



Independent
Evaluation
Office

United Nations Development Programme

EVALUATION OF UNDP SUPPORT TO **ENERGY ACCESS AND TRANSITION**



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FOREWORD

Since the turn of the twenty-first century, the number of people with access to energy has boomed. In the space of two decades, 1.2 billion more people in Asia and 200 million in Africa gained access to electricity in their households, largely as a result of technological advances, government investment and rapid urbanization.

Despite rapid growth, these gains are fragile and the coronavirus disease (COVID-19) pandemic has exposed how quickly they can be lost. The affordability of electricity has been compromised for 100 million people since 2019, jeopardizing their access to essential services like education and health care alongside household energy. Today, some 760 million people live without access to electricity, three quarters of them in sub-Saharan Africa. Millions more rely on unclean and unsafe sources of energy, or struggle with intermittent electricity supply to homes, schools and hospitals.

Many countries where universal access has been achieved are overly reliant on energy sources that contribute to the burgeoning climate emergency. The global community is at a crucial point, and decisions made about energy production today will determine whether we meet the target of global access to clean and affordable energy by 2030. UNDP is committed to climate action, and its efforts to expand access to energy for people in developing and fragile contexts are designed to contribute to the transition to clean energy sources and drive innovation. Improving access to renewable energy will incur benefits beyond the energy sector, and is expected to speed progress towards several of the Sustainable Development Goals.

This evaluation was undertaken through the lens of the urgent need to accelerate the move away from overreliance on fossil fuels as we strive to close the energy gap. Its recommendations outline a course of action, aligned with the ambition expressed at the United Nations High-Level Dialogue on Energy in September 2021 and the UNDP Strategic Plan, 2022-2025, which will inform the work of UNDP in this important field.

Important progress has been made but there is still much more to be done. First and foremost, the sustainability of new energy systems must be prioritized. Sustainability entails people's energy needs being met successfully, taking into account the varying needs of people of different ages and abilities in different locations, and the specific needs of men and women.

UNDP needs to redouble its support to Governments to achieve national emission targets and improve energy access in low-income countries and after conflicts or crises. UNDP should act as a facilitator for government efforts, complementing support for necessary policy change by leveraging its networks to improve access to funding and new technologies. Leveraging investment opportunities from the private sector will bolster access to funding for green energy infrastructures.

For UNDP to consolidate its position as a global leader in the field, an action plan should be devised, laying out the UNDP approach and the differentiated support it will provide to Governments to scale up energy initiatives and achieve the Sustainable Development Goals.

The bold commitment by UNDP to increase access to clean energy for 500 million people requires turning priorities into policy and connecting global ideas firmly with local action, in order to deliver transformational change at the scale required. The global transition to a greener and more sustainable future must incorporate equal access to energy and poverty reduction, to which independent evaluation contributes the evidence that drives learning and enhances accountability, ensuring that the world's poorest are not left behind.



Oscar A. Garcia
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CONTENTS

ACRONYMS AND ABBREVIATIONS	vii
EXECUTIVE SUMMARY	ix
CHAPTER 1. INTRODUCTION	1
1.1 Background and purpose of the evaluation	1
1.2 Objectives and scope	1
1.3 Evaluation questions	3
1.4 Evaluation methodology	4
1.5 Challenges and limitations	8
1.6 Structure of the report	8
CHAPTER 2. GLOBAL CONTEXT: THE ENERGY ACCESS AND TRANSITION CHALLENGE	9
2.1 Technological breakthroughs have shifted the challenge of expanding energy access and decarbonizing production to policy and investment considerations	10
2.2 The role of private, public and donor funding in the energy sector	12
2.3 The urgency of climate change makes energy initiatives central to institutional arrangements and economic planning	13
2.4 Energy demand is growing alongside renewable uptake	14
2.5 Cooking has received far lower policy attention and investment and is off-track for reaching the 2030 goal	14
CHAPTER 3. THE UNDP RESPONSE: THE ENERGY PORTFOLIO	17
3.1 Strategic direction	17
3.2 Programme portfolio	18
CHAPTER 4. FINDINGS	21
4.1 Positioning and comparative advantage	21
4.2 Access to electricity and clean fuels and technology for cooking	31
4.3 Energy transition	35
4.4 Energy and the Sustainable Development Goals	40
4.5 Leveraging investment	47
4.6 Management and resources	50
CHAPTER 5. CONCLUSIONS, RECOMMENDATIONS AND MANAGEMENT RESPONSE	57
5.1 Conclusions	57
5.2 Recommendations and management response	59

ANNEXES		71
FIGURES		
Figure 1.	Countries covered by the evaluation	5
Figure 2.	IEO Gender Results Effectiveness Scale	7
Figure 3.	Renewable energy investment, 2011-2020	11
Figure 4.	Annualized increase in population and the number of people with access to clean cooking over the period 2014–2018	15
Figure 5.	The UNDP energy portfolio budget, by bureau, 2018-2021	18
Figure 6.	Countries with the greatest expenditure under the UNDP energy offer, 2018-2021	19
Figure 7.	Thematic distribution and source of UNDP funding for energy, 2018-2021	20
Figure 8.	Distribution of the UNDP energy offer by region and theme, 2018-2021	22
Figure 9.	Surveyed country offices on their role in the energy sector	23
Figure 10.	The 30 country offices surveyed and their engagement with national energy actors	24
Figure 11.	Low-carbon development and economic risk	29
Figure 12.	UNDP achievements in improving access to electricity and clean cooking fuels and the impact pathway for households, services and income-generating activities (IGA)	32
Figure 13.	Country offices integrating energy into SDG and climate planning	40
Figure 14.	Number of UNDP country offices that supported energy connections, 2017-2021, and types of usage	41
Figure 15.	Example of the visual outputs of the DREI analysis	47
Figure 16.	UNDP energy expenditure flow, 2018-2021	51
TABLES		
Table 1.	UNDP energy objectives and services assessed	2
Table 2.	Methods used in the evaluation	5
Table 3.	Comparison of the share of regular (core) versus other resources (non-core) funding for UNDP signature solutions, 2018-2021	52
BOXES		
Box 1.	Energy and the Sustainable Development Goals	12
Box 2.	Energy transitions in Sudan	30
Box 3.	Transformational shifts through UNDP support: improving the energy efficiency of lighting and other building appliances, Egypt	38
Box 4.	The evidence base for energy's contribution to the SDGs	43
Box 5.	The DREI process in Kazakhstan	48
Box 6.	Emerging initiatives for common intervention approaches in UNDP	55

ACRONYMS AND ABBREVIATIONS

CEOBS	Conflict and Environment Observatory
COVID-19	Coronavirus disease
DREAM	Disaster Risk and Energy Access Management project (Barbados)
DREI	UNDP de-risking energy investment framework
DRR	Disaster risk response
EBRD	European Bank for Reconstruction and Development
EIB	European Investment Bank
EJ	Exajoule (unit of energy)
ESMAP	Energy Sector Management Assistance Program
FAO	Food and Agriculture Organization of the United Nations
GCF	Green Climate Fund
GEF	Global Environment Facility
GIZ	German Agency for International Cooperation
GW	Gigawatt
ICPE	Independent Country Programme Evaluation
IEA	International Energy Agency
IEO	Independent Evaluation Office
IFIs	International financial institutions
IPCC	Intergovernmental Panel on Climate Change
IRENA	International Renewable Energy Agency
KPI	Key performance indicator
LDCs	Least developed countries
LPG	Liquefied petroleum gas
MW	Megawatt
ODA	Official development assistance
PV	Photovoltaic
SDGs	Sustainable Development Goals
SE4All	Sustainable Energy for All
SUCRE	Sugarcane Renewable Electricity biomass project (Brazil)

tCO₂ eq	Tons of CO ₂ equivalent
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
UNHCR	Office of the United Nations High Commissioner for Refugees
UNIDO	United Nations Industrial Development Organization
UNOPS	United Nations Office for Project Services
UNSD	United Nations Statistics Division
USAID	United States Agency for International Development
WFP	World Food Programme
WHO	World Health Organization

EXECUTIVE SUMMARY

This evaluation is the first comprehensive attempt to gather and analyse evidence about the contribution of UNDP to energy access and transition. Presented to the Executive Board at the first regular session of 2022, it aims to provide UNDP management and programme stakeholders with an independent assessment of the effectiveness of UNDP work in this area in the period 2018-2021. The evaluation promotes accountability by assessing to what extent UNDP is meeting its energy objectives and whether its interventions remain relevant to the global efforts to meet Sustainable Development Goal (SDG) 7, "Ensure access to affordable, reliable, sustainable and modern energy for all".

The evaluation is also forward-looking, considering the strategic position of the UNDP energy portfolio for 2022-2030 and covering pipeline initiatives. It is expected to inform UNDP positioning vis-à-vis the United Nations system-wide strategic document to support implementation of the 2030 Agenda for Sustainable Development and relevant SDGs, the operationalization of the UNDP Strategic Plan, 2022-2025 and the planning and implementation of country programmes and partnerships. It is also intended to support the UNDP response to the United Nations High-Level Dialogue on Energy, through which Member States and other stakeholders renewed their commitment to reach SDG 7 by 2030.

The evaluation provides an overarching set of findings and conclusions on UNDP support for energy access, promoting renewable energy and enhancing energy efficiency. The findings suggest that UNDP offers important support to many national partners to move towards achieving the SDG 7 targets, but that significant room for improvement remains. It includes recommendations to strengthen the work of UNDP, to build on successes and improve its unique contribution in service to global sustainable development.

CONTEXT

Although significant progress has been made in the past decade, 759 million people still lack access to electricity and 2.6 billion people remain without affordable options for clean cooking. Of those without access to electricity, 590 million (78 percent) live in sub-Saharan Africa. In developing countries, there remains a sharp difference between levels of access in urban areas, where most people can access some form of electricity, compared to those living in rural areas, where 85 percent of the population cannot. The global coronavirus disease (COVID-19) pandemic has placed greater stress on energy supplies within health systems, reversed several years of progress on access in sub-Saharan Africa and may have made basic electricity services unaffordable for more than 100 million people worldwide who had electricity connections.

At the same time, the energy sector remains the dominant contributor to global warming, producing approximately 60 percent of total global greenhouse gas emissions. The majority of these emissions come from countries in which universal access has long been achieved, albeit largely via high-emitting forms of combustion and inefficient usage.

Nevertheless, progress has been made in reducing the cost of renewable energy sources, and advances have been made in the energy efficiency of buildings, transportation, appliances and other technologies. In 2019, the share of renewables in global energy supply reached 27 percent owing to rapid growth in solar,

wind and hydropower. However, even with these advances, the world is still far from the emissions reduction trajectories required to limit global warming to 1.5 degrees above pre-industrial levels, as stipulated in the Paris Agreement on Climate Change.

Cooking accounts for over 80 percent of household energy needs in low-income countries. Yet over the last decade, much more progress has been achieved in electricity access than in clean cooking. If the current trends continue, 2.3 billion people – 30 percent of the global population, mostly in Asia and sub-Saharan Africa – will remain reliant on harmful cooking practices in 2030.

Over the past decade, global final energy consumption has risen by 12 percent. The contributions of solar and wind power to total energy supply have increased by an annual growth rate of 18.5 percent and are increasingly viable options for producing renewable energy in developing countries. Although the trajectory of technology development is positive, several cost and practical hurdles remain in developing countries; operating rural off-grid energy systems remains expensive, as do the storage technologies for home solar systems. Developing and operating energy services in very remote areas and in island communities remains a challenge. Furthermore, new technologies are often produced and patented outside of the countries with the greatest access challenges, and their adoption must compete with the cost of fossil fuels held artificially low by subsidies or locally sourced biomass. Thus, they require policy measures to accommodate the intellectual property systems and trade and tax agreements for their adoption and maintenance.

Public funding for energy access and transition has increased significantly over the past decade, from US\$ 265 billion in 2011 to \$304 billion in 2020. However, reaching universal access by 2030 and climate mitigation goals by 2050 will require a step change in funding. Funding flows are concentrated in a small number of developing countries, and achieving the SDG 7 targets will require annual investments of around \$35 billion for electricity access, and \$4.5 billion for clean cooking between now and 2030.

The private sector provides the greatest source of investment in renewable energy globally, but many developing countries do not yet offer the conditions to attract such investment or guide it towards sustainable and equitable development. A significant objective of the development-energy agenda is therefore to use public resources in a way that encourages private sector investment.

Energy is a major part of the “whole of society” response required to address climate change. The breadth of the challenge calls for a cross-government response and the link to the SDGs involves roles for ministries with portfolios in health, environment, food production, livelihoods and employment. Many countries are currently formalizing these connections as they update their nationally determined contributions under the Paris Agreement. Some 61 percent of the nationally determined contributions prepared for the twenty-sixth Conference of the Parties to the United Nations Framework Convention on Climate Change (UNFCCC) in November 2021 contain a focus on energy supply.

Developing countries are not required to sign binding emissions reductions under the UNFCCC. Nevertheless, the Paris Agreement encourages voluntary pledges from emerging economies and developing countries, supported by financial and technological assistance from historically high-emitting countries. The most recent report of the Intergovernmental Panel on Climate Change demonstrates the necessity of curbing emissions as soon as possible, which creates a political and economic dilemma surrounding developing countries with national reserves of coal, oil or gas that may support energy access and development. However, the level of support for national Governments to divest from coal is low.

THE UNDP RESPONSE: THE ENERGY PORTFOLIO

As part of the Strategic Plan, 2018-2021, UNDP launched signature solution 5, which positioned the organization's work on energy in line with the SDGs and the Paris Agreement. The signature solution focuses on three objectives: increasing energy access; transition to renewable energy and energy efficiency; and restoring energy access in post-crisis contexts. In its strategy note on sustainable energy,¹ UNDP defines its support as: reducing the energy access gap; increasing the global rate of improvements in energy efficiency; and increasing the share of renewable energy in the global energy mix – the development of on- and off-grid renewable energy technologies and delivery services through technical, policy and financial de-risking.

In contexts where energy did not reach everybody, UNDP aimed to support innovative private and public solutions to increase energy access and delivery. In contexts where energy was already available to most or all people, UNDP would focus on transitioning to renewable energy and energy-efficiency measures and policies. In crisis and post-crisis situations, UNDP would focus on re-establishing energy access where it has been lost and strengthening risk-informed zero-carbon development.

The UNDP energy offer analysed for the purposes of this evaluation covers all projects with a significant energy component and budget expenditures between 2018 and 2021. In total, 200 projects fall into this sample, with the total budget of \$391,467,738 and total spending of \$254,484,507. The UNDP energy portfolio comprises two large sub-portfolios: the vertical funds, consisting of Global Environment Facility (GEF) and Green Climate Fund (GCF) projects; and non-vertical funds which consist of all other sources of funding. The total budget was marginally higher for vertical funds than for non-vertical funds (51 percent compared to 49 percent respectively). The greatest divergence in spending between the vertical funds and non-vertical funds is for supporting the transition to renewable sources of energy, with \$56 million more in the vertical funds.

UNDP has recently recommitted its support for energy through its Strategic Plan, 2022-2025. It retains the core focus areas of increasing energy access for those furthest behind and aims to expand the use of renewable sources and energy-efficiency measures. It intends to speed up investment in distributed renewable energy solutions, especially for those hardest to reach and in crisis contexts, and by working in partnership, aims to increase access to clean and affordable energy for 500 million people.

THE EVALUATION APPROACH AND METHODS

The evaluation is guided by nine evaluation questions designed to gauge the relevance, efficiency, effectiveness, coherence and sustainability of UNDP interventions in energy. The evaluation used mixed methods and followed a theory-based approach, considering the UNDP role in the identified pathways to results through the principles of contribution analysis. It aims to produce a plausible evidence-based narrative to explain how and why changes occurred, rather than to isolate and quantify the extent to which results can be attributed to UNDP.

The evaluation purposively sampled the most mature energy projects delivered over the signature solution period to provide the best evidence on the extent and causes of change. Further purposive sampling was used to ensure representation of all geographic regions, access, transition and conflict/post-conflict settings, and to allow testing of the UNDP approach to investment de-risking. Finally, the evaluation matched the

¹ UNDP (2016). Delivering Sustainable Energy in a Changing Climate: Strategy Note on Sustainable Energy, 2017-2021.

findings from the mature projects against the wider portfolio to understand whether the themes remained relevant to newer initiatives and the portfolio as a whole. In total, 88 countries are covered by the evaluation, along with all UNDP regional bureaux and headquarters.

Abridged findings and recommendations are presented below; the full version of the findings, conclusions and recommendations can be found in chapter 5.

FINDINGS

UNDP is delivering relevant energy initiatives where they are needed and in alignment with national energy priorities. Its neutrality and impartiality are of particular value because of the national importance of energy security, the geopolitical dimensions surrounding energy supply and the global trade in technology and knowledge. The organization is most likely to take the lead in roles of direct support to government policymaking or in technical assistance, but is one of many actors working across a spectrum of support.

UNDP has not successfully leveraged its country presence to provide the knowledge and coordination that could offer more coherence to a disparate United Nations energy offer. UNDP is an active co-Chair of UN-Energy but this platform does not provide a model for coordinated delivery at the regional or national levels, where pooled capacities are needed to ensure that Governments can apply the best approaches for expanding access and transition their economies away from fossil-fuel dependency.

UNDP frames its transition work as an opportunity for countries, but it is active in countries that are highly exposed to and lack preparation for the economic implications of a global movement away from investments in unclean energy sources. In these cases, UNDP has had minimal influence in pushing through broader and more integrated energy and governance strategies and systems that fully consider aspects of institutional quality and governance, human capital and technology adoption.

To expand energy access, UNDP has contributed to the provision of clean fuels and equipment to households and electricity to a range of facilities, services and businesses. The scale is in line with its intention to demonstrate models of access, rather than to provide substantial levels of access in contexts where the Government cannot. Projects were more effective in encouraging the adoption of energy access technologies when they found an appropriate cost model for households and small businesses and balanced this with the cost of locally available alternatives.

Its support for clean cooking is fragmented, limited in scale and not embedded within a coherent and long-term strategy. UNDP has not put in place the planning and policy-level support – product development, dissemination, marketing and financing – that are key to deployment of improved stoves on a large scale, nor has it developed the commercial approach required to achieving long-term sustainability.

UNDP has made a significant contribution to the enabling environments for expanding energy access, translating national priorities and strategies for energy access into policy frameworks, sectoral strategies, policy guidelines and building the capacities required for uptake. The utility of these interventions is heavily dependent on energy systems or technology, and a lack of guidance to contextualize and leverage demonstration sites has undermined efforts to encourage broader adoption of enabling environment successes.

Support for energy in crisis and post-crisis contexts is still underdeveloped as a UNDP focus area. The organization has managed to deliver effective renewable solutions in these contexts but lacks operational guidelines for managing energy challenges in these contexts. UNDP has yet to process its experience in crisis and fragile contexts into lessons on what does and does not work for response and transitions.

In terms of energy transition, UNDP helped to prove the viability of both grid-tied renewable and energy efficiency measures, supporting subnational energy transitions. Multi-country and national-level projects, while broadly successful, have not yet delivered transformational change at scale. The evaluation found that all highly successful projects had effective finance arrangements and benefited from UNDP project management experience, often convening partnerships, including with the private sector and municipalities, in complex institutional environments that may be too risky for others.

Project time frames are the major limit to realizing the demonstration effect of these initiatives: projects that aim to encourage further investment by building capacity, demonstrating viability *and* secure policy change, typically require more years to show results. UNDP has been more successful where it or others have helped to develop market readiness over a longer time.

The UNDP de-risking energy investment (DREI) framework has the potential to shorten these time frames, providing the organization with an analytical tool for demonstrating the financial benefits of renewable energy to government stakeholders and investors. It expanded the UNDP offer beyond its core policy and capacity-building work and has delivered to government partners an important tool to encourage market readiness. However, the lack of follow-on tools for the DREI framework has so far limited the ability of UNDP to leverage investment and claim an organizational strength in mobilizing energy finance. UNDP does not yet have a suite of standardized instruments for the post-analysis de-risking activities, which require development banks or the Government to transfer risk and for UNDP to formalize the engagement of the local financial sector or private investors.

UNDP has successfully used its high-level engagement to help countries align energy with their SDG planning and other international frameworks. Improved service delivery, not just an energy supply, is required to ensure that energy accelerates progress towards the SDGs, but UNDP energy projects have faced sustainability challenges that undermine this linkage. UNDP does not conduct the types of assessments that would allow it to understand and track the experience and capacities of energy users, which are key considerations for designing interventions that are affordable, convenient to use and promote local maintenance of the equipment.

The energy portfolio has integrated positive elements of gender equality and women's economic empowerment in the design of initiatives, but the majority of energy initiatives are too reliant on assumptions that women will automatically benefit if they are simply included in energy initiatives. UNDP often targets women specifically to increase their access to energy. However, decision-making over household energy and budgeting has been mostly overlooked by UNDP, and women continue to face challenges in converting energy access into changes to their economic status, often because initiatives failed to consider or address social norms regarding female livelihoods and financial control.

UNDP does not take sufficient measures to understand the experience of people with disability with energy, leaving a sizeable population reliant on energy access models that may be inappropriate for their circumstances. Disability is mentioned in the UNDP strategy note on sustainable energy but not linked to practical measures.

The UNDP energy portfolio has been steadily decreasing in funding volume since 2018, and it has received the smallest contribution from regular (core) resources of the signature solutions. Combined with its geographic spread, this downward trend reduces the ability of UNDP to commit energy expertise and hardware for sufficient time to make a sustained contribution to national energy challenges. Funding remains one of the most significant challenges to country offices in the attempt to retain a stable energy portfolio or to integrate energy issues more deeply into their country programmes. Nevertheless, the wider organization's new and innovated models of finance could be applied to energy, and government savings from renewables and efficiency measures could be further leveraged for cost sharing.

Although it holds a good track record in securing and delivering GEF funding (which requires greater management processes compared to other donor funding), UNDP is overly reliant on projects as the modality through which it delivers its energy offer. These create inefficiencies and make the organization's energy offer to Governments highly susceptible to implementation challenges and breaks in continuity. UNDP has not put in place the longer-term vision for its energy offer that would allow it to take advantage of larger-scale planning and management for knowledge-sharing, cost-efficiencies and energy procurement.

RECOMMENDATIONS

Recommendation 1. UNDP should detail its strategic and programmatic approach to energy in an action plan that clearly articulates how it will support national Governments to achieve their SDG 7 targets.

The plan should focus on ensuring that energy initiatives launched over the next eight years lead to sustainable results through national ownership, better connection between upstream advice and downstream opportunities, and new models of consistent engagement with public and private entities. UNDP should retain its focus on context specificity but with greater guidance and instruments that allow country offices to: (1) design initiatives that systematically address the enablers and barriers to scaling up energy initiatives; and (2) build project pipelines that sequence these activities over the time frames in which energy sectors and markets typically reach readiness for the wider adoption of policies and technologies.

Areas that merit greater attention include: (1) the promotion of uptake models of energy technology and systems in geographic areas the energy grid is unlikely to reach in the next three to five years; (2) the potential to leverage UNDP energy procurement; (3) mitigating the impact of climate change on renewable production and infrastructure; and (4) the UNDP position on, and engagement with, the digitalization of energy services. The action plan should clearly distinguish UNDP from other players, detailing its updated value proposition and subsequent partnership strategy. Additional staff with deep energy sector expertise and skills will be needed at regional and country levels.

Recommendation 2. UNDP should update its value proposition on access to energy and transition to low-carbon technologies, expanding its role as a convenor and delivery agent for complex energy project initiatives that incubate innovations and put in place sustainable pro-poor energy policies.

UNDP should systematically identify underdeveloped contexts and countries that would benefit from its capacity as a facilitator, working across government, development partners, the private sector and subnational entities. In framing this facilitator role, UNDP should support Governments to create plans for long-term barrier removal, investment and capacity development, aiming for far-reaching energy sector transformations. It should encourage "leap frogging" to more advanced access and efficiency measures, improvement to and delivery of nationally determined contributions and helping Governments access and translate appropriate sources of funding into downstream projects.

UNDP should focus greater attention on its work of advising on policy development, especially the economic policies that affect the cost and marketability of renewables, and the assessment and regulations that ensure that the groups farthest behind benefit from increased energy investments. To do so, the organization should consider developing the post-analysis de-risking tools itself or form closer partnerships with organizations that offer these mechanisms (see also recommendation 7).

Recommendation 3. UNDP energy access initiatives should contain formal design components that respond to the user and local experiences of energy initiatives, and UNDP should monitor how its energy services lead to sustainable and pro-poor benefits.

The UNDP commitment to increase access to clean and affordable energy for 500 million people is bold and provocative. Its attainment will require practical steps, focused on technology preference, cost and payment models, local value chains, productive usage and ownership and maintenance models. In developing this design component, UNDP should incorporate the perspectives of households, local businesses, facilities and subnational entities, which are key to the success and sustainability of energy initiatives. The assessment should lead to improved energy delivery, which should be monitored over the course of the project and beyond with a tool to capture the user experience and key indications of service quality. Improving the energy service and development benefits should build on impact assessments where UNDP projects have provided a more comprehensive energy service.

Recommendation 4. UNDP should establish itself as a global thought leader in sustainable pro-poor energy and transition approaches, adopting a step change in ambition and targeting support to the least developed and middle-income economies that are highly exposed to a global transition to low-carbon energy.

UNDP should strengthen its advisory role to Governments with guidance to encourage faster uptake of clean energy and abandonment of unclean sources, based on a national vulnerability rationale as much as a climate change or energy capacity contribution. For that, UNDP energy support to countries will need a broad lens that considers the wider economy, including energy switches within key sectors, job creation/replacement needs, the potential effects on particularly vulnerable groups and the risk to and from vested interests. This role should draw on the strengths of UNDP in governance and poverty reduction in combination with its energy expertise.

Given the top-down nature of global energy policy and investment decisions, the UNDP on-the-ground experience should have an important role to play in driving appropriate responses to the complex energy transitions now at hand. UNDP should build on its in-country knowledge to ensure the perspectives of the poorest and farthest behind groups are factored into global and national transition agendas. This requires investment in bottom-up knowledge generation.

Recommendation 5. UNDP should review its approaches to supporting energy access in crisis and fragile settings and develop formal principles and guidelines for addressing immediate energy needs within a more comprehensive plan for recovery and green transition.

UNDP should design a specific action plan on how it supports energy interventions before, during and after any crisis response, and wherever possible aim to ensure that interventions expand local capacities for adopting and governing cleaner sources of energy. It should build on the experience of countries and bureaux that operate in these contexts and incorporate wider research and deep case studies of national/transnational energy contexts. The objective should be to increase the application of more advanced intervention approaches at the country level while retaining flexibility to respond to contextual differences.

In developing this action plan, UNDP should consider: (1) supporting governance models for energy initiatives and natural resource management; (2) the potential for supporting local supply chains through energy procurement and capacity-building; and (3) models for expanding the focus on renewables and efficiency measures during power plant rehabilitations.

Recommendation 6. UNDP should promote a greater integration of gender considerations and more targeted gender guidance for its energy programming, and move away from the assumption that women will automatically benefit if they are simply included in energy initiatives.

The focus should move beyond the pursuit of gender parity and greater participation to a next echelon of programming that also addresses the social norms preventing women from fully and equally benefiting from improved energy outcomes. UNDP should work towards converting energy access into real changes to women's economic status, by adequately considering and to the extent possible addressing the associated social norms and impediments that limit women's livelihoods and financial control and prevent them from taking full advantage of the opportunities offered by improved access to safe and clean energy.

Although very different intervention strategies are required to support men and women of different ages and abilities, living in different settings, UNDP should increase the level of consultation with users and ensure they are conducted by specialists with an understanding of gender aspects. This will require guidance on the minimum steps needed in each project formulation and implementation to recognize the perspectives of men and women, and provide prompts to overcome resistance and counter false assumptions that people automatically benefit from their involvement in an energy project or within a facility that has improved electrical supply.

