the Trade and Development Bank Group, a regional African development finance group through its Trade and Development Fund, the platform blends concessional and commercial finance to help early- and growth-stage firms expand off-grid energy access. With $19 million from ESMAP complementing $300 million from IDA, REAF provides results-based financing and technical assistance to companies serving under resourced households.

In FY2025, ESMAP support helped the fund put the essential building blocks in place to get the platform running. This included establishing a dedicated team to manage applications and support companies; introducing a digital system (Odyssey) so that financiers, solar firms, and equipment suppliers can track funding and progress in real time; and appointing an independent verifier to confirm that results are achieved before grants are paid. Together, these steps made REAF's operations transparent, efficient, and ready to scale.

By year-end, the platform had completed its first call for proposals and signed initial grant agreements. A $65 million window for Sudan marked an important milestone—testing how off-grid energy can reach families and businesses in one of the world's most fragile settings.

Through these efforts, the Trade and Development Fund built a pipeline of over 90 private firms, more than half already in due diligence, paving the way for thousands of new household connections across the region.

NIGERIA | DISTRIBUTED ACCESS THROUGH RENEWABLE ENERGY SCALE-UP PROJECT (DARES)

About 39 percent of Nigerian households lack access to electricity, particularly in rural and peri-urban areas, where extending the national grid is costly and slow. For lighting and basic power, these households typically depend on candles, kerosene, or small diesel generators, which are expensive, polluting, and unreliable. DARES—a $750 million initiative supported by ESMAP—is expanding access to clean, affordable electricity through standalone solar mini grid solutions. The project uses results-based financing, providing performance-based grants to private companies that deliver verified electricity connections. This approach helps lower the cost of systems for suppliers and consumers alike, making off-grid solutions more accessible to low-income households. Between FY2024 and FY2025, ESMAP provided a $4.35 million grant as well as technical support to the project's design, market analytics, and a vulnerability index that directs solar distributors toward last-mile communities most in need of electrification.

ENERGY ACCESS FOR INCOME GENERATION

Energy is a key driver of livelihoods, job creation, and economic resilience. Productive uses of energy (PUE) enable small and medium sized enterprises (SMEs), farmers, and entrepreneurs to power equipment, create new businesses, expand existing operations, and create and increase household incomes. ESMAP works with World Bank teams and client governments to integrate PUE into energy access programs—linking access with agriculture, manufacturing, services, and business development.

In FY2025, ESMAP-supported operations helped scale productive uses of energy through targeted financing, innovation, and cross-sector partnerships. By enabling access to modern energy for enterprises and communities, these initiatives are improving food security, strengthening local value chains, and creating jobs.

UGANDA, NIGERIA, AND ETHIOPIA: POWERING LIVELIHOODS

Uganda | The ESMAP-supported Electricity Access Scale-Up Project is helping small businesses in Uganda access reliable power. ESMAP facilitated the design and rollout of the PUE Results-Based Financing program, strengthening the Uganda Energy Credit Capitalization Company's capacity through technical standards and demand studies to guide future investments. With ESMAP's support, the government launched Prospect Energy, a digital monitoring platform that tracks results across off-grid, clean cooking, and productive-use programs. This innovation enables the company to better coordinate and target results-based financing for small enterprises, empowering local entrepreneurs to power tools that boost productivity—such as irrigation pumps, milling machines, and other energy-efficient technologies. Under the project, 4,000 productive-use technologies will be financed, benefiting 5,000 enterprises with modern energy solutions. Through these efforts, ESMAP's contributions have enhanced the technical skills and strategic knowledge of key government agencies, driving tangible progress toward universal electricity access and sustainable public service delivery in Uganda.

Nigeria | In Nigeria, ESMAP played an instrumental role in shaping the Distributed Access through Renewable Energy Scale-up Project (DARES)—a $750 million operation designed to expand decentralized solar solutions across the country. Through a $4.35 million ESMAP grant, along with targeted analytics and technical assistance, the program developed cost benchmarks for mini grids, a market assessment for productive-use appliances, and a vulnerability index to help solar companies reach last-mile communities. These insights are guiding solar distributors and developers to areas where energy can have the greatest economic impact. By linking access to productive use, Nigeria-DARES is enabling farmers, traders, and small manufacturers to run machinery, process goods, and extend business hours—turning electricity access into a powerful driver of jobs and rural income. ESMAP continues to support the project through its National Electrification Strategy and Implementation Plan and Multi-Tier Framework survey, ensuring that energy access delivers real economic opportunities.

Ethiopia | The Access to Distributed Electricity and Lighting in Ethiopia project aims to provide 131,500 enterprises with new or improved electricity access through mini grid and off-grid solutions. Of these, around 120,000 off-grid systems support small businesses, with 20 percent benefiting women-owned enterprises, helping to expand productive use of energy and promote inclusive economic growth.on a prior $400,000 grant in FY2022, which focused on due diligence and preparatory activities.

SPOTLIGHT ON ENERGY AND JOBS

HARNESSING SOLAR POWER FOR SUSTAINABLE RURAL DEVELOPMENT

Agribusiness and Jobs

More than 40 percent of the world's population resides in rural areas, with a significant portion—especially in regions like Sub-Saharan Africa—relying on agriculture for employment and income. In these communities, agribusiness serves as a crucial driver of job creation and economic growth, spanning activities from farm production to logistics, processing, and marketing. World Bank analysis demonstrates that every $1 million invested in agribusiness generates more jobs compared to equivalent investments in manufacturing or services. However, the sector faces barriers such as poor infrastructure, limited market access, and lack of modern storage and processing facilities, which constrain its job creation potential.

Agribusiness and Energy

Energy is a vital component throughout the agribusiness value chain. Reliable and affordable energy access is essential for modernizing production, processing, storage, and distribution. In rural settings, where grid electricity is often unavailable or unreliable, renewable energy—particularly solar power—offers new opportunities to power irrigation systems, cold storage, and processing units. Expanding energy access not only increases productivity and reduces waste but also creates new employment opportunities in installation, operation, and maintenance of energy systems, as well as in the expanded agricultural value chain itself.

Irrigation and Solar Energy

Irrigation is fundamental to improving crop yields and ensuring resilience against climate variability. Traditional irrigation methods in many rural areas depend on rain, making them vulnerable to droughts and unpredictable weather. Solar-powered irrigation systems, such as solar water pumps, offer a sustainable solution by providing reliable water supply without using fossil fuels. These systems enable farmers to cultivate more land, increase cropping cycles, and boost productivity, leading to more jobs in farming, system installation, and maintenance. The mainstreaming of solar irrigation, as seen in countries like Bangladesh and Türkiye, is transforming rural agricultural practices and supporting job-rich growth.

Cold Chain and Solar Energy

Post-harvest losses and food waste are major challenges in agriculture, with an estimated 17 percent of global food production wasted annually. Lack of cold storage is a key contributor, especially in off-grid rural areas. Solar-powered cold chain solutions—such as off-grid refrigerators, freezers, and cold rooms—help preserve produce, reduce spoilage, and extend market reach. These technologies not only support farmers but also create jobs in cold chain logistics, equipment manufacturing, and maintenance. While high costs and service gaps remain, innovations are driving down prices and improving viability, opening new avenues for employment and income in rural communities.

Agribusiness Factories and Solar Energy

Agribusiness factories—spanning food processing, packaging, and storage—require significant and reliable energy. Solar energy can power these factories, reducing operational costs and carbon footprints while supporting sustainable development. Electrifying rural factories with solar mini grids or rooftop systems enables value addition to agricultural products, fosters rural industrialization, and generates diverse jobs, from factory workers and technicians to logistics coordinators and quality control specialists. Integrated energy planning and targeted investments can further enhance job creation across the agribusiness factory ecosystem.

The Role of ESMAP in Agribusiness and Renewable Energy

ESMAP is actively engaged in promoting the productive use of renewable energy in rural agribusiness. The program supports expanding electricity access, developing clean cooling solutions, and advancing sustainable irrigation technologies. By facilitating collaborations between the energy and agriculture sectors, ESMAP helps design and implement projects that create jobs, boost rural economies, and advance climate action. It supports the integration of energy-efficient and climate-friendly cold storage technologies in the agriculture sector (horticulture, dairy, fisheries) to reduce food loss, enhance food security, and improve economic productivity for farmers. A core part of our approach is promoting the use of renewable energy, such as solar power and storage units, to provide reliable electricity for cold storage facilities, especially in off-grid or unreliable grid areas. ESMAP's work also includes market studies, pilot projects, and technical assistance to governments and private sector partners, ensuring that investments in renewable energy can translate into tangible benefits for agribusiness and rural employment.

Country Examples

- **Bangladesh** | Solar irrigation programs have enabled smallholder farmers to access affordable, reliable water for crops, increasing yields and rural employment.
- **Rwanda** | The World Bank and the Food and Agriculture Organization have mapped solar energy needs across agricultural value chains, supporting the deployment of solar-powered solutions for irrigation and cold storage, which in turn drive job creation in rural communities.
- **Mexico** | Solar-powered agri-processing facilities are expanding, linking renewable energy adoption with job creation in rural areas.

NIGERIA: INTEGRATING AGRI-PROCESSING IN THE DEVELOPMENT OF MINI GRIDS

Through the Empowering Rural Consumers program in Nigeria, ESMAP is assessing the potential of mini grids to meet electricity demand in agri-business. The project was designed for the purpose of understanding existing and potential electricity demand in targeted sites and evaluating options to supply it. The analysis relied on (1) extensive data collection and analytics on the potential of solar mini grids; (2) Geographic Information System (GIS)-based analysis of settlement clusters; and (3) agri-processing data, including type of agri-business, types of crops and value chains, equipment used, the timing of its use, and communities neighboring the clusters. The conclusions suggest that sites near agricultural fields are good targets for mini grid development, as agricultural loads compensate for the small size of these communities. Value chains of rice and cassava are good anchor loads. Electrifying these value chains may reduce electricity tariffs by 10 to 15 percent when the agricultural load exceeds 15 percent. The pilot highlights the power of integrated planning anchored in data analytics to boost productive-use interventions, building the foundation for evaluating the impact of agribusiness on demand stimulation.

TÜRKIYE: STRENGTHENING CAPACITY FOR RENEWABLE ENERGY SOURCES IN THE AGRICULTURE AND FOOD SECTOR

The Türkiye Climate-Smart and Competitive Agricultural Growth Project (TUCSAP) is a $341.27 million World Bank investment, approved in March 2022 and implemented by Türkiye's Ministry of Agriculture and Forestry.

As part of the project, TUCSAP introduces a climate-finance model, with the Ministry using World Bank funds for a $50 million pilot to establish a geothermally heated greenhouse Industrial Organized Zone (OIZ) in Dikili Municipality. It is the first major agricultural sector investment in Türkiye in nearly 15 years.

TUCSAP provides concessional financing to develop essential infrastructure, notably renewable geothermal systems, in Dikili OIZ. This infrastructure is designed to attract private sector investment in greenhouse and packing facilities, covering over 300 hectares. The project aims to catalyze private capital for modern greenhouse construction and industrial-scale packing, boosting agricultural productivity and promoting sustainability and resilience in Türkiye's food systems.

Although TUCSAP's financing is only part of the total project cost, the government has expressed a strong interest in scaling up geothermal energy use in greenhouses, and in potentially replicating the model in other regions. Since geothermal energy use in agriculture is new for Türkiye, ESMAP is providing knowledge and advisory support to strengthen the capacity of the government and Dikili OIZ for successful implementation and future scale up.

Despite Türkiye's progress in renewable energy, adoption in agriculture lags. TUCSAP serves as a demonstration platform to expand these opportunities.

In FY2025, activities focused on three main areas:

- Technical assistance for infrastructure development
- Capacity building through geothermal resource assessment and study tours
- Advanced analysis of social and environmental impacts of clustered geothermal-greenhouse investments

ENERGY ACCESS FOR HUMAN CAPITAL DEVELOPMENT

Reliable and affordable electricity for schools, health facilities, and other public institutions is critical for delivering essential services and realizing human potential. Yet, across Sub-Saharan Africa, an estimated 50 to 60 percent of health facilities and nearly 70 percent of primary schools still lack access to reliable power (UN 2018; UNICEF 2022). These deficits weaken education outcomes, limit health care delivery, and undermine community resilience to shocks.

ESMAP's Human Capital Development workstream focuses on enabling renewable energy access for public institutions such as hospitals, clinics, and schools. Reliable electricity supports vaccine refrigeration, life-saving equipment, and digital tools in health centers and powers lighting, computers, and connectivity in schools and other public institutions.

In FY2025, ESMAP supported national programs that integrate "energy-as-a-service" models into least-cost planning for public institution electrification. This model shifts from one-off system procurement—which had hindered the sustainability of earlier efforts—toward a service-based approach that ensures reliable and lasting electricity provision for schools, health facilities, and other institutions by engaging private service companies under long-term contracts. Through the Electrifying Africa initiative (see Spotlight on Mission 300, page 20-22, ESMAP helped governments design assessments of energy needs for public facilities and pilot these private–sector-led models that improve the sustainability of electrification investments by linking payments to properly maintained and functioning systems.

Programs such as Nigeria's DARES and the ASCENT Regional Energy Access Platform integrated public facility electrification alongside household and productive-use components—demonstrating how decentralized renewable solutions can simultaneously power schools, clinics, and local enterprises.

ENERGY ACCESS FOR HUMAN CAPITAL DEVELOPMENT

ESMAP's work on human capital electrification highlights how reliable, renewable power can underpin stronger education, health, and community outcomes. In FY2025, these programs helped governments embed energy access in broader human development strategies and design financing mechanisms to sustain operations.

Looking ahead, ESMAP will continue to expand cross-sector collaboration—working with the World Bank's health, education, and digital development teams, as well as partners such as WHO, the United Nations Children's Fund (UNICEF), and the World Food Programme (WFP). Upcoming initiatives will scale up electrification of schools and health centers, integrate digital and cooling solutions, and ensure that service delivery is resilient and inclusive.

HAITI, MADAGASCAR, AND DRC: POWERING PUBLIC FACILITIES FOR BETTER SERVICE DELIVERY

Haiti | In Haiti, unreliable power has long constrained health care and water services. Under the Renewable Energy for All Project, ESMAP support enabled solar electrification to improve services at health centers and water treatment facilities. Systems combining solar photovoltaic (PV) and battery storage ensure continuous operation of essential services, from safe childbirth and vaccine refrigeration to access to clean drinking water. ESMAP also supported mesh-grid pilots and the deployment of certified solar products in rural areas—broadening access to sustainable energy for entire communities.

Madagascar | Through the Digital and Energy Connectivity for Inclusion in Madagascar Project, ESMAP supported the development of a service-based electrification model for rural health centers. Working jointly with the health, education, and digital development teams, the project established a framework for private–sector-driven delivery and long-term sustainability. The resulting model—which enjoys strong government support—serves as a blueprint for powering public institutions efficiently and reliably across sectors.

Democratic Republic of Congo (DRC) | The DRC Electricity and Water Access and Governance Project aims to significantly improve access to essential infrastructure and services across the country. The project's end-targets include providing reliable electricity and WASH (Water, Sanitation, and Hygiene) facilities to 250 health centers and schools, thereby enhancing the quality of health care delivery and education environments. Additionally, the project seeks to rehabilitate or construct 500 public WASH facilities equipped with electricity and supported by private operation and maintenance arrangements to ensure sustainability. Through these initiatives, the project contributes to better public health, improved learning conditions, and strengthened local governance in the delivery of basic services

In FY2024, ESMAP's Hydropower Development Facility provided a $300,000 grant to help ready the project for financing from the World Bank and other institutions. The grant builds on a prior $400,000 grant in FY2022, which focused on due diligence and preparatory activities.

ENERGY ACCESS FOR HUMAN CAPITAL DEVELOPMENT, BY THE NUMBERS

In FY2025, ESMAP activities resulted in:

- Contracts for five health centers and four water treatment facilities powered by solar PV (Haiti)
- Four hundred health facilities electrified in Sierra Leone under ESMAP-supported programs
- Two countries (Uganda and Madagascar) adopted sustainable, service-based electrification models for public institutions, integrating health, education, and gender priorities
- Six analytical outputs and two global knowledge events on energy access and service delivery

CLEAN COOKING FUND

Clean cooking is a critical yet often overlooked component of universal energy access, essential for improving health, gender equity, and environmental outcomes. Operationalized in 2020, the Clean Cooking Fund (CCF) has positioned the World Bank as a global leader in advancing clean cooking through financing, innovation, and knowledge.

Clean Cooking in World Bank Operations

Recent progress underscores the CCF's catalytic role in investment mobilization. In FY2025, the CCF co-financed two major World Bank projects: Accelerating Sustainable and Clean Energy Access Transformation in Malawi, and the ASCENT Regional Energy Access Financing Platform. With $10 million in CCF co-financing, these projects leveraged an additional $10 million in IDA financing and around $34 million from the private sector, aiming to reach approximately 2.65 million people with clean cooking solutions. In addition to direct investments, the CCF has supported national strategies, such as Sierra Leone's National Clean Cooking Strategy (2025–30), and provided technical studies and assessments that shape dialogue, strengthen project design, and build institutional capacity.

CLEAN COOKING FUND, BY THE NUMBERS

To date, the Clean Cooking Fund has:

- Allocated $86 million in grants and co-financed 12 projects
- Leveraged over $375 million from IDA/IBRD, carbon finance, and private investment
- Benefited 37 million people and 2,772 institutions

UGANDA | ELECTRICY ACCESS SCALE UP PROJECT

In Uganda, with $10 million in co-financing, ESMAP enabled the creation of a $20 million clean cooking window as a component of the Electricity Access Scale-up Project. Its objective is to increase access to energy for households, commercial enterprises, industrial parks, and public institutions.

The clean cooking component is advancing three key areas of intervention. First, it enables loans for working capital, giving financial institutions credit to lend to companies that provide efficient cookstoves and clean fuel technologies. Second, it uses results-based financing to help clean cooking companies grow, with a focus on companies selling high-performance technologies, using innovative business models, and reaching hard-to-serve areas. Third, it promotes clean cooking solutions for public and private institutions that currently rely heavily on biomass, with a focus on schools.

During FY2025, 85,355 clean cooking stoves—including biogas stoves, stoves using liquefied petroleum gas (LPG), and electric pressure cookers—reached approximately 401,386 people.

MALAWI | CLEAN COOKING INTERVENTIONS

In Malawi, ESMAP played a critical role in laying the foundation for clean cooking interventions. ESMAP financed preparatory work, including a comprehensive market assessment of the clean cooking sector. This groundwork informed the design of the Accelerating Sustainable and Clean Energy Access Transformation in Malawi (ASCENT-Malawi) project, which includes a dedicated clean cooking component co-financed by $5 million from ESMAP and a parallel $5 million contribution from IDA. This project is expected to provide 645,000 people in Malawi with access to clean cooking solutions. Stakeholder engagement has been central to the preparatory phase. In April 2025, the Ministry of Energy convened a national consultation workshop that identified a pipeline of eligible SMEs for participation in a loan window. These companies have since been actively engaged to inform the design of the project.

