

THE ENERGY TRANSITION IN AFRICA

OPPORTUNITIES FOR INTERNATIONAL
COLLABORATION WITH A FOCUS ON THE G7



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About IRENA

The International Renewable Energy Agency (IRENA) is an intergovernmental organisation that supports countries in their transition to a sustainable energy future, and serves as the principal platform for international co-operation, a centre of excellence, and a repository of policy, technology, resource and financial knowledge on renewable energy. IRENA promotes the widespread adoption and sustainable use of all forms of renewable energy, including bioenergy, geothermal, hydropower, ocean, solar and wind energy in the pursuit of sustainable development, energy access, energy security and low-carbon economic growth and prosperity. www.irena.org

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FOREWORD

Africa stands at a crucial crossroads in its developmental trajectory, and energy plays a pivotal role in shaping its future. Despite having abundant renewable resources, the continent faces a significant energy access deficit. Insufficient investment compounds this issue, with the continent receiving less than 2% of global investments in renewables over the last two decades.

The Nairobi Declaration on Climate Change and Call to Action recognises that Africa has the fundamentals to spearhead a climate compatible pathway as a cost-competitive industrial hub. Renewable energy is an essential part of this vision, and the Nairobi Declaration calls for an increase of renewable capacity from 56 GW in 2022 to 300 GW by 2030, aligning with COP28's tripling renewable energy and doubling efficiency goals.

The recommendations presented in this report are based on IRENA's long-standing partnership with African countries and on the knowledge the Agency has produced for the continent. These aim to support the efforts of G7 leaders to build on existing African-led initiatives to mobilise the necessary finance for infrastructure and ensure local ownership and value creation in the energy transition in Africa.

G7 countries have the opportunity to play a leading role in driving the deployment of renewables across the continent through collaborative initiatives such as the Accelerated Partnership for Renewables in Africa (APRA), IRENA remains committed to working with its Members and G7 leaders to support such engagement, with a view to ensuring a fair, sustainable and secure energy transition in Africa.

I am grateful to the Italian G7 Presidency for its support; IRENA remains committed to assisting the members of the Agency and the G7 in developing action plans to support the implementation and deployment of renewables across Africa.



Francesco La Camera

Director-General
International Renewable
Energy Agency

A handwritten signature in blue ink, appearing to read 'Francesco La Camera'.

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ABBREVIATIONS

AfDB	African Development Bank	G20	Group of 20
AfSEM	African Single Electricity Market	G7	Group of Seven
APRA	Accelerated Partnership for Renewables in Africa	GDP	gross domestic product
AREI	Africa Renewable Energy Initiative	GW	gigawatt
ASM	artisanal and small-scale mining	IDA	International Development Association
AU	African Union	IFC	International Finance Corporation
AUC	African Union Commission	IPP	independent power producer
AUDA-NEPAD	African Union Development Agency-New Partnership for Africa's Development	IAEA	International Atomic Energy Agency
CBDR	Common But Differentiated Responsibilities	IRENA	International Renewable Energy Agency
CCS	carbon capture and storage	JETP	Just Energy Transition Partnership
CIP	Climate Investment Platform	LDC	least-developed country
CMP	Continental Power Systems Masterplan	MDB	multilateral development bank
COP28	2023 United Nations Climate Change Conference	MW	megawatt
DFI	development finance institution	NDC	Nationally Determined Contribution
ETAF	Energy Transition Accelerator Financing Platform	PII	Partnership for Infrastructure and Investment
EV	electric vehicle	PPF	Project Preparation Facility
FIT	feed-in tariff	PV	photovoltaic
		SDG	Sustainable Development Goal
		SEFA	Sustainable Energy Fund for Africa
		USD	United States dollar
		WACC	weighted average cost of capital

1. BACKGROUND AND OBJECTIVES OF THIS REPORT

At the inaugural Africa Climate Summit in Nairobi, Kenya, in 2023, African heads of state and government clearly re-emphasised the economic development priorities outlined in Agenda 2063, the continent's strategic framework to deliver on its goal for inclusive and sustainable development. The summit produced the African Leaders Nairobi Declaration on Climate Change and Call to Action ("Nairobi Declaration"), which is now the basis for Africa's common position on the global climate change process.

The Nairobi Declaration stresses the importance of climate-positive growth, green industrialisation and local value creation (African Union, 2023). The declaration also acknowledges that the energy transition will be unique in Africa, as the circumstances in which it will take place are singular: for example, some 570 million people in sub-Saharan Africa still lack access to electricity and almost 960 million lack access to clean cooking (IEA *et al.*, 2023). The energy consumption of the African population remains low, at one-third of the global average. Less than seven years remain to achieve the United Nations Sustainable Development Goals (SDGs) of the 2030 Agenda, which are meant to address these critical basic needs.

Given the short timelines at play, leaders at the African Climate Summit have also strongly underlined that the deployment of renewable energy at a fast pace will play a major role in Africa's capacity to simultaneously address the continent's multiple economic, societal and climate objectives. To this end, the declaration calls on the international community to support its goal to increase Africa's renewable generation capacity from 56 gigawatts (GW) in 2022 to at least 300 GW by 2030 – an even more ambitious goal than the global pledge to triple renewable energy capacity agreed upon at the 2023 United Nations Climate Change Conference (COP28) – both to address energy poverty and increase the supply of cost-effective clean energy for industry.

The Group of Seven (G7) can be pivotal in leading the international community in support of the Nairobi Declaration. The Italian G7 presidency has requested the International Renewable Energy Agency's (IRENA's) support in delineating priority areas for the G7-Africa partnership, reflecting the following overarching goals:

- **Ensure any actions are in harmony with the region's goals** – as outlined in Agenda 2063, the African Union's (AU's) climate strategy, and the Nairobi Declaration on Climate Change and Call to Action – this will be critical to maintain fairness as a central tenet of any support.
- **Build on existing initiatives** – acknowledging, and learning from, the work that has already been done to drive the energy transition in Africa will be key to avoid duplication.

- **Highlight the importance of finance** – IRENA finds that the flow of public money into the African energy sector has declined, and necessary conditions for low-cost finance are not in place – this must be reversed.
- **Ensure local ownership and value creation** – actions must support countries to develop their own infrastructure, green industries, enabling policies and institutional capacity.