Recommendation 7. UNDP should map where energy investments are needed, by region, to develop a holistic strategy of support to match the most appropriate funding model and resource mobilization strategy for the context.

UNDP should identify opportunities where Governments are open to new financing modalities for energy access and transformation, and seek to expand engagement with international, regional and national financial institutions to help these countries achieve their aims. UNDP, together with the international financial institutions, should classify contexts on a scale of readiness for investment and set out where and how it can help lay the governance foundations for greater investment. In this role, UNDP should emphasize poverty, productive use and equal access to energy to ensure that successful investments do not deepen inequality. Where investment finance is not feasible, UNDP should work to expand funding options through other channels, such as the vertical funds, other donors and its SDG Bonds.

Chapter 1.

INTRODUCTION

1.1 BACKGROUND AND PURPOSE OF THE EVALUATION

The Independent Evaluation Office (IEO) of the United Nations Development Programme (UNDP) conducted an evaluation of UNDP support to energy access and transition. The evaluation focuses on one of the six UNDP signature solutions and dovetails with Sustainable Development Goal (SDG) 7. Energy access, supply and usage are central to the global challenges of improving human development and limiting global warming. Although significant progress has been made in the past decade, 759 million people still lack access to electricity, 2.6 billion people remain without affordable fuel options and the energy sector remains the largest contributor to greenhouse gas emissions.

This evaluation is the first comprehensive attempt to gather and analyse evidence about the UNDP contribution to energy access and transition away from polluting forms of energy production and consumption. The findings, conclusions and recommendations generated by the evaluation are expected to inform the theory and practice of energy interventions, to influence their strategic direction and to strengthen partnerships. It is expected to inform UNDP positioning vis-à-vis the United Nations system-wide strategic document to support implementation of the 2030 Agenda for Sustainable Development and relevant SDGs, the operationalization of the UNDP Strategic Plan, 2022-2025 and the planning and implementation of country programmes and partnerships. It is also intended to support the UNDP response to the United Nations High-Level Dialogue on Energy, through which Member States and other stakeholders renewed their commitment to reach SDG 7 by 2030.

The evaluation was conducted between May and September 2021 and will be presented to the UNDP Executive Board at its first regular session of 2022.

1.2 OBJECTIVES AND SCOPE

The evaluation aims to provide UNDP management and programme stakeholders with an impartial assessment of the effectiveness of UNDP work on energy. It supports accountability to UNDP stakeholders by assessing to what extent the organization's energy objectives are being met and whether its interventions remain relevant to the global efforts to meet SDG 7, "Ensure access to affordable, reliable, sustainable and modern energy for all".

The evaluation focuses on the design, positioning and performance of UNDP work on energy between 2018 and 2021, the period in which energy was a signature solution in the UNDP Strategic Plan. As the UNDP energy portfolio has not been covered by an evaluation since 2008, results from projects concluding in but starting before 2018 were also included, and the evaluation intentionally sought the longer-term perspective on the UNDP role in national energy sectors. The evaluation is also forward-looking, considering the strategic position of the UNDP energy portfolio for the period 2022-2030 and covering pipeline projects and initiatives.

The evaluation assesses all three objectives described in signature solution 5:

1. Increasing energy access
2. Transition to renewable energy and energy efficiency
3. Restoring energy access in post-crisis contexts

Across these objectives, UNDP services combine upstream (policy, institutional and investment support) and downstream activities with on-the-ground investments, which range from community-level to utility-scale systems. The organization is foremost focused on the development benefits of energy and promotes a range of technologies across the portfolio to improve energy service delivery and productive uses, particularly for the most vulnerable groups. As many intervention types may contribute to more than one objective, in order to form clear lines of inquiry, the evaluation assesses services in relation to objectives as set forth in table 1 below.

TABLE 1. UNDP energy objectives and services assessed

Objective	Services assessed*
Increasing energy access	<ul style="list-style-type: none"> • Support for meeting the electrical, thermal and mechanical energy needs of households, businesses and communities • Promoting access to clean cooking • Support in the energy-health nexus (where the primary objective is to improve the health service, rather than the efficiency of existing supply)
Transition to renewables and efficiency	<ul style="list-style-type: none"> • Replacing high greenhouse gas-emitting forms of energy with renewable sources • Replacing inefficient energy technology and practices with lower-consuming versions in cooling, infrastructure, transport and other sectors
Restoring access in post-crisis contexts	<ul style="list-style-type: none"> • Support to restore grid technologies • Provision of alternative energy solutions for affected populations • Incorporation of energy into crisis responses • Support to recovery via zero-carbon development

*These services were selected based on a document review of UNDP corporate and energy-specific strategies and consultations with the Bureau for Policy and Programme Support.

All forms of UNDP support directed towards these services were covered to the extent that relevant data were available. The report focuses on downstream activities – projects that provide a source of energy or efficiency measures – and upstream activities, covering the array of interventions designed to improve the enabling environment for increasing or improving access, such as policy support, the provision of technical expertise, capacity-building, private sector engagement and knowledge contributions. The evaluation includes a deeper exploration of UNDP interventions to de-risk energy investment, given the prominence of the tool in the UNDP approach to energy.

As far as data allowed, the evaluation explored who, and who is not, able to access clean and efficient energy via UNDP support, and which groups are less able to convert energy access into development benefits. It considers differences in the way men and women are engaged by UNDP initiatives, as well as the groups that often face challenges because of their geographic location, socioeconomic position, disability or other factors.

As UNDP is not expected, in any context, to achieve universal energy access or transition on its own, the evaluation considers how the organization uses and contributes to partnerships in pursuit of SDG 7. Finally, in seeking to understand the factors that influenced the effectiveness of UNDP in this area, the evaluation describes how its internal processes enable or hinder the organization's ability to contribute to universal energy access and transition. It also captures the major external factors that influence the effectiveness of the UNDP contribution in various country contexts.

1.3 EVALUATION QUESTIONS

The evaluation assessed the UNDP energy portfolio according to the norms and standards for evaluation set out by the United Nations Evaluation Group, including criteria designed to gauge the relevance, efficiency, effectiveness, coherence and sustainability of UNDP interventions. The following overarching questions frame the evaluation:

Relevance and coherence

1. To what extent is UNDP energy support aligned with global, regional and national energy policies, programmes and investments?
2. To what extent are the three components of the UNDP energy portfolio aligned towards common objectives?
3. To what extent does UNDP support for energy connect to other development sectors and initiatives in order to ensure it contributes to all SDGs?

Effectiveness

4. To what extent is the UNDP energy portfolio achieving the objectives of its stated outputs and outcomes?
5. Which groups are most or least able to access and benefit from UNDP energy access and transition support, and why?
6. What internal and external factors have influenced the ability of UNDP to increase energy access and support the transition away from polluting forms of energy production and consumption?

Impact

7. To what extent have UNDP energy results led to intended human development and environmental benefits?
8. To what extent is the UNDP service offering appropriate to the renewed efforts to achieve SDG 7 by 2030?

Sustainability

9. How well has UNDP support accounted for factors known to influence the sustainability of energy interventions?

1.4 Evaluation methodology

The evaluation follows a theory-based approach in which the major change pathways in the UNDP energy portfolio are mapped, assessed and tested. It considers the role of UNDP in these pathways through the principles of contribution analysis,² and aims to produce a plausible, evidence-based narrative to help explain how and why changes occurred, rather than to isolate and quantify the extent to which results can be attributed to UNDP.

An initial theory of change (see annex 4) was developed using the UNDP Strategic Plan, 2018-2021 and the UNDP strategy note on sustainable energy.³ This was used to categorize UNDP initiatives, direct evaluative inquiry towards different sub-areas and analyse and synthesize results along the change pathways. Over the course of the evaluation, the team focused on more detailed, nested theories of change appropriate to the sub-areas of policy and technology adoption, scaling, de-risking and the ways in which often-excluded groups engage with and benefit from these initiatives.

Having consolidated the project databases, the team tagged each output against the major intervention components in the theory of change. The database was then used for sampling.

1.4.1 Sampling and coverage

In an initial step, the evaluation covered the full portfolio with descriptive analysis of its major components. It then purposively sampled the most mature energy access and transition projects delivered over the signature solution period. These examples provide the best demonstration of whether UNDP is helping to create lasting change and offer a longer duration through which to assess how change happened. Within this broad category, the evaluation applied further purposive sampling to ensure it represented all geographic regions, both access and transition and conflict/post-conflict settings and to ensure that it could test the UNDP approach to investment de-risking. Finally, the evaluation reviewed the findings from the mature projects against the wider portfolio to understand whether the themes remained relevant to newer initiatives and the portfolio as a whole. In total, 88 countries are included in the sample covered by the evaluation, along with all UNDP regional bureaux and headquarters.

² Mayne, John. "Contribution Analysis: An approach to exploring cause and effect." (2008).

³ UNDP (2016). Delivering Sustainable Energy in a Changing Climate: Strategy Note on Sustainable Energy, 2017-2021.

FIGURE 1. Countries covered by the evaluation



Source: IEO compilation

Note: This map does not reflect a position by the Independent Evaluation Office or UNDP on the legal status of any country or territory or the delimitation of any frontiers.

1.4.2 Methods used

The evaluation used a mixed-methods approach to build the evidence through which it assessed the change pathways. Each method is described in table 2 below.

TABLE 2. Methods used in the evaluation

Method	Use in the evaluation	Evidence provided
Portfolio analysis	Portfolio overview Relevance and coherence discussion	Enabled a composite analysis of project outputs and an assessment of cross-cutting elements of project design, such as women’s equality and economic empowerment and support for people with disabilities.
Review of final evaluations*	Results calculation	Independent and in-depth assessment of mature energy projects, with consistent coverage of targets and results explained in relation to the energy system and enabling environment. Non-uniform reporting of results limited the ability to aggregate certain results. Limited information on gender,** the experience of people with disabilities or development impacts
	Identifying main factors affecting results	Independent, in-depth assessment of mature energy projects, and consistent coverage of factors relating to UNDP management and implementation, plus the surrounding context

◀ Table 2 (cont'd)

Method	Use in the evaluation	Evidence provided
Deep-dive country analysis: Bangladesh, Barbados, Burkina Faso	Verify and elaborate UNDP results with contextual understanding	Providing multi-stakeholder perspective on the UNDP national energy portfolio, though a lower response rate from external stakeholders in one country limited the independent perspective. No site visits or conversations with energy users were conducted, meaning the evaluation relied on discussions with national stakeholders to update site observations conducted in final project evaluations.
UNDP and external stakeholder interviews	Identifying and elaborating main internal and external factors plus the UNDP sectoral position	Interviews held with 89 stakeholders at global, regional and national levels (70 UNDP staff, 19 external).
Survey of country offices with mature energy projects	Triangulation and quantification of topics emerging in deep dives and interviews	Provides information from 30 countries (90 percent response rate) covering 26 percent of countries with an energy portfolio. 90 percent of respondents have more than two years of experience with UNDP energy projects.
Internal review of strategy, programme and project documents	Assessment of the UNDP energy strategy and associated guidance, from regional and country levels	Clearly described information on UNDP approaches and projects. Less information found on approaches at the regional and country office levels.
External literature review	To establish credible change pathways, benchmark expectation of change, and identify gaps in UNDP data	Provides meta-analysis and expert analysis at the level required to contextualize results achieved by UNDP.

* Only evaluations with a quality rating of 4 or above out of 5 in the IEO Evaluation Resource Centre were included.

** To analyse the level of gender-related approaches and results, the IEO Gender Results Effectiveness Scale was employed. Gender marker data were used for analysis of gender programme expenditures against commitments made; sex-disaggregated data were assessed where available.

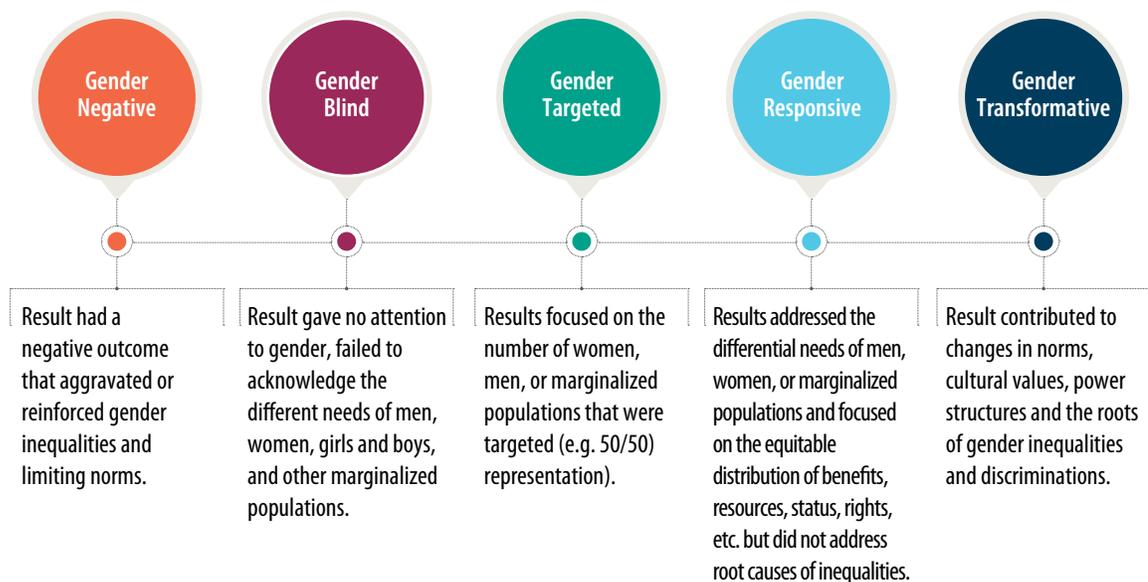
1.4.3 Data analysis and synthesis

The evaluation used a mix of standard data analysis methods:

1. Coding and meta-synthesis of evidence from past UNDP evaluations over the period 2018-2021 (77 decentralized evaluations, 27 Independent Country Programme Evaluations and assessments of four independent thematic evaluations)
2. Descriptive statistical analysis of survey data to identify and interpret cross-country pattern
3. Content analysis and descriptive statistical analyses of data from UNDP finance data, project portfolio analytics and results-oriented annual reports, and from UNDP and external document
4. Thematic analysis of key informant interview data
5. Correlation analysis of UNDP programming vis-à-vis relevant country-level statistics and population data
6. Theory-based analysis of actual versus intended results and influencing factor
7. Analysis of performance against the evaluation criteria set by the Development Assistance Committee of the Organisation for Economic Co-operation and Development

The gender-related approaches and results were assessed using the IEO Gender Results Effectiveness Scale (see figure 2 below). The gender marker data were used for analysis of gender programme expenditures against commitments made, and sex-disaggregated data were assessed where available.

FIGURE 2. IEO Gender Results Effectiveness Scale



Source: Evaluation of the UNDP Contribution to Gender Equality and Women's Empowerment, IEO, UNDP, 2015

Informed by the theory of change, evidence was contrasted and patterns synthesized into key findings to report on the key evaluation questions, framed around a triangulation matrix (see annex 5). Higher-level conclusions and forward-looking recommendations were derived from this analysis.

1.5 CHALLENGES AND LIMITATIONS

Coronavirus disease (COVID-19) and remote work. This evaluation was conducted under the challenging circumstances created by the COVID-19 pandemic. This meant that the evaluation team was unable to travel and therefore collected and analysed data remotely. While these extraordinary circumstances presented limitations, the evaluation was still able to respect evaluation norms and professional standards. Travel restrictions prevented the evaluation team from meeting those involved in UNDP projects, those who face access problems or are expected to adopt efficiency measures or renewable forms of production. Therefore, the report does not verify the experience of energy users. This perspective is taken from the independent evaluations of UNDP projects wherever it is provided.

Data scarcity. A challenge to the exercise was the paucity of monitoring data (poor age/sex disaggregation, little information on quality of services, etc.), along with the unavailability of certain key project documents and periodic reports. The availability of documentation varied across different interventions, making it difficult to identify the results UNDP attributes to its energy projects. To mitigate these challenges, and for triangulation purposes, the evaluation broadened the scope of its secondary data review by including external assessments and evaluations to cross reference internally available data and validate findings. Data are taken from final project evaluations with an IEO quality rating of four or above in order to increase the reliability of the data, avoid double counting and ensure they are derived from mature interventions that may be more sustainable. While monitoring reports were not always available, the evaluation was able to rely on a good number of interviews, studies and decentralized evaluations for its analysis.

1.6 STRUCTURE OF THE REPORT

The report is structured as follows. Chapter 2 explains the global context and development and environmental challenges, providing an overview of the most relevant trends in the energy sector. Chapter 3 addresses the UNDP response to these challenges through a descriptive review of the organization's energy portfolio over the 2018-2021 period. Chapter 4 covers the evaluation's main findings, split across seven areas. Chapter 5 presents the conclusions and recommendations intended to support the organization in its contribution to SDG 7.

Chapter 2.

GLOBAL CONTEXT: THE ENERGY ACCESS AND TRANSITION CHALLENGE

Although significant progress has been made in the past decade, globally 759 million people still lack access to electricity and 2.6 billion people remain without affordable clean cooking options.⁴ In developing countries, there remains a sharp difference between access levels in urban areas, where most people can access some form of electricity, compared to those living in rural areas, where 85 percent of the population cannot.⁵ Of those without access to electricity, 590 million (78 percent) live in sub-Saharan Africa.

The number of people living without electricity is projected to increase in coming years as populations grow and Governments, private businesses and households face financial challenges deepened by the COVID-19 pandemic.⁶ Based on current conditions, rates of progress and factoring for population growth, it is projected that 620 million people will remain without access to energy in 2030.⁷

In 2018, approximately 2.8 billion people relied on traditional energy (wood, charcoal or animal and bioresidues) and coal for cooking and heating. These forms of energy supply place significant stress on local environments and produce air pollution and residues detrimental to human health. The World Health Organization (WHO) estimates that 3.8 million people die prematurely each year due to the use of combustible fuels for household energy, with women and girls accounting for 6 of every 10 of these deaths.

At the same time, the energy sector remains the dominant contributor to global warming, producing approximately 60 percent of total global greenhouse gas emissions. The majority of these emissions come from countries where universal access has long been achieved largely via high-emitting forms of combustion – such as coal, oil and gas – and with inefficient usage. There has been progress in reducing the cost of renewable energy sources and in reducing the energy requirements of buildings, transportation, appliances and other technologies. In 2016, the share of renewables in global energy production increased at the fastest rate since 2012, up 0.24 percentage points, and reached 17.3 percent owing to rapid growth in hydropower, wind and solar energy. However, even with these advances, the world is still far from the emission reduction trajectories required to limit global warming to 1.5 degrees above pre-industrial levels.⁸

⁴ IEA, IRENA, UNSD, World Bank, WHO. 2021. Tracking SDG 7 , The Energy Progress Report. World Bank, Washington DC.

⁵ IEA (2020), World Energy Outlook 2020, IEA, Paris <https://www.iea.org/reports/world-energy-outlook-2020>.

⁶ IEA World Energy Outlook (2020). According to IEA, in sub-Saharan Africa, 30 million people who had access to electricity in 2019 may no longer be able to afford basic electricity services by the end of this 2020, representing around 6 percent of the connected population.

⁷ IEA (2019), Africa Energy Outlook 2019, IEA, Paris <https://www.iea.org/reports/africa-energy-outlook-2019>.

⁸ IPCC, 2018: Summary for Policymakers. In: Global Warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development and efforts to eradicate poverty, Masson-Delmotte, V., P. Zhai, H.-O. Pörtner, D. Roberts, J. Skea, P.R. Shukla, A. Pirani, W. Moufouma-Okia, C. Péan, R. Pidcock, S. Connors, J.B.R. Matthews, Y. Chen, X. Zhou, M.I. Gomis, E. Lonnoy, T. Maycock, M. Tignor, and T. Waterfield (eds.)). World Meteorological Organization, Geneva, Switzerland, 32 pp.

Demand for energy is also changing. Warming ambient temperatures have created a greater need for cooling technologies. The cheapest forms of air conditioning and refrigeration are the least energy-efficient and their greater adoption places further demand on national energy supplies and increases greenhouse gas emissions.⁹ The global COVID-19 pandemic has placed greater stress on energy supplies within health systems. In 2020, an estimated 1 billion people relied on health facilities without electricity.¹⁰ Even before the pandemic, energy supply to health facilities was insufficient for maintaining the cold chain for vaccination supply.

Over the past decade, there have been significant changes in the ways in which energy is financed, provided and used. Policy and investment issues of relevance to the work of UNDP are described briefly below.

2.1 TECHNOLOGICAL BREAKTHROUGHS HAVE SHIFTED THE CHALLENGE OF EXPANDING ENERGY ACCESS AND DECARBONIZING PRODUCTION TO POLICY AND INVESTMENT CONSIDERATIONS

Over the past decade, the options for producing renewable energy have increased in number and viability. The reduced cost of solar photovoltaic (PV) cells and their large-scale production have been key drivers in this trend. The adoption of other renewables, such as wind and to a much lesser extent biomass and smaller-scale hydropower, have also increased, though their affordability and viability have not tracked those of solar energy. The digitalization of energy systems has drastically changed the ways in which energy supply and usage can be managed, offering the potential for engineers to troubleshoot issues in the system and to reduce the time households spend disconnected after a missed payment.

In 2018, developing countries installed the greatest share of new renewable energy capacity globally, though capacity per capita remains approximately four times higher in developed countries.¹¹ Several hurdles limit the application of technological advancements in developing countries. Operating rural off-grid energy systems remains expensive, as do the storage technologies for home solar systems. Despite progress in decentralized energy technology, operating energy services in very remote areas and in island communities remains highly challenging. Furthermore, new technologies are often produced and patented outside of the countries with the greatest access challenges, and their adoption must compete with the cost of fossil fuels held artificially low by subsidies or locally sourced biomass. Thus, they require policy measures to accommodate the intellectual property systems, trade and tax agreements necessary for their adoption and maintenance. Advances in digital solutions require further capacity support to avoid digital divides between and within countries and to mitigate cybersecurity risks.¹²

In industrialized countries, studies show that the required greenhouse gas reductions from the energy sector are close to being technically achievable if the production of renewable energy is greatly expanded in combination with the adoption of efficiency measures.¹³ These technologies are also shown to be affordable

⁹ SE4All, Chilling Prospects: Providing Sustainable Cooling for All (2018) <https://www.seforall.org/publications/chilling-prospects-cooling-for-all-report>.

¹⁰ IEA et al. Tracking SDG 7: The Energy Progress Report 2020.

¹¹ IEA et al. Tracking SDG 7: The Energy Progress Report 2020.

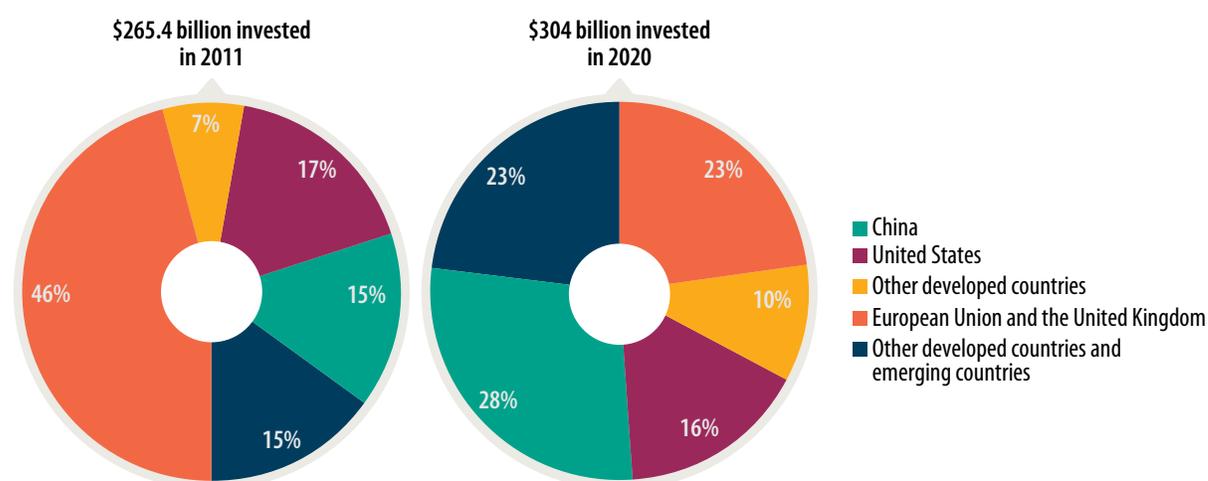
¹² UN-Energy (2021) Theme report on Innovation, Technology and Data: Towards the Achievement of SDG 7 and Net Zero Emissions for the High-Level Dialogue on Energy.

¹³ Dolf Gielen, Francisco Boshell, Deger Saygin, Morgan D. Bazilian, Nicholas Wagner, Ricardo Gorini, The role of renewable energy in the global energy transformation, Energy Strategy Reviews, Volume 24, 2019, Pages 38-50, ISSN 2211-467X.

based on cost-benefit analysis that considers the potential for jobs lost and created in a transition.¹⁴ However, many countries remain heavily dependent on fossil fuels for energy production and their gross domestic product, and the transition away from such models must compete with investments locked into the production and supply infrastructure for fossil fuels. The transition away from fossil fuels is far off the trajectory for curbing greenhouse gas emissions, targets for which are not achievable based on 2020 policies.¹⁵ Scenario modelling suggests that a sixfold acceleration of growth in renewables is needed globally to reach these targets.¹⁶

Public funding for energy access and transition has multiplied significantly, though the flows are still concentrated in a smaller number of developing countries and remain far below requirements. Global investment in new renewable energy capacity totalled US\$304 billion in 2020, up 2 percent from 2019. Developing and emerging countries (excluding China) accounted for 23 percent of the global investment in 2020 against 15 percent in 2015.

FIGURE 3. Renewable energy investment, 2011-2020 (In United States dollars)



Source: REN 21, 2021 data

Analysis by UN-Energy of the latest data shows that public financial flows continue to be concentrated in a few countries, though distribution by population improved between 2010 and 2018. The top receiving countries in absolute terms over the period 2010–2018 were emerging economies—including Argentina, India, Nigeria, Pakistan and Turkey. Together, these five countries received 30 percent of total commitments. In 2018, the 46 least developed countries (LDCs) received 20 percent of commitments, the same level as in 2017 in absolute terms but less than in 2016 and 2015.¹⁷ On a per capita basis, most LDCs received less than the average across developing countries; and most of these are in sub-Saharan Africa, home to several of the world’s top access-deficit countries.¹⁸

¹⁴ Ibid.

¹⁵ IEA et al, Tracking SDG 7: The Energy Progress Report 2020.

¹⁶ Ibid.

¹⁷ SEforALL, Analysis of SDG 7 Progress. 2021. Online: <https://www.seforall.org/fr/node/1711>. Accessed: 23rd September, 2021.

¹⁸ IEA et al. Tracking SDG 7: The Energy Progress Report.

The amounts of funding required to reach universal access by 2030 and climate mitigation goals by 2050 require a step change in funding. Achieving the SDG 7 targets on energy access requires annual investments of approximately \$35 billion for electricity access and \$4.5 billion for clean cooking between now and 2030.¹⁹ The International Renewable Energy Agency (IRENA) calculates that \$4.4 trillion per year is required for achieving net zero by 2050, though recent levels of energy investment are below \$2 trillion.²⁰ IRENA signals that greater funding is required across a wide range of technologies, including distributed and utility-scale renewables, efficiency solutions, infrastructure, and the electrification of end use sectors.²¹

BOX 1. Energy and the Sustainable Development Goals

SDG 7 focuses on ensuring access to affordable, reliable, sustainable and modern energy for all. It contains five sub-targets, two of which are cross-cutting:

- 7.1 By 2030, ensure universal access to affordable, reliable and modern energy services
- 7.2 By 2030, increase substantially the share of renewable energy in the global energy mix
- 7.3 By 2030, double the global rate of improvement in energy efficiency
- 7.A By 2030, enhance international cooperation to facilitate access to clean energy research and technology, including renewable energy, energy efficiency and advanced and cleaner fossil-fuel technology, and promote investment in energy infrastructure and clean energy technology
- 7.B By 2030, expand infrastructure and upgrade technology for supplying modern and sustainable energy services for all in developing countries

The 2021 United Nations policy brief, “Leveraging Energy Action for Advancing the Sustainable Development Goals”, sets out clearly the expected impact pathways from SDG 7 to the other SDGs.²² This builds on the notion of energy as a “golden thread” connecting economic growth, social equity and environmental sustainability, as put forward by the United Nations Secretary-General in 2012.