INTEGRATION OF CLEAN COOKING IN MISSION 300, AND HEALTH, EDUCATION, FORESTRY, AND CLEAN AIR PROGRAMS

As an incubator for Mission 300, ESMAP has been catalytic in the inclusion of cooking targets in the Energy Compacts (see Spotlight on Mission 300, pp. 20-28). Indeed, all 29 Sub-Saharan countries that have submitted an Energy Compact have included a clean cooking commitment. For example, the Democratic Republic of Congo has committed to "accelerate the pace of access to clean cooking to 5 percent per year, reaching 30 percent access by 2030—compared to 1 percent currently—thus enabling 40 million people, or an additional 5 million households, to have access to clean cooking solutions, with particular benefits for women and marginalized communities." With these new commitments, ESMAP's clean cooking work will continue to grow.

The CCF is also working closely with the World Bank Education, Health, Environment, and Agriculture Global Departments to expand clean cooking beyond household settings into public institutions, such as schools and hospitals, and include clean cooking components beyond energy programs, such as forestry, clean air, methane reduction, and social protection.

Externally, the CCF has deepened collaborations with a wide range of global partners, including the Modern Energy Cooking Services (MECS) program, Climate and Clean Air Coalition (CCAC), Sustainable Energy for All (SEforALL), WFP, WHO, the United Nations Development Programme (UNDP), and the International Energy Agency (IEA). These partnerships have advanced initiatives such as introducing clean cooking in schools, developing joint technical knowledge, and convening influential forums that amplify the clean cooking agenda globally.

RAISING THE PROFILE OF CLEAN COOKING

In FY2025, the CCF's contributions have significantly raised the political profile of clean cooking on global platforms. Ahead of the G20 in November 2024, the CCF supported Brazil's presidency in developing a Clean Cooking Roadmap. During the G20, the CCF successfully advocated in collaboration with the IEA and SEforALL for the inclusion of clean cooking as a priority in the Rio de Janeiro Leaders' Declaration. Under its G20 presidency as well, South Africa's priorities include clean cooking, and a Clean Cooking Voluntary Infrastructure Investment Action for Sub-Saharan Africa was launched in October 2025.

At the Energy Now SDG7 Action Forum in New York, ESMAP worked with WHO, the UN Department of Economic and Social Affairs (UN DESA), and UNDP to organize "The Global Clean Cooking Roadmap: Advances and Challenges." This event brought together energy leaders and experts during the UN General Assembly week to share ideas and build partnerships for clean cooking initiatives.

ESMAP also collaborated with MECS and other partners to produce the African Energy Commission's Sustainable Scaling: Meeting the Clean Cooking Challenge in Africa report. Presented during a side event at COP29 in Baku, Azerbaijan, the report highlights new technologies, new ways to fund projects, and policies needed to support cleaner cooking.

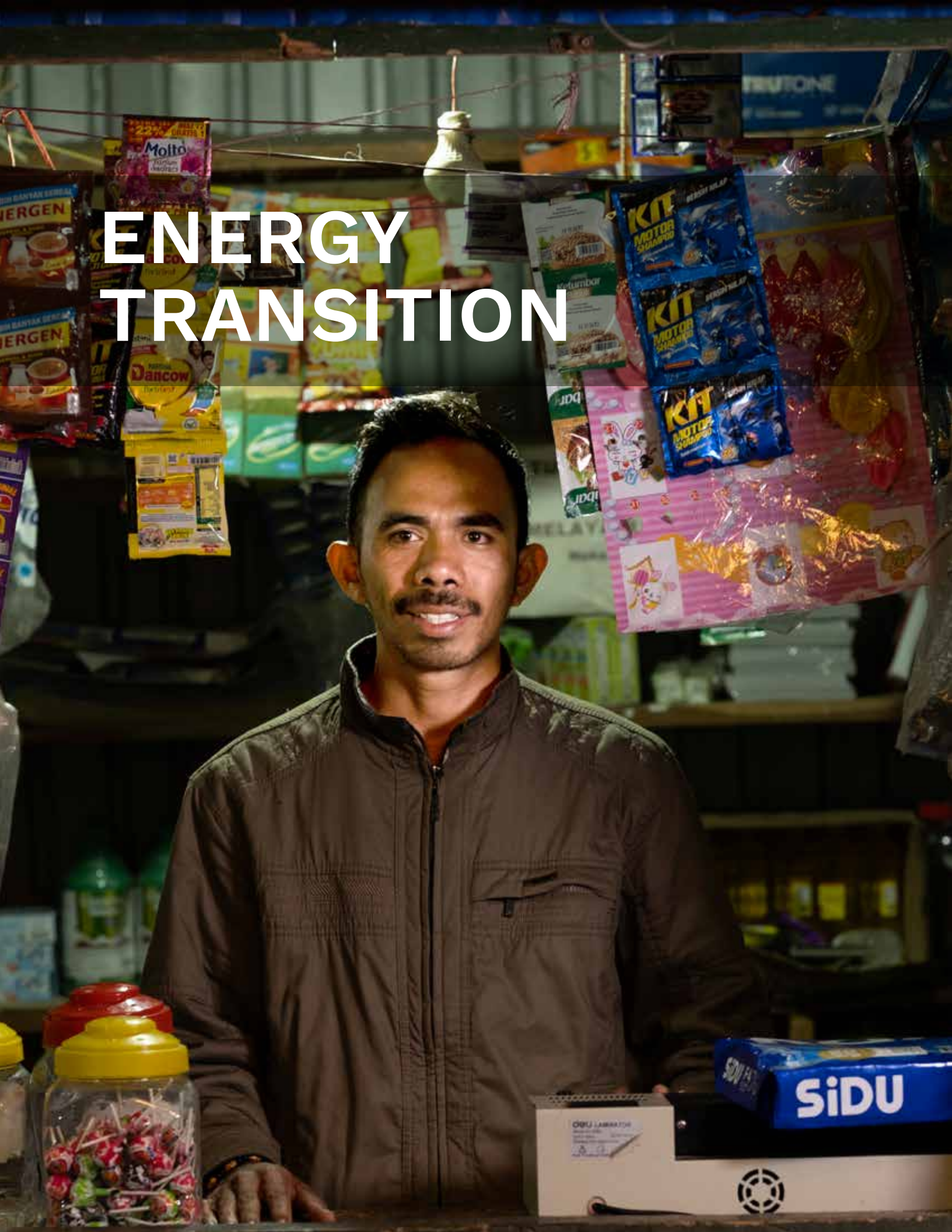
CLEAN COOKING AND CARBON FINANCE

The World Bank's carbon finance clean cooking interventions are currently delivered through its results-based climate finance approach: payments are made for verified emissions reductions (ERs) from clean cooking programs, sometimes implemented together with credit facilities or performance-based grants that lower end-user prices and help firms scale distribution.

The Bank's clean cooking carbon finance operations have relied on the Standardized Crediting Framework (SCF), a streamlined, country-owned emissions reduction crediting framework developed by the Carbon Initiative for Development (Ci-Dev). With its efficient methodologies and digital measurement, reporting, and verification, the SCF increases the speed and certainty of credit issuance and payment.

An example is the Rwanda Energy Access and Quality Improvement Project (EAQIP) clean cooking component—delivered via a national results-based financing (RBF) facility co-financed by ESMAP's Clean Cooking Fund—with Ci-Dev purchasing ERs (tCO_2e) to replenish the RBF Pro-Poor Fund. As of early to mid-2025, 440,000 households had received clean cooking solutions through 20 companies; the first issuance of an Emissions Reduction Purchase Agreement (13,584 ERs for 2021–22) was approved and the first payment was disbursed in August 2025, with verification for subsequent periods underway.

The CCF supports carbon finance for clean cooking through country grants and technical assistance. Additionally, the CCF is exploring with the MECS program other outcome-based approaches, including measurement and monetization of climate, gender, and health outcomes.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Global investments in the low-carbon energy transition exceeded $2 trillion for the first time in 2024, despite prevailing macroeconomic challenges such as high interest rates and geopolitical uncertainty.

ESMAP was critical to supporting developing countries to design, finance, and implement affordable and equitable transitions to low-carbon power. Yet even though solar and battery costs fell this year, high financing costs hindered clean energy expansion. At the same time, rising electricity demand and energy security concerns led to a resurgence in coal power plants, especially in Asia-Pacific (IEA 2025), as well as projections for the expansion of nuclear power globally (IAEA 2025).

Although political commitment may exist and financial resources may be available, limited institutional capacity often impedes effective planning and implementation.

This is where ESMAP steps in to provide upstream support through the development of transition roadmaps, strategies to attract private capital, identification of essential infrastructure needs, and innovative approaches to de-risk energy projects.

ESMAP's energy transition focus area is implemented through three complementary workstreams:

SCALING UP RENEWABLE ENERGY, STORAGE, AND CLEAN HYDROGEN

Under the previous business plan, ESMAP supported the scaling up of renewable energy and energy storage deployment while leading upstream work for offshore wind and clean hydrogen projects. With the new business plan, the goal is to use this momentum to accelerate the transition. ESMAP is leveraging this work through innovative partnerships including the Sustainable Renewables Risk Mitigation Initiative (SRMI), the Energy Storage Partnership (ESP), the Offshore Wind Program, and both the Hydrogen 10GW Lighthouse Initiative and Hydrogen for Development.

SCALING UP ENERGY EFFICIENCY AND DECARBONIZATION OF END-USE SECTORS

ESMAP's activities include enhancement of energy efficiency data and statistics; formulation of sectoral energy efficiency strategies; enhanced institutional, legal, and regulatory frameworks; capacity building and labor skill development for emerging clean energy jobs, such as energy auditors, technicians, and workers—including women; development of new business models and financing mechanisms; market assessments; and demonstration projects.

In FY2025, our Scaling Up Energy Efficiency (EE) and Decarbonization of End-Use Sectors program awarded 25 project grants, allocating a total of $10.9 million to support country and regional initiatives in 46 countries across all regions. These activities focus on demand-side decarbonization, targeting key sectors such as buildings and appliances, industry, transport—including charging infrastructure and power system planning—as well as distributed solar PV and geothermal direct use.

TRANSITIONING FROM UNABATED FOSSIL FUELS

ESMAP's Supporting Transitions Away from Unabated Fossil Fuels initiative helps developing countries shift from fossil fuel-based systems to low-carbon solutions by identifying plants for phaseout, repurposing facilities, and reducing extraction activities. Our focus is to ensure that communities that have been dependent on fossil fuel extraction and use are safeguarded during the transition toward cleaner energy sources.

ENERGY TRANSITION HIGHLIGHTS OF FY2025 RESULTS AND ACTIVITIES

Policy Guidance and Technical Support | Supported governments in adding over 50 gigawatts (GW) of renewable energy capacity.

Mobilized Investments | Informed $4.6 billion in World Bank lending, mobilized $3 billion in cofinancing from other multilateral development banks and donor partners, and enabled $1 billion in private capital, with major projects in Nigeria, the Philippines, and Argentina.

Global Studies and Knowledge Leadership| Published reports offering strategic insights on community engagement and key success factors for offshore wind in emerging markets. Green Hydrogen flagship publications issued to address investment de-risking, policy guidance, safety, and industrial applications.

Capacity Building | Strengthened institutional capabilities for renewable energy procurement and deployment. In 2025, this approach enabled participants from 12 Sub-Saharan African countries to graduate from the nine-month Effective Renewable Energy Tendering in Africa program, leading to concrete outcomes such as The Gambia's first competitive solar and battery storage tender and preparatory steps for similar initiatives in Liberia, Kenya, and Uganda.

SCALING UP RENEWABLES, ENERGY STORAGE, AND CLEAN HYDROGEN

In FY2025, ESMAP remained vital to advancing global clean energy solutions.

Working across a diverse range of technologies—including solar, geothermal, hydropower, energy storage, and offshore wind—ESMAP experts partnered with governments to shape policy and investment strategies, including strategies to attract private investment, and provided practical support through transaction advisory, feasibility studies, and capacity building.

ESMAP helped countries add more than 50 GW of renewable energy capacity. A total of 10.6 GW of renewable energy and 6,003 GWh of energy storage from hydropower were enabled via ESMAP-supported World Bank Group investments. ESMAP support informed $4.6 billion in World Bank financing, including major operations in Nigeria ($500 million), the Philippines ($800 million), and Argentina ($1.5 billion), along with $1 billion of private capital and $125 million of climate finance mobilized.

Through a combination of upstream policy guidance and downstream technical support, ESMAP's work in solar, wind, and hydropower in FY2025 helped countries make substantial progress toward their clean energy goals while also preparing the ground for future job creation and broader socioeconomic benefits.

SCALING UP WITH SRMI

SRMI helps countries integrate variable renewable energy sources into their electricity grids, enhancing the planning process, ensuring projects are financially viable, and securing essential public funding, particularly concessional and climate financing. This requires a multifaceted strategy that combines greater mobilization of private capital and financial innovation. SRMI is an ESMAP partnership with the Agence Française de Développement (AFD), International Renewable Energy Agency (IRENA), International Solar Alliance (ISA), Sustainable Energy for All (SEforALL), Asian Development Bank (ADB), European Bank for Reconstruction and Development (EBRD), African Development Bank (AfDB), and the Get.Transform program implemented by the German development agency (GIZ).

In FY2025, ESMAP's SRMI mobilized $150 million in concessional climate finance from the Climate Investment Fund (CIF), catalyzing an affordable and sustainable energy transition in developing countries. This CIF financing is set to leverage $1.45 billion in co-financing from multilateral development banks and the private sector, representing a leverage ratio of 1:10. SRMI-supported projects will reduce or avoid 30 million metric tons (Mt) of carbon dioxide equivalent (CO_2e) over a 25-year lifetime, with an annual average reduction of 1.2 Mt of CO_2e. The initiative will enable 1.7 GW of installed renewable energy capacity, alongside 200 MWh of energy storage systems and 60 MW of power rating for storage, strengthening grid reliability, and supporting variable renewable energy integration.

SMRI Results and Activities

ESMAP's SRMI is committed to building expertise and fostering knowledge transfer. In FY2025, SRMI developed a comprehensive nine-month Effective RE Tendering in Africa Practitioner Academy, specifically designed for francophone countries to enhance renewable energy (RE)

deployment. The academy will equip practitioners with the skills needed to design and implement successful tenders.

Mobilizing Climate Finance

SRMI's robust climate finance programs are implemented through strategic partnerships with the Green Climate Fund (SRMI-1 and SRMI-2, totaling nearly $500 million across 15 countries) and the Clean Technology Fund (CTF) (SRMI-FIW, $150 million). Looking ahead to FY2026, ESMAP plans to launch a second CTF program (SRMI-FIW-2) and explore innovative guarantee mechanisms to further expand climate financing options.

Supporting Renewable Energy and BESS Tenders

SRMI's core team is actively supporting over 35 countries in launching renewable energy and battery energy storage system (BESS) tenders. Key milestones for FY2026 include achieving financial close for projects in The Gambia, Burkina Faso, and Ethiopia while initiating new tenders in Liberia, Guinea Bissau, Tunisia, and São Tomé and Príncipe.

Advancing Knowledge and Risk Management

Knowledge generation remains central to SRMI's mission. A flagship report on risks in renewable energy tenders, developed in partnership with IRENA, will be launched at the IRENA Assembly in January 2026. The report provides actionable insights for policymakers and investors.

SRMI FY2025 Project Examples

Botswana | SRMI drove the development of solar and wind projects, launching a 900 MW solar tender and conducting environmental and social assessments. The associated grant enabled grid investment planning and the initiation of an independent power producer (IPP)-led renewable energy program, with a $122 million project blending IBRD and Green Climate Fund resources to finance grid upgrades for variable renewable energy integration. The program also emphasized gender and socioeconomic strategies, job creation, reskilling, and workplace equity.

Ethiopia | The program facilitated renewable energy development and private sector participation, with major solar IPP tenders underway and additional funding mechanisms to support liquidity and sector reform.

Indonesia | SRMI helped develop the ISLE framework to achieve universal access and boost renewable energy targets, supporting large-scale electrification programs and financial innovation for scaling investment. Efforts also extended to hydropower development, with major pumped storage projects underway and economic assessments guiding future investments.

Mongolia | SRMI supported power system analyses that inform grid investment and transmission upgrades, supporting decarbonization and variable renewable energy (VRE) integration. Subsequent projects aim to bolster transmission reliability and mobilize private capital for renewables.

Uzbekistan | The program facilitated solar IPP deployment, sector transformation, and grid upgrades, with multiple tenders and operational projects advancing VRE integration. The initiative also works on risk mitigation instruments and guarantees to attract further investment.

Across these countries, SRMI activities center on technical assistance, project financing, capacity building, regulatory reform, risk allocation, gender and socioeconomic inclusion, and the mobilization of public and private funding to accelerate the transition to renewable energy.

HYDROPOWER

Hydropower, when well designed, can advance gender equality and social inclusion, improving access to jobs, education, and business opportunities. The ESMAP case study on hydropower, *Jobs Generated by the Rampur Hydropower Project in India*, illustrates the broader impacts of hydropower on jobs and gender inclusion.

The Rampur Hydropower Project generated approximately 51,745 direct and indirect person-years of employment. A state mandate required at least 70 percent of employees to be from the local area. The project helped improve living standards and increased average incomes by 50 percent of affected families through land compensation, relocation grants, community infrastructure, vocational training, and health services. Women's participation, however, was limited mostly to unskilled jobs, primarily in roles like cleaners. Few women were employed on construction sites due to hazardous conditions and cultural barriers. Therefore, improving and effectively enforcing job safety standards within clean energy projects can help increase employment opportunities for women. Addressing these safety issues could also attract female workers in hydropower projects.

Hydropower FY2025 Project Examples

Indonesia | ESMAP provided technical assistance for the preparation and early implementation of Indonesia's Upper Cisokan pumped-hydroelectric storage facility, the first such facility in the country.

Burundi, Rwanda, and Tanzania | ESMAP supported the construction of the Rusumo regional hydroelectric plant to provide power across multiple countries.

Indonesia | ESMAP administered a project to create a central database for small hydropower resources to improve planning and investment.

Nigeria | ESMAP prepared two key technical studies to advance solar-based electricity generation: an integration study and a solar auction framework to support the government's plans for a 2026 tender. Additionally, ESMAP's Hydropower Development Facility supported the $500 million SPIN Project, which will develop Nigeria's Hydropower Masterplan to boost sustainable energy, dam safety, and climate resilience.