IRENA is well-positioned to support the G7 in this task, as 45 African countries are ratifying Members of IRENA. Furthermore, the agency provides support across priorities such as continental, regional and country energy plans; renewable energy integration; financing; socio-economic footprint; regulatory frameworks and policy formulation; and project facilitation. Across all of these workstreams, there is a strong focus on maximising socio-economic benefits for the countries that implement transition policies.

IRENA has a long-established footprint in Africa that includes the launch of clean energy corridors in 2012. Since then, the suite of IRENA's activities has expanded, as has the imperative to tailor support to meet the needs on the ground.

This report draws on IRENA's long-standing partnership with African countries and on the knowledge produced for the continent. This includes IRENA's work related to:

- the development of the Continental Power Systems Masterplan (CMP)
- analytical work done for the continent, most notably IRENA and African Development Bank's (AfDB's) *Renewable Energy Market Analysis: Africa and its Regions*, and Regional Energy Transitions Outlooks, currently being produced with the support of the European Commission
- support for African countries' Nationally Determined Contributions (NDCs) within the United Nations Framework Convention on Climate Change (UNFCCC) process
- the IRENA Energy Transition Accelerator Financing Platform (ETAFA)
- the Accelerated Partnership for Renewables in Africa (APRA) (see Box 1)

This report builds on the work of G7 countries to date in Africa. Initiatives such as the Just Energy Transition Partnership (JETP), for example, aim to facilitate the transition of emerging economies from fossil fuels to lower-emission technologies, offering financial support in the process. Furthermore, the G7 has launched the G7 Partnership for Infrastructure and Investment (PII) with the goal of narrowing the infrastructure investment gap in developing countries, emphasising the need to expand clean energy investment to address climate change. However, persistent challenges in the disbursement of funds and the form of financing highlight the complexity of financing mechanisms and the need for carefully crafted action plans to ensure the effective utilisation of investment. The G7's historical engagements with Africa, including promises of financial support for initiatives like the Africa Renewable Energy Initiative (AREI), underscore the importance of sustained commitment and effective implementation to support Africa's transition to renewable energy.

Box 1 The Accelerated Partnership for Renewables in Africa

Energy pathways emphasising a systemic transition to renewable energy hold significant potential for the continent as they drive industrialisation, socio-economic advancement and alignment with national climate goals fostering resilient and inclusive economies and societies. African countries launched the Accelerated Partnership for Renewables in Africa (APRA) in 2023, which is designed to help realise the vision embedded in the Nairobi Declaration on Climate Change and Call to Action.

APRA has a dual purpose: to provide vision and political leadership at the highest level and to accelerate implementation in respective countries. The partnership has identified three key areas: mobilising finance, building capacity and technical assistance, and engaging the private sector.

The anticipated outcome of APRA is a multifaceted transformation that prioritises renewable energy as a cornerstone of social, economic and climate strategies and plans across the continent. At present, APRA members comprise Ethiopia, Ghana, Kenya, Namibia, Rwanda, Sierra Leone and Zimbabwe, with Denmark, Germany, the United Arab Emirates and the United States supporting the partnership and IRENA acting as secretariat. It is envisaged that APRA will expand in the coming months and years to engage more partners and countries with high ambition on renewable energy.

APRA implementation is rooted in coherent and holistic country plans that guide efficient and aligned international co-operation, in line with national priorities. In 2024, while expanding its membership, APRA will also focus on the development of country plans and the execution of key activities such as the Investment Forum under the patronage of President William Ruto of Kenya.

Country consultations with the participation of APRA partners have already been held in Kenya, Namibia, Rwanda, Sierra Leone and Zimbabwe to define priority action areas and develop implementation plans. APRA National Plans for Kenya, Namibia and Sierra Leone are under development.

Building on the pillars of existing goals identified by African leaders and existing work between the G7 and African institutions, this report aims to identify areas of collaboration between the G7 and Africa, particularly on the themes of:

- increasing investments and enabling access to finance;
- expanding energy access and supporting the productive use of energy;
- managing critical minerals effectively; and
- strengthening institutional frameworks and capacity.

The G7 has enormous potential to support the areas above, and in so doing to accelerate the pace at which Africa can meet the energy transition targets its nations have set for themselves. Before addressing these themes directly and providing recommendations, the current context of the energy transition in Africa is outlined in the following chapter.

2. THE ENERGY TRANSITION IN AFRICA: OPPORTUNITIES AND CHALLENGES

2.1 Drivers and opportunities for the energy transition in Africa

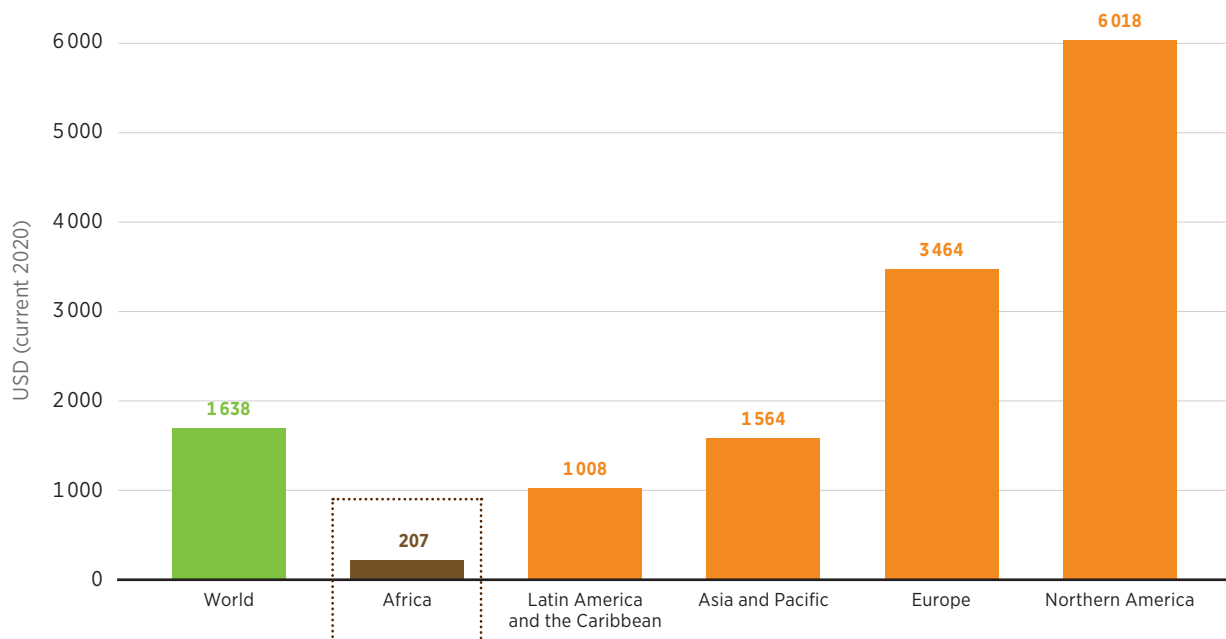
Africa is the world's second-largest continent, spanning 54 countries and boasting an estimated population of over 1.2 billion (World Bank, 2023). The populations in many African nations are among the youngest globally and are expected to experience the fastest increase in the working age population of all regions, with a projected net increase of 740 million people by 2050 (World Bank, 2023). The continent's energy demand is expected to increase tremendously over the next decades as a result of the combined impact of population growth, increased energy access, rising living standards, and industrialisation. Making sure future energy demand is met by sustainable, renewable energy represents a major socio-economic opportunity via reduced costs of fossil fuel imports, avoided pollution and improved public health, green industrialisation value chain development, and job creation.