2.2 THE ROLE OF PRIVATE, PUBLIC AND DONOR FUNDING IN THE ENERGY SECTOR

Although the private sector provides the greatest source of investment in renewable energy globally,²³ many developing countries do not yet offer the conditions to attract such investment or guide it towards sustainable and equitable development. Prominent global private sector actors have expressed their commitment to investing in renewables, but raised concerns about finding profitable models that overcome the many risks involved.²⁴ The clean cooking sector has received less private sector involvement than the

¹⁹ IEA, IRENA, UNSD, World Bank, WHO. 2021.

²⁰ IEA, IRENA, UNSD, World Bank, WHO. 2021.

²¹ IRENA and Climate Policy Initiative (2020), Global Landscape of Renewable Energy Finance, 2020, International Renewable Energy Agency, Abu Dhabi.

²² Leveraging Energy Action for Advancing the Sustainable Development Goals: (2021) Policy Briefs in Support of the High-level Political Forum: 2021 https://sdgs.un.org/sites/default/files/2021-06/2021-POLICY%20BRIEFS_3.pdf.

²³ IEA, IRENA, UNSD, World Bank, WHO. 2021. Tracking SDG 7: The Energy Progress Report. World Bank, Washington DC. © World Bank. License: Creative Commons Attribution—NonCommercial 3.0 IGO (CC BY-NC 3.0 IGO).

²⁴ See, for example, Financing the Low Carbon Future: A Private Sector View on Mobilising Climate Finance. Climate Finance Leadership Initiative, (2019) and USAID webinar series (2020): Understanding the barriers to Private Sector engagement in the energy sector.

electricity access sector. Although funding for the 25 largest clean cooking companies increased 68 percent in 2019, to \$70 million, it is still well below the required amount. In 2020, several new large-scale funding initiatives were announced for clean cooking in Africa, where the clean cooking deficit remains the largest.

A significant objective of the development-energy agenda is to use public resources in a way that encourages private sector investment, allowing grant-based models to be reduced over time. These techniques include the development of policies and regulations to promote market demand and blended finance mechanisms intended to reduce the risk profile of investments. There are no SDG targets for leveraging private investment towards access, but recent efforts at the High-Level Dialogue on Energy have encouraged steps towards greater ambition for 2030 and 2050. Although engaging private sector investment is a dominant objective, it also comes with certain risks, such as withdrawal of service, loss of social responsibility and monopolization.

2.3 THE URGENCY OF CLIMATE CHANGE MAKES ENERGY INITIATIVES CENTRAL TO INSTITUTIONAL ARRANGEMENTS AND ECONOMIC PLANNING

Energy is one major part of the whole-of-society response required to address climate change. The breadth of the challenge necessitates a cross-government response, which expands the number of possible national counterparts beyond the traditional ministry of energy to those with environmental, transport and infrastructure mandates, as well as central planning offices. The link between energy and the SDGs involves consideration by ministries with portfolios for health, food production, livelihood and employment. Many countries are currently formalizing these connections as they update their nationally determined contributions under the Paris Agreement. Although the process is still under way, 61 percent of the nationally determined contributions prepared for the twenty-sixth Conference of the Parties to the United Nations Framework Convention on Climate Change (UNFCCC) in November 2021 included a focus on energy supply, with the adoption of renewable sources by far the most referenced measure that Parties chose to adopt.²⁵ Although the nationally determined contributions are voluntary commitments, Parties are required to report against them.

The LDCs are not required to sign binding emissions reductions under the UNFCCC. Nevertheless, the Paris Agreement encourages voluntary pledges from emerging economies and developing countries, supported by financial and technological assistance from historically high-emitting countries. The most recent report of the Intergovernmental Panel on Climate Change demonstrates the necessity of curbing emissions as soon as possible,²⁶ which creates a political and economic dilemma surrounding developing countries with national reserves of coal, oil or gas that may support energy access and development.²⁷ Most international financial institutions (IFIs) have ruled out, or in practice are not, financing coal production. The divestment movement continued its upward trend in 2020, with more than 1,300 investors and institutions (worth nearly \$15 trillion of investment) committing to partially or fully divest from fossil fuel-related assets.²⁸

²⁵ Nationally determined contributions under the Paris Agreement Synthesis report by the secretariat. UNFCCC (2021) https://unfccc.int/sites/default/files/resource/cma2021_08_adv_1.pdf.

²⁶ IPCC, 2021: Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [Masson-Delmotte, V., P. Zhai, A. Pirani, S.L. Connors, C. Péan, S. Berger, N. Caud, Y. Chen, L. Goldfarb, M.I. Gomis, M. Huang, K. Leitzell, E. Lonnoy, J.B.R. Matthews, T.K. Maycock, T. Waterfield, O. Yelekçi, R. Yu, and B. Zhou (eds.)]. Cambridge University Press. In Press.

²⁷ SE4All (2021) Coal Power Finance In High Impact Countries.

²⁸ REN21, Renewables 2021: Global Status Report. 2021.

Gas has comparably lower emissions and has been considered as a transition fuel. However, the European Investment Bank (EIB) and World Bank are phasing down or out their investment lines for gas. Although the commitments are positive for the global environment, they have not been matched by a commensurate level of assistance to support countries to transition away from fossil fuels.

2.4 ENERGY DEMAND IS GROWING ALONGSIDE RENEWABLE UPTAKE

The total global primary supply reached 606 exajoule (EJ)²⁹ in 2019 against 536 EJ in 2010, i.e., an annual compounded growth rate close to 1.4 percent. During the same period, the share of solar and wind increased from 2 EJ to 9.2 EJ, i.e., an annual growth rate of 18.5 percent. Global total final consumption of energy has increased from 368 EJ to 417 EJ in 2019, close to 12 percent over the period,³⁰ driven by economic activity and population growth.³¹ Although certain regions have decreased or steadied consumption levels over the period, consumption has dramatically increased in Asia and grown in Latin America, the Middle East and Africa. The 2020 decline linked to COVID-19 lockdown measures only reduced global energy consumption to 2016 levels and is expected to be temporary. Increased demand can outpace the rate of renewable energy installation. The effect is acknowledged as holding back progress towards SDG 7, increasing the need for the uptake of efficiency measures combined with deployment of renewables.

2.5 COOKING HAS RECEIVED FAR LOWER POLICY ATTENTION AND INVESTMENT AND IS OFF-TRACK FOR REACHING THE 2030 GOAL

Cooking accounts for over 80 percent of household energy needs in low-income countries. The rate of access to clean fuels and technologies for cooking has gradually improved over the past decade, but current trends would leave 2.3 billion people (30 percent of the global population, split between Asia and sub-Saharan Africa) reliant on harmful cooking practices in 2030.³² Improvements in access have been led by the five most populous countries (Brazil, China, India, Indonesia and Pakistan). In 2019, 7 of the 20 countries that comprise 81 percent of the global population without access to clean cooking have very low rates of access to clean fuel and technologies for cooking (5 percent or less). They include the Democratic Republic of the Congo, Ethiopia, Madagascar, Mozambique, Niger, Uganda and the United Republic of Tanzania.³³ Figure 4 compares the rate of access to clean cooking with the rate of population growth, showing that the latter has outstripped the former in sub-Saharan Africa. In this region it is estimated that around 85 percent (894 million) of the population lack access to clean fuels and technologies for cooking.

Over the past decade, clean cooking has received far less support from policymakers, international organizations and the private sector than electricity access, and the sector and many countries suffer from a lack of long-term strategy for the sector. Little technological progress has been achieved in access to clean fuels and technologies. Liquefied petroleum gas (LPG) and improved cookstoves remain the main pathways to achieving universal access, and have faced challenges in promoting local supply. However, over the last decade, electric cooking with new solar PV technology has experienced a major breakthrough. The core

²⁹ EJ, or exajoule, is a unit of energy.

³⁰ Calculations based on IEA's World Energy Balances, 2020.

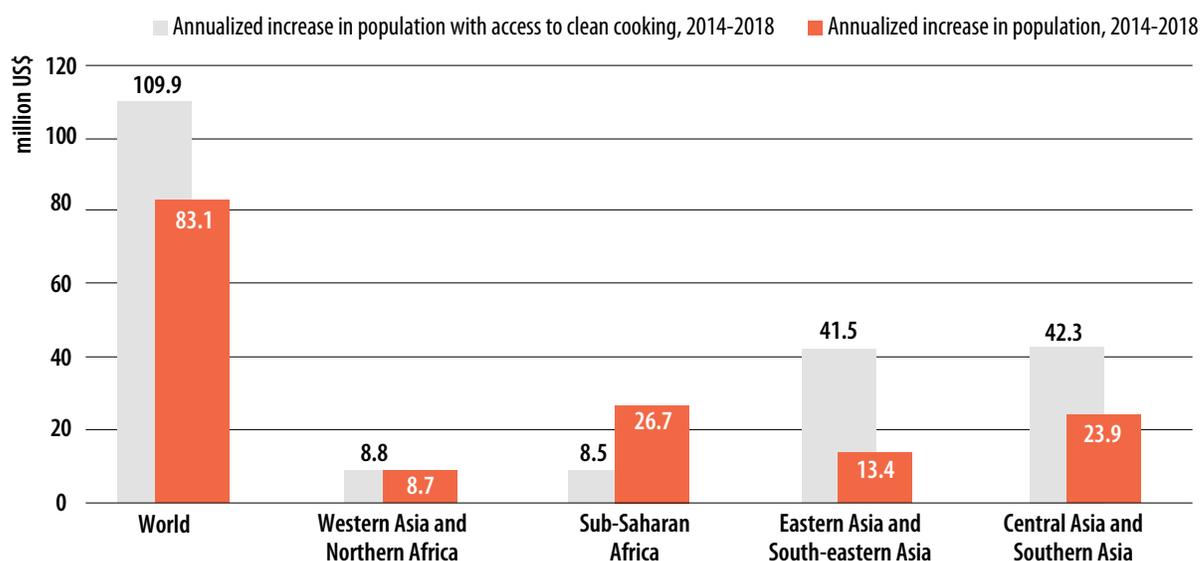
³¹ Batchelor, S (2015) Solar Electric Cooking in Africa in 2020A synthesis of the possibilities report has been produced with the assistance of the United Kingdom Department for International Development (DFID).

³² World Bank, ESMAP, *Cooking with electricity: A cost perspective*, 2020.

³³ IEA, IRENA, UNSD, World Bank, WHO. 2021. Tracking SDG 7: The Energy Progress Report. World Bank, Washington DC. © World Bank. License: Creative Commons Attribution—Noncommercial 3.0 IGO (CC BY-NC 3.0 IGO).

concept of a PV-battery-electric cooker as a substitute for purchased cooking fuels has been considered realistic since around 2015,³⁴ and recently the World Bank found that energy-efficient appliances and rising charcoal prices have created opportunities for affordable cooking using electricity in African countries.³⁵ It is still unlikely, based on current technology, policies and finance, that universal access to clean cooking will be attained by 2030, but increased access to electricity may enable more households to cook without indoor air pollution or depleting local natural resources in the near future.

FIGURE 4. Annualized increase in population and the number of people with access to clean cooking over the period 2014–2018



Source: Tracking SDG 7, The Energy Progress Report, 2021

³⁴ Batchelor, S (2015), Solar electric cooking in Africa, a synthesis of the possibilities.

³⁵ Energy Sector Management Assistance Program (ESMAP). 2020. Cooking with Electricity: A Cost Perspective. Washington, DC: World Bank.

THE UNDP RESPONSE: THE ENERGY PORTFOLIO

This chapter focuses on the features of the UNDP energy portfolio that explain its support towards energy access and transition since 2018.

3.1 STRATEGIC DIRECTION

As part of the Strategic Plan, 2018-2021, UNDP launched signature solution 5, which positioned the organization's work on energy in line with the SDGs and the Paris Climate Agreement. The signature solution describes access to clean and affordable energy as a critical enabler for nutrition, transport, education and economic opportunity, and in its strategy note on sustainable energy, UNDP links access to energy with social progress, health outcomes, disaster preparedness and climate change adaptation.³⁶ The transition is intended to support countries to implement low-carbon pathways that are compatible with their aspirations to social and economic development.

The signature solution focuses on three objectives: increasing energy access; transition to renewable energy and energy efficiency; and restoring energy access in post-crisis contexts, each to be achieved in a manner that is inclusive and responsive to the needs of different sectors of the population (urban/rural, women/men, household/business). In its strategy note on sustainable energy, UNDP defines its support towards these as:

- 1. Reducing the energy access gap:** Meeting electrical, thermal and mechanical energy needs of households, businesses and communities, with an emphasis on affordability, reliability and sustainability of energy access for the poor. This includes decentralized energy solutions and the use of off-grid options. It also includes the role of energy access in conflict and disaster recovery efforts, livelihoods and social inclusion.
- 2. Increasing the global rate of improvements in energy efficiency:** The promotion of energy efficiency across sectors – such as transport, infrastructure and cooling – and the creation of strong market demand and incentives for public and private investment.
- 3. Increasing the share of renewable energy in the global energy mix:** The development of on- and off-grid renewable energy technologies and delivery services through technical, policy and financial de-risking.

Across the three areas, UNDP services provide a package of technical assistance to remove barriers to market transformation and to create enabling conditions to de-risk investment and scale up sustainable energy solutions. This includes upstream support (policy, institutional and investment levels) and downstream activities, with on-the-ground investments ranging from local community-level support to nationwide efforts. UNDP promotes a range of energy technologies across the portfolio, but is primarily focused on development benefits, energy service delivery and productive uses, and ensuring that consumers – particularly the most vulnerable groups – have access to reliable, affordable and clean energy service.

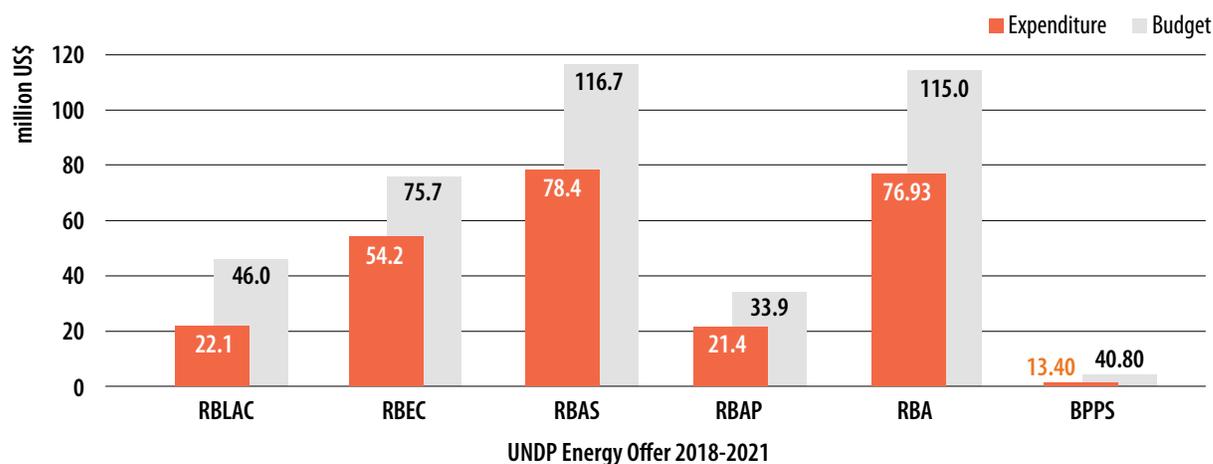
³⁶ UNDP, *Strategy Note on Sustainable Energy*, 2017.

The solution recognizes that countries had different starting points (“development settings”) for levels of access and uptake of efficiency measures and renewables. In contexts where energy did not reach everybody in 2017, UNDP intended to support innovative private and public solutions to increase energy access and delivery. In contexts where energy was already available to most or all people, UNDP would focus on transitioning to renewable energy and energy-efficiency measures and policies. In crisis and post-crisis situations, the solution was to focus on re-establishing energy access where it has been lost and strengthening risk-informed zero-carbon development. To deliver the signature solution, UNDP collaborates with other agencies under the UN-Energy framework, the Global Platform for Action on Sustainable Energy in Displacement Settings and the Sustainable Energy for All initiative.³⁷ Under the Health and Energy Platform of Action specifically, UNDP is working with WHO, the World Bank and other organizations.³⁸

3.2 PROGRAMME PORTFOLIO

The UNDP energy offer analysed for the purposes of this evaluation covers all projects deemed to have a significant energy component and budget expenditure between 2018 and 2021. Annex 5 describes how the evaluation identified these projects.³⁹ In total, the portfolio reviewed consists of 200 projects with a total budget of \$391,467,738 and total spending of \$254,484,507.⁴⁰ Figure 5 below illustrates where most funds were spent in the period 2018-2021, as defined by the UNDP bureaux.

FIGURE 5. The UNDP energy portfolio budget, by bureau, 2018-2021



Source: UNDP finance data, 2021

Note: RBA=Regional Bureau for Africa; RBAP=Regional Bureau for Asia-Pacific; RBAS=Regional Bureau for the Arab States; RBEC=Regional Bureau for Eastern Europe and Central Asia; RBLAC=Regional Bureau for Latin America and the Caribbean; BPS=Bureau for Policy and Programme Support.

³⁷ For which UNDP supports regional hubs in Africa, Asia and the Pacific, and Latin America and the Caribbean, together with regional commissions, regional development banks and other partners.

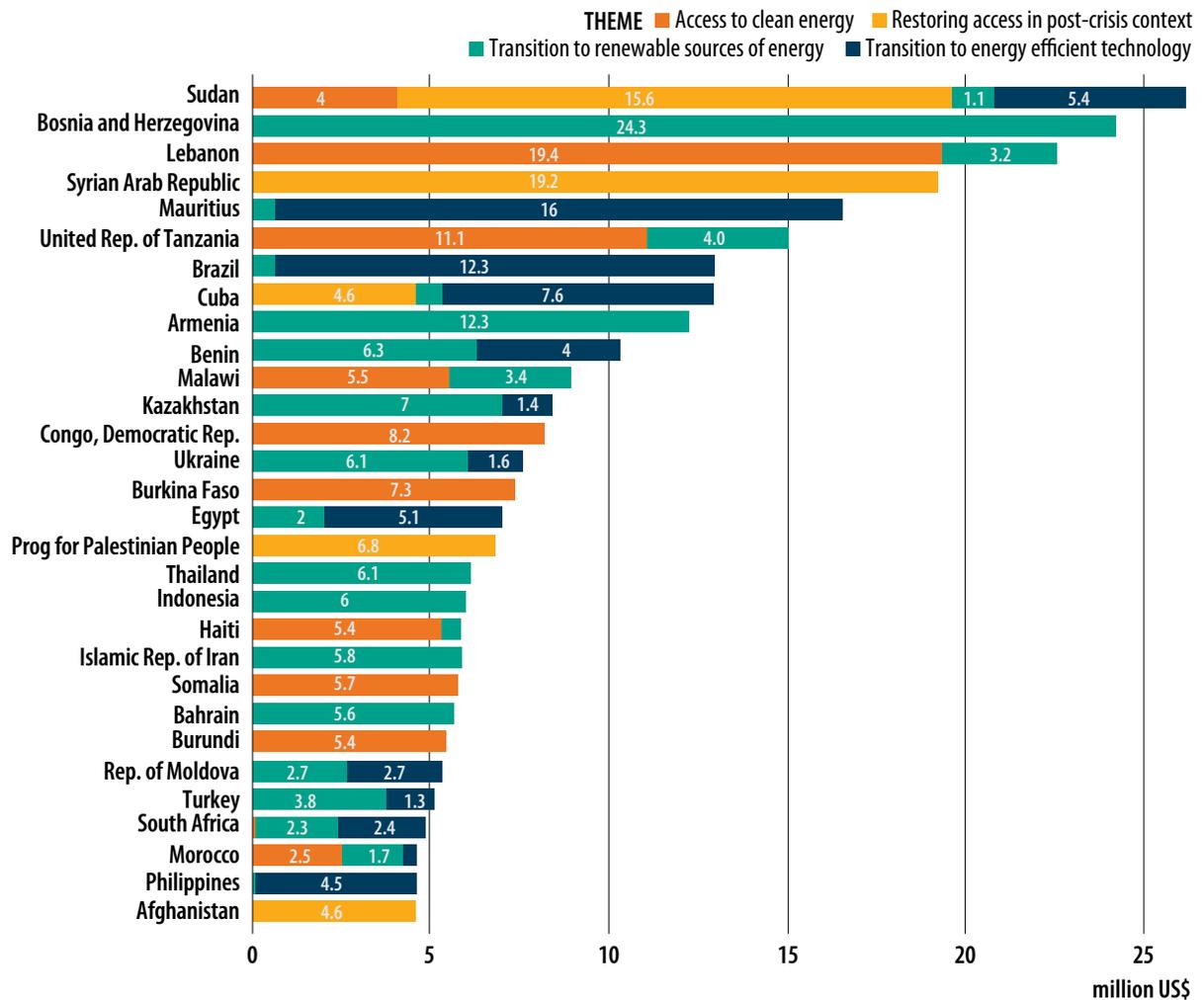
³⁸ WHO, Health and Energy Platform of Action. 2021.

³⁹ The evaluation team removed a number of projects tagged to signature solution 5 as they were considered to have insufficient energy content. The team also added energy projects not tagged with the signature solution found in a wider review of the UNDP project portfolio.

⁴⁰ The UNDP finance data were last accessed on 13 August 2021.

In terms of global distribution, the Arab States region had the largest amount of energy expenditure in 2018-2021, \$78 million, of which \$46 million was spent on restoring access in crisis contexts. The Africa region had the greatest expenditure on new access to clean energy. In the Europe and Central Asia region, the largest expenditure (\$65 million) was on transition to energy-efficient technologies, with funding concentrated in the Balkan and Central Asian countries.

FIGURE 6. Countries with the greatest expenditure under the UNDP energy offer, 2018-2021

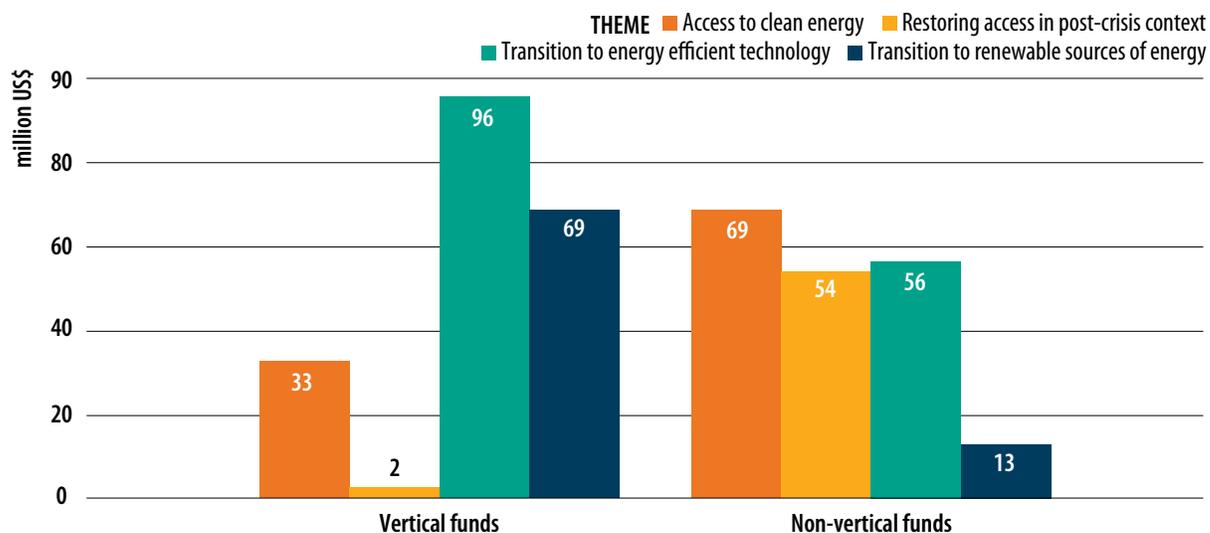


Source: UNDP finance data and UNDP Transparency Portal

The UNDP energy portfolio is composed of two large sub-portfolios: the vertical funds, consisting of projects funded by the Global Environment Facility (GEF) and Green Climate Fund (GCF), and non-vertical funds, comprising projects from all other funding sources. The most significant funders in the latter category are the European Union and the Governments of Denmark, Germany, Italy, Japan, Saudi Arabia, Spain and Sweden, as well as donor entities (Global Fund to Fight AIDS, Tuberculosis and Malaria, Joint SDG Fund). Figure 7 illustrates that total expenditure was marginally higher for vertical funds (\$199 million, 51 percent) than non-vertical funds (\$191 million, 49 percent).

The vertical funds provide the greatest share of UNDP support for energy and environmental objectives. Funding for transition to renewable sources and energy-efficiency measures is \$96 million higher than the funding available for these objectives in the non-vertical funds. The non-vertical funds are the largest source of UNDP funding for energy access and restoration objectives – \$88 million more than the vertical funds – and the majority of its funding is for clean cooking. The highest expenditures of non-vertical funds were in Lebanon, the Syrian Arab Republic and Sudan, and for the vertical funds in Armenia, Bosnia and Herzegovina and Brazil.

FIGURE 7. Thematic distribution and source of UNDP funding for energy, 2018-2021



Source: UNDP finance data 2021

UNDP has recently recommitted its support for energy through its Strategic Plan, 2022-2025. The new plan retains the core focus areas of increasing energy access for those furthest behind and expanding the use of renewable sources and energy-efficiency measures. It intends to encourage greater investment in distributed renewable energy solutions, especially for those hardest to reach and in crisis contexts, and aims to increase access to clean and affordable energy for 500 million people by working in partnership under UN-Energy.

FINDINGS

4.1 POSITIONING AND COMPARATIVE ADVANTAGE

This section analyses the extent to which UNDP has developed an appropriate response to the challenge of expanding energy access and supporting transitions to renewable production and energy efficiency.

Finding 1. The positioning of UNDP in the energy sector. UNDP is delivering relevant energy initiatives where they are needed and in alignment with national energy priorities. Its neutrality and impartiality are of particular value because of the national importance of energy security, the geopolitical dimensions surrounding energy supply and the global trade in technology and knowledge.

From a macro-level perspective, the thematic and resource distribution of UNDP support matches well the predominant energy challenges in the different regions (see figure 8).

The distribution of resources is well aligned with contexts in which access is low, such as in Burkina Faso, Burundi, the Democratic Republic of the Congo and Malawi, or disrupted, as in Afghanistan, Cuba, Iraq, Lebanon, Somalia, Sudan, the Syrian Arab Republic, Yemen and the State of Palestine. Importantly, the UNDP energy portfolio has avoided concentrating its resources in the countries that have already attracted the most funding from other partners. Between 2010 and 2018,⁴¹ more than half of global financial commitments for energy access went to Ethiopia, Guinea, Lao People's Democratic Republic, Uganda and Zambia.⁴² At the subnational level, UNDP has channeled its resources to off-grid solutions, which require less infrastructure investment than grid expansion, and are therefore more appropriate for reaching the poorest groups sooner and bring a range of local benefits.⁴³ All UNDP grid-tied support falls under its transition objectives and a small number of power plant restoration projects in crisis contexts.