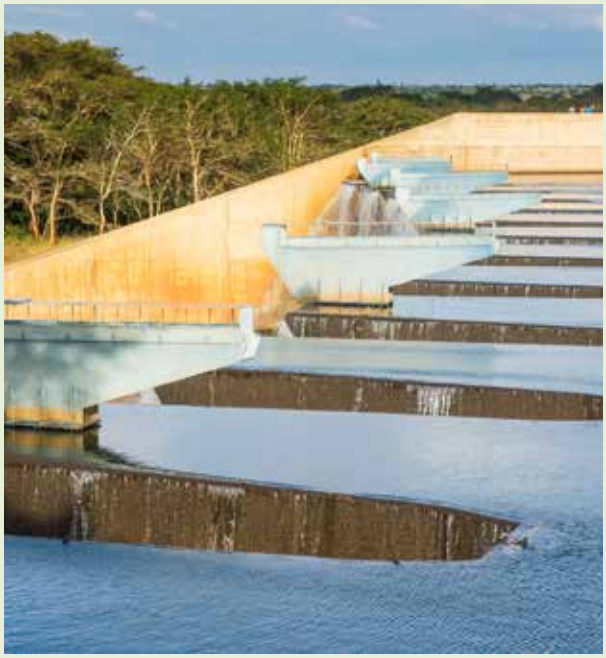
Bhutan | The Hydropower Development Facility supported Bhutan's development of the 1,125 MW Dorjilung hydropower plant. The ESMAP grant funded updates to the project's design and environmental assessments, aligning with international standards. It also strengthened institutional capacity. For example, two independent panels were established to ensure technical and environmental compliance, and over 350 officials were trained on international knowledge exchange.

Burundi | ESMAP supported Burundi in expanding renewable energy including hydropower and solar, contributing to the commissioning of the Jiji (32.4 MW) and Mulembwe (17 MW) plants and shaping the national energy masterplan to 2040 via key planning studies. These efforts, co-financed by international partners at a total cost of $360 million, are expected to boost electricity access, strengthen the grid, and promote gender inclusion while laying the foundation for future investments like the Ruzizi III hydropower partnership.

Power with Full Force: **Getting to Gender Equality in the Hydropower Sector (Global)** | ESMAP published a report establishing a global baseline on gender equality within the sector and provided best practices for fostering diversity.

POWERING MALAWI'S PROGRESS THROUGH STRATEGIC HYDROPOWER

The $350 million Mpatamanga Hydropower Storage Project will directly benefit 2.5 million people by 2030 through improved access, strengthened energy security, and over 2,000 jobs created.



ESMAP's support for the project has contributed to:

- Strategic technical assistance and knowledge support to the government of Malawi and project partners during the preparation phase.
- Design and implementation of robust environmental and social management frameworks.
- Capacity building of local institutions, project implementing entities, and government agencies on dam safety, stakeholder engagement, environmental and social risk management, and grievance redress mechanisms.
- Knowledge sharing and partnerships bringing together global partners, technical experts, and financiers.
- Cost-benefit, macroeconomic, and debt sustainability analyses to attract for successful public-private partnership structure.
- Climate change assessments and adaptation strategies.
- Gender equality and social inclusion plans and livelihood restoration strategies for project-affected communities.

EUROPE AND CENTRAL ASIA HYDROPOWER FACILITY FY2025

Launched at the start of 2025, the Europe and Central Asia (ECA) Hydropower Facility represents a strategic EUR 5 million commitment to the advancement of sustainable hydropower development across the Europe and Central Asia (ECA) region. The facility is dedicated to funding technical assistance and analytical activities, with a particular emphasis on small hydropower and the rehabilitation of aging assets. Ongoing activities under the portfolio of this facility already span six countries, in addition to regionwide activities, supporting a range of initiatives from pre-feasibility studies for pumped storage and modernization assessments to dam safety analyses and sector roadmaps. These activities are designed to inform future investment projects, strengthen enabling environments, and accelerate the region's transition to resilient, low-carbon energy systems.

A flagship component of the facility has been its knowledge-sharing program, kicked off with two pilot seminars delivered in Austria for hydropower experts from across the ECA region. Led by renowned technical institutions and industry specialists, these seminars focused on dam design, dam safety, and hydropower rehabilitation and featured technical instruction, case studies, and hydropower site visits. Feedback from participants, including senior engineers and utility experts from eight countries, was very positive, highlighting practical relevance and opportunities for peer learning. The seminars serve as templates that will be leveraged for future hydropower capacity building events targeted at technical experts.

The ECA Hydropower Facility has already demonstrated strong uptake and regional impact, with requests for technical assistance received from Ukraine, the Western Balkans, Southern Caucasus, and Central Asia. While many grants are still in early stages, the program is expected to inform significant potential lending operations in hydropower and therefore to help catalyze large-scale hydropower development and rehabilitation. As the facility continues to expand its portfolio and knowledge-sharing activities, it is well positioned to drive impactful outcomes in hydropower modernization and development in the ECA region.

Gender equality and social inclusion plans and livelihood restoration strategies for project-affected communities.

SPOTLIGHT ON HYDROPOWER

RAMPING UP HYDROPOWER

ESMAP assists World Bank clients with responsible development of hydropower, helping countries identify and build a pipeline of sustainable projects, and offers support during implementation, operation, and maintenance for both greenfield and modernization projects. ESMAP views hydropower as a crucial component of the clean energy transition due to its flexibility, storage capabilities, and its role in stabilizing power systems and enabling integration of variable renewable sources like solar and wind.

ESMAP's Approach to Hydropower

The Hydropower Development Facility focuses on sustainable and flexible hydropower and supports developing countries in four main areas:

Knowledge Generation | ESMAP creates and disseminates technical reports and guidance on hydropower development. Topics include job creation, maximizing socioeconomic benefits, flexibility, achieving gender equality, and leveraging private sector solutions within the hydropower energy sector.

Capacity Building | ESMAP hosts workshops and events to share best practices among technical experts and government officials, particularly in developing regions such as Sub-Saharan Africa.

Technical Assistance | ESMAP provides technical assistance to governments for improving project preparation, environmental and social impact assessments, and overall project implementation.

Project and Country Grants | ESMAP offers grant funding to advance projects from identification, least-cost development plans, and feasibility studies to implementation and operation and maintenance. For instance, ESMAP helped with the preparation of a pumped storage hydropower project in Indonesia and the implementation of a multi-county project in East Africa.

Why ESMAP Emphasizes Hydropower

Hydropower is a source of energy with numerous advantages and vast potential:

- **Power System Stabilization** | The flexibility of hydropower is critical for managing the intermittency of variable renewable energy like wind and solar where they are integrated into the grid. Hydropower acts as a "battery" that can provide dispatchable electricity on demand and secure a long-term supply of electricity.
- **Energy Access** | For many regions, including Africa, a large share of hydropower potential remains untapped. Proper development can provide affordable, reliable, and modern energy services to populations that currently lack access to electricity.
- **Climate Change Mitigation** | By providing a clean source of electricity, hydropower helps countries meet their climate targets and contributes to a decarbonized economy.
- **Socioeconomic Benefits** | Beyond energy generation, hydropower projects can offer multiple societal benefits, such as water resource management, irrigation, flood and drought control, and socioeconomic development.

Boosting Socioeconomic Impacts and Gender Equality through Hydropower

ESMAP is at the forefront of identifying the potential socioeconomic benefits of hydropower. The *Hydropower: Unveiling the Socioeconomic Benefits* report highlights how governments can enhance these benefits through effective policy and planning. Beyond electricity generation, hydropower dams can be used for irrigation, fishing, navigation, recreation, flood control, and water supply, contributing to broader societal needs. Hydropower projects generate significant government revenue through sales, taxes, and royalties. They stimulate economic growth by attracting industries, supporting small and medium sized enterprises, and creating jobs. The hydropower value chain can open opportunities for local sourcing of goods, services, and labor. Governments can use procurement policies to incentivize domestic participation, supported by industry associations and specialized financial products. Hydropower also boosts local development and benefit sharing for infrastructure work, skills enhancement, and revenue/ownership sharing. Legal frameworks and policies can promote inclusion of women and vulnerable groups.

OFFSHORE WIND

ESMAP works closely with IFC on accelerating the deployment of offshore wind in low- and middle-income countries. With over 71,000 GW of technically extractable offshore wind resources globally, our work aims to support the inclusion of offshore wind in energy sector strategies and the upstream work needed to build a pipeline of bankable projects to accelerate uptake in emerging markets.

We support both governments and industries in emerging markets. This combined approach enables the World Bank Group to provide clients with a comprehensive support package. The program also cooperates with the Global Wind Energy Council (GWEC), which provides strong links with the international offshore wind industry and market insights in our client countries. ESMAP offers direct technical assistance to developing countries to support regulatory reform enacted by the government to establish necessary market conditions, auction processes, grid upgrades, and planning.

Offshore Wind FY2025 Project Examples

Brazil | ESMAP supported Brazil in advancing its offshore wind ambitions with the publication of the Scenarios for Brazil Offshore Wind Development roadmap. The moderate-growth scenario projects 32 GW of offshore wind capacity by 2050.

Viet Nam | The Offshore Wind Program helped Viet Nam identify optimal wind zones and develop a private sector framework for offshore wind projects. These efforts informed national planning and policy updates, contributing to a revised power development plan (PDP-8) that sets a new offshore wind target of 6 GW by 2030.

Türkiye | ESMAP supported the preparation of the $750 million Transforming Power Transmission System Project, approved in August 2025, to upgrade Türkiye's grid and enable 2.5 GW of new wind and solar capacity by 2035. Ongoing assistance informs the country's first high-voltage direct current corridor to unlock renewable energy in the east.

SPOTLIGHT ON OFFSHORE WIND

A PATH TO ENERGY SECURITY AND GREEN POWER IN THE PHILIPPINES

Since 2019, the World Bank Group's Offshore Wind Development Program—jointly led by ESMAP and IFC—has supported the government of the Philippines in establishing offshore wind as a strategic pillar of its energy transition.

The Philippines, an archipelago of over 7,000 islands, faces rising energy demand and remains heavily reliant on imported fossil fuels. Offshore wind presents a unique opportunity to diversify the energy mix, reduce carbon emissions, and enhance energy security. With 90 percent of its wind resources located in waters deeper than 50 meters, the country is well positioned to adopt floating offshore wind technologies.

The Department of Energy has set ambitious targets: 35 percent renewable energy in the electricity mix by 2030 and up to 50 GW of offshore wind capacity by 2050. The first turbines are expected to be operational by the end of 2028, following a competitive auction process launched in 2025.

World Bank Group Support

The World Bank Group's support has been instrumental in establishing the foundation for offshore wind development. Key initiatives include:

- **Resource Mapping and Roadmap Development** | ESMAP-funded studies identified strategic offshore wind zones and culminated in the 2022 Offshore Wind Roadmap, which guided policy and regulatory development.
- **Capacity Building** | A series of workshops in early 2025 covered auction design, port and grid development, and supply chain readiness.
- **Embedded Technical Advisors** | Starting in April 2025, ESMAP experts were embedded within the Department of Energy, providing real-time guidance on auction structuring, bankability, and risk allocation.
- **Regulatory Support** | ESMAP support provided technical assistance to the Energy Regulatory Commission to prepare for the first dedicated offshore wind auction.

Policy Framework Development

A major milestone was the launch of the first dedicated offshore wind auction in 2025. This auction represents a major step toward commercializing offshore wind in the Philippines. Bids are due by the end of 2026, with project delivery targeted between 2028 and 2030.

Market Development

The auction targets 3,300 MW of fixed-bottom offshore wind capacity, which is projected to generate approximately 10 terawatt hours (TWh) annually—equivalent to 8 percent of the Philippines' electricity consumption. This capacity could displace over 6 million metric tons of CO_2 emissions per year, contributing significantly to climate mitigation efforts.

Private sector interest has surged, with both local and international developers expressing strong enthusiasm. The auction's design, informed by global best practices and tailored to the Philippine context, has enhanced investor confidence.

Strategic Positioning

Offshore wind is now firmly established in the country's long-term energy planning. The Philippine Energy Plan includes offshore wind targets of 19 GW to 50 GW by 2050, based on low and high growth scenarios. This integration reflects a strategic shift toward renewable energy as a cornerstone of national development.

Energy security has also improved, with offshore wind offering a domestic, stable, and scalable alternative to imported fossil fuels. The sector is expected to drive regional development, job creation, and infrastructure upgrades.

Financing and Policy Reform

The ESMAP-IFC Offshore Wind Development Program informed a major World Bank Development Policy Loan, valued at $800 million. This loan supports reforms aimed at accelerating the energy transition, increasing renewable energy share, and promoting green jobs and investment.

Lessons Learned

Several critical success factors emerged from the Philippines' offshore wind journey:

- **High-Level Political Commitment** | Executive leadership and interagency coordination were essential to driving progress.
- **Stakeholder Engagement** | Inclusive consultations ensured that policies were grounded in local realities and global insights.
- **Technology-Specific Policy Tools** | Tailored instruments such as spatial planning guidance and auction design frameworks supported early market development.
- **Embedded Technical Assistance** | Onsite advisors provided agile, responsive support that accelerated implementation.

As Undersecretary Rowena Cristina L. Guevara noted,

> *"It has been a huge advantage to have World Bank offshore wind experts based in the Department's offices every month during 2025. Our staff have benefited from immediate access to technical advice and global experience. This guidance has enabled a rapid and flexible form of direct support and has been instrumental to help meet the Department's timeline to launch the Philippines' offshore wind sector."*

Looking Forward

The Philippines' journey in offshore wind development illustrates how targeted technical assistance can catalyze transformative change. With first power delivery expected by the end of 2028, the groundwork laid in 2025 positions the country to become a regional leader in offshore wind.

The Offshore Wind Development Program continues to support the Philippines in building a resilient, low-carbon energy future that creates jobs and economic opportunities.

GEOTHERMAL

Despite its promise, many countries face barriers to geothermal adoption, including resource uncertainty, limited technical expertise, and gaps in knowledge about its viability. To address these challenges, ESMAP facilitates targeted capacity-building initiatives and knowledge-sharing activities at both the national and regional levels. These efforts engage sector experts, government officials, and key stakeholders to build understanding and support for geothermal energy as a sustainable alternative.

Geothermal FY2025 Project Examples

El Salvador | With ESMAP's long-term support for geothermal development in El Salvador, the World Bank Board approved a $150 million IBRD loan and $17.7 million in cofinancing for the drilling and construction of a 20–25 MWe geothermal power plant in the Chinameca geothermal field.

Georgia | Through the ESMAP-funded initiative Towards Sustainable Geothermal Heat in Georgia, a comprehensive assessment of the country's geothermal sector and its development potential was undertaken. The program included studies on the legal and regulatory framework, as well as geothermal resource assessment and utilization opportunities.

St. Lucia | With support from ESMAP, the World Bank Board approved $12.75 million in additional financing for geothermal exploration drilling in St. Lucia, aimed at confirming a viable geothermal resource for future power generation on the Caribbean island.

ENERGY STORAGE

With continuously dropping costs of battery storage systems (BESS), down 70 percent over the past decade, energy storage has become a cost-effective solution to providing necessary grid support, energy shifting, and transmission and distribution deferral. Renewable energy and storage hybrids are emerging as cleaner, more economic alternatives to diesel-based generation systems. ESMAP's Energy Storage Program and Partnership, established in 2019, has exceeded its goal of mobilizing $1 billion in World Bank Group investment and $1 billion in concessional finance. In fact, as of end-FY2025, ESMAP had supported or informed a total of more than $4 billion in energy storage investments in over 40 countries, including approximately $3 billion with public financing and $1 billion with private financing.

The Energy Storage Program and Partnership exemplifies the key role that ESMAP plays in "plugging in" developing countries with the latest technologies, and implementation experience. This has been achieved through horizon scanning of frontier technologies, international experience and principal players, capacity building, knowledge exchange with stakeholders of client countries, and technical assistance and operational support.

Energy Storage Program and Partnership Highlights, FY2025

In 2019, ESMAP convened the Energy Storage Partnership (ESP), whose members reached 59 in number in 2025 and range from research institutions and industry bodies to multilateral development banks, development groups, and power utilities.

The ESP helps introduce technological and regulatory solutions to countries and develop business models that leverage the full range of services that storage provides. In FY2025, the ESP significantly expanded its activities, focusing on knowledge exchange, training, portfolio support, and partnership strengthening.

The ESP continued to advance learning and technical capacity through multiple channels. The Storage Academy delivered a series of virtual training courses totaling 16 hours, four technical webinars, and project clinics. Partnership engagement also remained a central focus. The ESP Stakeholder Forum and 11th Partners Meeting, co-organized with MASEN, the Morocco Agency for Sustainable Energy, in Marrakesh, in November 2024. Over 100 participants from 27 countries, celebrated the five-year anniversary of the partnership and surpassing the original goals, and initiated the process of setting the strategic directions of the energy storage engagement toward 2030. To strengthen knowledge exchange and peer learning, ESMAP started the global energy storage Virtual Community and Storage Library to enhance member collaboration and information sharing and ensure that the network remains diverse and active.

The ESP and its partners advanced technical studies and analytical activities on BESS; research on battery recycling and repurposing; an Advisory Service and Analytics on storage pricing and compensation; increasing renewable energy penetration in mini grids through energy storage; and developing concepts for new studies on end-of-life electric vehicle battery management and regional battery recycling centers in Sub-Saharan Africa and East Asia.

ESMAP provided analytical and operational support to the World Bank's growing storage portfolio, including approximately 70 projects under implementation and another dozen in various stages of planning and preparation.

The ESP remains committed to advancing gender equality through the Women in Energy Storage Mentorship Program, implemented with the Global Women's Network for the Energy Transition (GWNET). The third cohort was launched in FY2025, attracting over 100 applications and selecting 24 mentees from 21 countries. Program activities included technical and networking sessions at the ESP Partners Meeting in Morocco and virtual events featuring experts on the latest emerging market and technology developments.

Energy Storage FY2025 Project Examples

Belize | ESMAP supported the Belize Renewable Integration and Resilient Energy System project, leveraging over $58 million in financing to strengthen the national electricity system and enable greater renewables integration, including the installation of four 10 MW BESSs. The project will enhance grid reliability, enable solar PV integration, and reduce costly electricity imports, as well as help set operational rules for BESS deployment.

Comoros | ESMAP's assistance laid the foundation for solar access, helping the government plan the deployment of solar energy and battery storage by 2030. Sector-wide training and new energy information systems empowered local teams while preparations for private investment frameworks advanced.

The Gambia | ESMAP delivered transaction advisory support guiding the country's first solar and battery tender, with 50 MWp and 40 MWh of BESS, setting the stage for the Regional Solar Park. Five independent power producers were prequalified, with financial proposals scheduled to open in the Fall of 2025.