Abundance of renewable energy sources and strategic mineral resources

Africa is endowed with abundant potential for bioenergy, geothermal, hydropower, ocean, solar and wind energy that is 1000 times larger than projected demand for electricity in 2040 (IRENA and AfDB, 2022). These sources are well distributed, positioning the entire continent to benefit from the energy transition.

Moreover, Africa is well endowed with many of the minerals – including manganese, copper, lithium, cobalt, chromium and platinum – that are essential inputs for renewable energy and low-carbon technologies like electric batteries and wind turbines. Growth in the market for these essential energy transition components holds great potential to benefit African producers – and African populations – if producing countries manage the move away from raw material export to in-country high-value production chains and recycle revenues to invest in clean energy infrastructure and energy access. Currently, Africa has the lowest manufacturing value-added per capita of any world region (Figure 1), but investing in manufacturing value-added for green industries could help raw material producers to raise that rate substantially.



Figure 1 Manufacturing value-added per capita, by world region, 2020

Source: (IRENA *et al.*, 2022).

Note: USD = United States dollar.

The energy transition will be a main driver of demand for several critical materials, many of which are abundant across the African continent. Notably, lithium, widely used in electric vehicle (EV) batteries, is plentiful in countries including the Democratic Republic of Congo (DR Congo), Ghana, Mali, Namibia and Zimbabwe. Together, these nations hold approximately 5 million tonnes of lithium resources, nearly 30 times more than the global lithium production in 2023 (USGS, 2024). Moreover, the African continent hosts nearly 25% of the world's natural graphite reserves, over 35% of global manganese reserves, 50% of global cobalt reserves and 75% of phosphate rock reserves (USGS, 2024).

The expected surge in mineral resource demand due to the energy transition presents an opportunity for attracting new investment flows. If managed effectively, these new resource revenues could spur long-term economic benefits, green job creation and sustainable local development. Critical to materialising the benefits associated with these resources is not just to increase exports of raw materials, but also to move up the value chain and attract higher-margin activities such as mineral processing. Processed materials are associated with premium prices compared to unrefined ores, reflecting the value added during refinement (IRENA, 2023a). In addition, transition-related minerals should be subject to higher ambitions for environmental and social safeguards than has been the case in the past, and should be actively used to generate revenues to build sustainable infrastructure and support socio-economic development. Achieving this goal is critically linked to greater social and environmental standards applied by both home governments and (foreign) businesses operating in this field.

Opportunity of socio-economic benefits including job creation

Green industrialisation and overall economic development as part of the energy transition in Africa have the opportunity to create millions of jobs on the continent. A modelling exercise of the energy transition conducted in 2022 found that IRENA's energy transition scenario, the 1.5°C Pathway, would create 26 million more jobs economy-wide in Africa by 2050 than under a business-as-usual approach, significantly outweighing fossil-fuel job losses in the industry (IRENA, 2023b). Renewables jobs alone would top 8.1 million by that time, up from less than 1 million in 2020, and energy transition-related fields would employ close to 17 million people. Energy-efficiency investments have particular potential to create more than 5.2 million jobs in Africa between 2019 and 2030 alone (IRENA *et al.*, 2022).

Renewable energy also has the potential to create a wide range of jobs along the value and supply chains. These jobs range from procurement and manufacturing to sales and distribution, installation and connection, operation and maintenance, and decommissioning. Jobs will also be created in the upstream side of the supply chain for transition minerals and materials, as well as in essential support services such as administrative services, education, financing, policy making, research and development, and transport (IRENA, 2017a, 2017b, 2017c, 2018, 2021).

With the right policies in place, renewable energy can contribute significantly to economic development and diversification, building on and incentivising the development and expansion of existing infrastructure, skills and local strengths (IRENA, 2023b; IRENA Coalition for Action, 2023). This also includes women: worldwide, the solar photovoltaic (PV) industry already employs almost twice as many women as the oil and gas sector (IRENA, 2019, 2022). The expansion of renewable energy in Africa also has great potential to help create more jobs for women across its value chain (IRENA *et al.*, 2022).

Energy access challenges

Sub-Saharan Africa is home to 570 million people who still lacked access to electricity in 2021 (IEA *et al.*, 2023). Access rates in 23 African countries is below 50%, and almost 960 million people continued to cook with only basic stoves and traditional fuels in 2020 (IEA *et al.*, 2023). This makes Africa home to the world's largest population without universal access to modern energy.

Beyond basic access, the affordability and reliability of the electricity supply and higher-quality fuels are major issues throughout the continent. This comes at a significant socio-economic and public health cost, hindering the development of productive economic activities and industries and the delivery of crucial public services, including education and healthcare, while contributing to respiratory disease (WHO, 2023a, 2023b: 23). Historically, even fossil-fuel exporting countries in the region continued to see large energy access deficits, particularly in rural areas. The success of the energy transition in sub-Saharan Africa will thus be closely tied to the way modern energy systems can be made more inclusive, serving those communities, farms and public facilities that are most likely to be left behind.

Limited energy access coupled with unreliable and unaffordable energy supply impede communities' ability to ensure sustainable livelihoods, build climate resilience and access critical social services. This is mainly triggered by the lack of appropriate and affordable finance for livelihoods and value-addition activities affecting poor smallholder farmers, farmer organisations and small businesses among the last-mile population. Agriculture plays an important role in this regard, as it currently generates the most jobs in Africa, accounting for nearly half of total employment (IRENA and AfDB, 2022).