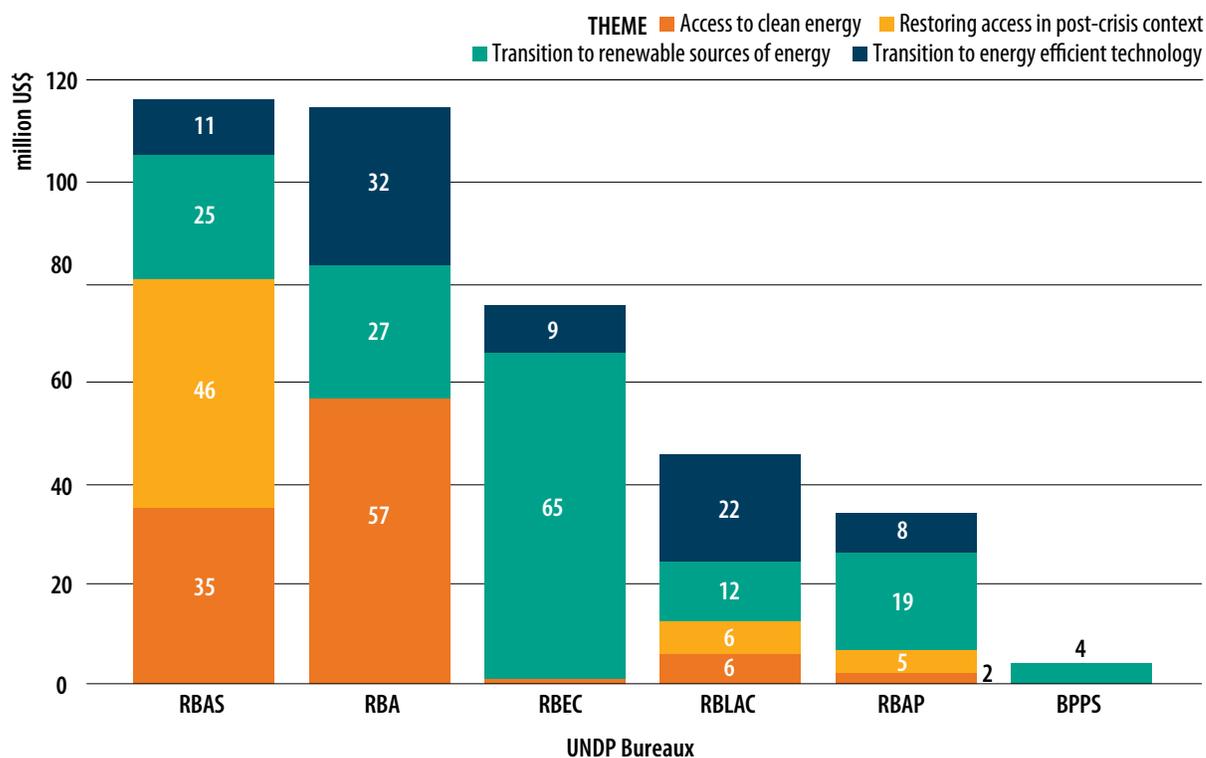
Nearly all project evaluations demonstrate that UNDP energy initiatives align their objectives well with national priorities, a product of the close relationship of UNDP with Governments and their joint planning. In certain countries, UNDP support for the enabling environment has helped to frame these priorities and in most countries, to support their implementation (see finding 7). Survey responses, evaluations and interviews demonstrate that country priorities often shift as the energy sector develops or transitions. An expanding number of countries where UNDP operates have achieved significant levels of electrification and are now confronted with new technical and socioeconomic challenges, including rising energy consumption and the challenge of keeping power grids stable after the introduction of volatile renewable electricity. Beyond these, countries are also facing geopolitical questions around energy security and decarbonization, and the threat of climate change to energy produced by hydropower or biomass. UNDP is not at present a significant provider of advisory services in these areas and relies on external expertise when Governments request assistance.

⁴¹ The period for which data is available.

⁴² UN-Energy, Tracking SDG 7 : The Energy Progress Report. Online: <https://trackingSDG7.esmap.org>. Accessed: 23 September 2021.

⁴³ IRENA, *Off-grid renewable energy solutions to expand electricity access: An opportunity not to be missed*. 2019.

FIGURE 8. Distribution of the UNDP energy offer by region and theme, 2018-2021



Source: UNDP finance data and UNDP Transparency Portal, 2021

Note: RBA=Regional Bureau for Africa; RBAP=Regional Bureau for Asia-Pacific; RBAS=Regional Bureau for the Arab States; RBEC=Regional Bureau for Eastern Europe and Central Asia; RBLAC=Regional Bureau for Latin America and the Caribbean; BPPS=Bureau for Policy and Programme Support.

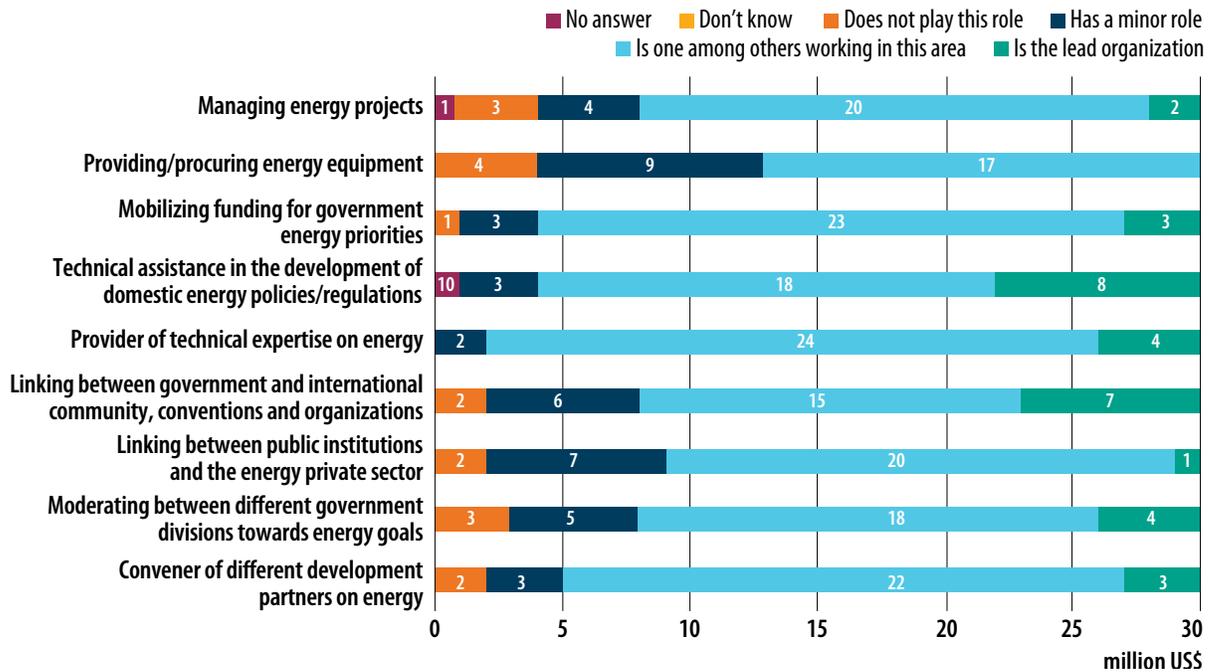
There are few countries in which UNDP is the principal adviser to the Government on energy policies, and in almost all areas of the energy-development nexus UNDP is one among many active groups. Organizations such as the German Agency for International Cooperation (GIZ), SNV Netherlands Development Organisation, United Nations Office for Project Services (UNOPS) and the World Bank have greater technical capacity and/or resources than UNDP in single countries, though their global coverage is smaller. Figure 9 highlights that UNDP is most likely to take a lead in direct assistance to government policymaking but is one of many organizations across a spectrum of support.

Triangulated data from surveys and interviews with government representatives and development partners demonstrate that the comparative advantage of UNDP is its neutrality. This heightens its credibility with Governments as UNDP is generally seen as an unbiased advocate for development, not partial to private interests and not representing the views (or export interests) of any specific bilateral donor or other country.⁴⁴ Encouragingly, there are instances where UNDP has ensured that a sustainable development perspective was included in large-scale renewable projects. The most notable example is the Sugarcane Renewable Electricity (SUCRE) biomass project in Brazil, for which UNDP ensured that the industrial users of sugar cane adopted safeguarding procedures to prevent damage to soil quality and local agriculture.⁴⁵

⁴⁴ Final evaluations in Bangladesh, Barbados, Cuba, Mauritius, Nepal and Turkey. Internal and external interviews at global and national levels.

⁴⁵ Final evaluation and internal and external interviews.

FIGURE 9. Surveyed country offices on their role in the energy sector



Source: IEO survey of country offices with mature energy projects, 2021

In line with the UNDP energy strategy, projects concentrate on the initial steps of technology adoption and developing the surrounding policy framework (See annex 9). This remains a valid focus for supporting energy access in LDCs and encouraging the use of energy-efficiency measures, but less so for larger-scale renewable initiatives in lower-middle and middle income countries, which increasingly can be adopted through public and private investment. In the latter contexts, the relevance of UNDP support is more closely tied to its ability to encourage the policy frameworks that promote wider development objectives in the uptake of a new technology, and to manage a multi-stakeholder pilot project in contexts where innovations may be held back because the institutional relationships are not in place (see chapter 4.3).

The UNDP approach to technology and policy adoption is inconsistent across the portfolio. The access and larger-scale renewable portfolios have not benefited from a systematic use of analytical tools and approaches to key activities, such as barrier analysis, private sector engagement and deciding the most effective deployment of upstream versus downstream support. UNDP efficiency programming is more coherent, as it adopts elements of a common approach, particularly in the Europe and Central Asia region, albeit still without a shared articulation of how development initiatives may encourage market uptake of efficiency measures.⁴⁶

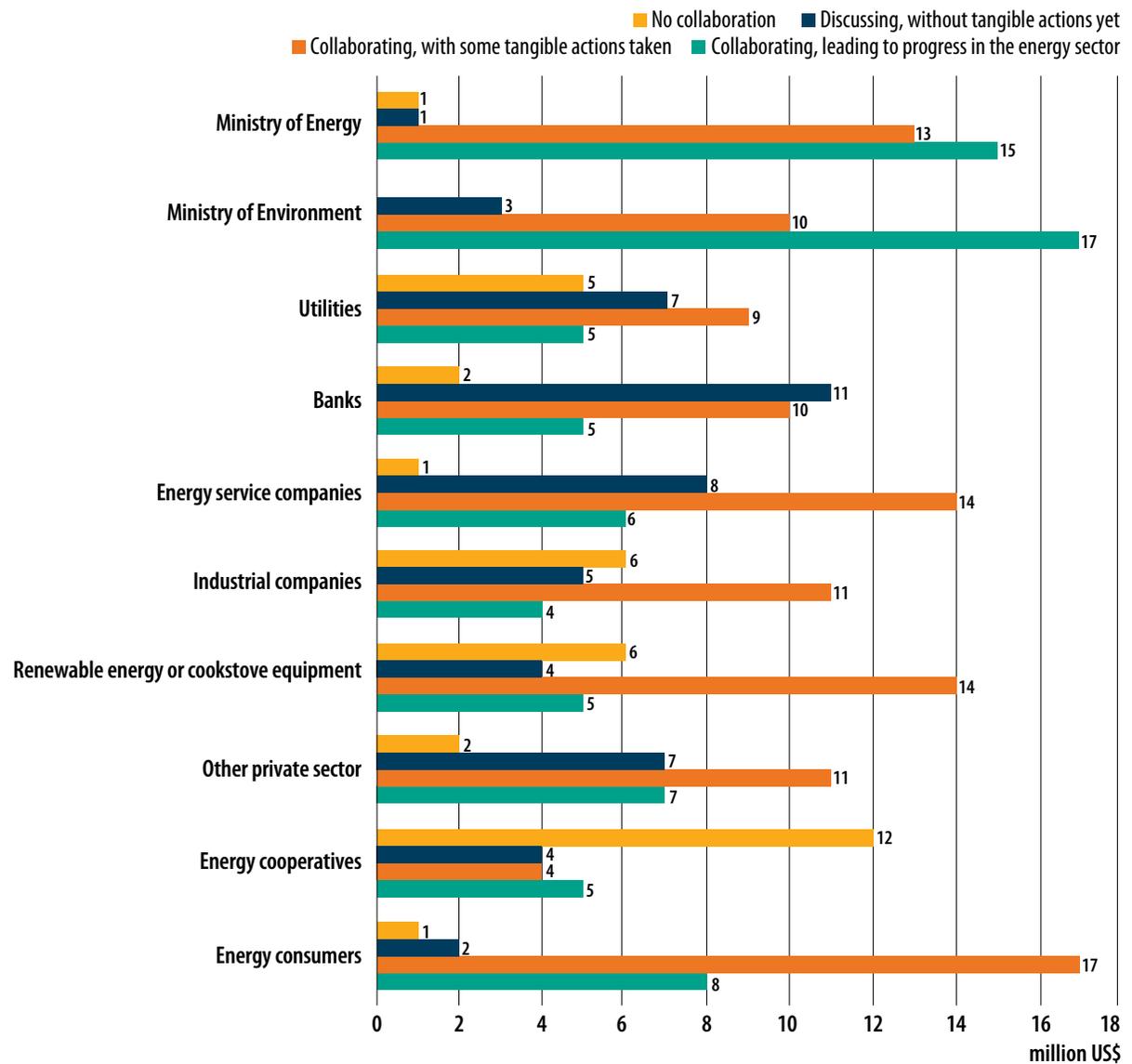
UNDP has been less successful in engaging with non-project stakeholders in the national energy sector, which has implications for the sustainability and wider adoption of demonstration initiatives. Many of its demonstration sites have failed to catalyse wider uptake due to a lack of continuing financial support and the inability of local actors to replicate new initiatives in their services (See chapter 4.3).⁴⁷

⁴⁶ For example, the USAID Energy Efficiency for Development Programme describes the building blocks from the market entrance of demonstration efficiency measures that expand consumer awareness and promote a market, initially as a premium product but reaching mass scale through endorsement labels, subsidy transfers and financing programmes, where they may be linked with minimum energy performance standards. See: www.usaid.gov/energy/efficiency/building-blocks. Last accessed October 2021.

⁴⁷ Final evaluations, Independent Country Programme Evaluations (ICPEs), interviews.

Engagement with these actors is illustrated in country office survey results, which show strong collaborations at the ministerial and user levels, but less successful engagement across the ancillary stakeholders that play a role in a well-functioning energy sector (see figure 10). This trend is found both in countries with more advanced energy sectors and in those where the sector is less mature, suggesting that the challenge of integration relates to the UNDP approach to engagement as well as external factors. The project evaluations demonstrate that UNDP engagement with banks and the private sector is often attempted late in the project life cycle and sometimes not included in project design. In many countries, these entities do not have product lines to support the people or technologies UNDP is working with, and therefore awareness-raising activities are needed before services can be developed.

FIGURE 10. The 30 country offices surveyed and their engagement with national energy actors



Source: Survey of country offices with mature energy projects, 2021

Finding 2. Global to national engagement. UNDP has not successfully leveraged its country presence to provide the knowledge and coordination that could offer more coherence to a disparate United Nations energy offer.

Stakeholders appreciate the historical role of UNDP in the development of action plans for SDG 7 and Sustainable Energy for All, global discussions on energy and gender and on the energy-humanitarian nexus, and in helping to make decentralized energy a mainstream option at a time when the development banks had reservations.⁴⁸ They also recognize a comparatively quiet period in the UNDP global voice on energy during the years preceding the 2021 United Nations High-level Dialogue on Energy. In the intervening period, UNDP has supported technical collaborations, but external stakeholders said there was a missed opportunity to enrich the energy-development and investment sectors with the unique breadth of the ground-level experience of UNDP.

“A lot of the energy sector discourse is very top-down. What’s really missing? The bubbling up of end user and solution provider perspectives, into the High-level Dialogue and COP26 discussions. I think UNDP, through its presence, has a key role to play there - to leverage more than it is at the moment.”

Global external stakeholder

In reflecting on the remaining challenges of reaching SDG 7, stakeholders⁴⁹ recognize that the United Nations energy offer does not form a package of coherent support to national Governments. UNDP is part of a fragmented United Nations landscape of energy initiatives,⁵⁰ which is split between the United Nations Environment Programme (UNEP), United Nations Industrial Development Organization (UNIDO), UNOPS and others in development settings, and the Office of the United Nations High Commissioner for Refugees (UNHCR), UNIDO, the United Nations Institute for Training and Research and the World Food Programme (WFP) in humanitarian and post-disaster settings. Although these organizations share similar objectives, they have different country profiles, funding sources and levels of technical and delivery capacity. UNDP is an active co-Chair of UN-Energy and has supported technical discussions to identify countries with high potential for impact.⁵¹ However, the platform does not provide a model for coordinated delivery at the regional or national levels, which is concerning for future UNDP plans because UN-Energy forms a core mechanism through which the organization intends to support access for 500 million people before 2025.⁵²

UNDP has had successful joint energy projects with United Nations agencies in certain contexts, such as with the Food and Agriculture Organization of the United Nations (FAO) on bioenergy in Sri Lanka and FAO and WFP in Yemen, but the trend is for single initiatives involving one or two agencies, and not the coordinated support that would allow a Government to access and deploy the best available energy support. Lack of integration with other agencies has weakened the support to some national Governments. For example, in the Low-Emission and Climate-Resilient Development project in Kenya, UNDP made effective cross-sectoral linkages but did not substantially invest in coordination with other United Nations agencies, resulting in partial utilization of the partnership potential and leaving significantly more work required to scale up.⁵³ In Somalia, UNDP, FAO and UNEP divided up the drivers of charcoal production but addressed them only

⁴⁸ External interviews.

⁴⁹ Internal, external (United Nations and non-United Nations) interviewees.

⁵⁰ Dalberg, *System-Wide Outline of the Functions and Capacities of the UN Development System*. 2017. External and internal interviews.

⁵¹ Based on external interviews and UN-Energy meeting minutes.

⁵² See UNDP blog: ‘Putting people at the centre of the energy revolution’. Posted July 2021. Last accessed October 2021: <https://www.undp.org/blog/putting-people-centre-energy-revolution>.

⁵³ Final evaluation.

with their own direct beneficiaries and with no combined effect. The national Energy Coordination Unit was left requiring significant additional resourcing at the end of the project because of weak institutional arrangements and resourcing.⁵⁴

Global stakeholders indicated UNDP could, and should, do more to leverage its global footprint and country presence towards delivering on SDGs 7 and 13 (climate action). The clearest examples of UNDP playing such a role are in crisis contexts; it has channelled substantial grant funding from Japan in the Syrian Arab Republic, provided the chapeau for a UNEP technical lead in Libya and played equally important roles for energy initiatives in Sudan and Yemen. UNDP has recently started to connect its regional and country offices to offer a more effective response to regional energy challenges through the Middle East and North Africa and Sahel energy programmes and the Africa Mini-Grid Programme, though these initiatives have not yet reached implementation.

External stakeholders suggested that UNDP could support the facilitation of national energy and development initiatives across ministries, the United Nations and development partners, similar to the way in which its climate teams helped develop Nationally Determined under the UNFCCC processes. Stakeholders saw a role for UNDP as an “anchor” for energy access and efficiency within the public sector, building on its field presence to share and amplify the expertise developed in agencies that are more specialized but have a smaller global reach, such as UNEP and UNIDO. The fact that most country offices with mature energy projects have led the integration of energy into their respective United Nations Sustainable Development Cooperation Frameworks⁵⁵ is a positive step, but the frameworks only convene the support available within country and require coordinated implementation to succeed. The need for coordination is said to be most pressing in the energy-health nexus,⁵⁶ in which multiple international actors work with their national counterparts and specific facilities, causing gaps and duplications in delivery. Its renewable energy and efficiency initiatives demonstrate that UNDP can convene and implement projects in complex environments and with actors that do not typically work together (see chapter 4.3).

Finding 3. Crisis contexts. Support for energy in crisis and post-crisis contexts is still underdeveloped as a focus area in UNDP. The organization has managed to deliver effective renewable solutions in these contexts but lacks operational guidelines for managing energy challenges in such contexts.

Although UNDP was not part of the development of the Global Platform for Action on Sustainable Energy in Displacement Settings in 2018, created in response to the limited focus on energy in the humanitarian system, it is a member of the steering group and the partners consider UNDP as a founding member because of the technical support and networking provided since its inception. The energy principles of both UNDP and the Platform for Action stress the importance of context specificity in designing interventions, which has allowed UNDP greater flexibility to work on energy solutions that are appropriate to the response and not constrained by the need to achieve emission reductions.

UNDP has delivered renewable solutions through its crisis/post-crisis programming. Whereas in 2012 it restored a power plan in Iraq with limited consideration of alternative models,⁵⁷ between 2014 and 2019, UNDP installed 10.9 megawatts of solar capacity in the country, accompanied by capacity-building for engineers and development of the regulatory environment.⁵⁸ The restoration of power plants in the Syrian

⁵⁴ Midterm evaluation and ICPE.

⁵⁵ Survey of 30 country offices with mature energy projects. See finding 15.

⁵⁶ External interviews.

⁵⁷ Based on the project document.

⁵⁸ Final Evaluation Report: *Catalyzing the Use of Solar Photovoltaic Energy*.

Arab Republic in 2018 was combined with a solar street light programme, renewable energy for essential services and capacity-building for engineers and technicians in the planning and financing of renewable energy technologies.⁵⁹ The work in Yemen is driven through renewable solutions aimed at transforming the fuel options in the country, and smaller steps have been taken to move beyond response operations to energy transitions in Somalia.⁶⁰ It is not clear whether the new support to electricity restoration in Libya plans to introduce renewables in this way.

UNDP has deployed a diverse range of mostly stand-alone technologies in crisis/post-crisis contexts since 2018. These include cookstove initiatives in recovered areas, solar lanterns, health facility support, solar for wastewater treatment and most recently, solar and biomass fuels and technologies to support Ethiopian refugees in Sudan.⁶¹ UNDP has not attempted to support mini-grid systems in active crisis situations, reflecting the greater complexity of engaging in connected supply and use compared to stand-alone solar or cookstoves units. However, its ongoing support in Afghanistan demonstrates a new entry point for supporting mini-grids in post-conflict situations,⁶² which when complete should offer lessons for such programming in repeat crisis contexts.

UNDP has not yet processed its experience in crisis and fragile contexts into lessons on what does and does not work. With the adoption of the energy signature solution, the Regional Bureau for the Arab States developed a regional policy brief on crisis recovery, which provides examples of how UNDP was using energy to meet emergency needs and for key service delivery and recovery.⁶³ The document illustrates components of the strategy note on sustainable energy through positive experiences in the region, creating a marker for a region where approximately half of the countries have experienced or been impacted by crisis in recent decades. However, the brief is retrospective and does not offer guidance for the unique challenges UNDP faces in working on energy in fragile contexts, such as migration, energy governance, equipment supply and servicing and balancing national and international expertise. Humanitarian actors are also researching ways to reduce the greenhouse gas emissions of their response operations and use their fuel purchases to encourage private sector engagement in public works.⁶⁴ Stakeholders expressed the opinion that UNDP could make a significant contribution to these efforts.

The situation in Yemen demonstrates the need for learning lessons on the deployment, coordination and governance of renewable energy in a crisis context. In response to immediate energy, food and economic needs, actors from the humanitarian, development and private sectors have supported a large-scale and unregulated deployment of solar equipment.⁶⁵ As in other countries, this has been linked to depleted groundwater levels,⁶⁶ as unregulated solar pumping allows farmers to extract water without being

⁵⁹ Project design document and ICPE.

⁶⁰ Project design document.

⁶¹ UNHCR, Inter-Agency Refugee Emergency Response Plan SUDAN: Refugee influx from Ethiopia November 2020 to December 2021. Revision May 2021. Available at: <https://data2.unhcr.org/en/documents/details/87530>. Last accessed October 2021.

⁶² Mid-term evaluation, Afghanistan Sustainable Energy for Rural Development (ASERD) programme.

⁶³ See UNDP, Compounding Crises: Will COVID-19 and Lower Oil Prices Lead to a New Development Paradigm in the Arab Region? 2021.

⁶⁴ See: Global Platform for Action, UNITAR 'Estimating the use of diesel generators in displacement setting: Preliminary results and recommendations for a solarisation programme'. Available at: <https://www.humanitarianenergy.org/assets/resources>. Last accessed October 2021.

⁶⁵ Ansari, D., Kemfert, C., al-Kuhlani, H (2021) Energy Access and Development Programme White paper: Yemen's solar revolution: Developments, challenges, opportunities. 2019. Available online: https://eadp.eu/uploads/WP201902_Yemen_Solar_EN.pdf. Accessed: 23 September 2021.

⁶⁶ Conflict and Environment Observatory (CEOS), Groundwater depletion clouds Yemen's solar energy revolution. 2021. Available online: <https://ceobs.org/groundwater-depletion-clouds-yemens-solar-energy-revolution/#7>. Last accessed: 23 September, 2021.

constrained by the cost and availability of diesel.⁶⁷ UNDP co-leads the solar working group with UNOPs, and in response to the problems has created the sector’s operational guidelines for solar equipment deployment and is also developing a register of all solar initiatives the country. Working at the coordination level leverages the UNDP comparative advantage because UNOPs, the World Bank and bilateral agencies have far greater resources for distributing solar equipment in Yemen. However, the environmental concerns, which are expected to worsen with climate change,⁶⁸ demonstrate the need to coordinate and safeguard renewable energy initiatives throughout, rather than after, their deployment, and to expand the oversight role to cover natural resources and food production.⁶⁹

Finding 4. The risks of low-carbon transition. UNDP frames its transition work as an opportunity for countries, but the organization is active in countries that are highly exposed to, and lack preparation for, the economic implications of a move away from fossil-fuel reliance. In most cases, UNDP has had minimal influence in pushing through broader and more integrated energy and governance strategies and system, that fully consider institutional quality and governance, human capital and technology adoption aspects.

The International Energy Agency notes that “as the world makes its much-needed way towards net zero emissions, there is an ever-present risk of mismatches between energy supply and demand as a result of a lack of appropriate investment signals, insufficient technological progress, poorly designed policies or bottlenecks arising from a lack of infrastructure”.⁷⁰ Recent analysis identifies countries that are likely to face significant impacts as part of a global transition to a low-carbon future.^{71,72} Their assessed high-risk exposure is based on current and projected dependencies on fossil-fuel reserves for their gross domestic product, exports, manufacturing and energy production, and their level of resilience.⁷³ The analysis does not cover effects on the informal economy, so there may be additional impacts on groups that depend on fossil-fuel byproducts or serving certain industries.

⁶⁷ Closas, A. and E. Rap, Solar-based groundwater pumping for irrigation: Sustainability, policies, and limitations. *Energy Policy*, Volume 104, 2017, Pages 33-37, ISSN 0301-4215, <https://doi.org/10.1016/j.enpol.2017.01.035>.

⁶⁸ CEOBS, Groundwater depletion clouds Yemen’s solar energy revolution. 2021. Online: <https://ceobs.org/groundwater-depletion-clouds-yemens-solar-energy-revolution/#7>. Accessed: 23 September 2021.

⁶⁹ Pahl-Wostl, C. Governance of the water-energy-food security nexus: A multi-level coordination challenge, *Environmental Science & Policy*, Volume 92, 2019, Pages 356-367, ISSN 1462-9011, <https://doi.org/10.1016/j.envsci.2017.07.017>.