Kenya | ESMAP supported Renewable Energy and BESS tenders, helping enhance Kenya's policy, legal, and regulatory environment for private sector investment in battery energy storage, wind and solar, while also building public sector capacity. The second phase of the Kenya GREEN Program

supported grid upgrades and a major battery storage installation, with feasibility studies and procurement advancing rapidly.

Liberia | ESMAP's cofinancing of the next phase of the Liberia Electricity Sector Strengthening and Access Project and advisory support paved the way for a new solar and battery tender. Local experts received specialized training, and a high-level steering committee was established to drive energy sector reforms.

GREEN HYDROGEN

ESMAP's Green Hydrogen Support Program advances global green hydrogen deployment through its Hydrogen for Development (H4D) partnership and 10 GW Lighthouse Initiative. In FY2025, these efforts identified 68 promising projects across 10 countries, addressing key challenges like regulatory barriers, technical risks, and investment readiness.

H4D is a global platform for accelerating clean hydrogen deployment by fostering international cooperation. H4D's visibility and impact grew notably, with the expansion of its partner network from 42 to 54 members, reflecting increasing global interest and momentum.

Global Collaboration on Clean Hydrogen in Japan

A major milestone was the 4th H4D Partners Meeting and Stakeholders Forum, held in Tokyo in May 2025. This marked the initiative's first convening in a hydrogen-importing country, with Japan's rising demand for clean hydrogen and its derivatives creating a space for dynamic and forward-looking dialogue with emerging markets and developing countries.

The 10 GW Lighthouse Initiative (see Spotlight, pp. 64-66), launched at COP29, now includes 15 partners and supports regional working groups and national strategy alignment. The Green Hydrogen Support Program also promotes capacity building and knowledge sharing to help countries meet SDG7 and Paris Agreement goals.

Green Hydrogen FY2025 Project Examples

Egypt | ESMAP helped Egypt identify renewable energy projects to replace aging thermal plants and informed its national low-carbon hydrogen strategy. The initiative strengthened the planning capacity and clarified the business model for green hydrogen, emphasizing the government's role in regulation and certification.

India | The Advancing Green Hydrogen Interventions in India grant supported work to streamline approval processes for green hydrogen projects, as part of India's $3 billion Development Policy Operation.

Mauritania | The World Bank completed an assessment of Mauritania's green hydrogen infrastructure needs, supporting its ambition to produce up to 80 GW. The study focused on shared infrastructure—especially ports and roads—critical for private investment. It also explored the socioeconomic benefits of excess desalinated water and electricity and proposed financing and partnership models.

Knowledge Products | The Organisation for Economic Co-operation and Development (OECD) and the World Bank published a joint report on de-risking instruments for clean hydrogen investment. At European Hydrogen Week, a policy guidance for EU hydrogen imports was launched with Hydrogen Europe in April 2025, followed by a Spanish-language version for Latin America. Three flagship publications explored ammonia decarbonization, hydrogen safety, and hydrogen's role in iron and steel industry location. A joint report with Colombia's Hydrogen Association highlighted insights on social licensing for renewable energy projects.

SPOTLIGHT ON CLEAN HYDROGEN

10 GW LIGHTHOUSE INITIATIVE: ACCELERATING RENEWABLE HYDROGEN IN EMERGING MARKETS

Renewable hydrogen, produced via electrolysis powered by renewable energy, offers a zero-emission alternative for hard-to-abate sectors such as steel, fertilizers, shipping, and aviation. For emerging markets and developing countries, the production of renewable hydrogen represents a unique opportunity to help decarbonize economies while attracting foreign investment and creating new engines of growth, employment, and energy security.

To help developing countries take advantage of this opportunity, ESMAP launched the 10 GW Lighthouse Initiative in 2023. Fifteen international development finance institutions are now behind this effort to bring 10 GW of renewable hydrogen electrolysis capacity to approval by 2030. Individual projects typically range from 50 MW to 1 GW. The goal is to unlock the potential of clean hydrogen in emerging markets and developing countries by demonstrating commercial viability, reduce costs through technological advances, and showcase innovative financing and risk mitigation solutions.

In 2025, the initiative made strides in derisking investments, assessing project pipelines, and building the foundation for green industrial development. The Lighthouse partners have established various financing instruments for hydrogen projects and programs in 10 priority countries.

Challenges to Deployment

Despite growing interest—over 500 hydrogen projects have been announced in emerging markets and developing countries (excluding China)—few have reached the final investment decision. The reasons are multifaceted: perceived high investment risks, regulatory uncertainty, immature supply chains, and limited access to concessional finance. These barriers have created a gap between ambition and implementation, slowing progress across the sector.

Country Prioritization and Pipeline Activation

Following a rigorous assessment, 10 countries (Brazil, Chile, Colombia, Egypt, India, Mauritania, Morocco, Namibia, South Africa, and Tunisia) have been prioritized for fast-tracked support based on their renewable energy potential, policy readiness, and strategic interest.

More than 60 hydrogen projects across these countries have been identified for further analysis to inform technical assistance and future lending operations. In 2025, the initiative helped enable 1 GW of electrolysis capacity of early-stage hydrogen projects throughout the countries. These projects are now undergoing detailed feasibility assessments, with several expected to reach the go-ahead stage by 2026–27.

Support activities included technical due diligence, risk mitigation strategy development, investor matchmaking, and policy advisory services—all tailored to the respective country-specific contexts.

Growing Momentum for Global Collaboration

Launched at COP29 in Azerbaijan with strong backing from the Breakthrough Agenda, the 10 GW Lighthouse Initiative marked a pivotal moment in aligning global ambition with actionable pathways for renewable hydrogen development. ESMAP serves as the convener, coordinating efforts across public and private sectors. This catalytic approach is designed to build confidence, reduce risk, and foster scalable investment.

Fifteen major development finance institutions are engaged in unlocking private sector participation and accelerate deployment of clean hydrogen. In addition to the World Bank Group, this includes the ADB, AFD, the Asian Infrastructure Investment Bank, the Development Bank of Latin America and the Caribbean (CAF), the Carbon Disclosure Project, EBRD, H2Global, Invest International, Inter-American Development Bank, Japan Bank for International Cooperation (JBIC), and KfW Development Bank.

This unprecedented collaboration is further supported by the Hydrogen for Development (H4D) partnership, launched and administered by ESMAP, which strengthens market foundations through policy support, capacity building, and knowledge sharing.

Innovative Financing and Private Sector Engagement

To improve bankability and reduce risk, the 10 GW Lighthouse Initiative is mobilizing blended finance solutions that combine concessional funding with commercial capital. In 2025, several pilot financing structures were developed, including guarantees for offtake agreements, viability gap funding mechanisms, renewable hydrogen purchase agreements, and carbon credit monetization strategies.

Private sector interest has been strong. In FY2025, more than 40 global hydrogen developers, electrolyzer manufacturers, and industrial offtakers participated in Lighthouse-hosted investor roundtables and matchmaking events. This engagement has helped build market confidence and foster early partnerships between developers and host governments.

Looking Ahead

The Lighthouse Initiative is focused on aligning financing institutions, unlocking project pipelines, strengthening due diligence, reducing costs through concessional instruments, and attracting private sector participation. This integrated, country-specific approach ensures that hydrogen strategies reflect local strengths and priorities.

As countries prepare for the next phase of the energy transition, the 10 GW Lighthouse Initiative is working to prove that clean hydrogen can be viable, scalable, and transformative in emerging markets and developing countries.

SCALING UP ENERGY EFFICIENCY AND DECARBONIZATION OF END-USE SECTORS

Energy efficiency is widely recognized as the "first fuel" in clean energy transitions. It is the most cost-effective mitigation for climate change and offers multidimensional benefits. Despite huge improvements in energy efficiency globally, the scale of the challenge is striking: almost two-thirds of the world's energy is not used productively. Due to these inefficiencies, combined with the projected 30 percent increase in energy demand over the next decade, an urgent scale-up of energy efficiency is needed to support continued economic development.

Unfortunately, unlike renewable energy deployment, this area does not attract as much interest from private investors, due to the lack of economic incentives, limited institutional and human capacities, scarce financial resources, and market and technology gaps. As these barriers are removed, the need for concessional financing decreases, paving the way for the successful mobilization of private capital.
ESMAP is uniquely positioned to support the deployment of innovative business models, drawing from global knowledge and lessons learned from past operations and fostering strong partnerships, including in:

- Urban areas, including energy efficiency in urban planning and utility services.
- Energy efficiency and decarbonization in buildings, as well as the construction and renovation of buildings.
- Energy efficiency and decarbonization in industry.
- Energy efficiency and decarbonization in transport.
- In FY2025, ESMAP advanced initiatives building energy efficiency, e-mobility, direct geothermal use, and industrial decarbonization.

Country Grants and Technical Assistance

ESMAP grants and technical support have driven notable progress in energy efficiency and decarbonization across all regions. Interventions range from early-stage technical support and policy development to capacity building and direct investment facilitation, with a consistent emphasis on local ownership, institutional strengthening, and knowledge exchange. These efforts are laying the groundwork for scalable, sustainable transitions to cost-effective, low-carbon energy systems and supporting partner countries in meeting climate, economic, and social development goals. The program places a strong emphasis on energy efficiency and demand-side decarbonization in all sectors of the economy, from buildings and industry to transport and agriculture. It includes the process heat and steam—often the "forgotten energy form"—where significant savings can be realized through measures such as boiler optimization, waste-heat recovery, heat pumps, district energy, and the direct use of geothermal or solar thermal heat. This focus extends beyond large energy-intensive industries to include residential buildings, single family homes, SMEs, and public facilities where the energy saving potential is frequently underexploited. Specific attention is provided to sustainable cooling.

Decarbonization FY2025 Project Examples

Türkiye | In FY2025, the Heat Pump Market Assessment was finalized, mapping shallow geothermal potential, analyzing the heating and cooling demand, and confirming the financial viability of heat pumps. These findings directly

informed the implementation of the Türkiye Second Energy Efficiency in Public Buildings Project, which prioritizes replacing fossil fuel boilers with electric heat pumps and includes technical assistance to strengthen and enforce building energy codes.

Nigeria | ESMAP's initiatives included using advanced mapping tools to support rooftop solar deployment and inform national clean energy strategies, with a focus on subsidy targeting and incentive design.

With the rise of electric mobility, transport is increasingly linked to the energy sector. ESMAP advances the energy dimension of transport decarbonization, complementing the Global Facility to Decarbonize Transport (GFDT) through joint knowledge work and support to World Bank operations in areas such as electric vehicle grid integration, charging infrastructure, charging tariffs, and utility capacity building.

Rwanda | ESMAP helped electrify the Kigali bus fleet with about 150 electric buses and convert key transport hubs into charging stations. The study *Exploring Enabling Energy Frameworks for Battery Electric Buses in Rwanda* assessed the readiness of the country's power system to support the transition to battery electric buses by analyzing electricity demand forecasts, grid impacts, tariff structures, and infrastructure planning. The study's recommendations, including adjustments to electric vehicle charging tariff methodologies and the development of technical guidelines for charger deployment, were integrated into the Rwanda Urban Mobility Improvement Project, World Bank Board approved in FY2025, which includes $26 million to electrify Kigali's buses. The study *Exploring Enabling Energy Frameworks for Battery Electric Buses in Rwanda*, assessed the readiness of the country's power system to support the transition to battery electric buses by analyzing electricity demand forecasts, grid impacts, tariff structures, and infrastructure planning.

Uganda | ESMAP supported the government in expanding access to sustainable and clean energy while promoting the productive use of energy for socioeconomic development and financial sustainability.

India and Bangladesh | ESMAP funded IFC advisory efforts to pilot and accelerate the adoption of innovative decarbonization technologies in hard-to-abate industrial sectors. This resulted in IFC investments of over $200 million, including in a greenfield steelmaking facility (Bangladesh) and tire manufacturing facility (India).

Mexico, Morocco, and Türkiye | ESMAP supported the development of eco-industrial parks, from preparing and piloting a national green industrial zone certification (Mexico) to fully implementing national certification (Türkiye). In Morocco, specific decarbonization options (biomass, waste exchange, solar, green hydrogen) were studied for use in five industrial parks.

Brazil and Viet Nam | ESMAP supported the development of strategic decarbonization roadmaps as well as prefeasibility studies on decarbonization at specific industrial plants (steel and cement).

Kyrgyz Republic | ESMAP enabled energy-efficient retrofits in public buildings, achieving up to 50 percent energy savings and reaching thousands through capacity building, with a strong focus on gender inclusion.

Moldova | ESMAP contributed to a $54.5 million project targeting public school retrofits and developed a national heating roadmap, coordinating closely with donors.

Knowledge Products and Capacity Building

ESMAP contributed to key knowledge products, including the flagship World Bank report *Power More with Less: Scaling Up Energy Efficiency for Growth and Energy Security*, rooftop solar PV assessments in multiple cities, and guidance notes on demand response programs. These resources support

utilities and regulators integrating renewables and managing grid flexibility.

Capacity-building efforts included the development of the Energy Efficiency portal, a webinar on sustainable aviation fuels together with the World Bank's Transport Global Knowledge Unit, contributions to the Scaling Up Energy Efficiency Academy Program, and training delivered in partnership with the International Energy Agency, reaching hundreds of participants.

ESMAP expanded cooperation with international organizations such as the United Nations Industrial Development Organization, IRENA, OECD, and IEA and supported the establishment of energy efficiency funds, including work with the Montreal Protocol Multi-Lateral Fund. ESMAP was also identified as a delivery partner for the Global Matchmaking Platform under the Climate Club. It also supported seven countries (Brazil, Egypt, Mexico, Namibia, South Africa, Türkiye, and Uzbekistan) with mobilizing climate financing under the inaugural Climate Investment Fund Industry Decarbonization Program, reinforcing its role in advancing industrial decarbonization efforts.

TRANSITIONING AWAY FROM UNABATED FOSSIL FUELS

Energy accounts for more than three-quarters of total greenhouse gas emissions globally (IEA 2024), with the combustion of fossil fuels still representing 80 percent of energy sources. Transition toward cleaner energy sources is critical to mitigating climate change and reducing air pollution that causes health issues.

However, the transition from unabated fossil fuels such as oil, coal, and natural gas has not progressed as expected, mainly due to financial, investment, technical, and affordability constraints.

In electricity production, the transition from coal, liquid fuel, and gas-powered stations to power plants that use renewable energy has been steady but slower than planned. The main barriers to eliminating fossil fuel power plants are fossil fuel subsidies, lack of political will, inconsistent enforcement of existing policies, high upfront capital costs for clean energy, a high cost of capital, and weak energy sector fundamentals like poor governance, inadequate planning, and problematic cross-sectoral subsidies. These challenges are particularly acute in developing countries, where governments struggle to afford the transition while also managing energy supply and costs for their citizens.

Since the World Bank stopped financing new coal projects, in 2010, ESMAP has been assisting governments in phasing out and repurposing coal plants and developing transition plans, social protection, and reskilling programs. A core priority of ESMAP's support is ensuring a fair and just transition, where communities are protected.

INDONESIA | AIDING THE EFFECTIVE TRANSITION TOWARD CLEANER ENERGY SOURCES

When ESMAP found that several Indonesian coal plants might be eligible for repurposing to renewable power plants, the state-owned utility Perusahaan Listrik Negara listened. ESMAP's FY2025 analysis not only identified 16 coal units (5.6 GW) across seven plants for closure before 2030. It also showed that, subject to full sustainability and viability assessments, some of these mining areas could be used for utility-scale solar PV plants and pumped storage hydropower. Perusahaan Listrik Negara voiced strong interest in pursuing this work, as it could help address the operational and financial constraints faced by the utility and mitigate environmental and health challenges due to air pollution. ESMAP and the World Bank sent a joint team to Jakarta to investigate further and kick off an investment financing project. In parallel, ESMAP is working with the utility and Indonesia's energy and mineral resources ministry on advancing coal decommissioning, repurposing, and integrating renewable energy. This work will continue going forward, following the design of the decommissioning of the Komati power plant in South Africa. The Indonesian Climate Investment Fund Accelerating Coal Transition project will support the repurposing of one of the Ombilin 100 MW units, a coal-fired power plant in Sawahlunto City, West Sumatra.

Transitioning FY2025 Project Examples

Colombia | In FY2024, ESMAP supported a gap analysis of coal mine closure plans, which informed the coal mine closure plans of three major mining operators: Drummond, Cerrejon, and Colombian Natural Resources.

In September 2024, a training workshop was conducted on the Land Use and Repurposing Assets (LURA) tool for government agencies. During the workshop, it was identified that LURA would focus its work on two mines licensed to Prodeco (La Jagua and Calenturitas).

Bosnia and Herzegovina (BiH) | ESMAP funded four studies on mine and plant repurposing that informed the $86 million Just Transition in Select Coal Regions of BiH project, approved by the World Bank Board in FY2025. A study tour to Greece and Western Macedonia provided insights into stakeholder engagement and planning for a post-lignite future.

South Africa | ESMAP has been supporting the around $500 million Komati coal-fired power plant decommissioning project over the past three to four years. It is the first World Bank engagement of this kind and includes procurement for decommissioning coal-fired plants, repurposing them for renewable energy plants, and support for communities that have depended on the plant for work and income opportunities. The Komati project now serves as a model and benchmark for subsequent coal plant decommissioning projects in South Africa and other countries. These projects include, next to World Bank and ESMAP funding, contributions from the Climate Investment Funds (CIF). The CIF Accelerating Coal Transition (ACT) Multiphase Programmatic Approach (MPA) concept was approved in 2025. In South Africa, it allows deferring decommissioning of five coal plants (around 8 GW in total) to 2030 and after. Sunsetting the coal plants later than South Africa's utility operator ESKOM had initially planned became necessary to ensure stable power supply in the country. However, a so-called 'emissions-constrained power dispatch mechanism,' supported by ESMAP, will be in place in the interim to ensure South Africa's power mix optimizes not just for low cost but also for low emissions. That way, ESKOM plans to still meet the original target of 71 Mt CO_2 emissions reduction by 2030. The project will follow Komati's technical design, with solar PV, wind, and battery storage to repurpose existing sites and parts of the equipment. As with Komati, the Just Transition component of the project aims to retain ESKOM jobs in energy projects and support community development.

Viet Nam | ESMAP funding informs long-term decarbonization plans and policy recommendations, supporting the National Energy Transition Strategy and Power Development Plan 8. While Viet Nam has committed to achieving net zero by 2050, coal phaseout plans remain under development, with ESMAP analysis identifying least-cost alternatives and viable technical solutions.

ESMAP Knowledge Products

In FY2025, ESMAP completed two key knowledge products to help regulators, system operators, utilities, and policymakers make decisions on coal plan retirement or repurposing:

Coal Retirement and Repurposing Model | The model was developed to support the revision of the South Africa Accelerating Coal Transition Investment Plan. The national utility ESKOM needed to substantially change this plan, as massive power cuts made delaying the retirement of coal plants from 2026/27 to 2030 and beyond necessary.