Access to social services like healthcare is also severely affected due to the lack of a reliable energy supply. This is evident from the latest statistics that show more than 1 billion people rely on healthcare facilities without a reliable electricity source, with 15% of the facilities in Africa having no power connection (IRENA, 2023d).

Commitments to the energy transition

The continent has plans and initiatives for the energy transition already in place, with many countries well on their way to embracing renewables as an enabler for a more sustainable energy system that can deliver universal access and sustainable economic development. Table 1 gives an overview of some key existing initiatives that African institutions have agreed on and are in the process of implementing. Most recently, as noted in the introduction to this report, the Nairobi Declaration was also endorsed by African leaders, and calls have been made for the international community to contribute to the concrete goal of boosting Africa's renewable capacity from 56 GW in 2022 to 300 GW by 2030 – an even more ambitious goal than the global COP28 pledge to triple renewable energy capacity.



Table 1 Key African initiatives for energy transition

Agenda 2063
<p>Agenda 2063 is the AU’s development blueprint to achieve inclusive and sustainable socio-economic development over a 50-year period. Development of world-class infrastructure, including sustainable energy infrastructure and renewable energy, is one of the central goals outlined in Agenda 2063. Two major initiatives were recently endorsed as flagship projects of Agenda 2063 to deliver on this goal (AUDA-NEPAD, 2024):</p>
African Single Electricity Market (AfSEM)
<p>AfSEM aims to establish a comprehensive marketplace for electricity throughout Africa, interconnecting various power pools to facilitate easier electricity trade between countries. This initiative aims to increase energy security, reduce electricity prices and enhance accessibility through the development of market structure.</p>
Continental Power Systems Masterplan (CMP)
<p>The CMP aims to provide a strategic roadmap for the long-term, continent-wide interconnection of Africa’s physical energy infrastructure. The CMP encompasses a wide range of initiatives, including a first phase of capacity building for long-term energy planning and modelling within African institutions and the eventual development of a pipeline of energy infrastructure projects that are attractive to investors and focus on interconnectors and power plants of transnational importance. It is implemented by the African Union Development Agency- New Partnership for Africa’s Development (AUDA-NEPAD) and supported by various partners, including the European Union, Power Africa, GIZ and IRENA.</p>
African Union Climate Change and Resilient Development Strategy and Action Plan
<p>This plan represents the foundation for the continent’s joint climate action in the ten-year period between 2022-2032, adopted by AU heads of state and government (African Union and United Nations Economic Commission for Africa, 2022). The strategy supports the realisation of the Agenda 2063 vision by setting out principles, priorities and action areas for enhanced climate co-operation and long-term, climate-resilient development. In terms of energy, the strategy defines “enhancing climate-resilient and low carbon energy and infrastructural systems” and “enhancing access to renewable energy” as strategic intervention areas.</p>
Nairobi Declaration on Climate Change and Call to Action
<p>Adopted at the inaugural Africa Climate Summit in September 2023, the declaration solidified Africa’s common position in COP28 and beyond (African Union, 2023). It calls for actions to decarbonise the global economy while urging the international community to contribute to realising the continental vision of economic transformation in harmony with climate needs, including increasing Africa’s renewable generation capacity from 56 GW in 2022 to at least 300 GW by 2030.</p>
African Development Bank’s High 5s initiative
<p>This initiative represents the AfDB’s five priority areas to scale up investment to enable the continent to meet the SDGs and the UNFCCC Paris Agreement (African Development Bank, 2024). One of the five priority areas is “Light Up and Power Africa – A New Deal on Energy for Africa”, which aims to provide universal access to electricity, with a strong focus on encouraging clean and renewable energy solutions.</p>

On a country level, many national governments in Africa have energy sector (or power sector) master plans that guide long-term energy policies and also serve as a guide for short-term investment plans in the sector. While these master plans may not always be effectively co-ordinated with national climate planning, many African governments also formulate and submit Nationally Determined Contributions (NDCs) within the UNFCCC process. NDCs provide a framework for countries to articulate their climate action goals, balancing national aspirations with the availability of enabling resources. NDCs often have specific references to external financial and technical assistance, for which the international community can provide support (see Box 2 for further discussion).

Box 2 NDCs in Africa

Many African NDCs employ a two-tiered approach to address the task of expanding renewable energy capacity. Unconditional targets outline achievable goals using existing domestic resources, demonstrating a strong baseline commitment. Additionally, many NDCs include conditional components that outline broader renewable energy ambitions. These conditional targets are often contingent upon external financial and technical assistance, directly addressing the funding shortfall challenges elaborated in Chapter 2, Section 4.

This reliance on external support emphasises the immense cost of the energy transition, the unique socio-economic context of African nations, and the principle of Common But Differentiated Responsibilities (CBDR). For the G7, the challenge lies in developing a balanced, multifaceted approach to NDC conditionality that simultaneously catalyses rapid renewable energy deployment, enhances investor confidence, and supports Africa-owned plans like the APRA initiative.