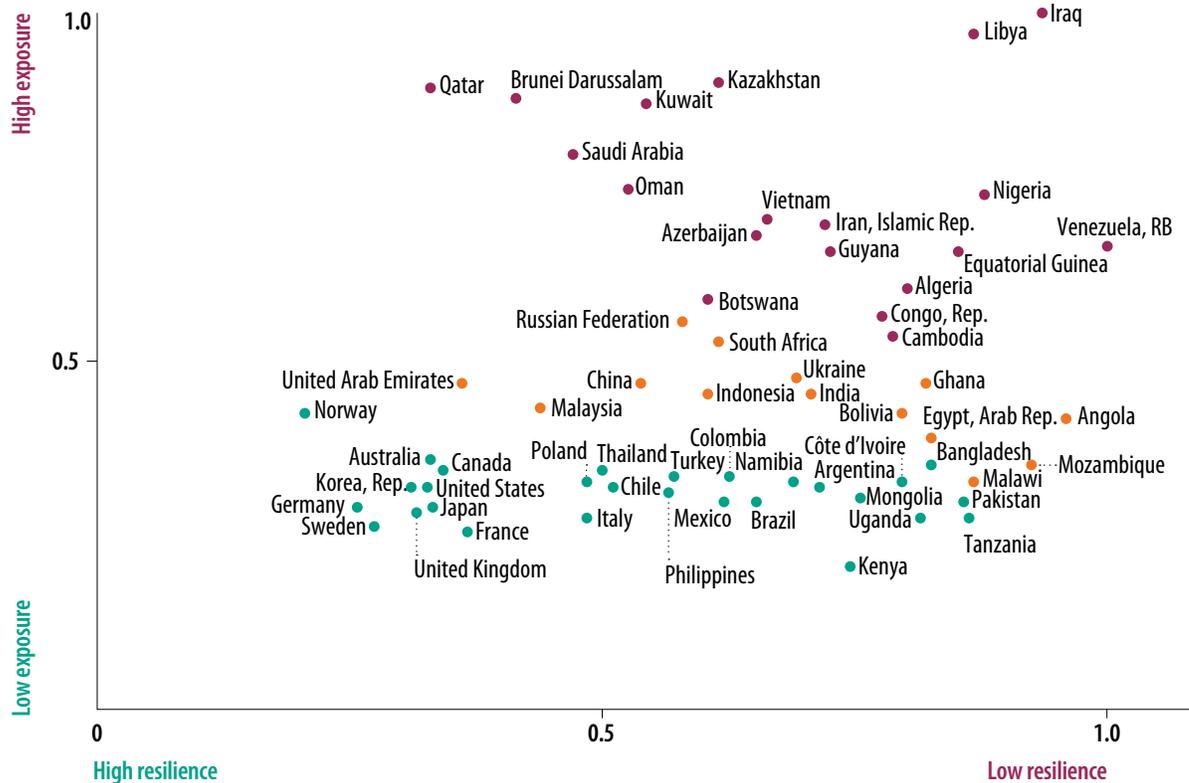
⁷⁰ IEA (2021), *World Energy Outlook 2021*, IEA, Paris <https://www.iea.org/reports/world-energy-outlook-2021>.

⁷¹ Peszko, G., D. van der Mensbrugge, A. Golub, J. Ward, D. Zenghelis, C. Marijs, A. Schopp, J.A. Rogers, and A. Midgley. 2020. *Diversification and Cooperation in a Decarbonizing World: Climate Strategies for Fossil Fuel-Dependent Countries*. Climate Change and Development. Washington, DC: World Bank. doi:10.1596/978-1-4648-1340-5. License: Creative Commons Attribution CC BY 3.0 IGO.

⁷² The UNFCCC’s synthesis of the intended nationally determined contributions, shows that fewer than 10 percent of the recent submissions specifically refer “to the overall low-carbon transformation of the economy, the decarbonization of energy supply, increasing carbon sinks, and the modernization and diversification of the economy”.

⁷³ Ibid 71. Other analysis highlights specific risks to financial systems as economies transition from ‘sunset’ industries invested in fossil fuels to ‘sunrise’ green industries. See: Semieniuk, G., Campiglio, E., Mercure, J-F, Volz, U., Edwards, NR. ‘Low-carbon transition risks for finance.’ *WIREs Clim Change*, Vol 12, 2021.

FIGURE 11. Low-carbon development and economic risk



Source: World Bank, 2021

UNDP projects in countries⁷⁴ that are assessed as having high exposure and low resilience tend to be largely sector-focused, either within the supply/production of renewable energy or a specific application of efficiency measures.⁷⁵ In these countries, UNDP promotes and guides adoption of renewable technology and efficiency measures, but without engaging in broader sectoral planning that can identify the most at-risk elements of the economy and help steer a transition away from fossil-fuel dependency. UNDP has promoted new jobs and livelihoods from renewables and has organized training to re-skill technicians in renewables, though these are not linked to wider transitions away from fossil fuel-dependent jobs. Notwithstanding successful projects to expand renewables, and promote greater efficiency (see chapter 4.3 on energy transition), for the most part, UNDP efficiency and renewable measures can be considered additional rather than transitional, and most fuel-transition efforts focus on imported fuels rather than national reserves.

In Indonesia, UNDP is supporting the Ministry of Finance in its efforts to transition the country away from coal usage.⁷⁶ UNDP was able to leverage its successful support on financial innovations (non-energy-related) and its work on downstream energy projects to have a seat at the table for these discussions. Guyana is also midway through several initiatives aimed at transforming its power sector to deliver on a national green

⁷⁴ UNDP has energy projects in Azerbaijan, Guyana, Islamic Republic of Iran, Iraq, Kazakhstan and Nigeria, as well as a small presence in Venezuela and a new project in Libya. It also works in Papua New Guinea and Turkmenistan, two countries that are expected to have high vulnerability but for which data were not available.

⁷⁵ In Kazakhstan, UNDP contributes to the discussion on energy sector fiscal policy reform targeting fossil fuel subsidies.

⁷⁶ Internal interviews.

development plan,⁷⁷ which has recently become more complicated due to the discovery of significant offshore oil reserves. The loss of oil reserves in Sudan (see box 2) and the political crisis in Lebanon demonstrate the value of UNDP having an energy presence in extreme moments of capacity loss, but these have been reactive, mostly small-scale interventions that have not measurably changed the nation's energy mix. In the evaluation team's survey, Bosnia and Herzegovina described a huge need for investment in decarbonization in the country and considers UNDP well positioned to grow in this field. Internal interviews demonstrate that staff recognize the risk and opportunity, as well as the challenging energy decisions that are emerging in lower-income countries with fossil-fuel reserves.

BOX 2. Energy transitions in Sudan

Sudan provides a heightened example of energy transitions. A transition to renewable energy and efficient usage became a national priority following the loss of nearly 75 percent of oil reserves with the secession of South Sudan in 2011 and the increased cost to the economy of replacement oil imports. The country also faces an environmental imperative to move to new forms of renewables; since the 1990s, between 70 and 81 percent of the population have relied on firewood for their energy needs, which has led to a significant drop in Sudan's biomass,⁷⁸ and its large-scale hydropower production of energy is under threat from climate change. UNDP has worked in the Sudanese national energy sector since the 1990s. Over this period, UNDP has supported several projects within the Government's renewable energy strategy, including solar pumping for agricultural use; a one-megawatt demonstration wind turbine site; and rules and regulation to "leapfrog" the Sudanese market towards more efficient electrical appliances.

The country office's energy initiatives reflect many achievements and challenges found across the UNDP global energy portfolio. Although there is strong buy-in from the Government and demand from the domestic private sector to enter the renewable market, the viability of utility-scale wind in Sudan requires larger-scale financiers to be convinced that the risk of investing has reduced, which goes beyond energy considerations. As a single site, the wind turbines could only provide electricity for a share of the population, 65 percent of whom currently have no access to the electrical grid. Smaller-scale solutions, such as solar pumping, have shown promise but have also struggled to find a price model equipment that does not exclude the poorest groups. Another factor is that the switch to solar requires reskilling technicians trained in repairing diesel generators. Despite having two energy projects that seek to improve women's equality and economic empowerment, the country office is reviewing its targeting conditions for the pumps because many Sudanese women do not have the right to own land, regardless of whether their husbands live in the household. UNDP energy initiatives in Sudan demonstrate the need for long-term, broad and persistent efforts to create just transitions.

⁷⁷ Project document review.

⁷⁸ UNEP (2020) Sudan First State of Environment and Outlook Report 2020.

4.2 ACCESS TO ELECTRICITY AND CLEAN FUELS AND TECHNOLOGY FOR COOKING

This section analyzes the effectiveness, efficiency and sustainability of UNDP results in creating access to clean fuels and technologies for cooking, and access to electricity for households and institutions that did not have it in 2018 or lost access over the period because of displacement or supply disruption. It also covers UNDP results in establishing or improving the enabling conditions for energy access, such as policies, investments and capacities, and describes the links between these and the options for scale-up.

Finding 5. Energy access. UNDP has contributed to the provision of clean fuels and equipment to households, and the provision of electricity to a range of facilities, services and businesses. The scale of single initiatives is in line with its intention to demonstrate models of access, rather than to provide substantial levels of access in contexts where the Government cannot.

The evaluation reviewed 22 projects completed since 2018. Through these projects, UNDP and its partners have reached over 120,000 households (more than 600,000 people) with clean forms of energy. The projects cover all five UNDP regions, but with a slightly higher number in Africa and Asia-Pacific. Afghanistan and Cuba jointly have the largest numbers for household electricity connections (10,000 each), and the country office in Afghanistan also provided cooking equipment for 4,400 households.⁷⁹ Malawi has the single greatest combined contribution, though with a larger focus on cooking (25,536 households) compared to electricity supply (1,000 households).

Electricity access was provided to over 2,200 service facilities such as health centres, schools and street lighting, benefiting more than 6 million people per year. At least 2,700 businesses, including water systems for irrigation, market centres and stove manufacturing, were supported either with renewable electricity or biomass-related activities.

The potential impacts⁸⁰ from these initiatives differ by the form of energy and equipment used, and whether support is provided for household activities, social services or income-generation activities. This typology is summarized in figure 12, along with the numbers for UNDP project results.

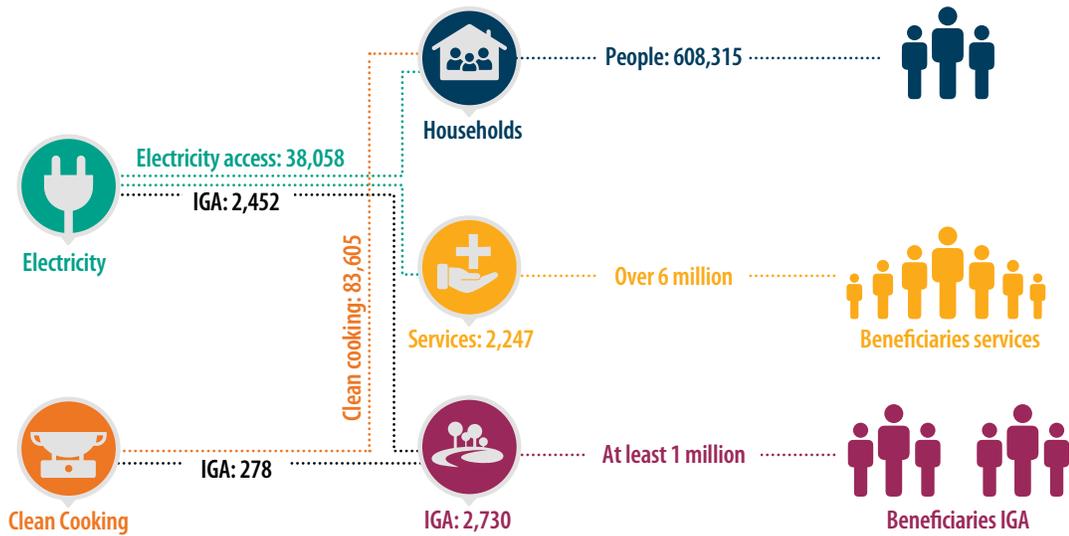
In the projects reviewed, there is a tendency to underestimate the number of indirect beneficiaries and the impact. In Afghanistan, solar water systems were installed in 35 clinics and reported to benefit 1,400 people without further explanation. It is plausible that the number is much higher and may reach up to 500,000 people per year as the number of people using these services is described as being much higher. Similarly, Mauritius has supported over 6 megawatts (MW) of grid connection but claims 604 connections. This is approximately an eightfold underestimation, even if calculated on the assumption that these grid connections provide the highest quality form of access.⁸¹

⁷⁹ In a limited number of cases (Côte d'Ivoire, India, Malawi), targets are not sufficiently disaggregated between households and businesses. In another case (solar PV in Lebanon), targets are expressed in installed capacity and electricity generation. It is therefore difficult to assess the impact as the beneficiaries include households, social services and businesses. However, the size of the installed capacity in this case (2.4 MW) and the number of villages suggest that there are tens of thousands of direct and indirect beneficiaries.

⁸⁰ As described in finding 11, UNDP collects limited information on the impact of its access interventions, and therefore the evaluation has not been able to quantify the effect on incomes, local environments or service quality.

⁸¹ Estimate based on multi-tier framework approach.

FIGURE 12. UNDP achievements in improving access to electricity and clean cooking fuels and the impact pathway for households, services and income-generating activities (IGA)



Source: IEO compilation, 2021

UNDP bioenergy projects have faced major challenges in reaching their targets. Most biomass projects did not reach the quantitative targets and their sustainability remains an issue even when quantitative targets have been exceeded during the project lifetime. The design and implementation of bioenergy is particularly challenging because of the complexity of the biomass value chain and the logistics. A biogas survey carried out in Egypt shows that less than 15 percent of the biogas units were still working. This is due to problems in the enabling environment rather than the technology, which is mature.⁸² There is only one project focused on biofuels (jatropha oil) as a substitute for diesel in small-scale electricity generation and as a clean cooking fuel. The project design stated that jatropha oil is seen by the public as a high-quality national energy resource and an affordable and feasible alternative to oil products or diesel. This project includes development and dissemination of 300 improved stoves. However, the project faced major constraints and was eventually restructured without reaching the key outcomes.⁸³ This was due to issues in the project design and the quality of baseline information, which overlooked technical, economic and financial dimensions of the promotion of biofuels.

Some projects currently under implementation target a significant number of households, services and beneficiaries of income-generation activities; Nigeria, South Africa and Ethiopia are prominent examples. These projects are expected to improve electricity and clean cooking access for several hundred thousand households and several million individual beneficiaries. It is reasonable to expect that these projects will reach or come close to their quantitative targets, as a review of their project designs shows a greater focus

⁸² Lida Ioannou-Ttofa, Spyros Foteinis, Amira Seifelnasr Moustafa, Essam Abdelsalam, Mohamed Samer, Despo Fatta-Kassinou, Life cycle assessment of household biogas production in Egypt: Influence of digester volume, biogas leakages, and digestate valorization as biofertilizer, *Journal of Cleaner Production*, Volume 286, 2021, 125468, ISSN 0959-6526, <https://doi.org/10.1016/j.jclepro.2020.125468>.

⁸³ Major factors hindering the deployment of jatropha oil particularly the economics of the whole value chain (low yields in marginal lands) were not sufficiently considered. Although a jatropha oil stove was designed, no stoves were produced.

on activities that promote sustainability, such as stove manufacturing and renewable electricity access. Countries that experienced challenges in deploying biofuel energy projects are now prioritizing electricity access, which has been a more successful intervention area for UNDP.

Projects were more effective in encouraging the adoption of energy access technologies when they found an appropriate cost model for households and small businesses and balanced this with the cost of locally available alternatives. UNDP has had mixed success in this area, encouraging quick uptake when initiatives provide households and facilities a lower cost alternative to diesel-generated power, but with slower adoption where communities prefer to wait for grid expansion or have available firewood.⁸⁴ UNDP has done little to understand and address the cost and payment models at the household/community level (see finding 11), although a small number of countries have recently begun exploring the potential for public-private-community partnerships for ownership of energy systems.

The fact that solar PV initiatives account for more than 54 percent of total UNDP energy funding is promising because there is growing evidence of the socioeconomic benefits of off-grid solar solutions,⁸⁵ such as solar home systems and mini-grids for household and productive uses. In East Africa, for instance, it is estimated that one third of the people who purchase solar home systems extend their workday or boost enterprise activities, increasing earnings by an average of \$46 per month, equivalent to a 14 percent increase in average income for the region.⁸⁶ Supported by falling prices for solar PV, the payback period is relatively low (depending on the systems and the sectors) and has allowed a rapid uptake of solar home systems even without public interventions.

Finding 6. Clean cooking. UNDP support for clean cooking is fragmented, limited in scale and not embedded within a coherent and long-term strategy.

Many UNDP clean cooking fuel initiatives did not continue beyond the lifetime of their projects and created limited results and impact.⁸⁷ Furthermore, results for access to clean cooking fuels are aggregated with equipment. With few exceptions, the quantitative result expresses that people have access to improved cooking stoves rather than the clean cooking fuels required to power them. It is common for people who have access to improved stoves to still rely on traditional firewood or charcoal, but UNDP and most other agencies count these people as moving up the energy ladder.

UNDP has not put in place the planning and policy-level support, product development, dissemination approach, marketing and financing that are key to achieving large-scale usage of improved stoves, nor the commercial approach required to achieve long-term sustainability. These factors were found to be essential in non-UNDP cookstove programmes. For example, Energising Development (EnDev), a multi-donor partnership led by GIZ, has supported access to modern energy services (mainly improved stoves) for approximately 24 million people across 20 countries. In this programme, 28,500 social institutions have gained access to modern energy services, including 18,000 schools and 2,000 health centres, and more than 73,550 small and medium-sized enterprises have grown their business through the productive use of energy, with 29,000 jobs created. The closest example in the UNDP portfolio is the Ethiopia cookstove

⁸⁴ External literature, final evaluations in Malawi, Nepal, Nigeria, Papua New Guinea, Tajikistan and Yemen, and interviews.

⁸⁵ IRENA. Off-grid renewable energy solutions to expand electricity access: An opportunity not to be missed. Online. Accessed: 23rd September 2021.

⁸⁶ Gogla, 2021 'Powering Opportunity: Energising Work, Enterprise and Quality of Life with Off-Grid Solar'. Available online at <https://www.gogla.org>. Last accessed in October 2021.

⁸⁷ Burkina Faso, Egypt, Sierra Leone and Uganda.

project, which applied many of these elements and deployed a large-scale campaign to promote cooking, though its local enterprise component was undermined by the reluctance of the local banks to lend to cookstove producers.⁸⁸

Finding 7. Enabling environment. UNDP has contributed to translating national priorities and strategies for energy access into policy frameworks, sectoral strategies, policy guidelines and the capacities required for uptake. A lack of guidance to contextualize and leverage demonstration sites has undermined efforts to encourage scaling and broader adoption of enabling environment successes.

In a number of countries, UNDP has helped Governments to develop their national renewable energy strategies, such as in Afghanistan, Fiji and Ghana; and in most countries, it has worked in close partnership with the relevant ministries to develop sub-initiatives to the national strategy. In Yemen, for example, UNDP is researching innovations in solar micro-grids and waste-to-energy solutions, and has conducted a macro-level assessment of the country's potential for utilizing other renewable sources. Across a broad range of countries, UNDP has helped develop analytical products designed to support expansion of energy access initiatives, such as feasibility studies, barrier analyses and natural resource mapping. In Bosnia and Herzegovina, UNDP developed databases and maps of the potential of wood and agricultural biomass. The Sudan country office plans to assess wind patterns in the country to identify other sites for turbines.

In all projects, UNDP had a strong focus on capacity-building, encouraging knowledge and skills that are preconditions for policy adoption or support the operation of energy access initiatives. Support has been provided to governmental, non-governmental, private sector, financial sector and civil society organizations, as well as communities and other stakeholder groups. The content varies from introductory support to raise awareness to more specialist assistance for managing a pipeline of renewable energy projects at various levels of government, and in some cases developing awareness of gender and energy issues.

Evaluations have recognized the practical and catalytic potential of the outputs described above, especially when combined with demonstrations and delivered in collaboration with national institutions. In low-access contexts, however, the utility of the policies, capacities and technologies is heavily dependent on the ability of a demonstration project to convince policymakers to develop the regulations and financial incentives that promote wider adoption. In most cases, the decisions regarding follow-on and scale-up fail to materialize. The reasons relate to the underdevelopment of the value chains, private sector and financing options for the equipment and energy technology in the context. In Ghana, for example, the country office supported the development of the renewable energy master plan, but the accompanying support to promote Ghanaian production of renewable technologies failed over time because of policy delays and expectation of larger markets for international private sector actors who were to transfer knowledge. The Ghana project is one of the most consistent engagements of the private sector in the UNDP energy portfolio, and illustrates a wider challenge stemming from the fact UNDP does not have a systematic approach for developing access initiatives that match local capacities and markets. Several final evaluations describe UNDP initiatives as being too advanced for subnational governments, local supply chains and institutions.

In the best cases, the results of such a project are taken forward in a follow-up initiative by UNDP or other agencies. In Malawi, for example, a project installed a significant quantity of off-grid power capacity but had slow uptake due to the cost to consumers and challenges connecting the power to income-generating activities, which the country office is now addressing in a follow-on project. The worst conceivable situation is to leave incomplete pilot technologies without uptake plans, which has been flagged as a risk in midterm

⁸⁸ Final evaluation and ICPE.

and final evaluations, especially where novel technologies are introduced. In India, for example, the project attempted to introduce bioenergy technology that was beyond the needs and financial capacity of farmer cooperatives, and the project closed without significant improvement in rural livelihoods or changes to decentralized renewable energy regulations and subsidies. As well as the potential negative impacts of leaving behind unusable hardware at the local level, these initiatives lead decision makers to lose confidence in such technologies and make it harder to bring about supportive policy change.

UNDP work in crisis/post-crisis contexts has focused primarily on deploying solar technology in response to urgent energy needs, and enabling environment support has proved challenging due the fragility of the governance structures. UNDP has provided a level of support to longer-term response plans; for example, the Regional Bureau for the Arab States developed the energy sections of the national response plans to the Syrian crisis in Jordan and Lebanon, countries with the highest per capita share of refugees and high levels of dependency on imported fuel. In addition to the elements describe above, Yemen has supported local governance of energy schemes through the village cooperative councils that formulated the community resilience plans, and made possible the access to local and external financing for community projects. Less successful examples were found elsewhere.

4.3 ENERGY TRANSITION

This section looks at UNDP results in encouraging countries to move towards less polluting forms of energy production and consumption. It covers initiatives that support transition, rather than those included in the access and clean cooking sections above, although the two overlap. It also covers UNDP results in establishing or improving the enabling conditions for transition – such as policies, investments and capacities – and links these to the uptake of renewables and efficiency measures wherever possible.

Finding 8. Renewable energy achievements. UNDP has supported energy transitions with subnational partners in a number of challenging contexts. However, multi-country and national-level projects, while broadly successful, have not yet delivered transformational change at scale. Projects that aim to encourage further investment by building capacity, demonstrating viability and securing policy change typically require more years to show results.

The seven completed renewable⁸⁹ energy projects assessed in this evaluation cover industrial/municipal sustainable biomass generation (Brazil, Serbia, Sri Lanka and Ukraine), de-risking the transition to renewables (Caribbean), capacity-building for low-carbon development (Kenya) and PV generation and capacity-building to start transforming the City of Marrakesh Bus Rapid Transit System. Further analysis of each project is provided in annex 8.

Most of the initiatives assessed have been successful and combined have averted 5.1 million tons of CO₂ equivalent (tCO₂ eq) within the lifetime of these projects.⁹⁰ Complex multi-stakeholder partnerships have been established to deliver changes in the enabling environment (policy/institutional aspects for the Caribbean and Kenya) and (policy/institutional plus financial for Marrakesh (Morocco), Serbia, Sri Lanka and Ukraine). In some cases, the viability of clean technology has been demonstrated, e.g., with major private

⁸⁹ The majority of renewable energy projects were independently evaluated to have met their objectives (satisfactory) or exceeding them (highly satisfactory). Two projects were evaluated as being moderately satisfactory.

⁹⁰ Six out of eighteen project evaluations.

sector partners in the São Paulo sugar industry in Brazil; in Serbia, Sri Lanka and Ukraine, the demonstration was accompanied by subsequent changes in the enabling environment to encourage uptake. Co-financing of \$538 million has been raised against total project/programme costs of \$557 million.

UNDP has been more successful in implementing challenging projects with municipal or provincial stakeholders over a longer period. The multi-country and national-scale projects (Caribbean, Kenya) have not delivered the desired transformational change at scale. These are useful projects that build on trusted relationships with Governments but do not provide large-scale sustainable, strategic solutions for energy transition.

The projects reviewed provide several areas of agreement on the drivers of project performance (see annex 8). All highly successful projects benefited strongly from effective finance components. These include partnerships with the private sector (Brazil, Sri Lanka) and municipalities (Serbia, Ukraine). Financial incentives for change were also an important motivator for progress and helped to overcome weaknesses in some project components. In the Caribbean, savings with the renewable technologies motivated uptake and in Brazil, the private sector partners in the SUCRE project delivered transformative investment once technical and financial viability had been demonstrated, even though the intended policy change did not materialize. In Ukraine, decentralization allowed municipalities to keep savings from the increased use of biofuels.

In most cases, UNDP is involved in all stages of the project, from design to implementation, often as a project manager. Its experience on the ground and ability to convene diverse stakeholders in a fast-moving political environment has been important for success, especially where the private sector was key to delivering outcomes (Brazil, Serbia, Sri Lanka).

A realistic time-horizon has been an important success factor. Projects typically take 8-10 years to reach scale, but GEF “full size” projects, which are the main instrument for UNDP transition work, have four-year timescales, to fit within the GEF replenishment process. In most cases, projects have required extensions and/or follow-on projects. In a number of cases, projects were linked to earlier work, but this strategic approach is not consistently present.

The use of adaptive management by UNDP has also been required, to compensate for limitations in project design and unforeseen implementation challenges. Projects were tailored to the local context, but often had to be significantly modified to remain relevant (Serbia, Sri Lanka, Ukraine), in at least one case because UNDP had not sufficiently assessed challenges in the institutional landscape (Sri Lanka). Finally, the extent of political support was usually a factor in how successful and sustainable the projects are. In Marrakesh, the creation of the Transport Local Development Corporation prior to the project and support from the Secretariat of State for Sustainable Development during the project was very valuable. In Kenya and Serbia, line ministries led implementation and in the Caribbean and Sri Lanka, projects were closely aligned with policy objectives.

Projects that are evaluated as successfully delivering their objectives still may not be sustainable. All the renewable energy projects that were “highly successful” in delivering expected outcomes were judged to be sustainable but the one “successful” as well as two “moderately successful” projects were given only a “moderately likely” chance of sustaining results. This is because projects that aim to de-risk further investment by building capacity, demonstrating viability and securing policy change typically do not deliver this in a four- or five-year period. The UNDP grid-connected renewable energy initiatives (decentralized, small and utility-scale) are typically active in markets where the energy systems have not yet been

developed, or only in small numbers, due to unfavourable policy and market conditions. There is some scope for the projects to accelerate their preparatory activities, but often longer times are required because of the dependence on political will, approval processes and pilot project development.

In most cases, the projects aim to improve the enabling environment for such systems, develop initial pilot projects, organize financing for them and if possible, implement them. The project design in these initiatives is very similar: usually, there is a policy, legal and regulatory development component (often accompanied by knowledge and capacity-building activities for policymakers); a development component for the pilot projects; and a component to facilitate financing for the pilot projects and ideally for future replication. These projects often elaborate and submit recommendations on the legal and policy framework to the government for adoption. In many cases, however, the policies are not passed during the project period, as is the case in the Caribbean and Kenyan examples above. As these are often crucial legislation (e.g., the introduction of an auction system or a feed-in tariff), without which further market uptake cannot be expected, the project objectives can only be achieved to a limited extent. The market conditions remain unattractive for future financiers or consistent engagement with the private sector, and the implementation of the scale-up activities cannot be completed within the project period. The exceptions in this portfolio have been projects where the private sector can already access finance (Brazil, Sri Lanka) or where the projects themselves have put financing arrangements in place (Serbia, Ukraine). As such, UNDP renewable projects were often successful when the market segment was developed continuously over a longer period and bolstered by initiatives from other agencies.

Finding 9. Energy-efficiency achievements. UNDP has helped to deploy successful energy saving measures through projects that demonstrate an ability to work in complex partnerships and across sectors. Despite project success, the sustainability of the efficiency measures is dependent on financing that only in a few instances arrived within the project lifetime.