The CRRM was an effort to expand the scope of retirement and repurposing to see if there were wider optimization opportunities to achieve the emissions reduction target that formed the core objective of the initial plan. The CRRM showed that adjusting the power dispatch across ESKOM's coal plants could help reduce CO_2 emissions to about the same level as the original target and

do so without early retirement of coal plants or jeopardizing energy system security.

Security and Emission Constrained Economic Dispatch Model (SECED) | This ESMAP model helps run India's power plants more efficiently and cut pollution. It builds on an earlier World Bank-supported system, SCED, which saved over $500 million between 2019 and 2024 by optimizing national power generation. SECED includes all Indian states and adds emission constraints for local pollutants and carbon. While shutting down coal plants is controversial, SECED may reduce emissions by changing how coal and gas plants are used—even if fuel costs rise. It also supports India's new carbon trading market starting in 2026. The World Bank is currently engaged with the relevant government agencies to chart a course forward.

SECED's linear programming approach optimizes real-time power dispatch every 15 minutes by shifting generation from higher-cost plants to cheaper ones. It considers proposed generation schedules, plant costs, system demand, and operational constraints, such as spinning reserve, ramping limits, transmission capacity, and minimum loading. The model runs in seconds to deliver the least-cost dispatch solution while maintaining system security requirements.

FINANCIAL INNOVATION WINDOW FOR ENERGY TRANSITION

The Financial Innovation Window is a new initiative based on lessons from ESMAP's Sustainable Renewables Risk Mitigation Initiative and aims to reduce barriers to private investment in clean energy. Its core purpose is to provide tailored risk mitigation instruments for renewable energy projects, helping them reach financial closure quickly and deliver benefits to utilities and countries where they are deployed.

Removing Barriers to Clean Energy Investment

Through collaboration with MIGA and IFC, the Financial Innovation Window structures risk mitigation solutions for grid-connected renewable energy projects, using donor and climate funding. These instruments are designed to address key residual risks that often hinder clean energy investments. While existing tools are leveraged where possible, the window fills gaps where such instruments are unavailable or insufficient. It brings together solutions to cover risks such as liquidity guarantees for payment risk, tariff buydown, first loss or foreign exchange risk, offtaker bankability, and innovation risk.

Addressing Foreign Exchange Risk

One major challenge for renewable energy projects is foreign exchange risk. When a power purchase agreement cannot be made in local currency, it must be denominated in hard currency, which introduces risks around convertibility and the actual availability of foreign currency. While some risks are covered by existing instruments, others—such as the availability of US dollars in-country—are not.

In Ethiopia, limited access to hard currency has prevented many renewable energy projects from reaching financial close. To address this, the ESMAP supported the regional Bank team in piloting a leading-edge foreign exchange risk mitigation instrument, supported by a $20 million Green Climate Fund reimbursable grant. This approach could be replicated in Nigeria and other countries in Sub-Saharan Africa.

The pilot in Ethiopia, known as the Foreign Exchange Liquidity Support Mechanism, directly tackles the availability gap. It provides independent power producers with the assurance needed to reach financial close for critical projects, such as the initial 125 MW solar PV installations at Gad II and Weranso.

By guaranteeing access to hard currency when needed, this mechanism serves as a crucial derisking tool, unlocking hundreds of millions of dollars in private capital for Ethiopia's renewable energy sector.

Enhancing Offtaker Bankability

Many existing risk mitigation instruments are inaccessible to smaller or higher-risk projects or are too restrictive for countries with limited fiscal capacity. In such cases, the Financial Innovation Window offers a grant-funded liquidity instrument, deployed alongside World Bank investment operations, to provide a backstop indemnity.

In The Gambia, the Regional Solar Park project is supporting the government's first competitively procured solar and battery energy storage system. Due to the fragile financial position of the national utility, a liquidity support mechanism was developed. This mechanism uses a six-month escrow account, seeded with financing from an IDA grant, to cover payments owed to the power producer if the utility fails to pay on time.

Supporting Tariff Buydown and Viability Gap Funding

In some countries, utilities face major viability challenges, especially where fossil fuels remain cheaper than renewables. The Financial Innovation Window provides tariff buydown instruments to reduce the cost of power purchase agreements, supporting the deployment of low-carbon options and enhancing resilience, particularly in small island states.

Indonesia's Sustainable Least-Cost Electrification Operation aims to bring clean, affordable electricity to 3.5 million people, demonstrating how innovations in financing can make renewables cost-competitive and facilitate public-private partnerships. The operation targets a 10 percent reduction in greenhouse gas emissions across Kalimantan and Sumatra over six years, creating a replicable model for other island nations.

Indonesia's outer islands face tough competition from heavily subsidized coal power. To make renewable projects viable, ESMAP funds and the World Bank's Framework for Financial Incentives provided a capital expenditure buydown, specifically targeting battery storage technology. This reduced the combined cost of solar and battery storage below the regulatory ceiling, making the 540 MW renewable energy program financially attractive to the state utility. Without these financial incentives, solar-plus-battery projects would not have been viable. With support, they are now financially sensible and enable private sector participation through innovative partnerships.

FOUNDATIONS FOR DECARBONIZED ENERGY SYSTEMS

Although each country faces unique barriers and risks, advancing energy transition largely relies on addressing the limitations posed by weak sector fundamentals.

These include:

- An inadequate policy and regulatory environment and inadequate enforcement
- A lack of markets and efficient price signals, plus, where markets exist, market distortions
- Weak power grids
- Poorly performing utilities
- An insufficiently trained workforce
- Persistent gender inequalities in energy access and economic opportunities

Substantial shifts in the energy sector are underway, spurred by the electrification of end-uses like electric vehicles or heat pumps, the rising affordability and reliability of distributed renewable energy, and the widespread adoption of digital technologies, including artificial intelligence. The changing landscape is creating new opportunities to modernize and strengthen countries' energy foundations.

ESMAP'S FOCUS ON FOUNDATIONS

Enabling countries to harness those opportunities through strong energy sector foundations is a core objective of ESMAP's new business plan. This support is provided through integrated engagements tailored to the specific needs and context of client countries. In this work, ESMAP focuses on four intertwined themes:

Infrastructure | Modernized Energy Systems: Modern grids and resilient utilities are vital for achieving energy access and low-carbon goals. ESMAP supports regional integration, market reform, and utility modernization while addressing private sector gaps and promoting sustainable infrastructure.

Regional integration and interconnected power systems support the cost-effective use of renewable and low-carbon energy while enhancing energy security. ESMAP works to eliminate barriers to cross-border electricity trade, improve market efficiency, and strengthen institutions by developing regional masterplans and harmonized regulations (see Spotlight on Regional Integration & Power Trade, pp. 80-82).

To build climate-resilient infrastructure, ESMAP also helps countries assess climate change's impacts on power systems, understand societal vulnerabilities, and implement adaptive solutions. In addition, it supports pilot projects and innovative strategies to boost resilience.

Institutions | Effective Markets, Pricing, and Policies: Reforming energy prices and inefficient subsidies is vital for clean energy and sector sustainability. ESMAP guides countries on subsidy reform, stakeholder impacts, and communication. In one example, ESMAP's efforts led to Ecuador's July 2024 decision to eliminate gasoline subsidies after years of work.

Also, competitive electricity markets are lacking in most developing countries and often unsuitable for renewable energy scale up. ESMAP supports countries in developing effective, inclusive market structures. Similarly, ESMAP advises governments on enabling policies, planning, and regulations to drive decarbonization and universal energy access. ESMAP will ramp up its support in this area.

Data | Data-Driven Decision Making and Digital Technologies: ESMAP is developing an open data platform to enhance global energy tracking tools like the SDG7 tracking report, Multi-Tier Framework for Energy Access (MTF), Regulatory Indicators for Sustainable Energy (RISE), and Solar and Wind Atlases. It supports data accessibility, visualization, and progress monitoring—especially in Sub-

Saharan Africa—to inform energy planning and decision making.

Digital technologies like AI and machine learning accelerate renewable energy adoption. ESMAP's data framework empowers regulators and planners with timely insights to optimize grid planning, support mini grid development, and enable corporate renewable energy markets in developing countries.

Rising electricity demand and digital growth strain transmission grids. ESMAP promotes digital solutions for efficiency and service quality, while expanding support for cybersecurity, data governance, and AI to strengthen resilience and planning in client countries' power sectors.

People | Improved Equity and Benefits: ESMAP promotes gender equality in energy by supporting gender components in power projects and regional networks. In FY2025, efforts were expected to benefit 11.5 million[13] people, advancing women's access, employment, and leadership.

The energy transitions will create jobs and socioeconomic benefits. ESMAP supports client countries in assessing those benefits and turning ambitions (such as those included in the Just Transition Principles) into concrete energy sector interventions.

The overall work on foundations of the energy system was supported by knowledge products, including reports such as *Harnessing the Potential of Flexible Demand Response in Emerging Markets*, *Power Grid Interconnections and Regional Electricity Markets for the Sustainable Energy Transition*, and *From Ambition to Action: Practical Insights on Energy Subsidy Reforms*, that informed policy dialogue and operational engagement globally.

INFRASTRUCTURE | MODERNIZED ENERGY SYSTEMS

Modern, flexible grids are essential for universal energy access and the deployment of variable renewable energy. In FY2025, ESMAP helped countries and regions modernize their energy infrastructure, strengthen the performance of their utilities, and build resilience against climate and operational risks. This included advice and hands-on support for digital transformation and advanced data analytics, innovative and strengthened business models, and corporate governance. ESMAP also supports utilities in client countries to better harness distributed energy resources, such as accelerated penetration of rooftop solar.

Infrastructure FY2025 Project Examples

Malawi | The country's power grid has been disrupted by severe weather events, necessitating robust asset management. An ESMAP grant supported the design of an Asset Management Framework for the Electricity Supply Corporation of Malawi, including a detailed asset inventory, lifecycle practices assessment, and cost-benefit methodologies. A pilot Early Warning System, including real-time alerts and risk mapping, for climate and vandalism risks was finalized. This grant informed the $250 million Accelerating Sustainable and Clean Energy Access Transformation (ASCENT) Malawi.

India | ESMAP is supporting automation in electricity distribution to support the adoption of distributed renewable energy and electric mobility in India. Activities included preparing case studies, designing a smart electricity distribution operation center, and exchanging best practices. The project's findings informed the smart grid investment component under the West Bengal Electricity Distribution Grid Modernization Project. The new activity supports smart meter data analytics in

13. Calculated by the World Bank Outcomes Measurement Department using gender-tagged World Bank energy projects informed by ESMAP

MAURITANIA | DIGITAL TRANSFORMATION FOR THE ENERGY TRANSITION

Mauritania's power sector faces significant financial and operational challenges due to subsidized energy tariffs, fraud, and low collection rate (around 65 percent in 2022). The technical and commercial losses reached almost 40 percent in 2022. Utility digitalization, therefore, is critical for improving Mauritania's national power utility SOMELEC's operational performance.

The ESMAP grant facilitated the delivery of a Utility Modernization Masterplan for SOMELEC that includes organizational restructuring, a performance improvement plan, and identification of urgent investment needs. Digitalization is at the core of the masterplan and proposes tools such as Enterprise Resource Planning, mobile money, and drone-based inspections to reduce losses, and enhance customer service. The plan also emphasizes skills development for women in technical fields. The masterplan is expected to continue to guide future policy reforms and investments

Madhya Pradesh, aiming to reduce losses and improve customer service, and has the potential for replication nationwide.

South Africa | An ESMAP grant is supporting the City of Cape Town in developing a smart grid roadmap to modernize its electricity network. The roadmap assessed current systems and identified integration, data quality, and cybersecurity as key challenges, recommending upgrades to information technology and operational technology infrastructure and staff skills. The grant provides a model for other South African municipalities seeking to adopt digital technologies and accommodate more distributed energy resources. This work is significant for ESMAP because it operationalizes Foundations' strategic priorities, demonstrating how digitalization can enable the energy transition, build local capacity, and provide a scalable model for other cities.

Uzbekistan | An ESMAP grant supported technical assessments and a prefeasibility study for digitalizing Uzbekistan's electricity distribution sector. The grant's recommendations directly informed the design of a $150 million Program for Results, which links disbursement to the adoption of a digitalization roadmap by the national utility. The operation will help establish advanced systems such as SCADA (Supervisory Control and Data Acquisition) and Distribution Automation, laying the groundwork for a modern, resilient grid. This has great impact because it demonstrates how targeted upstream support can unlock large-scale, results-based investments and embed digitalization as a core sector reform.

Infrstructure Knowledge Products and Capacity Building

In FY2025, ESMAP published the report ***Harnessing the Potential of Flexible Demand Response in Emerging Markets***, which explores how optimally managing electricity demand can help with the global energy transition. The report highlights how demand response programs—where consumers adjust their electricity use in response to price signals or grid needs—are emerging as powerful tools to enhance system reliability and efficiency. By treating electricity demand as a flexible resource, alongside battery energy storage, demand-response programs provide critical grid flexibility that enables countries to integrate higher shares of variable renewable energy such as solar and wind into their power systems. The report highlights the implications of better harnessing load flexibility for managing growing demand from electric vehicles, data centers, and electrification of industrial processes.

Capacity-building efforts included study tours on smart grid deployment in South Korea and cybersecurity in Paris, training over 100 stakeholders from 60 utilities. These engagements supported peer learning on regulatory frameworks, distributed energy resources integration, grid security, and AI-driven management. As a direct outcome of these trainings, ESMAP expanded technical assistance and grant support to countries including Botswana, Jordan, Kenya, Senegal, Türkiye, and West African Power Pool, building on ongoing engagements in Georgia, Moldova, and Ukraine, and direct collaboration with the French utilities Enedis and RTE.

To systematize support for adaptation and resilience, ESMAP supported the development of a Repository of Practical Guidance and Tools to help practitioners integrate climate adaptation and resilience into operations, analytics, and policy dialogue. A Catalogue of Climate Adaptation & Resilience Measures for Project Design, featuring over 200 measures, a repository of expert rosters, and technical notes on resilience and energy access is currently being developed.

Joint training and knowledge sharing events leveraged partnerships with leading agencies such as the IEA, Electric Power Research Institute's Climate Resilience and Adaptation Initiative, International Institute for Applied Systems Analysis, International Organization for Standardization, Coalition for Disaster Resilient Infrastructure, ADB, IRENA, and many others.

SPOTLIGHT ON REGIONAL INTEGRATION & POWER TRADE

THE NEW ENERGY MARKETS IN SUB-SAHARAN AFRICA

Regional energy integration is a cost-effective and scalable pathway to delivering electricity access across the globe. Universal access to reliable and affordable power cannot be achieved in isolation. The more interconnected the grids are, the greater the synergies and access to diverse energy resources.

This is particularly true in Sub-Saharan Africa, where abundant but unevenly distributed energy resources meet still-limited electricity access and small power systems that constrain economies of scale. Regional integration allows countries to harness complementary renewable resources—linking hydro, solar, wind, and geothermal potential across borders—thereby reducing supply costs and strengthening system resilience to shocks and variability.

As such, regional integration is one of the five pillars of the nearly 30 African countries' energy strategies, known as National Energy Compacts, that underpin Mission 300—the World Bank's and African Development Bank's effort to connect 300 million more people in Sub-Saharan Africa with power by 2030 (see Spotlight on ESMAP and Mission 300, page 20).

ESMAP leads the World Bank's ramp-up of support for regional power integration and trade, particularly in Sub-Saharan Africa. It has supported and will continue to support the development and strengthening of the four African Power Pools—Eastern (EAPP), Southern (SAPP), West (WAPP), and Central (CAPP)—contributing to the longer-term vision of the African Union's African Single Electricity Market, which aims to connect all African subregions in a unified continental power market.

ESMAP's support for regional integration in Africa combines global knowledge, technical assistance, and capacity building to help countries and power pools strengthen the technical, regulatory, and institutional foundations of cross-border electricity trade. The program's engagement spans the full integration cycle—from grid development and project preparation to regional planning and system operation, regulatory

harmonization, and market design—while also promoting gender inclusion through initiatives such as the Women in Energy Network (WEN-Africa).

The story of ESMAP's impact and support for the Zambia-Tanzania Interconnector transmission line connecting the EAPP and SAPP is told in this video and LinkedIn post.

ESMAP's sustained engagement has catalyzed a new generation of large-scale World Bank investments structured as Multiphase Programmatic Approaches (MPAs)—notably the Regional Energy Transmission, Trade, and Decarbonization (RETRADE) programs in Eastern and Southern Africa and the West Africa Regional Electricity Market Program (WA-REMP). These long-term, multi-country initiatives mobilize various financing instruments and sources to develop priority regional transmission corridors. Within these large-scale investments, ESMAP's Sustainable Renewable Risk Mitigation Initiative (SRMI) is able to offer its risk-mitigation services and encourage private sector investments. Thus, ESMAP's work on grid integration and regional markets leads to larger private investment projects and increased bankability for the offtaker. The long-term power sector initiatives also strengthen the enabling environment for deeper and more liquid electricity trade and catalyze private investment in transmission infrastructure (see following box).

ESMAP SUPPORT TO THE AFRICAN POWER POOLS

Eastern Africa Power Pool (EAPP) | ESMAP has been a longstanding partner of the EAPP, bringing it to the verge of launching its regional market. Support has been instrumental in building regulatory, institutional, and technical capacity for cross-border and market operations. In FY2025, these efforts led to major achievements, including the formal establishment of the regional regulator—the Independent Regulatory Board (IRB); the completion of regional regulatory harmonization and trade benefits studies; and a high-level ministerial conference on regional power trade co-hosted by EAPP and the government of Kenya, which reaffirmed the political commitment needed to advance the regional agenda. This work directly underpins the RETRADE-EA program, expected to be approved in early 2026 with an envelope exceeding $1 billion. Phase 1 includes the Uganda-Tanzania Interconnector together with continued support to the EAPP General Secretariat and the newly established IRB to bolster the regional power market and regulatory frameworks. The MPA also promotes private sector participation in transmission, with plans to pilot at least one Independent Transmission Project in later phases. It will further expand technical assistance and strengthen the regional grid, including the integration of the Horn of Africa countries currently unconnected to the regional network.

Southern African Power Pool (SAPP) | Southern Africa currently hosts the continent's most mature regional market, supported by ESMAP's longstanding collaboration through MARCOT and related trust funds, such as the SIDA-funded Advancing Regional Energy Projects (AREP) (See p. 93). Over the past decade, support established the Project Advisory Unit, prepared a pipeline of nine regional interconnectors, and advanced blended-finance solutions through

the creation of the Regional Transmission Infrastructure Financing Facility in FY2025. This foundation culminated in the RETRADE-SA MPA, approved in January 2025 with a financing envelope of around $1.2 billion. Its first operation—the Zambia-Tanzania Interconnector—is now under implementation, physically linking SAPP and EAPP and marking a milestone toward the African Single Electricity Market initiative. Subsequent phases will continue providing technical assistance and financing additional priority interconnectors to further deepen regional trade and renewable energy integration. See the video on ESMAP's role in connecting the EAPP and SAPP.