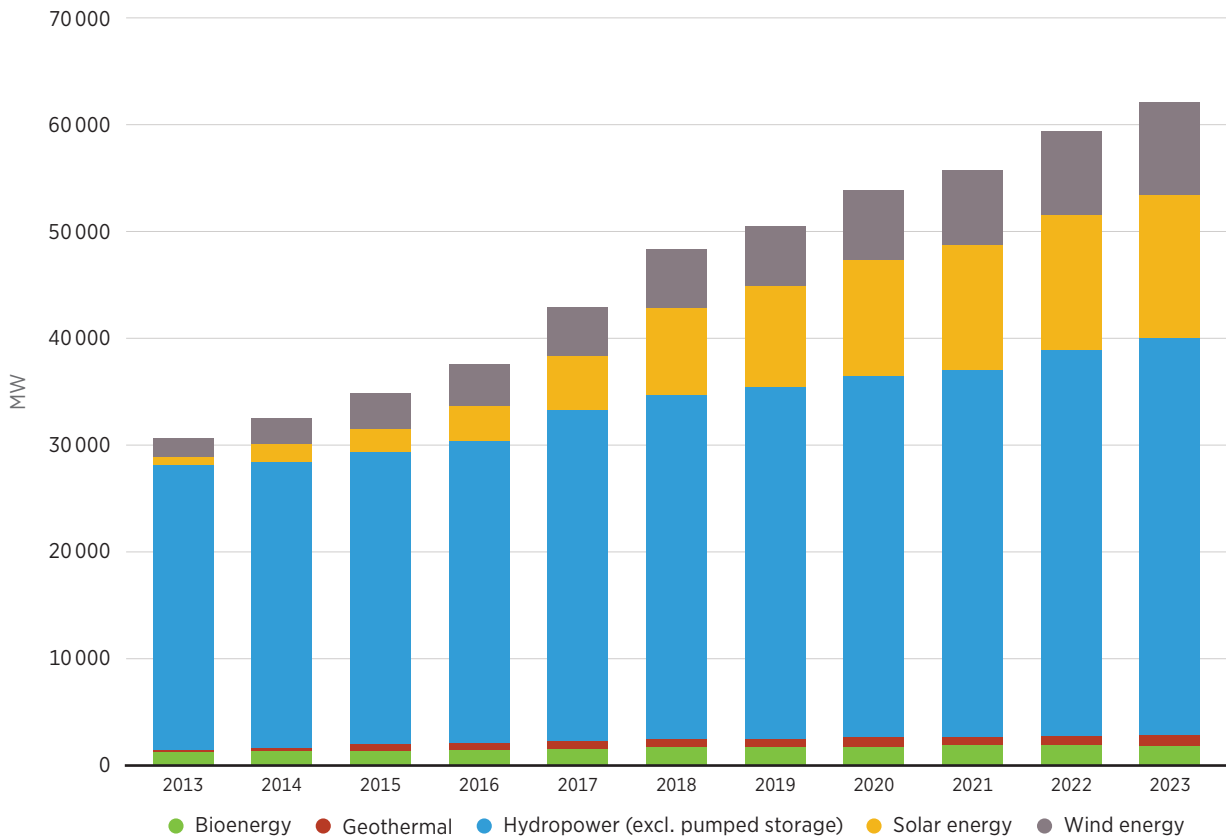
Supporting APRA could help address conditions for NDC and renewable energy implementation by focusing on technical assistance (TA) and financing needs for a renewables-based energy transition. In terms of technical assistance and capacity building, support should prioritise capacity within African institutions and communities, fostering long-term ownership and sustainability of climate action by reducing reliance on external expertise and resources. In addition to providing NDC financing, the G7 can mitigate risk perceptions by supporting risk mitigation tools such as robust NDC implementation reporting, increasing transparency and reassuring investors. G7 support could relieve infrastructure bottlenecks identified by many NDCs, such as network infrastructure and local supply chains, enabling nations to progress toward their necessary and substantial renewable energy capacity goals.

To ensure maximum impact, the G7 could specifically amplify the objectives of APRA, potentially creating a unified front in the pursuit of Africa's renewable energy transformation. Collaboration with APRA offers the G7 an opportunity to co-ordinate efforts and optimise the effectiveness of their support.

2.2 The current status of the power sector in Africa

The electricity generation capacity on the African continent stood at 256 GW as of 2023 (IRENA, 2024a). This represents a modest share of global capacity, comprising only 4-5% despite the population of Africa nearing 20% of the global total. Renewable energy constitutes 23% of total power capacity in Africa and is largely made up of hydropower, which has historically been a major source of electricity in many countries on the continent. Over the past decade, solar PV and onshore wind have grown strongly in Africa, albeit from a low base, at an annual average rate of 44% and 21%, respectively (IRENA, 2024a), with a number of large-scale solar PV and onshore wind power installations in select countries. As a result, renewable power in Africa has doubled in the last decade (Figure 2).

Figure 2 Renewable capacity in Africa, 2013-2023

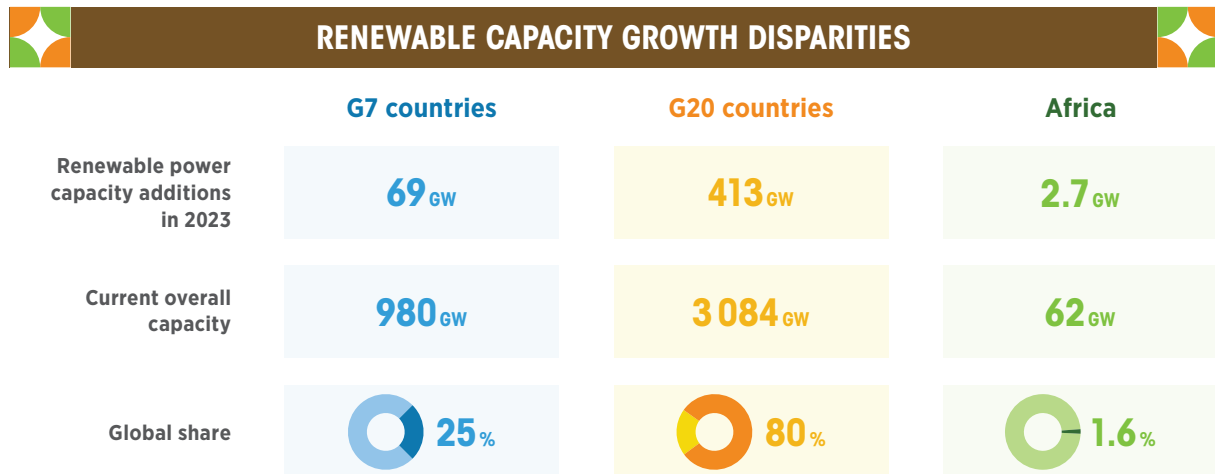


Source: (IRENA, 2024a).

Note: MW = megawatt.

Yet, as shown in Figure 3, the stark disparity in renewable energy capacity with respect to the G7 and Group of 20 (G20) countries manifests in Africa's mere 2.7 GW of renewable power capacity additions in 2023, compared to 413 GW in G20 countries in the same year (IRENA, 2024b). Africa's overall renewable capacity was only 62 GW as of 2023, representing just 1.6% of the global share and indicating considerable scope for growth to unlock its renewable potential.