In the lifetimes of the 16 completed energy-efficiency projects reviewed for this evaluation, UNDP has helped avert some 18 million tCO₂eq. This is a broad, indicative figure as projects have used different methodologies for their calculations.⁹¹ These projects typically started in 2015-2016 and were completed between 2018 and 2021. The sample covers all five UNDP regions and 22 percent of the current efficiency portfolio. The Egypt lighting and standards project accounted for more than 80 percent of this total and led to saving of two gigawatts (GW) and \$2 billion in generation costs. Two other highly satisfactory projects⁹² were comparable with the Egyptian project in terms of progress relative to their project objectives, but Egypt stands out because of the scale of change. The other 13 projects made less progress relative to their stated objectives. Further analysis of each project is provided in annex 9.

Enabling environment successes are prevalent, and a key precondition to encourage and sustain a transition. UNDP has been instrumental in establishing complex multi-stakeholder partnerships to deliver changes in energy-efficiency regulations or legislation in many countries,⁹³ to drive improved compliance in particular sectors, ranging from public buildings to specific industries,⁹⁴ or to build earlier stage capacity, awareness

⁹¹ Evidence of UNDP outcomes would be strengthened if consistent measures of energy saved (in terms of MWh and tCO₂ eq) were reported for each project. Some of the projects reviewed reported MWh saved, some reported tCO₂ eq only within the project lifetime and some for the projected lifetime of appliances and some reported all or none of the above. This made aggregation across the portfolio of projects difficult, and the summary above describes the minimum level of achievement.

⁹² Green Urban Lighting for municipalities in Armenia and a nationally appropriate mitigation action for industrial technology transfer in Cundinamarca region of Colombia. The energy-efficiency projects were independently evaluated to have met their objectives, performing satisfactorily (69 percent) or exceeding them, with 19 percent rated highly satisfactory. Two projects (12 percent) fell below this standard.

⁹³ Seven out of eighteen project evaluations.

⁹⁴ Six out of eighteen project evaluations.

and monitoring for nationally appropriate mitigation actions in support of the UNFCCC.⁹⁵ Compliance and regulations for energy efficiency can be challenging to achieve because they often do not lead to new market opportunities as quickly as, for instance, renewable policies.

UNDP has helped build co-financing of \$542 million against total project/programme costs of \$520 million. This co-finance for energy efficiency was primarily from the public sector and typically provides 89 percent of total costs,⁹⁶ with donor funding in one programme driving the higher overall result.

Similar to the renewable energy work, a number of projects work with municipal or provincial stakeholders. Working with multiple subnational partners (e.g., in Bosnia and Herzegovina, Serbia and Sri Lanka) capitalizes on the ability of UNDP to work in complex institutional environments that may be too risky for others. In other cases (e.g., Low-Carbon City project, Thailand), UNDP has focused on second-level cities, where risks and the need for demonstration are higher. In Bosnia and Herzegovina, the UNDP role in managing stakeholder interests was sufficiently important for it to lead the Swedish International Development Cooperation Agency evaluation of the Green Economic Development phase II project to conclude: “This project represents a good example of how UNDP project should be – creating depth over time through strengthened trust and alliances with all relevant stakeholders. UNDP has really become an agent of lasting change in the area of energy efficiency in the country.”

BOX 3. Transformational shifts through UNDP support: Improving the energy efficiency of lighting and other building appliances, Egypt

This project had a transformational effect on energy consumption in Egypt, saving 2GW and \$2 billion in generation costs. UNDP started with a large GEF energy-efficiency project for 2000-2010 that had limited impact because high electricity subsidies undermined the incentives for energy efficiency. Subsequently, a crippling electricity shortage and tariff increases provided strong incentives and political backing for improving energy efficiency. The project used established energy-efficiency interventions to raise awareness and pilot, provide grant finance for piloting and working with government to support the introduction of energy standards and monitoring. Due to delays in starting the project, the efficient lighting technology changed from CFL (compact fluorescent) to LED (light-emitting diode) but adaptive management coped with this.

Each component was successful but the innovative decision to allow private companies access to 25 percent grant financing for pilots was important as these convinced businesses such as supermarkets, hotels and banks to make the initial investment. Cooperating businesses found that the switch to LEDs led to a massive, unexpected reduction in demand for air conditioning, reducing electricity consumption in some cases by 40 percent. The grant financing and energy savings enabled payback periods of 12 months on average, and there was rapid private sector uptake. The public information component was also very successful, with a media campaign using Facebook and the Cairo Metro and an energy-efficiency competition with prizes. The focus on LEDs at the outset – “low hanging fruit” – was important to build momentum for subsequent energy-efficiency regulation. UNDP played an important role in project design and management but also as a trusted government partner, with the ability to work with a wide range of public and private stakeholders.

⁹⁵ Three out of eighteen project evaluations.

⁹⁶ Based on the median of co-finance to total project costs.

Considering the drivers of project performance (see annex 9), the “highly successful” projects all had strong government support (at national and where relevant, subnational levels). In these cases, energy efficiency was directly aligned with an important national agenda (e.g., green growth in Cundinamarca, Colombia) while in others it was a means to address a crisis (e.g., electricity supply shortages in Egypt). All the “successful” projects had political support to some degree and high levels of government or municipal commitment helped to offset challenges that would otherwise have held back implementation (e.g., significant institutional complexity in Bosnia and Hercegovina or lack of strategic focus in the Low-Carbon City project in Thailand). Furthermore, highly successful projects found financial incentives for end users: municipalities in Armenia and the private sector in Colombia and Egypt saw sustainable financial returns within the project lifespan.

The difference between “successful” and “highly successful” energy-efficiency projects often relates to finding an appropriate finance model. A number of “successful” projects had financing components that worked reasonably well but less so than other project components (e.g., Morocco, Serbia, Sri Lanka, Thailand). In these cases, there was limited scaling-up beyond demonstration. Moreover, where projects had significant problems with a financing component (e.g., Brazil and Republic of Moldova), this undermined the success of the entire project.

Projects typically failed to build capacity, pilot *and* secure legislation for energy efficiency in their lifetime. Strategic planning to build on earlier work (e.g., Armenia and Bosnia and Herzegovina) helped to add significant value relative to more ad hoc approaches elsewhere in the portfolio. In addition, many projects had to use adaptive management. In some cases, delays in implementation meant that the appropriate energy-efficiency technology changed (e.g., Egypt) but in general, it was required to modify limitations in project design and unforeseen implementation challenges.

The chances of sustainability are only moderately likely even when the projects were successful or very successful in delivering project outcomes.⁹⁷ In Serbia, for example the project design was successful, but the project did not tailor the grant proportion to reflect the payback period and could not engage private finance. In Morocco, significant co-finance was provided by project stakeholders, but finance for the nationally appropriate mitigation action was not secured and further work over a longer period will be needed to expand coverage to the rail industry and to pass legislation. Mongolia has successfully engaged banks to provide financing for the nationally appropriate mitigation actions in the construction sector, and earlier UNDP/GEF projects enabled banks to provide financing for energy-efficient private houses. However, while buildings will be more energy-efficient, individuals lack incentives to save energy as tariffs are based on floorspace or volume.

Investors are often uncertain whether energy-efficiency measures will lead to cost savings that are sufficient to reward their investments, typically because they lack confidence in the equipment and the personnel in charge, e.g., energy planners and auditors. Standardization and accreditation of equipment and persons or organization involved respectively are thus considered as key to de-risking energy-efficiency investments. Local private sector actors (e.g., energy service companies, engineering and installation firms, manufacturers) directly benefit from accreditation and standardization. Thus, closing the confidence gap has twofold benefits: it can lead to more investment through financiers and create business for private companies. UNDP planned to develop a de-risking energy investment (DREI) methodology for energy efficiency, such as grid-tied and off-grid renewable energy investments. However, due to the complexity of the topic, a standardized methodology for energy efficiency has not yet been implemented.

⁹⁷ This is expressed in 14 of the 16 final evaluations.

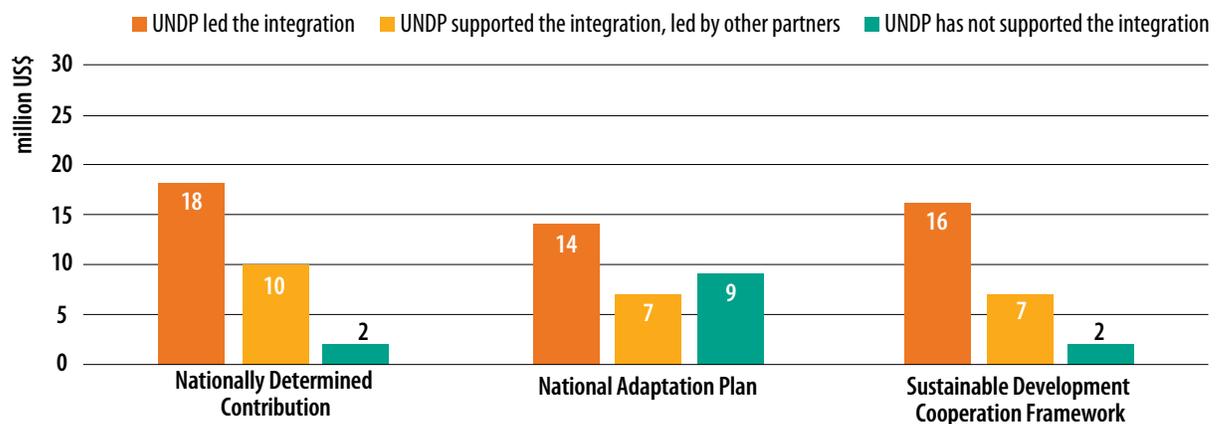
Final project evaluations, Independent Country Programme Evaluations (ICPEs) and in-depth interviews confirm significant revenue savings for government from the transition to renewables or efficiency projects that reduce government expenditure on fossil fuels or a requirement for fossil-fuel generation. These savings have the potential to lead to increased national expenditure on human development priorities. The pathways are dependent on Governments reinvesting the revenue in public services, and interviews with IFIs working across low-income and lower-middle-income countries suggest that the savings may often be used to support energy utilities. Nevertheless, the size of the savings in these countries are a promising area that UNDP could leverage, supported by further research and sharing experiences across its country offices.

4.4 ENERGY AND THE SUSTAINABLE DEVELOPMENT GOALS

Finding 10. Energy alignment to other SDGs. UNDP has successfully used its high-level engagement to help countries align energy into their SDG planning and other international frameworks. Improved service delivery, not just an energy supply, is required to ensure that energy accelerates the SDGs, and UNDP energy projects have faced sustainability challenges that undermine this linkage.

The 2021 United Nations policy brief, “Leveraging Energy Action for Advancing the Sustainable Development Goals”⁹⁸ sets out clearly the expected impact pathways from SDG 7 to the other SDGs. This builds on the notion of energy as a “golden thread” connecting economic growth, social equity and environmental sustainability, as put forward by the United Nations Secretary-General in 2012.⁹⁹ The UNDP country offices that have delivered energy projects under the signature solution are effectively delivering the planning frameworks to guide these impact pathways. The majority of country offices surveyed report leading the integration of energy planning into the host country’s nationally determined contribution and the United Nations Sustainable Development Cooperation Framework, and almost half into national adaptation plans (see figure 12). This work is led by UNDP climate specialists.

FIGURE 13. Country offices integrating energy into SDG and climate planning



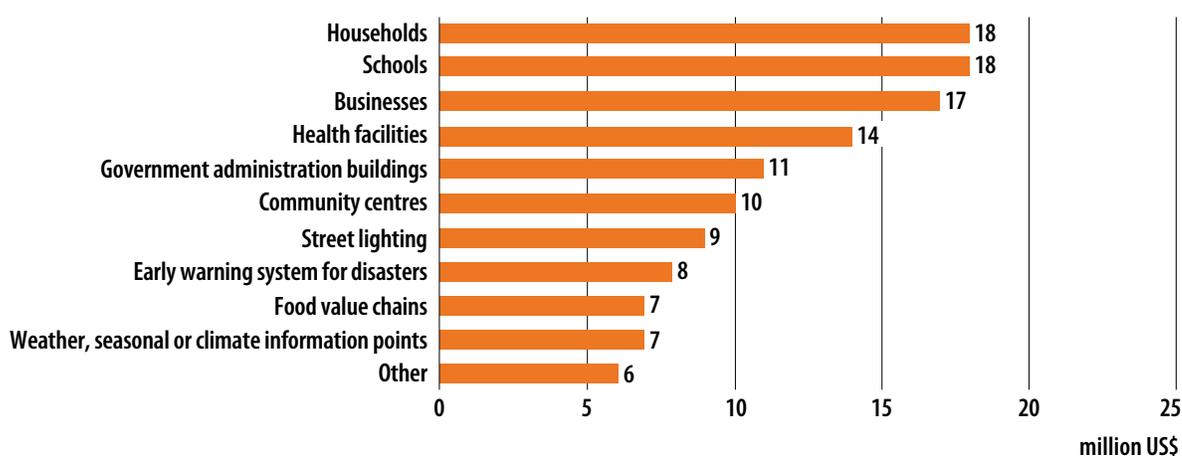
Source: Survey of 30 country offices with mature energy projects, 2021

⁹⁸ United Nations, *Leveraging Energy Action for Advancing the Sustainable Development Goals*, 2021.

⁹⁹ “Sustainable Energy ‘Golden Thread’ Connecting Economic Growth, Increased Social Equity, Secretary-General Tells Ministerial Meeting”, statement by the Secretary-General to the Clean Energy Ministerial Meeting, Seoul, Republic of Korea, 12 May 2014.

The ICPEs and interviews show that these country offices surveyed have made some progress in integrating energy into their country programmes: 40 percent of the staff survey respondents believe that this was leading to better results for the SDGs targeted in their country programmes and a further 47 percent had made connections in their country programme but felt more could be done to strengthen the linkage. At a practical level, the surveyed staff reported that they have provided several forms of connection (a median of 11 per country office). In addition to the households, health facilities and businesses mentioned above, UNDP has also supported connections to administrative offices, food value chains, weather information services and early warning systems. The UNDP portfolio also contains projects that provide services in addition to the electrical supply, such as the support for solar-heated water at maternity centres. The survey responses and interviews demonstrate that senior leadership in these countries strongly recognizes the need to integrate energy across the country programme, and in country offices with the most advanced portfolios, planning for the energy component takes place between technical and monitoring and evaluation staff during each project application.

FIGURE 14. Number of UNDP country offices that supported energy connections, 2017-2021, and types of usage



Source: Survey of 30 country offices with mature energy projects, 2021

The ICPEs, final evaluations and interviews verify that these connections were made but demonstrate that UNDP often does not plan well for sustainability of the connection. This is more understandable in contexts such as the Syria crisis, where immediate health, economic and social needs were met before challenges with equipment and institutional framing reduced functionality,¹⁰⁰ but less so in more stable contexts where UNDP should be able to leverage its contextual knowledge and energy expertise to develop appropriate initiatives. The UNDP Disaster Risk and Energy Access Management (DREAM) project in Barbados, for instance, installed decentralized, solar PV systems at community and resource centres, pavilions and polyclinics throughout the country to strengthen disaster risk response to extreme events, typically hurricanes. However, the clinics themselves lacked a means of financing PV maintenance and the final evaluation raised concerns about the sustainability of the project's impacts.

¹⁰⁰ ICPE Syrian Arab Republic, 2019.

This challenge is also found in the Solar for Health programme, which has encouraged Governments to add PV to 900 clinics in rural areas, providing light for the clinics, energy for refrigeration and opportunities for community use of electricity. As with the DREAM project, experience from a number of Solar for Health countries has shown that lack of funding for maintenance threatens sustainability, and the impact on service is dependent as much as on several qualities in the health programme as the energy connection. This problem is recognized by external and internal interviewees, and in response the programme has developed a new business model for working with private sector provision of PV services and linking this to ministries of health. The project team is proposing a 7-10-year programme for support to implement this.

Finding 11. Measuring progress towards the SDGs. UNDP does not conduct the types of assessments that would allow it to plan for and promote sustainability in energy project designs, and track whether its initiatives are leading to greater development and environmental benefits.

Although the theory underpinning energy's contribution to the SDGs is well articulated and intuitive, there are limited empirical data to consistently demonstrate how energy supports the SDGs (see box 4). The evidence does suggest that turning energy provision into sustainable development benefits often requires several outputs to be in place, of which energy is just one, and the knowledge gaps imply that better measurement is needed to improve and monitor the quality of programme designs.

UNDP projects have not adequately sought to develop an understanding of the energy user experience and capacity which are key considerations for designing intervention that are affordable, convenient to use and promote local maintenance of the equipment. Several final evaluations demonstrate that UNDP project designs can be too advanced for the capacity of subnational governments, local supply chains and institutions.¹⁰¹ Post-design, country offices collect a set of binary data on access numbers and disaggregate between households, services and income-generating activities.¹⁰² This is a cost-efficient way to collect data on a large scale; however, it limits the ability of UNDP to understand the reliability, affordability and other qualities of the energy men and women use. These qualitative factors can be used to tailor designs to encourage adoption and improve service and are a key component of SDG 7.

No UNDP project reviewed uses the multi-tier framework, which was devised by the Energy Sector Management Assistance Program and the development partners under the Sustainable Energy for All initiative to assess multiple dimensions of household energy access.^{103,104} Its use as a stand-alone survey would increase project budgets; however, project designs and regular monitoring processes could have been improved by including a simplified multi-tier framework tool and implemented with limited additional resources. This evaluation found no impact assessments of UNDP work on energy, which means that the post-hoc experience has not been captured and it is not possible to assess whether projects are leading to sustainable development and environmental benefits.

¹⁰¹ Final evaluations in Botswana, India, Malawi, Mauritania, Somalia and Tajikistan, and midterm evaluations in Papua New Guinea and Tuvalu.

¹⁰² Globally, there are relatively good data tracking electricity and clean cooking fuels access. However, the disaggregation is limited to binary information i.e., whether a household has a connection, has access to clean cooking fuels and lives in an urban or rural area.

¹⁰³ Bhatia, Mikul; Angelou, Niki. 2015. Beyond Connections: Energy Access Redefined. ESMAP Technical Report;008/15. World Bank, Washington, DC. © World Bank. <https://openknowledge.worldbank.org/handle/10986/24368> License: CC BY 3.0 IGO.

¹⁰⁴ Multi-tier framework surveys. have been carried out in limited number of cases in Africa (Ethiopia, Rwanda) and Asia (Cambodia, India, Myanmar). The multi-tier framework focuses only on households; there is still no comprehensive information on access to services such as schools, health facilities and income-generating activities. These data are crucial to capturing information on the livelihoods of poor people.

BOX 4. The evidence base for energy's contribution to the SDGs

Jeuland et al. (2021)¹⁰⁵ reviewed approximately 3,000 papers that consider the impacts of access to energy on both development and/or environmental outcomes. They conclude that “Overall, the review reveals that there is not always strong evidence for the claim that access to modern energy services improves environmental and development outcomes. For instance, while there is strong support for the idea that traditional household cooking technology is damaging, evidence on the positive effects of improved cooking technologies is more ambiguous.” ... “Furthermore, in some domains (e.g., health care delivery), and for some technologies (e.g., decentralized renewables), evidence is thin, inconsistent, or even invisible in the literature...”. A 2019 review of 85 energy-intervention impact-evaluation studies for the Asian Development Bank¹⁰⁶ reaches a similar conclusion.

A narrower review of 50 rural electrification impact-evaluation studies for the Inter-American Development Bank in 2017 finds “...substantial welfare gains, which tend to be greatest for women and small firms. On average, electrification leads increases of around 7 percent in school enrolment, 25 percent in employment, and 30 percent in incomes. However, the estimates vary widely, with many studies finding no effects, indicating weak links in the empirical literature.” Lee et al (2021), consider why the impacts of rural electrification are so varied and conclude that “access to household electrification alone is not enough to drive meaningful gains in development outcomes.” A successful energy project is therefore a necessary but not sufficient condition to realize the other SDGs.

Finding 12. Gender equality and women's empowerment through energy. The energy portfolio has integrated positive elements of gender equality and women's economic empowerment in the design of initiatives, but the majority of these initiatives are too reliant on assumptions that women will automatically benefit if they are simply included in energy initiatives.

Just over half of the total UNDP energy budget goes towards project outputs that were expected to benefit women's equality and economic empowerment.¹⁰⁷ This low number is disappointing since the UNDP gender equality strategy¹⁰⁸ encourages projects to adopt outputs that are at least gender-responsive, meaning results address the differential needs of men, women or marginalized populations and focus on equitable distribution of benefits, resources, status and rights. There are good reasons to do so for the energy sector: evaluations demonstrate that UNDP energy initiatives operate in a male-dominated sector, and evidence from outside UNDP suggests that a gender-responsive strategy should be considered a minimum to avoid a detrimental impact on women's equality.

¹⁰⁵ Jeuland, M et al (2021) Is energy the golden thread? A systematic review of the impacts of modern and traditional energy use in low- and middle-income countries. Marc Jeuland and T. Robert Fetter and Yating Li and Subhrendu K. Pattanayak and Faraz Usmani and Randall A. Bluffstone and Carlos Chavez and Hannah Girardeau and Sied Hassen and Pamela Jagger and Monica M. Jaime and Mary Muthoni Karumba and Gunnar Kohlin and Luciane Lenz and Erin L. Litzow and Lauren Masatsugu and Maria Angelica Naranjo and Jorg Peters and Ping Qin and Remidius Denis Ruhinduka and Montserrat Serrano-Medrano and Maximiliane Sievert and Erin O. Sills and Michael A. Toman}, *Renewable & Sustainable Energy Reviews*, 2021, Vol 135.

¹⁰⁶ Asian Development Bank, *Pacific Energy Update 2019*, 2019.

¹⁰⁷ Based on UNDP gender review of project design. GEN2 and GEN3 outputs make up slightly more than half of UNDP energy expenditure (\$132 million), with GEN0 and GEN1 (\$128 million). In the UNDP gender equality strategy 2018-2021, GEN0 indicates outputs at the project level are not contributing to gender equality. No activities or components of the output contribute to the promotion of gender equality and are considered 'gender-blind'. GEN1 indicates output at the project level contributes in a limited way to gender equality, but not significantly. GEN2 indicates that gender equality is not the main objective of the expected output, but the output promotes gender equality in a significant and consistent way. GEN 3 indicates that gender equality and/or the empowerment of women are an explicit objective. It is considered equal to GEN2, rather an improvement.

¹⁰⁸ UNDP, *Gender Equality Strategy*, 2021. Online: <https://www.undp.org/publications/undp-gender-equality-strategy-2018-2021>. Accessed: 14 September 2021.

It is a concern, therefore, that the UNDP portfolio has 3.5 times as much allocated to energy outputs that have no approach to gender (\$40 million) than to outputs that seek to benefit women (\$12 million). There is little difference in the overall picture of expenditures on gender between the vertical and non-vertical funds. The GEF has only required projects to have a gender analysis and action plan since 2018, but a significant portion of the portfolio was designed before then. Some final evaluations and interviews describe projects increasing their focus on gender after design approval, and interviewees also describe a greater organizational focus on gender recently influencing the designs in the energy portfolio.

The projects expected to benefit women contain positive and negative elements of gender design, and many ambiguous elements in which empowerment objectives are set with little description of how gender considerations were developed, or how the objective will be achieved. Although there are fewer positive than ambiguous or negative elements of project design, it is encouraging that more ambitious designs are found in countries that rank low on the Gender Inequality Index, such as Afghanistan, the Democratic Republic of the Congo, Sudan and Yemen.

The best examples treat energy as necessary but not sufficient for women's equality and empowerment, and perform or build on a gender assessment, not only on access to energy, but also on the usage of energy, sociopolitical views of women-led enterprises,¹⁰⁹ household decision-making and financial control, and constraints women may face in accessing the project and/or the technology. Good examples involved women and men in the design of the energy activity and suggested further gender-focused research before the activity design was completed. Very few projects have a comprehensive strategy to transform the systematic issues that compound women's unequal role in relation to energy and economic development, but projects contain elements that may support this, often combining energy access with one or more of the following elements: a component on women's economic empowerment; advocacy to incorporate gender into energy policies; and training to support women in institutional positions in the energy sector. Finally, some designs consider the gender ratio and expertise in the project management team.

The negative elements of project design are not based on an assessment of women's experience and are overly reliant on the assumptions that women automatically benefit from energy access, or that new business opportunities and technical capacities in energy production will shift broader gender norms. The assumptions of women's automatic benefit have been challenged in interviews and external literature, demonstrating that a more detailed and broader understanding of gendered norms is required.^{110,111} The introduction of LPG for cooking in India, for example, has been accompanied by male control over household supply decisions.¹¹²

The design problems link to issues in the way gender results are understood. The final evaluations, combined with interviews and survey responses, often describe women benefiting more than men from UNDP energy services. In some cases, this is because the project has purposely targeted women with a package of support, equal to or greater than that on offer for men. In these instances, it seems that women

¹⁰⁹ Jiska de Groot, Nthabiseng Mohlakoana, Abigail Knox, Hans Bressers, Fuelling women's empowerment? An exploration of the linkages between gender, entrepreneurship and access to energy in the informal food sector, *Energy Research & Social Science*, Volume 28, 2017, Pages 86-97, ISSN 2214-6296, <https://doi.org/10.1016/j.erss.2017.04.004>.

¹¹⁰ Summarised in: Jiska de Groot, Nthabiseng Mohlakoana, Abigail Knox, Hans Bressers, Fuelling women's empowerment? An exploration of the linkages between gender, entrepreneurship and access to energy in the informal food sector, *Energy Research & Social Science*, Volume 28, 2017, Pages 86-97, ISSN 2214-6296, <https://doi.org/10.1016/j.erss.2017.04.004>.

¹¹¹ Sylvia Chant & Caroline Sweetman (2012) Fixing women or fixing the world? 'Smart economics', efficiency approaches, and gender equality in development, *Gender & Development*, 20:3, 517-529, DOI: 10.1080/13552074.2012.731812.

¹¹² Jain, A., S. Tripathi, S. Mani, S. Patnaik, T. Shahidi, and K. Ganesan *Access to Clean Cooking Energy and Electricity: Survey of States 2018*. 2018. New Delhi: CEEW.

have been successfully engaged in the project activity. The most prominent example is the work of UNDP Yemen, which won the Ashden Award for its engagement of women refugees in solar enterprises. This work is highly regarded by the external and internal interviewees and cited as an example of development and gender perspectives that UNDP can bring to protracted conflict settings. To achieve the results, UNDP was actively engaged in community dialogues, as was the case with the GEN3 projects in Sudan.

The most common explanation given by staff and final evaluations, however, is that women were disproportionately engaged in arduous household work prior to gaining access to electricity or receiving improved cooking equipment. UNDP has done little to test whether and how the nature of this work has shifted with electrification and more modern cooking equipment. There is sufficient evidence in the external literature and some final evaluations to give cause for reservations. Beyond the difficulties of encouraging adoption, studies^{113,114} have shown that use of biomass often continues alongside the adoption of clean energy, and women still collect firewood even when their household has clean energy equipment.¹¹⁵ Project evaluations do not apply a specific gender equality assessment or a post-hoc assessment of how gender norms influenced use or decision-making around technologies or incomes, although some do allude to the challenge. The ICPE of the Zambia programme,¹¹⁶ for example, shows that more efficient household use of firewood can be diverted to greater sales rather than clean household production.

Several project designs and results identify women as the key component of success and recommend that they be used strategically as multipliers: i.e., they should promote renewable energy or efficiency measures in their homes, villages and workplaces, or use the energy supply and incomes to increase the resilience of the household. Though these projects see this as a new role for women, there are recognized risks of over burdening women from such an approach.¹¹⁷ It is not clear that the country offices have undertaken an assessment of the extra burden or pushback women may face in these roles.