West Africa Power Pool (WAPP) | Following the synchronization of more than 10 national grids in 2023, WAPP is now consolidating its regional market architecture with ESMAP's continued support to strengthen regulatory and operational foundations. Its technical assistance focuses on designing the Day-Ahead Market, full synchronization, enhancing liquidity, and building national and regional capacity for market and trade operations. In FY2025, support included preinvestment and grid-reinforcement studies, the completion of the regional transmission tariff methodology—providing the technical basis for adoption in FY2026—and the start of preparation for the Liquidity Enhancement Revolving Fund. This engagement now underpins the WA-REMP MPA, approved in January 2025 with a financing envelope of about $4 billion. Phase 1 includes the development of the Côte d'Ivoire-Ghana interconnector and national grid reinforcement in Mauritania, building on existing regional networks such as the Côte d'Ivoire-Liberia-Sierra Leone-Guinea interconnection and the interconnection linking The Gambia, Guinea, Guinea-Bissau, and Senegal. Future phases aim to further expand cross-border transmission capacity, deepen market liquidity, and mobilize private sector participation.

Central African Power Pool (CAPP) | CAPP remains the least advanced of Africa's four regional power pools, with limited cross-border infrastructure and still-developing institutional capacity. Drawing on lessons from other regions, ESMAP is providing targeted support to help CAPP strengthen its institutional framework and strategic direction for regional integration. Support has centered on developing CAPP's Strategic Business Plan (2025–28), improving coordination among member utilities and energy ministries under the Economic Community of Central African States Commission, and identifying opportunities for medium-voltage cross-border electrification to enhance access and early trade. In FY2025, the business plan was finalized and endorsed by the region's Energy Ministers, and technical studies on medium-voltage interconnections between Cameroon-CAR and DRC-CAR were completed. Building on this momentum, the region is now preparing its MPA—currently under design and expected by FY2027. Following the model of RETRADE and WA-REMP, the program will combine infrastructure development, regulatory harmonization, and institutional strengthening.

INSTITUTIONS | EFFECTIVE MARKETS, PRICING, AND POLICIES

Robust institutions, such as markets, pricing mechanisms, and policy frameworks, play a critical role in promoting efficient resource allocation, fostering innovation, and mitigating risks. ESMAP helps establish effective price signals and regulatory incentives while also advancing competitive energy markets that support both access and decarbonization goals.

SUBSIDIES AND PRICES

Subsidy reforms are particularly critical in developing countries, where fiscal constraints are severe and opportunity costs—such as a lack of funds for investments in critical areas like health and education—are high. ESMAP helps governments understand these trade-offs and design reforms that are equitable, economically sound, and politically feasible.

In FY2025, ESMAP continued supporting governments' energy subsidy reform efforts. Subsidies too often miss their stated goal of protecting vulnerable groups. Instead, they distort markets and drain scarce public resources. To help counter these unintended consequences, ESMAP has distilled key insights and lessons learned derived from energy subsidy reforms in eight technical papers and the umbrella report *From Ambition to Action: Practical Insights on Energy Subsidy Reforms*. These resources offer actionable guidance on subsidy reform design, stakeholder impact analysis, mitigation strategies, and communication approaches. The reports cover macroeconomic analysis, social protection, distributional impacts, firm-level effects, political economy, and carbon pricing signals.

ESMAP aided governments in designing and implementing energy subsidy reforms by helping deliver tailored and timely advice to countries through World Bank operational and advisory engagements. Through this support, several countries have developed their energy subsidy reform roadmaps, adopted cost-reflective tariffs, and improved utilities' financial viability. ESMAP also supported governments in implementing carbon pricing mechanisms, including through a series of country case studies that informed the *Carbon Pricing in the Power Sector: Role and design for transitioning toward net-zero carbon development* report that ESMAP copublished with the IEA.

Energy Subsidies FY2025 Project Examples

Ethiopia | A financially sustainable electricity sector is vital for Ethiopia to attract investments in power generation and transmission, crucial for expanding access and supporting economic growth. Since 2024, the World Bank has assisted Ethiopia through advisory work focused on improving the sector's financial performance. This includes analysis of tariff reforms and their social impacts, which informed a four-year tariff adjustment plan aiming for cost recovery by 2028. Under the plan, tariffs will rise by at least 10 percent quarterly in the first year, with adjustments in the second year based on cost changes. Importantly, the lifeline tariff for the first 50kWh/month will increase more slowly, remaining below half the cost of service by the end of the adjustment period.

Ecuador | In July 2024, after several years of reform attempts, Ecuador eliminated gasoline subsidies, shifting to market-linked pricing with a smoothing formula to protect consumers. The reform, expected to save $600 million annually, was guided by ESMAP's analytical support, including pricing methodologies, stakeholder engagement, and social impact assessments. It forms part of a broader plan to phase out all fuel subsidies. The government is now exploring diesel subsidy reforms and improving electricity pricing to attract private investment in renewable energy and grid infrastructure.

Tunisia | Since FY2024, ESMAP has supported Tunisia's energy sector reforms to improve financial viability and enhance the performance of public electricity and gas utility Societe Tunisienne de l'Electricite et du Gaz (STEG). In February 2025, the utility and the Ministry of Industry signed

a performance contract informed by ESMAP's technical assistance. The contract aims to stabilize the sector and prepare for a long-term plan (2029–33). It aligns with Tunisia's goal of 35 percent renewable energy by 2030, targeting reduced generation costs, improved operational efficiency, financial sustainability, governance, and better integration of renewables into the grid.

CREATING COMPETITIVE ELECTRICITY MARKETS AND ADVANCING REGIONAL INTEGRATION

Research shows that 80 percent of developing countries do not have competitive electricity markets. Often, transmission infrastructure is underdeveloped, private sector participation is limited, and enabling environments are weak. Institutional delays, technical and commercial obstacles, and geopolitical risks further hinder progress. Moreover, low market liquidity, legacy power purchase agreements, and inadequate institutional and regulatory frameworks obstruct market reform and utility restructuring, limiting countries' ability to scale up renewable energy and improve system reliability. These challenges are even more acute at the regional level, where the success of power trade depends on aligning diverse infrastructures, institutions, and regulatory frameworks across countries. Through the Energy Markets, Connectivity, and Regional Trade (MARCOT) and the Advancing Regional Energy Projects (AREP) associated trust fund, ESMAP helps countries and regions address these challenges by fostering competitive market structures, strengthening regulatory and institutional capacity, and harmonizing planning and operational frameworks. MARCOT supports both national market reforms—including cost-reflective tariffs, liquidity mechanisms, risk-mitigation tools—and regional integration efforts that promote efficient cross-border trade, shared use of generation resources, and enhanced reliability.

ESMAP's support for building resilient and efficient energy markets is embedded in our contributions to the Mission 300 initiative. Helping remove barriers to electricity trade, improve system reliability, and enable cost-effective regional trade are part of the National Energy Compacts of countries such as Nigeria, Senegal, Tanzania, and Zambia.

This practical work is underpinned by cutting edge research. The report *Beyond Borders: Power Grid Interconnections and Regional Electricity Markets for the Sustainable Energy Transition* provides a foundational framework for regional energy integration centered on five building blocks: transmission infrastructure, planning and investment coordination, technical and operational coordination, commercial arrangements and market design, and institutional architecture.

Electricity Markets FY2025 Project Examples

Pakistan: Wholesale Market Transition | ESMAP's Annual Block Grant-financed technical assistance supported Pakistan's shift from a vertically integrated system to a competitive wholesale electricity market. This includes redrafting the market commercial code and revising the distribution code to align with competitive market principles; preparing Security Package Documents tailored for renewable energy integration; and capacity building for the system operator, regulator, and utilities. This work was foundational for the wholesale market launch targeted in fall 2025 and informed a $55 million additional financing for the Electricity Distribution Efficiency Improvement project.

Niger: Generation Masterplan and Scaling Solar | ESMAP supported Niger's energy sector transformation by funding variable renewable energy integration studies that informed the government's generation masterplan, identifying 660 MW of new renewable capacity (518 MW solar PV, 142 MW wind, plus 32 MW battery storage). A 60 MW solar plant under the World Bank's Scaling Solar program is under negotiation, with the government considering whether to proceed as a public project or as an independent power producer investment.

Namibia: Utility-Led Wind and Solar Development ESMAP supported the wind measurement

campaign and the Environmental and Social Impact Assessment for a 300 MW wind project and a 120 MW solar project run by Namibia's state utility. The aim is to prepare the project for private sector participation.

Angola: Enabling Private Investment in Transmission | ESMAP Technical assistance was provided on legal and regulatory reviews of the electricity law, leading to reforms that allow private participation in transmission—an approach to be tested in the upcoming Angola-Namibia interconnection.

Pan-Arab Electricity Market | ESMAP facilitated the signing of regional agreements to create a shared electricity market among Arab countries, harmonizing regulatory frameworks and market rules.

Central Asia: Unlocking Trade Opportunities | ESMAP provided technical assistance to quantify economic benefits from deeper electricity trade, identify priority transmission investments, and develop the region institutional framework for market integration, including the design of a pilot day-ahead market led by a consortium headed by Nord Pool.

Western Balkans: Aligning with the European Market | ESMAP supported cooperation among transmission operators and regulators to transpose European market rules, establish a regional governance framework, and create a shared capacity-calculation platform.

Regional Power Trade in Africa: Foundations for Integration | ESMAP's Foundations program has played a pivotal role in advancing regional power integration and cross-border electricity trade across Africa, among other regions, including support for harmonizing grid codes, developing regional masterplans, and enabling private sector participation. These foundational efforts are essential for creating liquid, competitive markets that can scale renewable energy and improve affordability. (See Spotlight on Regional Integration & Power Trade, page 80-82.)

ENABLING POLICIES, PLANNING, AND REGULATION

Setting the right policies and regulations is the first step toward a well-functioning national energy system that is affordable, low-polluting, and sustainable. Under ESMAP's 2025-2030 Business Plan, advisory work has been ramped up to build the legal, institutional, and technical foundations necessary for such competitive energy systems.

Enabling Policies FY2025 Project Examples

Sri Lanka | ESMAP supported the implementation of the 2024 Electricity Act and the 2025 Electricity Amendment Bill, which introduced sector unbundling, competitive procurement, and cost-reflective pricing. These reforms aim to improve governance, transparency, and service delivery and are foundational for attracting private investment in renewable energy and transmission.

India | ESMAP's analysis of business and financing models for energy efficiency and industrial decarbonization identified commercially ready technologies and the enabling policies and risk-sharing structures needed to scale them. This work informed the design of the Partial Risk Sharing Facility II, aligned with India's net-zero targets.

Planning and Regulation FY2025 Project Examples

Bangladesh | ESMAP supported a national techno-economic study to integrate over 3,000 MW of captive generation and industrial load into the grid. This included forming a client task force, developing data protocols, and convening stakeholder workshops. The work built the foundation for future decisions on independent system operator functions and private sector participation in transmission.

Sri Lanka | Regulatory reforms included tariff policy and methodology updates, financial standing assessments of the Ceylon Electricity Board, and human resource policy reviews. These measures aim to improve sector creditworthiness and institutional capacity, enabling private participation in renewables.

DATA | DATA-DRIVEN DECISION MAKING

Modernizing data collection and analysis through a unified framework and advanced tools is essential to effectively tracking progress on energy access and decarbonization.

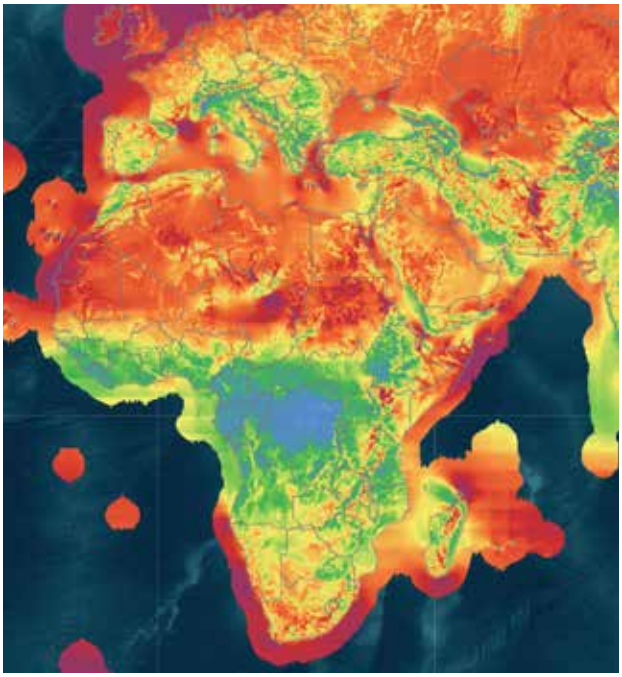
ESMAP is advancing intelligent, open data platforms and enhancing key products such as the Tracking SDG7 report, Multi-Tier Framework, Regulatory Indicators for Sustainable Energy, and the Global Solar and Global Wind Atlases. These datasets are publicly accessible via the Energy Data Hub.

The ***Tracking SDG7: Energy Progress Report 2025,*** published in June by five custodian agencies—the World Bank, UN Statistics Division, WHO, IRENA, and IEA—offers a comprehensive assessment of global trends in electricity access, clean cooking, energy efficiency, and renewable energy. Based on data from over 200 countries, the report highlights that while global electricity access has improved, 666 million people still lack power—85 percent of them in Sub-Saharan Africa. This year's edition underscores the impact of Mission 300 and the Dar es Salaam Declaration, where countries committed to accelerating energy access through infrastructure development and capacity building under Energy Compacts.

Regulatory Indicators for Sustainable Energy (RISE) serves as a global scorecard to evaluate countries' progress toward SDG7 through their energy policies and regulations. The 2024 edition revealed that although many countries have strengthened electricity access policies, fragile states continue to face significant implementation challenges. Policies on clean cooking and energy efficiency remain weak or moderate, and renewable energy frameworks show limited advancement. To improve clarity and analytical rigor, RISE has streamlined its indicators and enhanced data collection methods, aligning with partner organizations and consolidating public data.

The **Multi-Tier Framework (MTF)** helps countries establish energy access baselines and identify barriers to electricity and clean cooking. In response to growing demand driven by Mission 300 and Energy Compacts, new MTF initiatives were launched in nine African countries to support standardized monitoring and implementation. Nigeria, Senegal, Angola, and Mozambique are preparing to begin tracking through MTF's microdata household surveys. ESMAP has also partnered with the Living Standards Measurement Study team to develop cross-sectoral approaches for streamlined implementation.

The **Global Solar and Wind Atlases** underwent major upgrades in FY2025 with the release of Global Wind Atlas 4.0, offering improved geospatial modeling tools to assess solar and wind potential and support investment decisions. Enhanced data accuracy and usability were key focuses, and technical assistance was provided to Armenia (wind), Kosovo (wind), and Liberia (solar) to support their renewable energy development efforts. The team also facilitated the integration of ENERGYDATA.INFO into the new bankwide Data360 initiative, thereby securing increased visibility of ESMAP to the public and across operations.



PEOPLE | IMPROVED EQUITY AND BENEFITS

Women remain underrepresented in the energy sector, particularly in technical and leadership positions. Challenges to women's inclusion persist, including a lack of access to science, technology, engineering, and mathematics (STEM) education, gender bias in hiring and promotion, insufficient family-friendly policies, and cultural norms that reinforce traditional gender roles. Yet, the underutilization of women's talent represents a significant missed opportunity. Women bring unique perspectives and innovative solutions that are known to increase above-average profitability for companies, strengthen communities and families, and boost GDP in many developing countries.

The changing landscape of the energy sector, driven by emerging technologies and data-driven strategies, is creating new opportunities to tackle gender disparities and enhance the socioeconomic benefits of expanded energy access.

During FY2025, ESMAP and its partners made strides in advancing gender equality in the energy sector through dedicated investments, strategic collaborations, and the introduction of innovative tools. In FY2025, ESMAP's gender and energy teams supported 55 projects across six regions, with 91 percent of them incorporating gender-focused interventions and measurable targets to promote gender equality and women's economic participation. Over two-thirds of these initiatives aimed to improve women's access to financing and quality employment.

Globally, gender-focused measures in IBRD/IDA-financed energy projects are expected to benefit approximately 11.5 million people. Additionally, regional knowledge sharing and partner-led activities, such as through the Women in Energy networks, have been instrumental, benefiting around 250,000 women. Programs like internships, certification courses, and scholarships are steadily expanding women's opportunities in green jobs.

Gender FY2025 Project Examples

Mauritania | The Transmission Corridor Project, in partnership with ESMAP, aims to boost the recruitment of women in technical roles in Mauritania by 30 percent. The project is also establishing a Gender Unit to attract, retain, and promote women in STEM positions and expand the country's engagement in regional networks.

Tanzania | ESMAP is narrowing the gender employment gap in Tanzania through the Rural Electrification Program and the Zanzibar Energy Sector Transformation and Access projects. Led by a gender expert, key initiatives include a STEM internship and certification program, a *Gender Equality Situational Analysis Report*, and the development of a Gender Equality Policy for the Rural Energy Agency. Technical support is also provided to implement gender action plans for TANESCO and ZECO, ensuring systematic monitoring and reporting.

Cabo Verde | The country's Renewable Energy and Improved Utility Performance Project integrates gender-focused components such as technical training, business incubation, and skills development for women. An ongoing socioeconomic assessment aims to maximize local participation and job creation, with workshops planned to emphasize gender equality and local economic impact.

Western and Central Africa | The Mission 300 Patient Capital Facility is investing in distributed renewable energy companies, with a goal of 20 percent being female-owned or -led.

ESMAP also launched new efforts such as the preventing Violence Against Women and Girls Energy Brief and an innovative virtual course using the Geospatial Women's Employment Analytical Framework to explore how location affects women's access to jobs and entrepreneurship in the **Maldives**.

WOMENS REGIONAL NETWORKS

ESMAP supports gender networks in all World Bank regions.

In the **Middle East and North Africa,** the MENA-AP Energy and Gender Program provided technical guidance to Tunisia's Company of Electricity and Gas, which now seeks to double its number of female technicians. The Regional Network for Women in Energy in MENA recently launched a new chapter in Jordan, inaugurated by the Minister of Energy. RENEW MENA's internship placements in Egypt and Jordan have resulted in all participants securing jobs in the sector. In Aden, Yemen, a workshop for female engineers at the Ministry of Electricity and Energy marked significant progress, offering training and technical opportunities for clean energy skilling programs in a challenging environment.