Figure 3 Geographical disparities in renewables distribution are a barrier to a just transition

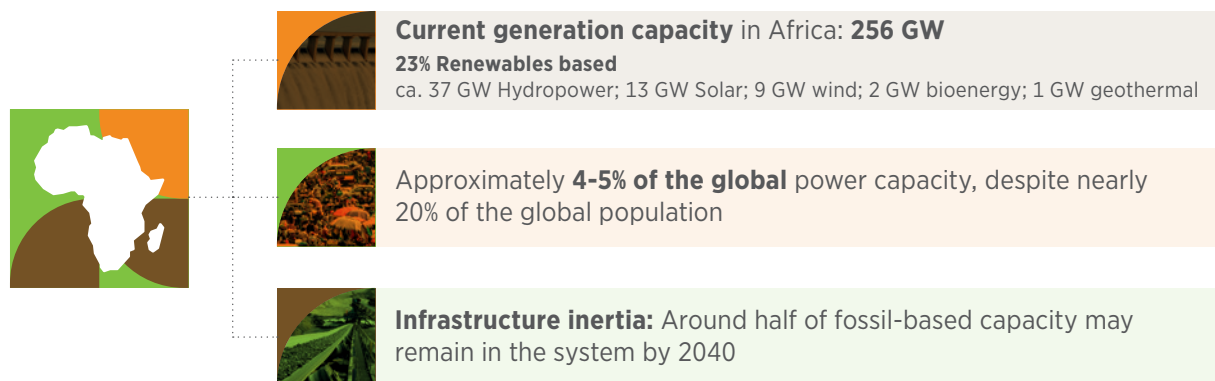


Source: (IRENA, 2024b).

The fact that the majority of power capacity on the continent – nearly 200 GW – is fossil-fuel based cannot be ignored, as this represents well-established investments in many major African nations. In fact, based on typical plant lifespans of existing generation capacity and expectations regarding the current committed project pipeline, there is potential for half of the current fossil fuel capacity amount to remain by 2040 (AUDA-NEPAD, 2023a). Given that much of this capacity in the African region is relatively recently installed, this potential inertia in energy infrastructure development – and the importance of any existing capacity for electricity access goals – must be taken into account in long-term planning of renewable and climate targets.

While there is clearly a gap in progress on the deployment of renewable energy capacity, it must also be acknowledged that inadequacies in transmission and distribution infrastructure – both in terms of quality and scale – also pose major constraints to adding renewable capacity at pace, both on the domestic and regional levels (Africa-EU Energy Partnership, 2023).

Figure 4 Key context for the African power sector



Source: (IRENA, 2024b; AUDA-NEPAD, 2023a).

2.3 CMP power sector infrastructure outlook

One of the central continental initiatives to achieve the goals of Agenda 2063, the CMP aims to be a visionary blueprint for Africa's energy transition and to usher in a new era characterised by a stronger, more cohesive and sustainable power infrastructure (AUDA-NEPAD, 2023a). The development of the CMP was tasked to AUDA-NEPAD by African energy ministers during the AU Specialized Technical Committee meeting on infrastructure in 2018 and 2019.

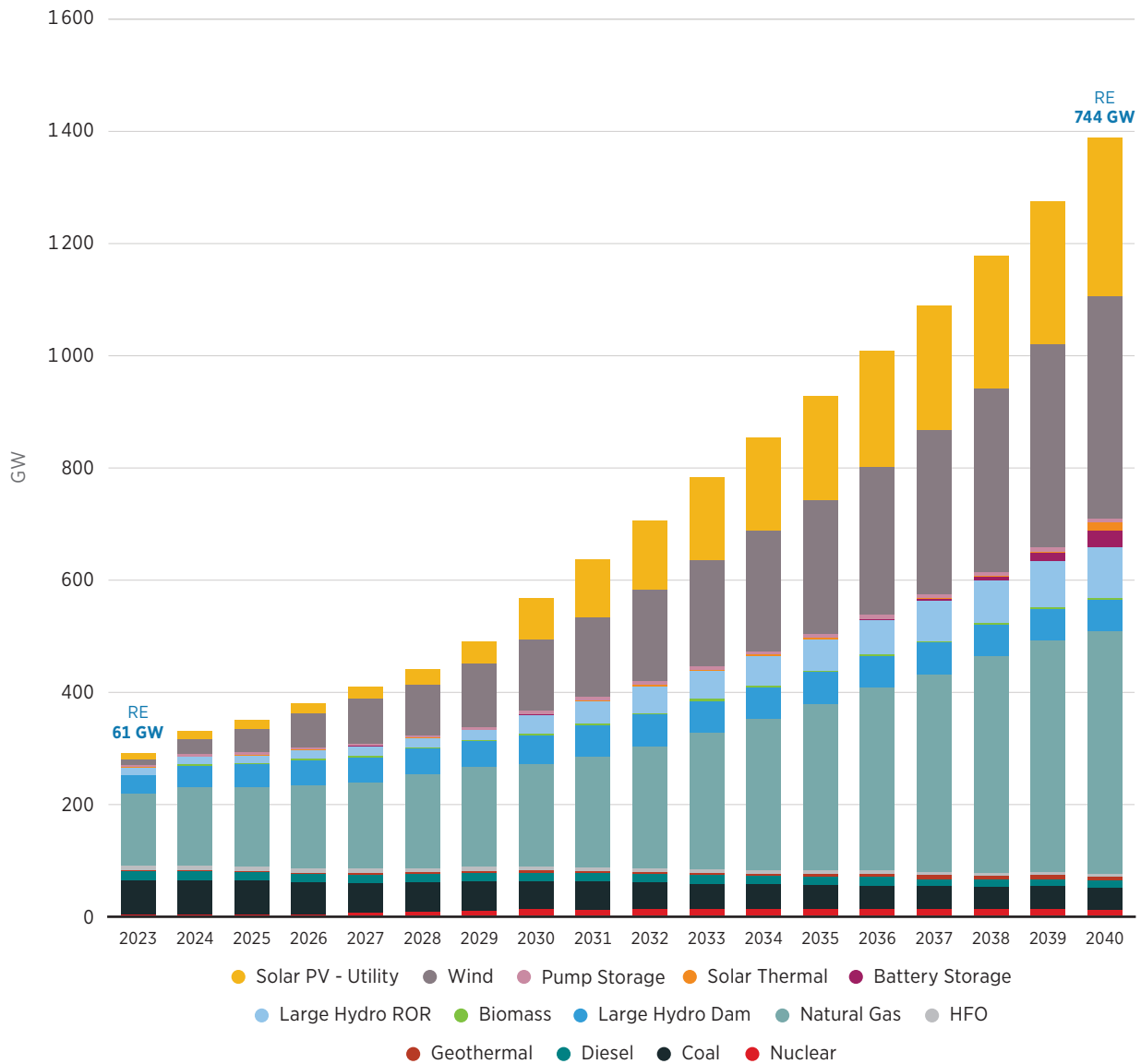
The CMP is a fully Africa-owned plan, driven by an Africa-owned process and developed through collaborative efforts among Africa's five power pools and continental bodies, including AUDA-NEPAD, African Union Commission (AUC) and AfDB. The plan provides authentic guidance to international communities on continental priorities for power sector infrastructure investment. Based on this, priority infrastructure projects are being identified. IRENA is supporting the CMP initiative as an officially endorsed modelling partner, providing capacity building for model development and use, data sharing, and knowledge transfer to enable the creation of a power systems master plan that promotes access to clean, affordable, reliable and sustainable electricity supplies across the continent.