Technological solutions do not always shift the underlying reasons for the status quo and are dependent on the efficacy and sustainability of the equipment. This is also acknowledged in the country office survey responses, the majority of which describe women as facing issues in converting energy access into changes in their economic status, often because of social norms regarding female livelihoods and control of household budgets. It is notable that in the wider programme of support for refugees in Yemen, women faced social reprisals for their engagement in cash-for-work programmes, which demonstrates how important the context is for creating transformative results in any single initiative.

¹¹³ Jain, A., S. Tripathi, S. Mani, S. Patnaik, T. Shahidi, and K. Ganesan, *Access to Clean Cooking Energy and Electricity: Survey of States 2018*. 2018. New Delhi: CEEW.

¹¹⁴ Energy Sector Management Assistance Program (ESMAP), *The State of Access to Modern Energy Cooking Services*. 2020. Washington, DC: World Bank. License: Creative Commons Attribution CC BY 3.0 IGO.

¹¹⁵ A study in Kenya, for example, where clean cooking initiatives have been in use for several decades, show that even in households with a mix of fuel options, women continue to commit an average of three hours a week to walk 6-8 kilometres round trips carrying heavily wood loads. Women also have to navigate forestry protection laws. See: M. Njenga, J.K. Gitau, R. Mendum, *Women's work is never done: Lifting the gendered burden of firewood collection and household energy use in Kenya*, *Energy Research & Social Science*, Volume 77, 2021, 102071, ISSN 2214-6296.

¹¹⁶ UNDP Independent Evaluation Office, *Independent Country Programme Evaluation: Zambia*. 2020.

¹¹⁷ S. Chant & C. Sweetman, *Fixing women or fixing the world? 'Smart economics', efficiency approaches, and gender equality in development*, *Gender & Development*, 2020, 20:3, 517-529, DOI: 10.1080/13552074.2012.731812.

Finding 13. Access to energy for people with disabilities. UNDP does not take sufficient measures to understand the experience with energy of people with disabilities, leaving a sizeable population reliant on energy access models that may be inappropriate for their circumstances. Disability is mentioned in the UNDP strategy note on sustainable energy, but not linked to practical measures.

Global awareness of how people living with disabilities experience energy access and economic development has gradually increased since the publication in 2019 of the United Nations flagship report, which signalled that less than half of households with people with disabilities have access to electricity, and that people with disabilities face greater risk from unclean combustion within the household and have specific power requirements for assistive technologies.¹¹⁸ Beyond their energy needs, people with disabilities often are stigmatized, which for women may be compounded by norms around gender and social status.¹¹⁹ Disability is mentioned in the UNDP strategy note on sustainable energy but not linked to practical measures. It does not yet feature in the plans for the new Sustainable Energy Hub, though there is a stronger focus on the principle of leaving no one behind and reaching the last first.

The energy portfolio contains no outputs specifically focused on supporting people with disabilities. Rather, some projects are supplying electricity to facilities and services where people with disabilities are cited as users. Though the data does not allow a comparison of the number of disability services which UNDP has supported over time, an increase may be expected since the examples cited in the 2015 evaluation of disability-inclusive development at UNDP¹²⁰ because of the expansion of schools and health facilities in the energy portfolio. Under the Solar for Health programme, for instance, UNDP is supporting energy for HIV treatment and care services in Zimbabwe and in Gaza, State of Palestine, support is provided to hospitals for children with Down syndrome. Some interviewees spoke of purposively selecting schools that serve people with disabilities when more broadly targeting educational institutions, but for others this happened as a by-product. One country office, for example, has improved electrical supply to community and public sites that are already adapted for the needs of people with disability, but without a plan for targeting these groups.

The lack of plans to target people with disabilities is concerning because only 27 percent of the country offices surveyed believed these people can easily access UNDP energy projects, and only 7 percent believed that people with disabilities can convert energy access into long-term changes in their economic status. This reflects a general challenge in the energy sector, in which approaches to disability are still nascent. Conversely, UNDP non-energy disability projects have several useful components that could be combined with the energy interventions, such as livelihood and employment creation, policy reform, rights-based approaches and lessons from conflict contexts.

¹¹⁸ United Nations Department of Economic and Social Affairs, *Disability and Development, Realization of the Sustainable Development Goals by, for and with persons with disabilities*. 2018.

¹¹⁹ Ibid.

¹²⁰ UNDP Independent Evaluation Office, *Evaluation of Disability-Inclusive Development at UNDP*. 2016. <http://web.undp.org/evaluation/evaluations/thematic/disability.shtml>. Accessed: 23 September 2021.

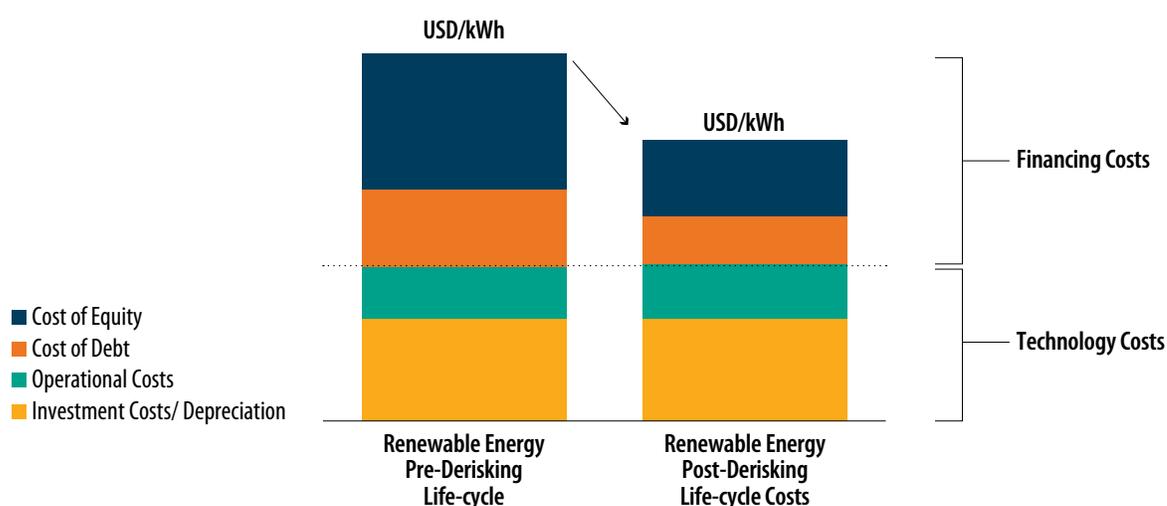
4.5 LEVERAGING INVESTMENT

Finding 14. De-risking renewable energy investment. The DREI framework has provided UNDP with an analytical tool for demonstrating the financial benefits of renewable energy to government stakeholders and investors. It expanded the UNDP offer beyond its core policy and capacity-building work and has delivered to government partners an important tool to help achieve market readiness.

UNDP developed the DREI methodology in response to the observation that in many developing countries, financing costs for renewable energy remain high even as hardware costs fall, because of the higher risks of investing in these contexts. Prior to DREI, UNDP worked primarily on policy de-risking, supporting Governments to adopt regulations that encourage financial investment. This remains the most common practice where UNDP seeks to encourage a market for renewable technology. As described in chapter 4.3, the reviewed projects set the right targets for their policy work and planned the right activities. However, in many cases the project duration is too short to develop a market for the technology. In some cases, these projects have already been the subject of initial discussions with potential financiers, which were broken off with the termination of the projects. Typically, the market will not yet be self-supporting or provide large-scale opportunities ready for investment. There is scope for the projects to accelerate their preparatory activities, but longer time frames are often required because policy approvals depend on political will, approval processes and pilot project development.

The DREI framework provides clear financial analysis to supplement this process. Ideally, the analytical results show that the clean energy technology is financially competitive, thus reducing the economic uncertainties surrounding policy adoption and investment. Where the analysis shows that further subsidies are still necessary to achieve competitiveness, or to yield sufficient return for the investor, the subsidies may still be lower than those applied to non-renewables options. The analysis is particularly useful in situations where fundamental political persuasion for the creation of an enabling environment is still needed, i.e., where there is no market uptake yet and there is a lack of clarity regarding the financial options. However, even in contexts where initial steps have been taken to de-risk investments the tool can highlight further measures to reduce barriers and improve the regulatory environment.

FIGURE 15. Example of the visual outputs of the DREI analysis



Note: LCOE= Levelized Cost of Electricity

Source: Adapted from UNDP Bureau for Policy and Programme Support, 2021

UNDP has carried out DREI analyses in several countries.¹²¹ Over the course of the Strategic Plan period, analyses were carried out as project activities in Kazakhstan (utility-scale solar and wind energy), Belarus (utility-scale wind energy) and Tunisia (utility-scale solar and wind energy). In preparation for upcoming activities (i.e., outside of a UNDP project), a DREI study was prepared for Nigeria (solar mini-grids) and for Cambodia (utility- and small-scale PV, solar mini-grids and solar home systems). Its potential is recognized by midterm reviews and internal and external interviewees, but so far only in Kazakhstan has UNDP applied the DREI analysis to the point where its results can be assessed (see box 5).

BOX 5. The DREI process in Kazakhstan

Kazakhstan presents the clearest case for the value of the DREI framework. The analysis was carried out at the beginning of a project promoting small- and utility-scale renewable energies (including off-grid systems). Previous interventions by other agencies (especially by the European Bank for Reconstruction and Development (EBRD) and to some extent the International Finance Corporation) succeeded in establishing a legal and regulatory framework, which resulted in the establishment of an auctioning scheme in 2018 with the support of the United States Agency for International Development (USAID) and others. One achievement of this project was that it demonstrated clearly how and to what extent de-risking can reduce the cost of capital, and thus lower the levelized cost of electricity of utility-scale renewable energy. The UNDP project developed a new site-specific auction mechanism which was applied to a 50 MW solar project in Shaulder, a village in southern Kazakhstan. This new auction mechanism included the preparation of a pre-feasibility study, solar resource assessment, grid connection analysis or the securing of permits, factors which can lower bidding prices according to international experience.

The auction for the Shaulder project was held in 2019, and resulted in a bid of \$0.032/kWh by Italy's Eni Group, a price approximately one third lower than under the first renewable energy auctions in 2018.¹²² The midterm evaluation elaborated that "other international agencies (notably EBRD under the funding of the Green Climate Fund, as well as USAID) have been very active in supporting large-scale renewable energy policy and finance in the country, [but] they had not worked on the detailed development and implementation of the site-specific mechanism, nor on the Shaulder auction itself." This is a particularly interesting observation, suggesting that UNDP succeeded in occupying a very specific niche, complementing the work of others. It is noteworthy that this approach was replicated by the EBRD in support of a wind farm.

¹²¹ The first DREI analyses were carried out as pilot case studies in Kenya, Mongolia, Panama and South Africa. The illustrated examples were presented in the original DREI report for grid-tied renewables published in 2013. In South Africa, the analysis informed the preparation and design of a project. In the DREI report for off-grid electrification (published in 2018), DREI analyses were carried out as illustrative case studies in Kenya as well as in India (Uttar Pradesh). In Kenya, the analysis was used as a source of information for preparing the Kenya project in the Africa Mini-Grids Program. See UNDP & ETH Zurich (2018). *Derisking Renewable Energy Investment: Off-Grid Electrification*. United Nations Development Programme, New York, NY and ETH Zurich, Energy Politics Group, Zurich, Switzerland.

¹²² PV Magazine, *Italy's Eni wins Kazakhstan's 50 MW solar auction with \$0.032/kWh bid*. 2019. Online: <https://www.pv-magazine.com/2019/12/02/italys-eni-wins-kazakhstan-50-mw-solar-auction-with-0-032-kwh-bid/>. Accessed 23 September 2021.

Although external stakeholders increasingly recognize the value of the DREI approach, there is potential for attracting further interest. Some key donors, Governments and agencies recognize the added value, which increases the UNDP offer in a partnership and its alignment with organizations that encourage greater leveraging of private investments. In some countries, the DREI reports have allowed other United Nations agencies to tailor their initiatives to the analysis. DREI is considered an important part of the upcoming GEF-funded Africa Mini-Grids Programme, for which UNDP intends to apply the analysis (and the recommendations) in each partner country.

The institutional benefits of DREI to UNDP renewable energy initiatives are clear. Prior to DREI, UNDP was engaged in at least one energy project in which donor requirements for financial leverage exceeded the ability of UNDP to deliver an appropriate response. Staff now report stronger investment-oriented thinking and foster more systematic project planning and targeting. Even if the organization decides not to develop its financial capacity further, DREI analysis is said to have promoted greater awareness within UNDP of the relationship between policies and finance sector activities.

UNDP planned to develop a DREI methodology for energy efficiency. However, due to the complexity of the topic, a standardized methodology has not yet been implemented. The project results described in chapter 4.3 demonstrate that there is a role for DREI in this area. Investors are often uncertain whether energy-efficiency measures will lead to cost savings that are sufficient to reward their investments, typically because they lack confidence in the equipment and capacity of energy planners and auditors to ensure that efficiency measures are applied. Standardization and accreditation are thus considered as key to de-risk energy-efficiency investments and bring additional benefits for the local private sector (e.g., energy service companies, engineering and installation firms, manufacturers). UNDP has succeeded in introducing standards and capacity for the energy-efficiency sector, but rarely in such a way that financiers develop sufficient confidence within the project lifetime.

Finding 15. Post-analysis financial de-risking activities. The lack of follow-on tools for the DREI framework has so far limited the ability of UNDP to leverage investment and claim an organizational strength in mobilizing energy finance. UNDP does not yet have a suite of standardized financial instruments for the post-analysis de-risking activities, which require development banks or the Government to transfer risk and for UNDP to formalize the engagement of the local financial sector or private investors.

UNDP has good relationships with some energy financiers, but in many regions successful cooperation depends on the capacities of individuals rather than a set of shared operating procedures for blending financing from different sources. The IFI stakeholders in Latin America and Africa saw an opportunity to connect the downstream, grant-delivered approaches of UNDP to their own investment approaches; in Africa, discussions around this issue are under way through the Africa Mini-Grid Programme. This is said to require greater joint planning at the grant project design stage and the involvement of the United Nations Capital Development Fund for the blending modalities.

Armenia provides a positive example, in which UNDP persevered beyond the initial challenges in a GCF-funded project on retrofitting buildings. The project was initially intended as a collaboration with the EIB, but after the start of the project the planned sovereign loan was declined by the Government due to fiscal restrictions. The project solved the problem and gathered funding from several other sources, including a State subsidy, an EIB sub-sovereign loan, co-financing from communities/municipalities, private equity and debt (financed from loans from commercial banks in partnership with KfW and the National Mortgage Company). UNDP also established cooperation with Armenia's Renewable Resources and Energy Efficiency Fund on retrofitting public buildings, which was financed by the Eurasian Development Bank and through UNDP resources. This example shows that UNDP was able to bring together different financiers

and negotiate a co-financing package which, although 25 percent smaller, was still sufficient to proceed with the project, with the prospect of achieving similar greenhouse gas reductions as originally planned. In 2021, the Kazakhstan country office also took steps to create a guarantee facility for renewable energy investments, responding to the reluctance of banks to accept renewable energy assets as collateral.

The lack of follow-on tools for DREI also limits the ability of UNDP to strategically deploy its own downstream investments. As described in chapters 4.2 and 4.3, the organization routinely deploys demonstration projects in its energy initiatives. Although these allow UNDP to introduce innovations and directly provide access, they also absorb capacity and funds, which may be more effective in progressing an energy sector if spent on longer-term policy and financial de-risking activities. By shifting its focus towards more consistent work on the enabling environment, it is conceivable that the first pilot projects could be implemented by other stakeholders (investors, financiers, communities) and not UNDP. The demonstration effect may be stronger as it would indicate that national political, regulatory or financial conditions had supported the installation of the clean energy technology, rather than a donor-driven initiative. This potential is greater where public and private entities have the requisite capacities to absorb a level of risk and implement a pilot; UNDP-led demonstrations are still likely to be required in contexts where the market is at a very early stage of development.

4.6 MANAGEMENT AND RESOURCES

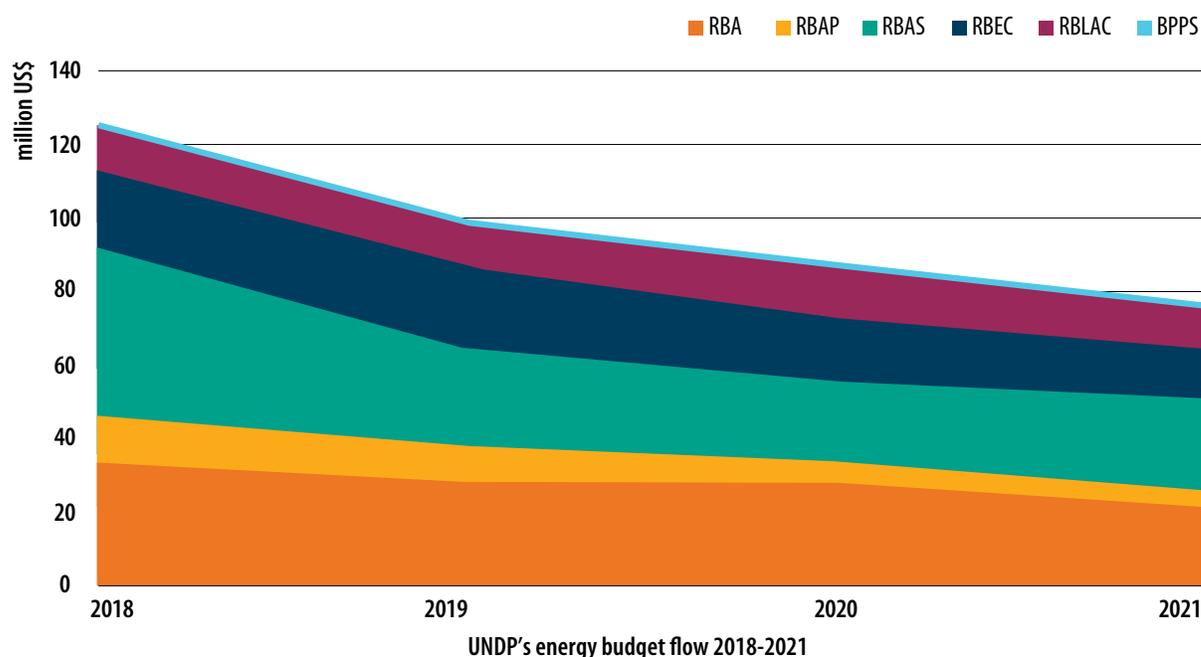
This section covers the major components of the UNDP organizational framework for the energy portfolio and the role of external funding in shaping the UNDP response to SDG 7.

Finding 16. Funding. The UNDP energy portfolio has been steadily decreasing in funding volume since 2018, and it has received the smallest contribution from regular (core) resources of the signature solutions. Combined with its geographic spread, this downward trend reduces the ability of UNDP to commit energy expertise and hardware for a sufficient time to make a sustained contribution to national energy challenges.

Since the start of the signature solution, total budget amounts for energy have been reduced by 30 percent, from just under \$126 million in 2018 to just under \$88.5 million in 2020, matched by a commensurate drop in expenditure.¹²³

¹²³ Average expenditure rate was 78% over the period. The Bureau for Policy and Programme Support has grown over the period.

FIGURE 16. UNDP energy expenditure flow, 2018-2021



Source: UNDP finance data and UNDP Transparency Portal, 2021

Note: BPPS= Bureau for Policy and Programme Support; RBLAC=Regional Bureau for Latin America and the Caribbean; RBEC=Regional Bureau for Eastern Europe and Central Asia; RBAS=Regional Bureau for the Arab States; RBAP=Regional Bureau for Asia-Pacific; RBA=Regional Bureau for Africa; BPPS=Bureau for Policy and Programme Support.

Survey responses suggest that funding sources remain one of the most significant challenges that country offices face in their attempt to retain a stable energy portfolio, or to integrate energy issues more deeply into their country programmes. As these are country offices that have completed energy projects under the signature solution, it is reasonable to expect that the challenge is even more pronounced in countries with only new or elapsed projects. UNDP headquarters stakeholders recognize that official development assistance (ODA) will not be sufficient for the step change required to reach SDG 7 or the organization’s own targets. However, ODA (either from the vertical funds or from bilateral donors) remains the principle means by which most country offices could fund an energy project. The use of more innovative models of financing by UNDP, such as SDG Bonds, Green Bonds or Islamic Bonds, are applied in a relatively small number of countries and so far without a specific focus on energy.

Despite the downward trend, new areas of funding have been developed in the areas of energy access and post-crisis restoration of energy supplies, which receive comparatively lower levels of funding from the vertical funds and relatively more from other donors. This funding has expanded over the signature solution period and is often linked to post-crisis recovery and non-environment-related bilateral aid rationales. A factor in attracting this funding is the continued UNDP country presence during moments of crisis and reduced capacities from other organizations working on energy, as has been the case in Afghanistan, Sudan, Yemen and other countries. UNDP operations have proved successful in challenging contexts, and country offices have built strong relationships with donors such as the European Union for multiphase funding.

The diversification of funding sources has been more successful in the Arab States region than in most other regions. The Government of Saudi Arabia is providing an overall funding envelope of more than \$90 million for the establishment of a national Saudi Energy Efficiency Centre, similar to other examples in

the Gulf region. However, these countries have yet to use renewable and efficiency measures to decrease oil production and see it rather as a way of extending their oil supply. This offers a window of opportunity for UNDP to increase its ambition and support economic diversification. In Latin America, vertical funds projects provide over two thirds of the total energy funding, constituting around 55 percent of the overall signature solution and 61 percent of other (non-core) resource funding.

There is also an increase in government cost-sharing projects, in which Governments request UNDP support in building up domestic capacities for energy transition. More than 18 percent of the expenditures are covered by government cost sharing, mainly in contributions such as travel and daily subsistence allowances. More than 10 percent of funds are provided through local government cost sharing, not only in middle-income countries but also in LDCs, such as Burkina Faso and the United Republic of Tanzania. As mentioned in Chapter 4.3, there are significant revenue savings for governments from the transition to renewables or efficiency projects which form a promising area that UNDP could further leverage to encourage greater cost-sharing.

In annual averages, the UNDP energy offer has accounted for a little less than \$110 million in expenditures over the last three years, which puts it behind all other signature solutions except gender. For example, signature solution 1 on poverty has almost \$2 billion in expenditures. The signature solution for energy receives the lowest amount of absolute funding from the core budget. These contrasts are particularly stark because energy is a capital- and funding-intensive sector (see table 3).

TABLE 3. Comparison of the share of regular (core) versus other resources (non-core) funding for UNDP signature solutions, 2018-2021

Signature solution	Core expenditure	Non-core expenditure	Share of core financing in expenditure
Poverty	\$403,190,000	\$5,380,000,000	7.5 percent
Governance	\$404,290,000	\$5,680,000,000	7.1 percent
Resilience	\$116,250,000	\$879,530,000	13.2 percent
Sustainable environment	\$84,510,000	\$1,350,000,000	6.3 percent
Energy	\$28,750,000	\$295,080,000	9.7 percent
Gender	\$31,450,000	\$87,120,000	36.1 percent

Source: UNDP finance data, 2021

The UNDP database is not structured in a way that would allow the evaluation to link the financial resources to staffing levels or to determine what share of internal capacity is available for the technical advisory role for the country offices. It is also not possible to clarify across the organization to what degree this support is financed from the vertical versus non-vertical core funds. The GEF provides UNDP with a fee-funded competence structure in the form of the regional technical advisers, and UNDP funds regional policy advisers for non-vertical funds. The regional staff specialize in energy or climate mitigation and play an important role as sources of technical knowledge on energy. They often have long years of experience – including as country office staff – and valuable technical knowledge. However, the country office survey and interviews highlight that staff capacity is too small for the development of, and advisory for, highly complex energy projects, particularly as few country offices have staff with energy expertise. This point is raised in some evaluations, though the country office capacity for project management is well recognized.

The new Sustainable Energy Hub is an important initiative for addressing capacity levels, as it intends to combine a significant amount of technical and specifically finance-related competence with a multi-donor fundraising approach, in order to leverage more funding for projects (see box 6).

Finding 17. Programmatic approach. UNDP is overly reliant on projects as the modality through which it delivers its energy offer. This makes its contribution to SDG 7 highly susceptible to implementation challenges and breaks in continuity, and constrains its ability to capitalize on the advantages of pursuing a longer-term vision and larger-scale planning and management.

The fact that almost 90 percent of the energy funds are from project funding rather than UNDP regular resources implies that UNDP spends a considerable amount of staff time and financial resources on repeated fundraising activities, i.e., design, review and approval as well as other transaction costs. The absence of shared processes also introduces several inefficiencies that reduce the effectiveness of UNDP.

Project design. UNDP operates in contexts where energy policy requires careful consideration of social, financial and environmental factors prior to investment in technology and infrastructure. Except for the energy-efficiency portfolio, UNDP provides very little centralized or shared knowledge compared to the volume of projects being designed. Across project evaluations, it is possible to see UNDP energy projects facing challenges and finding solutions on similar issues (such as community adoption models, biomass value chains, private sector engagement and gender-responsive designs) though rarely together. There are instances where final evaluations pinpoint a lack of awareness of proven approaches as an oversight that leads to weak delivery.

The GEF management standards help produce higher-quality projects and programmes for approximately half of the energy portfolio. GEF projects are required to have annual reporting and are subject to thorough quality control on three levels within UNDP and covering formal and technical aspects. The GEF requires strict monitoring and evaluation frameworks and budgets. Other donors do not insist on such tight project quality management processes, and internal interviews have routinely described UNDP staff capacity for quality assurance as over-stretched, weakening control over the non-GEF portfolio. Interviews across UNDP global and regional levels suggest that inappropriate designs have been captured through the internal quality assurance processes, which is inefficient and poses a reputational challenge given the involvement of government.

The reduced level of attention in the project design phase has led to a situation where the database on GEF projects is very strong, and that for non-vertical fund projects is much weaker, with highly inconsistent data about outcomes and even budgets and limited oversight with respect to the major donors.

Consistent engagement. Certain country offices, such as Sudan, have reached a position where over the course of decades, energy is recognized as an organizational strength, and the Government consults with UNDP on its sectoral strategies and the policy and project ideas that can implement a national plan. However, the broader trend is for emerging relationships to be developed on a project basis and weakened or broken by implementation challenges and project cycles.

As mentioned in chapters 4.2 and 4.3, projects are designed with a three-to-five-year implementation window but require implementation over eight to ten years. By the time an initiative closes, project teams have often achieved a position of trust and close collaboration with the government, but this is lost in the two years it typically takes to establish the next project and any follow-on project typically spends the first year re-establishing a team, office, support structure and connection to the government. This leads to a typical gap of three years between the termination of one project and the effective start of the follow-on activities, and UNDP provides no core funding to bridge this gap. The Regional Advisers cannot ensure continued collaboration with Governments because they cover too many countries and are often siloed at the regional level by UNDP operating guidelines.

Final evaluations demonstrate that most projects start very slowly after approval, which has led to instances where initiatives are out of date by the time of implementation. For example, the off-grid components of the Development of Sustainable Renewable Energy Power Generation project in Bangladesh and the land-based components of the solar projects in Turkey were no longer relevant because their respective sectors had advanced. These projects were required to adjust their approaches and technologies. As developments in the renewable energy sector happen quickly, initiatives can lose their relevance within one to two years, which is a typical time for a UNDP project to move from design to approval. Analysis by Sustainable Energy for All shows that the net trend of project delays in the energy-development sector (i.e., not only in UNDP) slows the rate of global financial disbursements towards SDG 7.¹²⁴ Furthermore, delayed initiatives can jeopardize partnerships, especially if they occur after the private sector has been engaged. As one interviewee put it, “delays kill deals.”

The prevalence of service breaks is caused, to a significant degree, by the dominance of vertical fund projects in the UNDP portfolio. These projects have long application and approval periods, leading almost automatically to disruptions in initiatives that require continuous collaboration and delivery. However, these challenges also occur outside of the vertical funds and external factors also play a role.