In FY2025 in **Africa**, the Africa Gender and Energy Program contributed to 20 new projects, 19 of which feature comprehensive gender action plans. The Women in Energy Network Africa's annual conference in Lusaka brought together 141 policymakers and practitioners from 26 countries, with five strategic partnerships established to enhance advocacy and networking.

In **South Asia,** the Gender and Energy Program expanded successful projects such as WePOWER's SAR-100, leveraging ESMAP and other resources to train 70 midcareer female engineers and launching SAR100-2.0 for an additional 108 participants. The Maldives Gender Mainstreaming in the ASCENT project held a validation workshop for its Gender and Energy Roadmap, with ministries expressing interest in using the results to guide climate and gender budgeting.

In **Latin America**, the LACEG Program supported a $1 million initiative in Argentina's Renewable Energy Sector Development Project, focusing on the education-to-employment transition for young women. The WENERGY mentoring network has created a robust community of female professionals, with 95 percent reporting positive utcomes.

The Pacific Women's Energy Employment and Empowerment Program published its Pacific Women in Power baseline report, identifying ways to improve gender diversity in **Pacific Island Countries** and guiding regional policy development.

Collectively, these efforts are working toward transformative change and embedding gender equity into sustainable energy transitions.

Regional Networks FY2025 Project Examples

Haiti | Through the Renewable Energy for All project, 250 jobs, specifically for women and female-headed micro-enterprises, are being created, with an emphasis on targeted recruitment, training, and improved workplace conditions—all in support of inclusive economic growth and energy access.

Tajikistan | The Rogun Hydropower Project is set to double the number of women in permanent technical and managerial roles, marking a significant step toward gender parity in a traditionally male-dominated sector. The Gender Action Plan facilitates STEM training for women and advances recruitment, retention, promotion, professional development, and mentoring. It promotes an inclusive and safe work environment and includes onsite childcare.

EXPANDING WOMEN'S ACCESS TO GREEN JOBS

- In the first half of 2025, ESMAP collaborated with the Poverty & Equity and Social Protection & Labor Global Departments in the MENA-AP region to deliver two workshops focused on women's access to green skills and employment:

- ESMAP participated in a regional course on Boosting Female Labor Force Participation (FLFP), where it moderated and introduced a new session on "Women in Green Jobs" to address the intersection of gender and energy/climate work. This initiative responded to regional demand for strategies to increase FLFP, which remains the lowest globally despite a strong pool of STEM female talent. The session also showcased ESMAP's support for women in the industry and highlighted plans to strengthen policies and programs, including the Expanding Clean Hydrogen in Brazil-Ceara Green Hydrogen Hub project.

- ESMAP contributed to a workshop under the United Arab Emirates Gender Balance Center for Excellence & Knowledge Exchange, supporting governments of Bahrain, Saudi Arabia, and the United Arab Emirates in their efforts to boost female labor force participation and promote women's economic empowerment. Over 30 government officials attended, sharing experiences and exploring the demand for green and energy skills. Participants showed particular interest in ESMAP-supported interventions such as the Returning Mothers Toolkit (by WePOWER) and joining RENEW-MENA, highlighting the promise of cross-sector collaboration on gender, jobs, and energy in the region.

ASSOCIATED TRUST FUNDS

ADVANCING REGIONAL ENERGY PROJECTS

The Advancing Regional Energy Projects (AREP) in the Southern and Eastern Africa Multi-Donor Trust Fund closed in FY2025 after eight years of successfully advancing the integration of African energy markets.

Since its inception in 2016, AREP helped transform regional energy integration by assisting countries in Eastern and Southern Africa in pooling their power sectors, strengthening regional sustainable cross-border energy trade, and connecting the two regions' power grids to allow for even more flexibility in power planning, and distribution. This innovative program also cofinanced mechanisms to unlock private investment in regional transmission. The Swedish International Development Cooperation Agency was the sole donor to this trust fund, with a total contribution of $17.4 million.

Through AREP, ESMAP incubated the integration of regional power markets in Africa that eventually led to its inclusion as one of the five pillars of the currently 29 African countries' energy strategies, known as National Energy Compacts. The compacts are the cornerstones of Mission 300, the World Bank and African Development Bank effort to provide electricity to 300 million more people in Sub-Saharan Africa by 2030. AREP's legacy also continues through retained expertise, ongoing programs, and rolled-over funds for future regional energy initiatives.

FY2025 CUMULATIVE OUTCOMES AND HIGHLIGHTS

Southern African Power Pool (SAPP)

- AREP enabled the advancement of multiple regional energy projects from concept to financial close and construction, notably the Mozambique-Malawi, Zambia-Tanzania, and Kolwezi-Solwezi interconnectors.
- Eighteen preparatory studies (including feasibility studies and environmental and social impact assessments) were completed, underpinning over $900 million in verified investment. The Project Advisory Unit, established with AREP support, became a recognized technical hub, catalyzing robust project preparation and stakeholder coordination.
- Thirty capacity-building programs reached over 1,000 participants, strengthening regional expertise.

Eastern Africa Power Pool (EAPP)

- AREP advanced market and regulatory readiness in the Eastern Africa Power Pool, including regulatory harmonization, operational guidelines, and the formal establishment of its independent regulatory board. Institutional capacity was bolstered, and gender equality promoted, via the WEN-Africa initiative. The 2024 Mombasa Regional Trade Conference gathered ministers, utilities, regulators, donors, and private sector actors, producing a joint ministerial statement reaffirming political momentum toward market launch.

Analytical and Financial Results

- Fourteen analytical studies for the Southern African Power Pool led to improvements in planning, grid codes, transmission pricing, and climate resilience. The transmission pricing model and the Regional Transmission Infrastructure Financing Facility were developed to mobilize investment and mitigate risks.
- AREP's support was pivotal in preparing the World Bank's $1.3 billion regional energy integration operations in Southern Africa (RETRADE-SA MPA) program, approved by the

Board in January 2025, as well as the ongoing development of the Eastern Africa regional energy integration (RETRADE-EA MPA) program, expected to be presented for Board approval in January 2026 with a financing envelope exceeding $1.2 billion

ENERGY ACCESS AND QUALITY IMPROVEMENT PROJECT IN RWANDA

The Energy Access and Quality Improvement Project (EAQIP) single-donor trust fund was established in December 2021 with a $3.8 million contribution from the government of Denmark to provide additional financing to the Rwanda EAQIP. The project aims to improve livelihoods by expanding access to modern energy, especially in rural and peri-urban areas where many of Rwanda's poor and vulnerable reside. Funds from this single-donor trust fund are focused on increasing access to clean cooking in public schools. The project's overall $150 million IDA budget benefited from an additional $161 million in cofinancing from entities such as the French Agency for Development, the OPEC Fund, and the Saudi Fund, as well as an additional $10 million from ESMAP's Clean Cooking Fund (CCF).

The project is the World Bank's largest clean cooking operation in Africa, and the first project co-financed by ESMAP's Clean Cooking Fund.

RWANDA'S COMMITMENT AND STRATEGY

For decades, over 80 percent of Rwandan households relied on traditional cooking methods, mainly firewood and charcoal. These methods have been harmful to health and the environment and offer limited economic opportunities.

As part of its energy transition, Rwanda aims to increase the share of renewable and clean energy in the national power generation mix from 51 to 60 percent. The government is accelerating the adoption of clean and efficient cooking technologies for schools, health facilities, prisons, and households.

The World Bank, through grants and expertise from ESMAP, supports the government in deploying clean cooking solutions.

> *"Across communities in Rwanda, a quiet transformation is underway, not only in kitchens but also in livelihoods. Beyond the evident health and environmental benefits, these efforts are catalyzing meaningful change in the energy sector by creating jobs and economically empowering women across the growing clean energy value chain."*
>
> ***—Development Bank of Rwanda***

SCHOOLS

The government of Rwanda has adopted a policy to exclude biomass-based clean cooking solutions from institutional settings and provide only LPG and electric cooking solutions. Thanks to the support from the single-donor trust fund, tendering processes for 33 LPG institutional stoves and kitchen construction in 35 schools have been launched, incorporating lessons learned from previous unsuccessful tenders.

This activity has experienced delays. The Rwanda utility, Energy Development Corporation Limited, launched the tender twice for the construction of kitchens and installation of clean cooking systems without attracting qualified bidders. An updated detailed action plan has been agreed with the government with a timeline to complete the construction and installation of all institutional cooking technologies by January 2026.

COMPANIES

The project is also helping local businesses in the clean cooking sector. Through a results-based financing (RBF) subsidy scheme, the project supports private companies in distributing clean

cooking solutions—including improved cookstoves, electric cookers, and LPG systems—nationwide.

PROJECT RESULTS

- Overall, thanks to EAQIP, over 460,000 households have benefited, impacting more than 1.8 million people—about 14 percent of all households in Rwanda.
- Twenty clean cooking companies, primarily Rwanda-owned startups, have received training in business development, environmental and social safeguards, and technology manufacturing.
- EAQIP-supported companies generated 757 jobs in 2024, including 181 for women.
- The Development Bank of Rwanda disbursed about $13 million to clean cooking companies as RBF partial subsidy payments.
- The World Bank is also supporting efforts to strengthen and expand the testing capacity of the Rwanda Standards Board. So far, 127 technologies have been tested.

KYRGYZ REPUBLIC ELECTRICITY SECTOR MODERNIZATION AND SUSTAINABILITY PROJECT

The Kyrgyz Republic's electricity sector faces significant challenges: aging infrastructure, high technical and commercial losses, and tariffs that do not cover the true cost of service. These challenges have made it tough to attract new investments and ensure reliable, affordable energy for everyone. Recognizing the urgency, the government has made energy sector reform a centerpiece of its medium-term development agenda, focusing on tariff adjustments, modernization, and tapping into the country's rich renewable energy potential.

To help address these issues, the Support to Electricity Sector Modernization and Sustainability Project (KEMS) was launched in 2022 with $50 million in IDA financing. The Swiss State Secretariat for Economic Affairs (SECO) provided an additional $13.8 million in funding through the KEMS associated trust fund for a multiyear technical assistance program.

This support has helped the Kyrgyz government design and implement priority reforms, strengthen governance, and build institutional capacity. Through sector studies, policy and regulatory advice, and hands-on implementation support, ESMAP has worked side by side with local partners to lay the foundation for lasting change.

FY2025 HIGHLIGHTS

In FY2025, ESMAP's technical guidance was instrumental in advancing key reforms and building the capacity of the Ministry of Energy and other stakeholders. The project team, with ESMAP's support, helped recruit skilled personnel for the Project Management Office, boosting the government's ability to manage complex reforms and move key contracts forward.

Technical assistance on energy tariff design built on the earlier approval of a new tariff methodology in October 2023, consistent with full cost-recovery principles. This paved the way for energy tariff adjustments in May 2023 and May 2024—critical steps toward financial sustainability.

Legislative reforms also moved ahead in FY2025, following the adoption of an updated Renewable Energy Law in August 2023. This law designated the National Electricity Grid of Kyrgyzstan as the renewable energy offtaker and single buyer, creating a more robust framework for renewables.

To promote financial sustainability, the government developed a cost-recovery tariff methodology for heat and hot water and issued an Energy Regulator's Order to implement tariff increases for electricity and heating supply. A lifeline heating tariff was introduced to protect low-income households, reflecting the project's commitment to social equity.

KEY RESULTS IN FY2025

- Adoption of the Mid-Term Tariff Policy 2025–2030 for electricity, with corresponding tariff adjustments to ensure sector viability.
- Development of a new heat tariff methodology, supporting the sector's financial health.
- Legal reforms allowing foreign currency commitments in public-private partnership agreements, facilitating private investment in renewable energy.

SUSTAINING MOMENTUM

The partnership between ESMAP and SECO remains important to the Kyrgyz Republic's commitment to ensuring that energy reforms are sustainable, inclusive, and aligned with global best practices.

Progress under KEMS shows how targeted technical assistance and donor collaboration can catalyze systemic change, laying the groundwork for a modern, sustainable, and equitable energy future in the Kyrgyz Republic.

REGIONAL OFF-GRID ELECTRICITY ACCESS PROJECT

Approximately 52 percent of people in Western and Central Africa live without electricity. Electrification rates are particularly low in Burkina Faso, Niger, and the Central African Republic, where only about 20 percent of the population has access to power. Out of the subregion's 970 million residents, 503 million remain without electricity, with the vast majority residing in rural communities. Even among those who do have electricity, many are plagued by frequent interruptions and unreliable service. Beyond lacking connection to the main electricity grid, these communities also face significant challenges in accessing off-grid electrification, as private sector activities across smaller fragmented markets have lagged. Initiated in 2019, the Regional Off-Grid Electricity Access Project (ROGEAP) seeks to support 19 countries across Western and Central Africa in developing a sustainable and scalable market for off-grid electrification.

To support this, a single-donor trust fund was established in 2019 with a $44 million contribution from the government of the Netherlands to provide additional financing for the $140 million IDA ROGEAP project.

The program is focused on building a unified regional market by harmonizing policies and regulations, and by supporting the adoption of international quality standards for solar products, making the region more attractive to off-grid industry stakeholders. ROGEAP is implemented by the Economic Community of West Africa States and the West African Development Bank with support from ESMAP, the World Bank, and the African Development Bank. The program combines policy reform, market development, and innovative financing. It harmonizes regional technical standards, builds the capacity of solar companies and financial institutions, and provides a credit line and risk-sharing facility to expand lending for households, enterprises, and social institutions. The project also incorporates a comprehensive gender action plan to promote economic opportunities for women and vulnerable groups, alongside measures ensuring environmental and social sustainability, including hazardous waste oversight and battery recycling.

FY2025 HIGHLIGHTS

ROGEAP enabled direct electricity access to 269,070 individuals via standalone solar systems and electrified 1,327 SMEs—including 265 led by women.

The program also catalyzed over $150 million in private investment, expanding the reach of reliable solar power for homes, farms, and small businesses. As part of ESMAP's broader Energy Access Program, ROGEAP demonstrates how decentralized renewable energy can scale regional markets and deliver clean, resilient power across West Africa for households, businesses, and public institutions.

In FY2025, two calls for proposals awarded $3.5 million and $8.1 million, respectively, to 121 off-grid solar SMEs. Of these, more than a quarter were women-led enterprises, reflecting a strong commitment to gender inclusion.

The full grants are expected to benefit 1.6 million people, support the electrification of public institutions, and generate over 2,000 jobs, particularly in rural and underserved communities.

SMALL ISLAND DEVELOPING STATES

Across the world's oceans, small island developing states face rising seas and increasingly extreme weather. Another challenge is their heavy reliance on imported fuels for all their energy needs.

In 2011, ESMAP launched the SIDS DOCK Support Program, with generous funding of $22.1 million from Denmark and Japan. The mission: help SIDS navigate significant climate challenges and the complex transition to clean, reliable energy.

As of FY2025, the program had reached 15 countries and three regions, supporting four global initiatives and 23 country or regional activities. From Belize to Vanuatu, from the Maldives to St. Lucia, the program has helped mobilize $309 million in investments—bringing together resources from IDA and cofinancing partners.

On the ground, ESMAP grants have supported the addition of a total of 98.1 MW of new renewable energy capacity, including geothermal and hydro projects, and 75 MWh of new battery energy storage systems capacity. These advances mean more reliable power and less dependence on imported fuel.

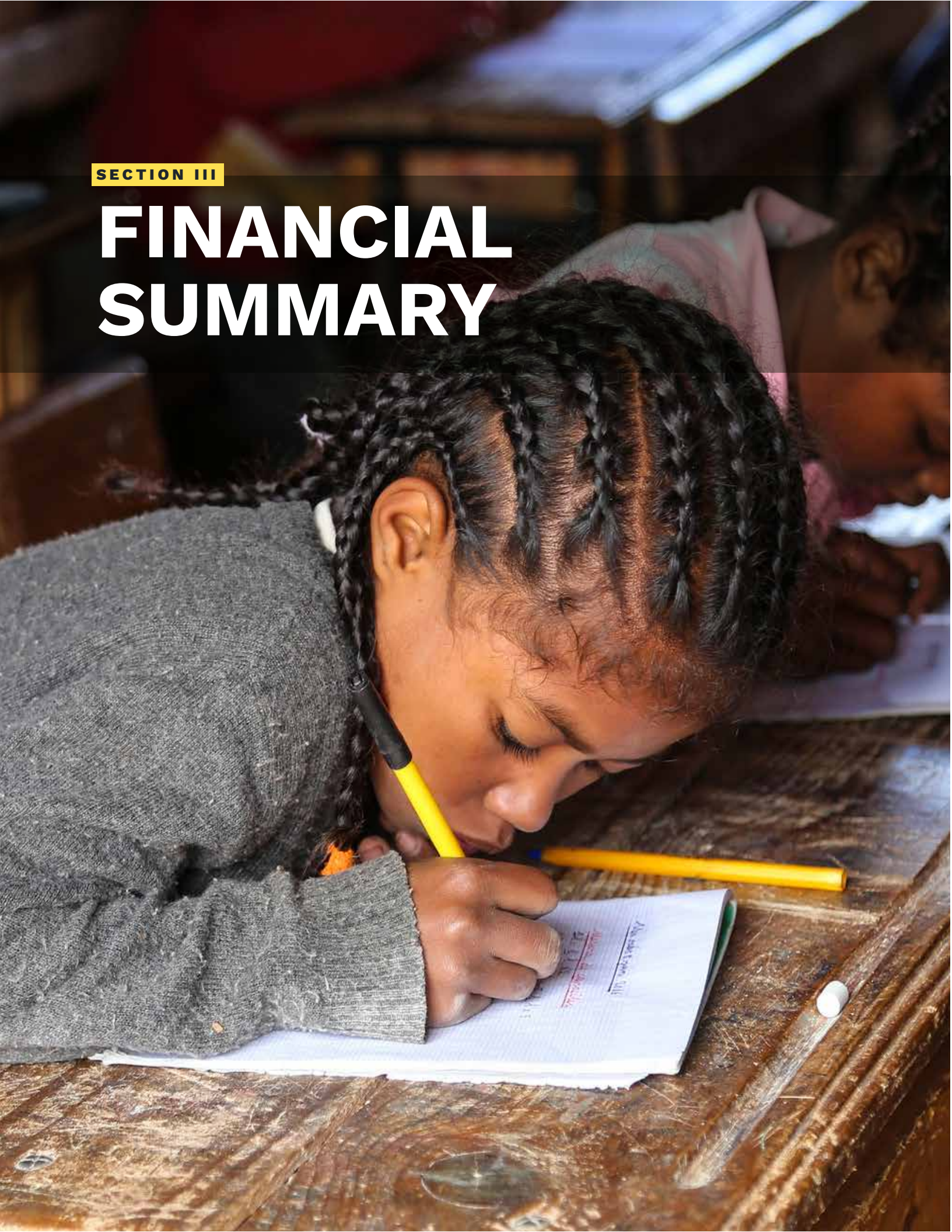
The program is scheduled to close on December 31, 2025.