This section presents the roles of renewables and supporting infrastructure in the future African power system per the first phase of CMP results, focusing on 2040 (AUDA-NEPAD, 2023b). The CMP results show enormous opportunities for investment in large-scale renewable capacity, cross-border transmission and storage projects. While the CMP contains multiple scenarios, and revisions to this work are ongoing, the contents in this section reflect the Full Continental Integration scenario presented during the 37th African Union Summit.¹

The CMP's Full Continental Integration scenario shows the strong role that renewables play in Africa's future energy systems. Following an expected tripling of peak electricity demand by 2040, from 165 GW to 550 GW, overall capacity needs on the continent would be expected to more than quadruple from around 260 GW to nearly 1200 GW in 2040 (Figure 5). The CMP shows that investments in renewable energy are by far the dominant cost-effective opportunity, with the capacity of wind, solar, hydro and other renewables growing more than 10-fold in Africa in less than two decades, potentially reaching nearly 750 GW (nearly 65% of total capacity) in 2040. Continuing the trend of the past decade, solar and wind lead this growth and together are expected to become the largest source of capacity on the continent, with an impressive 20-fold increase in both of their capacity totals.

¹ The Full Continental Integration scenario reflects the achievement of universal electricity access by 2035, an increase in each country's per capita consumption by one income level by 2040 (low income, lower-middle income, upper-middle income, high income), and the ability to construct cross-border transmission within and between all regional power pools (AUDA-NEPAD, 2023c). For more information on scenario definitions and any CMP-related documentation, please see the dedicated AUDA NEPAD Mwangi (nepad.org) website.

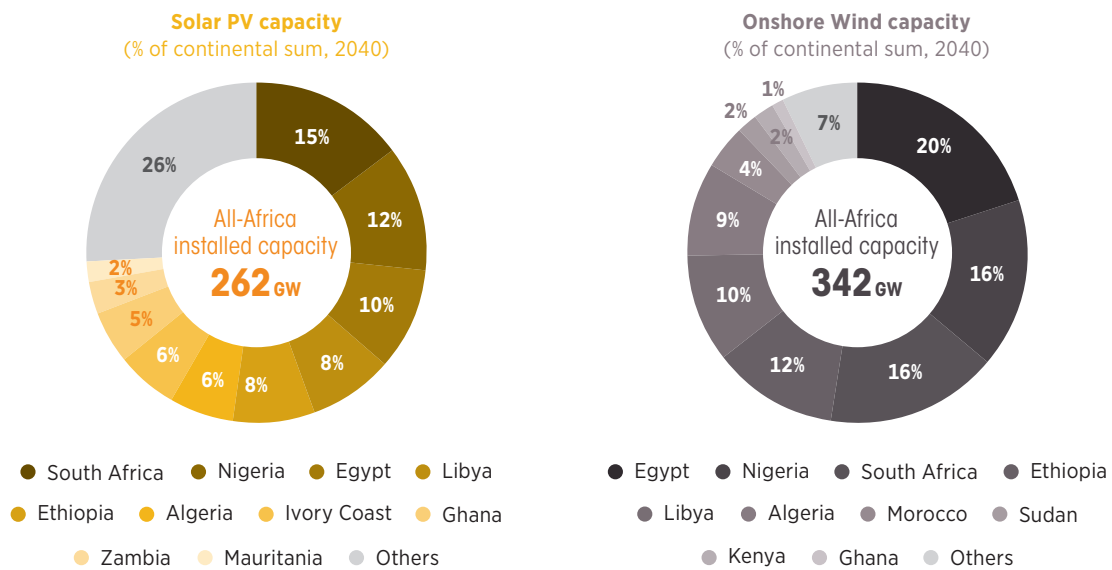
Figure 5 Capacity in CMP's Full Continental Integration scenario



Notes: HFO = heavy fuel oil; RE = renewable energy; ROR = run of river.

Major markets are expected to emerge for solar, wind and hydropower. As seen in Figure 6, the top ten countries for utility-scale solar PV and onshore wind account for 74% and 93%, respectively, of the total continental installed capacity of each technology in 2040, per the CMP. While solar and wind deployments are well diversified across northern, southern, eastern and western Africa, the best hydropower resources are concentrated in western, central and eastern Africa. These “big three” renewable resources are highly complementary – solar and wind have complementary daily and seasonal production profiles, and hydropower acts as a powerful source of flexibility and storage in the CMP results. However, to fully unlock these benefits in all regions of the continent, strong cross-border transmission infrastructure is crucial, along with a strong foundation of national transmission and distribution systems.

Figure 6 Solar PV and onshore wind capacity – Top ten countries from the CMP



Source: (AUDA-NEPAD, 2023c).