¹²⁴ SEforALL, *Energizing Finance: Missing the Mark* (2020). Online: <https://www.seforall.org/publications/energizing-finance-missing-the-mark-2020> Accessed 23 September 2021.

Energy procurement. Across its portfolio, UNDP is a significant purchaser of equipment for renewable energy production, efficiency measures and logistical operations. UNDP has demonstrated its ability to leverage its purchasing power in the health sector and other fields. Under its energy portfolio, however, the organization does not leverage this purchasing power to encourage cost-efficiencies or to promote private sector engagement in developing countries. Its Green Solutions team in Copenhagen is seen as a model of excellence for its seven-step approach to procuring solar equipment; however, this initiative is also dependent on grant funding and therefore not applied widely enough. The opportunities from UNDP procurement are recognized by internal and external staff but are not taken up in the new Sustainable Energy Hub model or the African Mini-Grids programme. A more systematic approach specifically on “green” procurement has not yet been considered.

BOX 6. Emerging initiatives for common intervention approaches in UNDP

The DREI toolkit (See chapter 4.6) is the oldest approach reviewed and the closest example of an initiative that could be built into a model that supports more country offices in providing consistent support to Governments. As described above, it requires more conceptual work for the post-analysis phase, but this could form the vision through which UNDP articulates how it will target components of the enabling environment and build a sequence of activities and projects that are staggered over a 10-year period.

The new GEF-funded African Mini-Grids Programme provides a regional umbrella structure to support 18 countries that are implementing national projects to increase energy access. The programme intends to provide dedicated knowledge-sharing and support anchored in activities of the umbrella programme to facilitate exchange. Internal stakeholders still see a risk that the individual projects will be developed, implemented and approved one by one. The project document and interviews suggest that the programme currently has limited flexibility for resource fungibility between countries, which may limit the ability to support projects that require longer implementation time.

Finally, the concept of the Sustainable Energy Hub attempts to provide thematic coherence and competence through a global structure. The hub team will be located regionally and is intended to cover different competencies with respect to financing energy investments. This is expected to leverage more funding for downstream implementation and thus has a higher probability of reaching the ambitious quantitative targets. As downstream financing is not necessarily seen by the country offices as their comparative strength, the support should be tailored to and expand existing capacity.

Although these initiatives offer new macro-level capacities for UNDP, few of these approaches are suited to ensuring continuous energy operations on the country office level. The examples of success in the UNDP portfolio suggest that this continuity to government energy planning can be provided only by experienced country office staff.

CONCLUSIONS, RECOMMENDATIONS AND MANAGEMENT RESPONSE

5.1 CONCLUSIONS

Conclusion 1. The multifaceted support provided by UNDP, covering energy access, promoting renewable energy and enhancing energy efficiency, offers important support for many national partners. UNDP has used its neutrality, impartiality and long-standing presence in countries to provide highly relevant implementation support towards achieving the targets of SDG 7.¹²⁵

Globally, the UNDP role and focus on sustainable energy are significant among international development partners, with broad country reach, coverage of a wide range of energy topics and linkages to national strategy settings on the SDGs. The long-standing UNDP presence in countries has helped to broaden and implement stakeholder commitment. UNDP has significantly helped countries to create enabling frameworks that are crucial for expanding sustainable access and transforming national energy systems. Its best results are seen where national leaders have recognized the urgency for action and possess the financial capacity to adopt and advance renewable energy and energy-efficiency actions.

UNDP has demonstrated that it can build and manage projects that convene multiple actors to advance new renewable energy technology and energy-efficiency initiatives. Yet its application of energy expertise from other providers has been inconsistent. Its past work in this sector underscores the need for a partnership model that can effectively coordinate and deliver more integrated packages of support to government partners.

Conclusion 2. UNDP provide a valuable contribution to the global effort of expanding access to energy. It operates in contexts where there are major hurdles for promoting sustainable energy services, and its initiatives need to navigate these and promote adoption and scaling.¹²⁶

UNDP support has helped countries launch electricity access programmes and expand the availability of clean cooking fuels and technologies. UNDP projects demonstrate that despite advancements, significant implementation challenges remain in developing countries, particularly in sub-Saharan Africa, with energy initiatives held back by the scale of improvements still needed in areas such as institutional capacity, financial services and private sector engagement. UNDP has combined upstream support and downstream projects to fill perceived gaps in government capacities, to prove or disprove innovations and to prepare the ground for future investments. However, UNDP has not consistently provided the guidance for making the most effective use of these strategies. UNDP higher-end access figures come from the number of people who use facilities and streetlights and the households that receive cookstoves. These areas have shown the greatest sustainability risks in the UNDP portfolio, often because projects overlook how the equipment supplied,

¹²⁵ Relates to findings 1, 3, 5, 7, 8, 9, 10, 11, 13.

¹²⁶ Relates to finding 5, 6, 7.

and its maintenance requirements, fit within institutional, household and community budgets. Similar challenges are found where UNDP is supporting new forms of power or technology for productive use, and stem from project designs that have limited assessment of user experience and monitoring processes that count basic metrics rather than qualitative experience.

Conclusion 3. UNDP programme time frames are often too short to achieve the intended level of progress and sustainability in the energy sector. Furthermore, the organization has not systematically developed a pipeline of follow-on downstream projects to implement its energy strategy.¹²⁷

UNDP has succeeded in developing projects that establish the vision and crucial steps for transformational change in the energy sector. In only a limited number of cases has it engaged early enough in the process to ensure that national actors have the means to continue these initiatives at the end of short-term project cycles. Underdeveloped sectors require a longer gestation than is typically funded through donor and vertical fund-supported projects. In few contexts has UNDP been able to articulate and then help implement longer-term strategies that include sequenced projects and bridging funds. The urgency of energy access and transitions, and the availability of private sector options for technical and financial support, suggest that taking a “business as usual” approach to project preparation will not be sufficient for UNDP and partner countries to achieve their SDG 7 targets.

Conclusion 4. UNDP energy programming tends to be insular, project based and country-specific, with missed opportunities for replication of best practices and innovative techniques. UNDP has not established the level of integration and knowledge management required to develop advanced integrated energy solutions to contextual challenges.¹²⁸

The UNDP country-specific approach increases country receptivity, but there is too much reliance on a small cadre of internal energy experts and not enough cross-referencing of solutions and project experiences elsewhere in the UNDP global programme portfolio or from outside UNDP. Across the portfolio, it is possible to see country offices promoting technologies, addressing contextual barriers and engaging the private sector in ways that could be improved by better information exchange and learning. The exception is strategic advice on energy efficiency provided by UNDP, which is well considered for utilizing widely applied global approaches – especially through the GEF project development requirements – and leveraging learning and experience. Still, the energy-efficiency offer draws on the experience of a relatively small number of country offices, which would need to be expanded and draw on the long-standing UNDP presence in countries to shorten project lead times, as well as broaden and sustain stakeholder commitment.

Conclusion 5. The UNDP energy offer has now the opportunity to strategically reposition its capacities for energy transition and sustainability measures to provide Governments with a consistent level of support commensurate with the national importance of energy policies that can be sustainable and pro-poor oriented.¹²⁹

Energy cuts across all economic sectors and involves sensitive policy decisions on investments, infrastructure, jobs and natural resources. UNDP energy support has been sector-focused, dependent on the expertise and relationships formed on a project basis and often limited by the narrow objectives of pilot projects. Since the development of the UNDP energy strategy in 2017, the urgency for transitioning away from fossil fuels has become obvious and more is known about the potential benefits and also the economic risks for many

¹²⁷ Relates to findings 8, 9, 13, 16.

¹²⁸ Relates to findings 5, 6, 8, 9, 13, 14, 16.

¹²⁹ Relates to findings 3, 4, 8, 9, 16.

developing countries in the global shift to a carbon-neutral future. The transition in certain economies will require significant levels of disinvestment, asset diversification, job replacement and livelihood support. It is also likely to raise national interest in other areas of energy policy such as land use for renewable production and the use of gas as a transitional fuel, which require context-sensitive planning to ensure that national needs are met in ways that still conform to international commitments.

Conclusion 6. UNDP has struggled to diversify its funding sources for energy support, remaining mostly GEF-funded, and current funding is far below what is needed to achieve set targets. The organization has not yet launched new and innovative funding models to address the persistent low levels of global ODA for SDG 7 and energy transformation.¹³⁰

UNDP achievements in securing GEF funding have vaulted the organization to a prominent position in energy support among United Nations agencies and encouraged greater consistency in management processes. However, this does not alleviate the need to diversify funding sources. In addition, the environmental focus of GEF funding that relates directly to the energy sector, especially focused on climate mitigation, has in some cases constrained UNDP from giving attention to human development concerns.

New funds leveraged during the past five years have often focused on energy access in crisis and recovery or on national capacity-building and institution-building activities, in several instances funded by the countries themselves. These projects have tended to address specific deficiencies in the energy sector and do not apply holistic integrated approaches. The new developments through SDG Bonds and other innovative financial models have not yet been applied to energy objectives. These have the potential to help diversify funding sources and address the persistent low levels of ODA for SDG 7.

Conclusion 7. Gender equality and women's empowerment are not sufficiently and adequately considered in UNDP energy work. Women are targeted to increase their access to energy. However, decision-making over household energy and budgeting has been mostly overlooked by UNDP, and women continue to face challenges in converting energy access into changes to their social and economic status.¹³¹

UNDP has supported gender parity in its energy initiatives, aiming for equal participation of men and women, but has not done enough to increase the number of projects designed to tackle gender issues connected to energy as the principal objective, or with significant contributions that could help to better address the differential needs of men and women. The greatest risk is the prevalent assumption that women would automatically benefit from energy access and are not subject to further discrimination in new technologies, business models or institutional positions that accompany renewable energy. A similar lack of attention is found in the design of initiatives that fail to consult with people with disabilities, a particular group left behind in energy matters.

¹³⁰ Relates to finding 15.

¹³¹ Relates to finding 11.

5.2 RECOMMENDATIONS AND MANAGEMENT RESPONSE

Recommendation 1



UNDP should detail its strategic and programmatic approach to energy in an action plan that clearly articulates how it will support national Governments to achieve their SDG 7 targets.¹³²

The plan should focus on ensuring that energy initiatives launched over the next eight years lead to sustainable results through national ownership, better connection between upstream advice and downstream opportunities and new models of consistent engagement with public and private entities. UNDP should retain its focus on context specificity but with greater guidance and instruments that allow country offices to: (1) design initiatives that systematically address the enablers and barriers to scaling up energy initiatives; and (2) build project pipelines that sequence these activities over the time frames in which energy sectors and markets typically reach readiness for the wider adoption of policies and technologies.

Areas that merit greater attention include: (1) the promotion of uptake models of energy technology and systems in geographic areas where the energy grid is unlikely to reach in the next three to five years; (2) the potential to leverage UNDP energy procurement; (3) mitigating the impact of climate change on renewable production and infrastructure; and (4) the UNDP position on and engagement with the digitalization of energy services. The action plan should clearly distinguish UNDP from other players, detailing its updated value proposition and subsequent partnership strategy. Additional staff with deep energy sector expertise and skills will be needed at regional and country levels.

Management response: **Accepted**



UNDP **fully accepts** the recommendation. The recently formed Sustainable Energy Hub (referred to as the “Energy Hub” in this management response) represents the systematic and programmatic approach of UNDP to respond to the energy and climate change agenda in programme countries. The Energy Hub is designed to harness networks, experience and innovation to help 500 million additional people gain access and transition to clean, reliable and affordable energy by 2030, and will prioritize actions in countries and regions with the highest levels of energy poverty. The Energy Hub will work with Governments in programme countries as they build forward better from COVID-19 and with investors, to unlock and harness public and private finance to power progress towards the Sustainable Development Goals. Specifically, it will help UNDP partners to do three things:

1. Close the gap on energy access so that marginalized people and communities gain access to sustainable, clean energy and the dignity and opportunities it brings;
2. Drive innovation in energy value chains to speed up investments in energy access in off-grid and fragile contexts. This includes the development and deployment of alternative business models to support off-grid solutions;
3. Accelerate an energy transition from fossil fuels through system changes that support a green recovery and bring together the best ideas from the worlds of government, business and finance.

¹³² Relates to conclusions 1, 2, 4, 5.

◀ Recommendation 1 (cont'd)

With energy being one of the six signature solutions of the Strategic Plan, the Energy Hub will leverage the organization’s diverse portfolio of clean, affordable energy initiatives in over 100 countries to scale up support to programme countries on Sustainable Development Goal 7 – affordable and clean energy – in this decade of action. UNDP will work in partnership including within UN-Energy, to deploy its own operational capacity including on energy procurement as well as strengthened fiduciary oversight systems. A clear link will be made to help advance green procurement, to ensure that projects are implemented with the lowest environmental impact and support significant socioeconomic gains in countries.

Key action(s)	Time frame	Responsible unit(s)	Tracking	
			Comments	Status
1.1 Develop global strategy and action plan for the UNDP Sustainable Energy Hub	December 2021	Bureau for Policy and Programme Support Regional bureaux		
1.2 Develop partnership and engagement strategy for the Sustainable Energy Hub	March 2022	Bureau for Policy and Programme Support Regional bureaux		
1.3 Design and deploy new business models and partnerships in the deployment of clean energy in off-grid contexts	December 2025	Country offices with support from the Bureau for Policy and Programme Support		
1.4 Integrate sustainable procurement practices during project design and implementation by: (a) promoting the uptake models of energy technology and systems in geographic areas where the energy grid is unlikely to reach in the next three to five years; (b) leveraging of UNDP energy procurement; and (c) expanding and clarifying with guidance the approaches to mitigate the impact of climate change on renewable production	December 2025	Bureau for Policy and Programme Support Bureau for Management Services		

Recommendation 2



UNDP should update its value proposition on access to energy and transition to low-carbon technologies, expanding its role as a convenor and delivery agent for complex energy project initiatives that incubate innovations and put in place sustainable pro-poor energy policies.¹³³

UNDP should systematically identify underdeveloped contexts and countries that would benefit from its capacity as a facilitator, working across government, development partners, private sector and subnational entities. In framing this facilitator role, UNDP should support Governments to create plans for long-term barrier removal, investment and capacity development, aiming for far-reaching energy sector transformations. It should encourage “leap frogging” to more advanced access and efficiency measures, improvement to and delivery of the nationally determined contributions and helping Governments to access and translate appropriate sources of funding into downstream projects.

UNDP should focus greater attention on its work of advising on policy development, especially the economic policies that affect the cost and marketability of renewables and the assessment and regulations that ensure the farthest behind groups benefit from increased energy investments. To do so, UNDP should consider developing the post-analysis de-risking tools itself or form closer partnerships with organizations that offer these mechanisms (See also recommendation 7).

Management response: **Accepted**



UNDP **fully accepts** the recommendation. UNDP support to countries via the Sustainable Energy Hub will focus on all countries but especially those that are furthest behind on energy access. UNDP will be working with key partners in UN-Energy as well as new partnerships with multilateral development banks, international financial institutions (African Development Bank, World Bank), global funds (GCF, GEF), the private sector, foundations (Rockefeller Foundation) and others to strengthen local capacities to respond to urgent energy access needs.

Key action(s)	Time frame	Responsible unit(s)	Tracking	
			Comments	Status
2.1 Map energy access gaps at local/community level through the collection of geospatial and ground-level data in partnership with leading technology providers and other stakeholders (e.g., international agencies, utility companies, financial institutions, philanthropy, et. al)	December 2022	Bureau for Policy and Programme Support, in coordination with regional bureaux and country offices		

¹³³ Relates to conclusions 1, 5.

◀ Recommendation 2 (cont'd)

Key action(s)	Time frame	Responsible unit(s)	Tracking	
			Comments	Status
2.2 Build government capacities to collect and analyse data to expand provision of access and reach the last mile in at least 30 least developed countries, small island developing States and other developing countries	December 2025	Country offices with support from the Bureau for Policy and Programme Support		
2.3 De-risk use of smaller-scale, off-grid energy solutions to scale up access to more remote/rural communities e.g., through the provision of quality standards for sustainable off-grid solutions (Distributed Renewable Energy Certificate, first loss capital investments, insurance and other policy de-risking tools and mechanisms) in at least 30 least developed countries, small island developing States and other programme countries	December 2025	Bureau for Policy and Programme Support, in coordination with country offices		
2.4 Work with key partners in UN-Energy and with multilateral development banks, international financial institutions (African Development Bank, World Bank), global funds (GCF, GEF), the private sector, foundations (Rockefeller Foundation) and others to strengthen local capacities to respond to urgent energy access needs	December 2025	Bureau for Policy and Programme Support		

Recommendation 3



UNDP energy access initiatives should contain formal design components that respond to the user and local experiences of energy initiatives, and UNDP should monitor how its energy services lead to sustainable and pro-poor benefits.¹³⁴

The UNDP commitment to increase access to clean and affordable energy for 500 million people is bold and provocative. Its attainment will require practical steps, focused on technology preference, cost and payment models, local value chains, productive usage and ownership and maintenance models. In developing this design component, UNDP should incorporate the perspectives of households, local businesses, facilities and subnational entities, which are key to the success and sustainability of energy initiatives. The assessment should lead to improved energy delivery, which should be monitored over the course of the project and beyond with a tool to capture the user experience and key indications of service quality. Improving the energy service and development benefits should build on impact assessments where UNDP projects have provided a more comprehensive energy service.

Management response: **Accepted**



UNDP **fully accepts** the recommendation. The UNDP commitment to increase access to clean and affordable energy for 500 million people will rely on strengthened and expanded partnerships across public and private sectors, including international development organizations and financial institutions, philanthropy and other key stakeholders. Support to countries via the Sustainable Energy Hub will include a digital platform that will enable near real-time monitoring of energy delivery and track the quality of service, as well as broader linked sustainable development impacts on areas such as access to health and education.

Key action(s)	Time frame	Responsible unit(s)	Tracking	
			Comments	Status
3.1 Deploy data and digital planning tools to identify productive use opportunities at the subnational and local levels (including village scale)	December 2023	Bureau for Policy and Programme Support in coordination with country offices		
3.2 Identify and deploy mechanisms for stimulating micro, small and medium-sized enterprises in the distributed/off-grid renewable energy space and across the energy value-chain (e.g., to support cold storage or the agriculture, food and water sectors)	December 2023	Bureau for Policy and Programme Support in coordination with country offices		

¹³⁴ Relates to Conclusions 2, 4 and 7.

◀ Recommendation 3 (cont'd)

Key action(s)	Time frame	Responsible unit(s)	Tracking	
			Comments	Status
3.3 Deploy digital platform to capture provision of energy delivery and impacts	December 2025	Bureau for Policy and Programme Support in coordination with country offices		

Recommendation 4



UNDP should establish itself as a global thought leader in sustainable pro-poor energy and transition approaches, adopting a step change in ambition and targeting support to the least developed and middle-income economies that are highly exposed to a global transition to low-carbon energy.¹³⁵

UNDP should strengthen its advisory role to Governments with guidance to encourage faster uptake of clean energy and abandonment of unclean sources, based on a national vulnerability rationale as much as a climate change or energy capacity contribution. For that, UNDP energy strategy support to countries will need a broad lens that considers the wider economy, including energy switches within key sectors, job creation/replacement needs, the potential effects on particularly vulnerable groups, and the risk to and from vested interests. This role should draw on the strengths of UNDP in governance and poverty reduction in combination with its energy expertise.

Given the top-down nature of global energy policy and investment decisions, UNDP with its on-the-ground experience should have an important role to play in driving appropriate responses to the complex energy transitions now at hand. UNDP should build on its in-country knowledge to ensure the perspectives of the poorest and farthest behind groups are factored into global and national transition agendas. This requires investment in bottom-up knowledge generation.

Management response: Accepted



UNDP **fully accepts** the recommendation. UNDP will leverage its expertise and on-the-ground knowledge to support Governments with a holistic view of policy options and frameworks to help guide a clean, inclusive energy transition and quantify the benefits and impacts. This includes understanding the distributional impacts of policy reforms, including those related to fossil-fuel subsidies and carbon pricing; options to limit adverse impacts on vulnerable groups; and support to develop a well-communicated and coordinated policy implementation with evidenced-based advocacy and outreach.

¹³⁵ Relates to conclusion 5.

◀ Recommendation 4 (cont'd)

Key action(s)	Time frame	Responsible unit(s)	Tracking	
			Comments	Status
4.1 Roll-out of guide on fossil fuel reform and carbon pricing	December 2022	Bureau for Policy and Programme Support		
4.2 Conduct ongoing trainings and advocacy to build government capacities to implement reforms and overcome public/political barriers	December 2025	Bureau for Policy and Programme Support Country offices		
4.3 Support development of country-level communications and outreach initiatives and platforms	December 2025	Bureau for Policy and Programme Support Bureau for External Relations and Advocacy		

Recommendation 5



UNDP should review its approaches to supporting energy access in crisis and fragile settings and develop formal principles and guidelines for addressing immediate energy needs within a more comprehensive plan for recovery and green transition.¹³⁶

UNDP should design a specific action plan on how it supports energy interventions before, during and after any crisis response, and wherever possible aim to ensure that interventions expand local capacities for adopting and governing cleaner sources of energy. It should build on the experience of countries and bureaux that operate in these contexts and incorporate wider research and deep case studies of national/transnational energy contexts. The objective should be to increase the application of more advanced intervention approaches at the country level while retaining flexibility to respond to contextual differences.

In developing this action plan, UNDP should consider: (1) supporting governance models for energy initiatives and natural resource management; (2) the potential for supporting local supply chains through energy procurement and capacity-building; and (3) models for expanding the focus on renewables and efficiency measures during power plant rehabilitations.

¹³⁶ Relates to conclusions 4, 5.

Management response: Accepted



UNDP **fully accepts** the recommendation. UNDP will leverage its expertise and experience in conflict and fragile settings to ensure that its support through the Sustainable Energy Hub is context-specific and interventions are adequately and appropriately sequenced and layered with wider development and humanitarian response efforts.

Key action(s)	Time frame	Responsible unit(s)	Tracking	
			Comments	Status
5.1 Develop an action plan to close the energy access gap in fragile and crisis contexts	December 2022	Bureau for Policy and Programme Support and Crisis Bureau, in coordination with regional bureaux and country offices		
5.2 Support Governments with developing national road maps for energy access and transition aligned to recovery efforts, including embedding energy access and transition into post-disaster needs assessments	December 2025	Country Offices with support from Bureau for Policy and Programme Support		
5.3 Identify and publish examples/case studies of best practice and lessons learned in poor and crisis affected communities (e.g., decentralized solar solutions in Yemen and Sudan; energy for crisis recovery in Lebanon; energy transition in major oil exporting and fragile States)	December 2025	Country offices Regional bureaux Bureau for Policy and Programme Support		
5.4 Develop/update operational guidelines and lessons learned for managing energy challenges in conflict or fragile settings	December 2025	Bureau for Policy and Programme Support Crisis Bureau		

Recommendation 6



UNDP should promote a greater integration of gender considerations and more targeted gender guidance for its energy programming, and move away from the assumption that women will automatically benefit if they are simply included in energy initiatives.¹³⁷

The focus should move beyond the pursuit of gender parity and greater participation to a next echelon of programming that addresses the social norms preventing women from fully and equally benefiting from improved energy outcomes. UNDP should work towards converting energy access into real changes to women's economic status, by adequately considering and to the extent possible, addressing the associated social norms and impediments that limit women's livelihoods and financial control and prevent them from taking full advantage of the opportunities offered by improved access to safe and clean energy.

Although very different intervention strategies are required to support men and women of different ages and abilities, living in different settings, UNDP should increase the level of consultation with users and ensure they are conducted by specialists with an understanding of gender aspects. This will require guidance on the minimum steps needed in each project formulation and implementation, to recognize the perspectives of men and women and provide prompts to overcome resistance and counter false assumptions that people automatically benefit from their involvement in an energy project or within a facility that has improved electrical supply.

Management response: **Accepted**



UNDP **fully accepts** the recommendation. UNDP has incorporated gender as a KPI for the Sustainable Energy Hub, both in terms of its own capacities, but also support to women-headed households and micro-, small and medium-sized enterprises; the access women and girls have to education, skills development and jobs in the clean energy sector; and the wider development impacts that come with the provision of clean energy, most notably in the provision of clean cooking solutions.

Key action(s)	Time frame	Responsible unit(s)	Tracking	
			Comments	Status
6.1 Develop guidance to support integration of gender-specific considerations and targets in energy project formulation and national energy plans/strategies	December 2023	Bureau for Policy and Programme Support, with inputs from country offices		

¹³⁷ Relates to conclusion 7.

◀ Recommendation 6 (cont'd)

Key action(s)	Time frame	Responsible unit(s)	Tracking	
			Comments	Status
6.2 Conduct in partnership with internal and external gender experts, country-level consultations and capacity-building exercises to ensure greater understanding of gender aspects in energy programming	December 2025	Bureau for Policy and Programme Support, in coordination with regional bureaux and country offices		
6.3 Include gender-specific data points in the UNDP Data Futures platform to track links between energy access and improved safety and economic opportunities	December 2025	Bureau for Policy and Programme Support, in coordination with regional bureaux and country offices		
6.4 Ensure that gender is considered in integrated way on gender across all projects deployed and supported under the Sustainable Energy Hub	December 2025	Bureau for Policy and Programme Support		

Recommendation 7



UNDP should map where energy investments are needed, by region, to develop a holistic strategy of support to match the most appropriate funding model and resource mobilization strategy for the context.¹³⁸

UNDP should identify opportunities where Governments are open to new financing modalities for energy access and transformation, and seek to expand engagement with international, regional and national financial institutions to help these countries achieve their aims. UNDP, together with the IFIs, should classify contexts on a scale of readiness for investment and set out where and how it can help lay the governance foundations for greater investment. In this role, UNDP should emphasize poverty, productive use and equal access to energy to ensure that successful investments do not deepen inequality. Where investment finance is not feasible, UNDP should work to expand funding options through other channels, such as the vertical funds, other donors and its SDG Bonds.

¹³⁸ Relates to conclusions 1,2, 3, 4, 5, 6.

Management response: Accepted 

UNDP **fully accepts** the recommendation. The strategy under the Sustainable Energy Hub will be to work with countries' integrated national financing frameworks and nationally determined contributions as part of a "holistic strategy of support". The solution put forward by UNDP is to promote investment in clean energy by supporting countries to access abundant, low-cost commercial capital through policy de-risking. Financial resources for clean energy are limited, while the investment needs are enormous. These public resources need to catalyse far larger private financial flows if there is to be a widespread adoption of clean energy. Recognizing that transparent, clear and long-term targets, policies and regulations are key for private sector investment, and building on its expertise, partnerships and on-the-ground network, UNDP focuses on policy de-risking to support Governments to design, implement and enforce policies and regulations. UNDP also works with financial and national partners on complementary financial de-risking and financial incentives to achieve the most cost-efficient overall approach to attracting investment.

Key action(s)	Time frame	Responsible unit(s)	Tracking	
			Comments	Status
7.1 Develop, package and upgrade a series of standardized instruments for post-analysis de-risking work	December 2025	Bureau for Policy and Programme Support		
7.2 Build a pipeline of investment-ready projects in collaboration with key financial institutional partners	December 2025	Country offices with support from Bureau for Policy and Programme Support		
7.3 Launch an "Energy Access Innovation Challenge" to contribute to the roll-out of new business models for distributed renewable energy solutions	December 2022	Bureau for Policy and Programme Support, Regional bureaux		

ANNEXES

Annexes to the report (listed below) are available on the website of the IEO at:
<https://erc.undp.org/evaluation/evaluations/detail/13379>

Annex 1. Terms of reference

Annex 2. People consulted

Annex 3. Documents consulted

Annex 4. Initial theory of change

Annex 5. Data compilation

Annex 6. Technologies deployed under UNDP energy access projects

Annex 7. Further analysis of the renewable energy results and factors of project performance

Annex 8. Further analysis of the energy-efficiency results and factors of project performance

Annex 9. Country responses to energy in sampled projects



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