PACIFIC ISLANDS | STRENGTHENING ENERGY SECTOR PLANNING AND INVESTMENT

ESMAP provided advisory support to Pacific Island Countries and Papua New Guinea, enhancing energy sector planning and investment readiness. Technical assistance informed policy development and lending operations, including PNG's National Energy Access Transformation Project and Tonga's Climate Resilience Development Policy Operation. Key outputs included the *Pacific Atoll Country Climate and Development Report* and energy data platforms. The ESMAP support contributed to strengthening energy sector dialogue on energy transition in several countries and regional institutions, aided governments' capacity building, and positioned the World Bank as a key energy partner in Fiji, Tonga, and Tuvalu.

MALDIVES | ADVANCING ISLAND-GRID ENERGY TRANSITION

The Maldives received targeted technical assistance to support its energy transition and integrated resource planning. Key interventions included analysis of Battery Energy Storage Systems (BESS) under the ARISE project, technical assessments of offshore floating solar PV, and development of a roadmap for electric mobility. This work catalyzed tenders for 10 MWp floating solar in Addu City and 15 MWp solar PV under ARISE. Tools for variable renewable energy integration and electric vehicle planning were also developed.



SECTION III

FINANCIAL SUMMARY

This chapter summarizes the FY2025 financial information of the ESMAP Umbrella Trust Fund Program, which was composed of the current and previous "anchor" multi-donor trust funds (MDTFs) (Nos. 73553 and 72490) and five associated trustee accounts. (See Table 3 for a list of associated trust funds.)

CONTRIBUTIONS

During the first year of ESMAP's FY2025-30 business plan, ESMAP received $150.2 million from 12 donors. Table 1 presents total contributions, actual receipts, as well as cumulative receipts since the inception of the anchor MDTF (No. 073553). Table 2 shows cumulative contributions and receipts for MDTF No. 72490, predecessor to the anchor MDTF. Table 3. indicates cumulative contributions and receipts for associated trust funds to ESMAP.

Table 1: Donor Contributions to ESMAP TF73553, FY2021 – 25 (US$)

Country	Donor Name	ESMAP Cumulative Contributions Paid-In & Receivables	Contributions Paid-In (Cumulative Receipts)	Contributions Paid-In 07/2024 – 06/ 2025 (FY2025 Receipts)	Contributions Not Paid as of 06/30/2025 (Receivables)
Austria	Federal Ministry of Finance	7,729,228	7,729,228	5,285,000	-
Canada	Environment and Climate Change Canada	17,894,848	14,312,160	6,261,305	3,582,688
Switzerland	Swiss State Secretariat for Economic Affairs (SECO)	23,083,782	18,073,762	4,375,191	5,010,020
Germany	Bundesministerium fur Wirtschaftliche Zusammenarbeit	4,478,610	3,312,260	546,300	1,166,350
Germany	Federal Ministry for the Environment, Nature Conservation, Nuclear	11,269,000	11,269,000	-	-
Germany	Federal Ministry for Economic Affairs and Climate Action (BMWK)	30,879,600	30,879,600	30,879,600	-
Denmark	Royal Ministry of Foreign Affairs	73,507,726	50,076,999	21,969,924	23,430,728
France	Agence Francaise de Developpement	1,222,114	1,222,114	-	-
United Kingdom	Department for Energy Security & Net Zero (DESNZ)	73,666,484	22,028,472	3,774,491	51,638,012
United Kingdom	Foreign, Commonwealth and Development Office (FCDO)	85,315,239	66,464,136	35,389,439	18,851,103
Iceland	Ministry of Foreign Affairs	3,600,000	2,400,000	800,000	1,200,000
Italy	Ministry of Environment and Energy Security	22,721,482	11,013,232	-	11,708,250
Japan	Ministry of Finance	15,000,000	15,000,000	-	-
Netherlands	Minister for Foreign Trade and Development	110,500,000	70,500,000	20,000,000	40,000,000
Norway	Norwegian Agency for Development Cooperation (NORAD)	51,347,250	51,347,250	7,851,610	-
Sweden	Swedish International Development Cooperation Agency (Sida)	66,108,100	50,173,321	13,055,997	15,934,780
	ClimateWorks Foundation	100,000	100,000	-	-
	Global Energy Alliance for People and Planet (GEAPP) LLC	30,000,000	30,000,000	-	-
	TOTAL	**628,423,464**	**455,901,533**	**150,188,857**	**172,521,931**

Note: Table 1 summarizes financials for ESMAP Multi-Donor Umbrella Trust Fund (No. 073553), established in FY2021. UK DESNZ and UK FCDO provide contributions (fully or partially) in promissory notes. Receipts denote the encashed amount.

Table 2: Donor Contributions to ESMAP TF072490, FY2016 – 21 (US$)

Country	Donor Name	Total Contributions Paid-In (Cumulative Receipts)
Austria	Federal Ministry of Finance	1,709,408
Canada	Department of Foreign Affairs, Trade and Development	2,297,618
Switzerland	State Secretariat for Economic Affairs (SECO)	14,050,000
Switzerland	Swiss Agency for Development and Cooperation (SDC)	3,373,819
Germany	Bundesministerium fur Wirtschaftliche Zusammenarbeit	4,016,280
Germany	Federal Ministry for the Environment, Nature Conservation, Nuclear	8,464,850
Denmark	Royal Ministry of Foreign Affairs	18,349,396
United Kingdom	Department for Energy Security & Net Zero (DESNZ)	60,888,864
United Kingdom	Foreign, Commonwealth and Development Office	43,668,247
Iceland	Ministry of Foreign Affairs	2,917,105
Italy	Ministry of Foreign Affairs and International Cooperation	6,054,173
Netherlands	Minister for Foreign Trade and Development	37,077,634
Norway	Norwegian Agency for Development Cooperation (NORAD)	30,336,677
Norway	Ministry of Foreign Affairs	4,772,965
Sweden	Swedish International Development Cooperation Agency (Sida)	34,055,134
	ClimateWorks Foundation	3,000,000
	Rockefeller Foundation	1,650,000
Finland	Ministry for Foreign Affairs	144,122
Australia	Department of Foreign Affairs and Trade	1,154,400
Luxembourg	Ministry of the Environment, Climate and Biodiversity	1,124,100
	The European Union	7,297,530
Spain	Ministry of Economy, Trade and Enterprise	7,088,261
	TOTAL	**293,490,583**

Note: Predecessor MDTF (No. 072490) received cumulative contributions of $293.5 million with $284.2 million paid in by FY2021 and small residual contributions paid in FY2022 and FY2023. Previously established grants under TF072490 continue implementation and will close by December 31, 2027.

Table 3: Donor Contributions to Associated Trust Funds to ESMAP (US$)

Trustee Account	Donor Name	Donor Name	ESMAP Cumulative Contributions (Paid-In & Receivables)	Contributions Paid-In (Cumulative Receipts)	Contributions Paid-In 07/2024 – 06/2025 (FY25 Receipts)	Contributions Not Paid as of 06/30/2025 (Receivables)
TF071728	Support for Small Island Developing States (SIDS) DOCK Support Program Multi Donor Trust Fund	Denmark Royal Ministry of Foreign Affairs	7,093,116	7,093,116	--	--
		Japan: Ministry of Finance	15,000,000	15,000,000	--	--
	Total		**22,093,116**	**22,093,116**		
TF073420	Support to Regional Off-Grid Electrification Project (ROGEP) Trust Fund	Netherlands: Minister for Foreign Trade and Development	44,000,000	34,000,000	18,000,000	10,000,000
TF073761	Support to Energy Access and Quality Improvement Project (EAQIP) in Rwanda Single-Donor Trust Fund	Denmark: Royal Ministry of Foreign Affairs	3,795,931	3,795,931	--	--
TF073825	Support to Electricity Sector Modernization and Sustainability Project (KEMS) in Kyrgyz Republic Single-Donor Trust Fund	Swiss State Secretariat for Economic Affairs (SECO)	13,789,422	8,779,401	--	5,010,020
TF072636	Advancing Regional Energy Projects in Southern and Eastern Africa Multi-Donor Trust Fund	Swedish International Development Cooperation Agency (Sida)	17,446,236	13,388,985	--	--
GRAND TOTAL			**101,124,704**	**82,057,432**	**18,000,000**	**15,010,020**

Note: Contributions paid in for TF072636: Advancing Regional Energy Projects (AREP) in Africa exclude $4,057,252, transferred to TF073553 upon closure of the AREP MDTF.

DISBURSEMENTS

ESMAP disbursed a combined $108 million from both anchor MDTFs in FY2025, a 47 percent increase over the $74.3 million disbursed in FY2024, mainly due to the increase in recipient-executed activities. The total FY2025 disbursements for the associated trust funds—AREP, EAQIP, KEMS, ROGEP, and SIDS DOCK—amounted to $6.2 million. By the end of FY2025, $168.3 million had been disbursed out of the total $455.9 million in paid-in contributions to the anchor MDTF, with $87 million and $21 million disbursed in FY2025 from both Anchor MDTFs, respectively. Out of the total $101 million in contributions to the five associated trust funds, $85 million had been disbursed cumulatively, with FY2025 disbursements amounting to $6.2 million. The following figures and tables show disbursements by region and type of execution.

Disbursements include Bank- and recipient-executed disbursements, unless otherwise noted. Bank-executed disbursements are recorded upon payment for services (e.g., consultants) or monthly staff time deductions. Recipient-executed disbursements are recorded when payments are made to Recipients (typically a government ministry) responsible for project implementation, in accordance with the signed grant agreement. Some RETF payments are conditional upon achieving performance-based indicators.

Figure 7: ESMAP Disbursement Percentages by Region, FY2025 (of total $108 million)

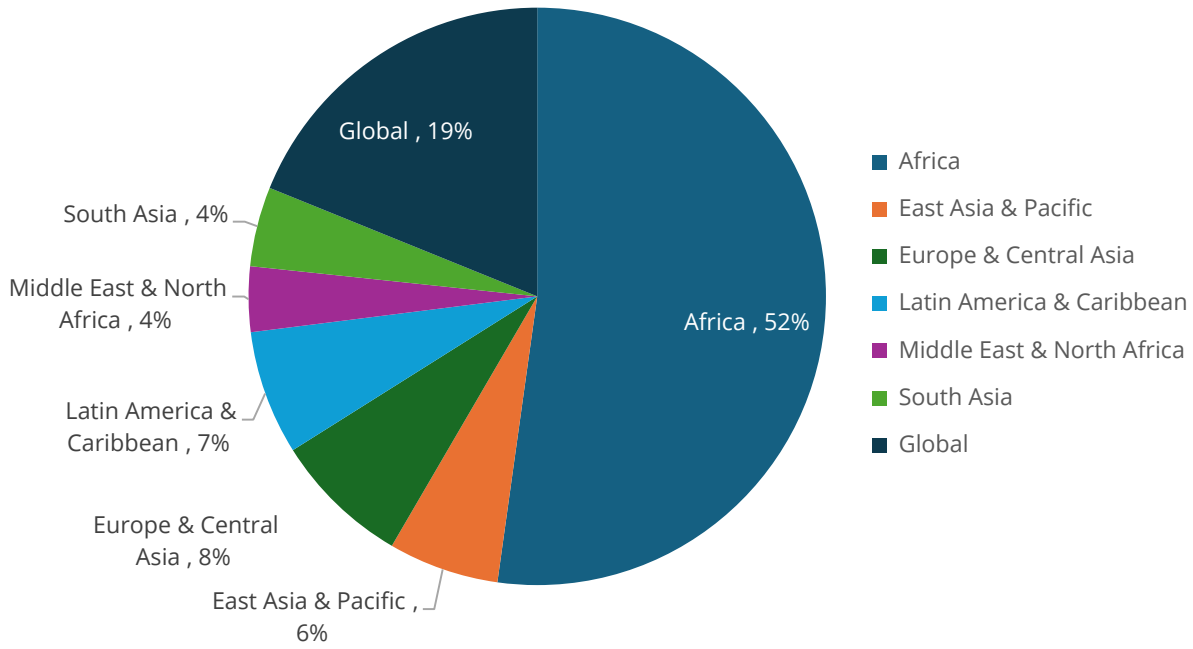


Figure 8: ESMAP Disbursements from Anchor MDTFs by Region, FY2023-25 (US$)

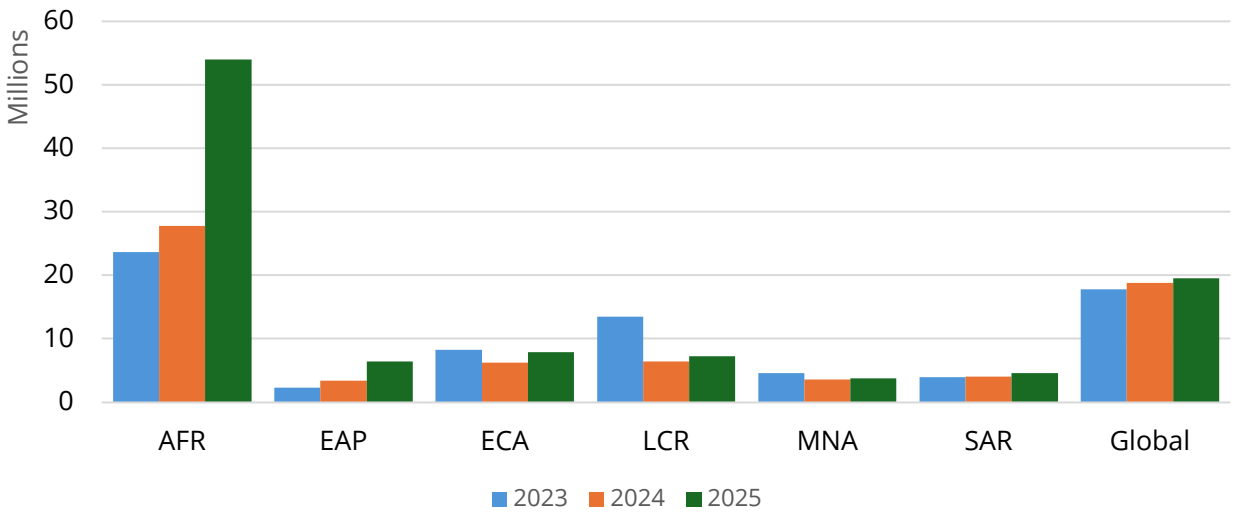
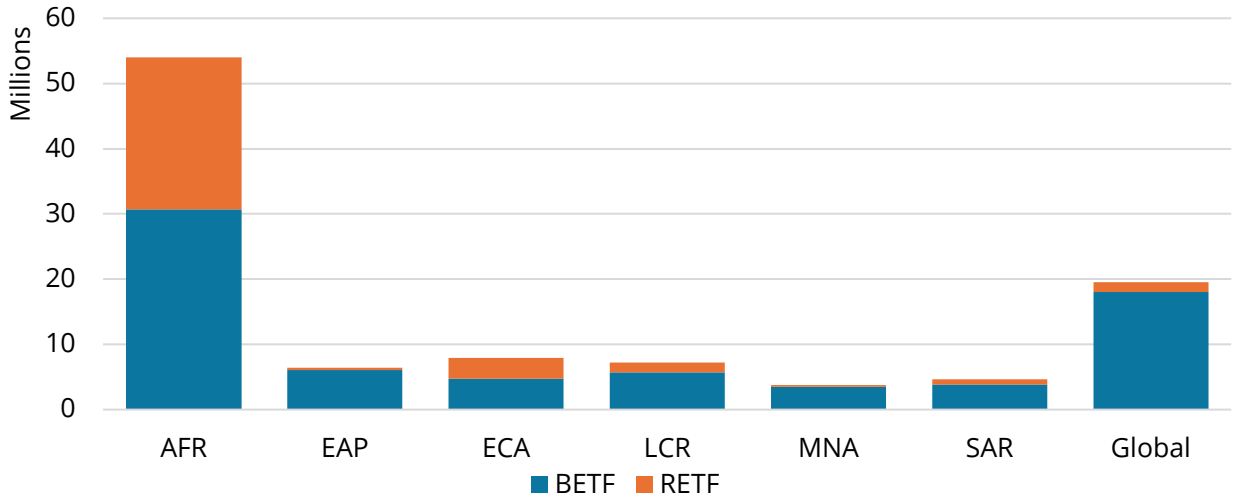


Figure 9: ESMAP Bank-Executed and Recipient-Executed Disbursements by Region, FY2025 (US$)



Note: BETF denotes disbursements toward Bank-executed activities and RETF denotes disbursements toward recipient-executed activities.

Table 4: ESMAP Anchor Multi-Donor Trust Fund Disbursements, FY2025 (US$)

	BETF Disbursements	RETF Disbursements	Total Disbursements
Region	**72,678,042**	**30,802,556**	**103,480,598**
AFR	30,725,312	23,297,521	54,022,833
EAP	6,053,012	357,500	6,410,512
ECA	4,712,659	3,214,164	7,926,823
LCR	5,755,420	1,441,853	7,197,273
MNA	3,539,050	242,098	3,781,147
SAR	3,838,638	776,501	4,615,139
Global	18,053,951	1,472,920	19,526,871
Program Management	4,499,303	-	4,499,303
GRAND TOTAL	**77,177,345**	**30,802,556**	**107,979,901**

Table 5: ESMAP Anchor and Associated Trust Funds Disbursements, FY2025 (US$)

Trustee Account		Cumulative Disbursements as of 12/02/2025	Cumulative Disbursements as of 06/30/2025	FY2025 Disbursements	Outstanding Commitments as of 12/02/2025
Main:					
TF073553		195,517,185	168,268,863	86,988,476	165,172,650
TF072490		269,915,218	261,031,739	20,991,425	19,395,846
Total		**465,432,403**	**429,300,602**	**107,979,901**	**184,568,496**
Associated:					
TF071728	Support for Small Island Developing States (SIDS) DOCK Support Program Multi Donor Trust Fund	21,615,467	21,544,062	1,341,094	213,125
TF073420	Support to Regional Off-Grid Electrification Project (ROGEP) Trust Fund	6,804,193	6,748,335	4,022,143	22,507,578
TF073761	Support to Energy Access and Quality Improvement Project (EAQIP) in Rwanda Single-Donor Trust Fund	1,335,000	1,335,000	337,500	1,815,000
TF073825	Support to Electricity Sector Modernization and Sustainability Project (KEMS) in Kyrgyz Republic Single-Donor Trust Fund	5,663,826	5,586,843	95,302	811,117
TF072636	Advancing Regional Energy Projects in Southern and Eastern Africa Multi-Donor Trust Fund	14,190,242	14,190,242	368,415	-
Total		**49,608,729**	**49,404,482**	**6,164,454**	**25,346,820**
GRAND TOTAL		**515,041,132**	**478,705,084**	**114,144,355**	**209,915,316**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