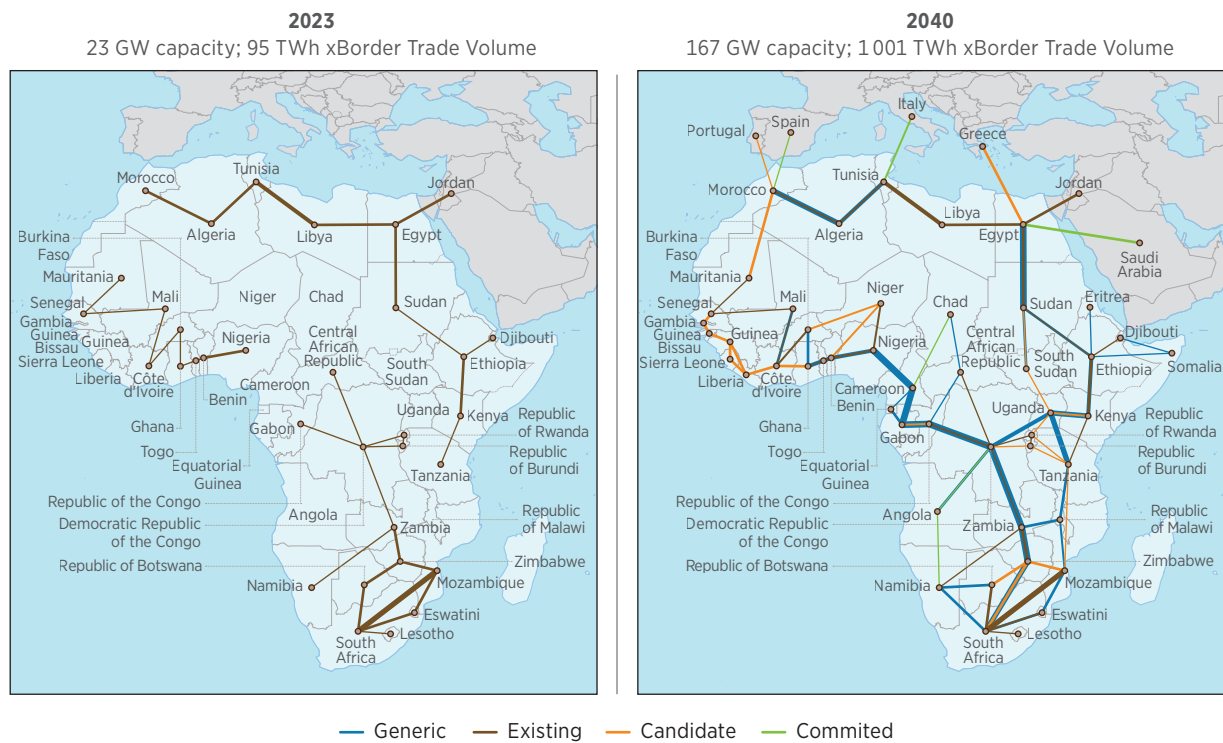
Note: GW = gigawatt.

To maximise the utilisation of the lowest-cost solar, wind and hydropower resources on the continent, it would be beneficial to invest in a massive expansion of current cross-border infrastructure. Figure 7 shows the evolution of cross-border transmission infrastructure in the main CMP scenario – it is a seven-fold expansion from 23 GW in 2023 to 167 GW in 2040. While this infrastructure will provide many complementarities between individual neighbouring countries, on a larger scale it will enable the hydropower hubs of the continent – especially in central and east Africa – to provide very important complementarities regarding flexibility and storage to the large solar and wind installations in all regions. Such major cross-border infrastructure requires the additional backbone of strong in-country transmission networks as a prerequisite.

With such infrastructure in place, volumes of electricity trade would be set to increase nearly ten times their current amount by 2040. This would provide significant new revenue opportunities for many African countries, either as primary electricity exporters or wheeling hubs. Regional power pools will be critical institutions to explore how such new financial dynamics can spur the investment that will be required.

As seen in Figure 7, the CMP has identified certain transmission corridors that would see the largest facilitation of future inter-regional trade. The DR Congo, with the major potential of its Grand Inga hydropower project, is a driver of two such corridors, namely DR Congo → Zambia → Zimbabwe → South Africa and DR Congo → Congo → Gabon → Cameroon → Nigeria. Another corridor exists from Egypt through all of east Africa, including Ethiopia, Kenya, Sudan, the United Republic of Tanzania and Uganda.

Figure 7 Cross-border interconnections in CMP's Full Continental Integration scenario



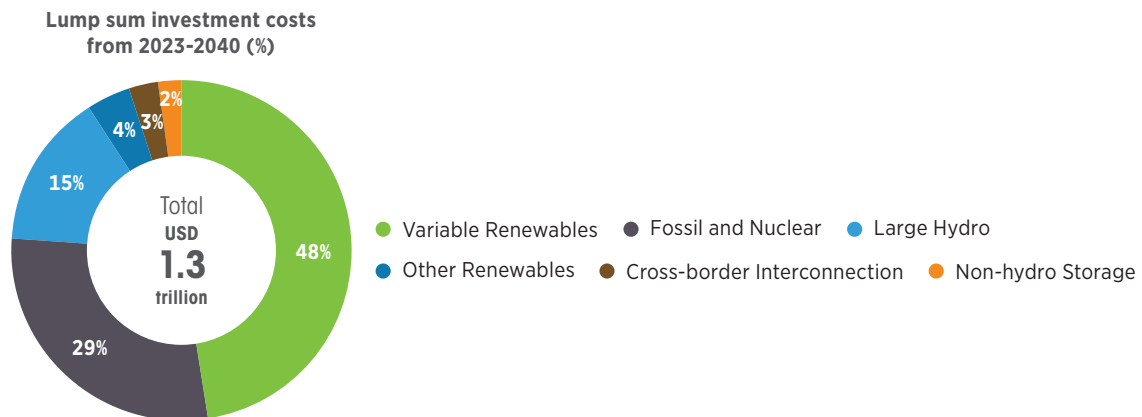
Disclaimer: This map is provided for illustration purposes only. Boundaries and names shown on this map do not imply the expression of any opinion on the part of IRENA concerning the status of any region, country, territory, city or area or of its authorities, or concerning the delimitation of frontiers or boundaries.

The infrastructure opportunities discussed in this section represent a historic step change in power sector investment in Africa. As seen in Figure 8, including only generation, storage (both hydro and battery) and cross-border transmission capacity investment, the vision described in the CMP would require approximately USD 1.3 trillion by 2040, or about USD 72 billion on average per year between 2023-2040. For scale, as Chapter 2, Section 4 will show, only USD 60 billion has been invested in renewable energy in Africa cumulatively in the past two decades (between 2000-2020) (IRENA *et al.*, 2022).



However, the CMP also underscores the critical need for substantial investments in domestic transmission and network enhancements to provide a solid foundation for the large-scale investments in generation and cross-border transmission. To this end, grid modernisation is another cornerstone of the CMP. This involves not only reinforcing and expanding physical infrastructure but also integrating smart grid technologies that leverage digital communication to contribute to a more efficient, flexible and responsive power system.

Figure 8 CMP investment costs



2.4 Challenges - Insufficient finance flow into Africa

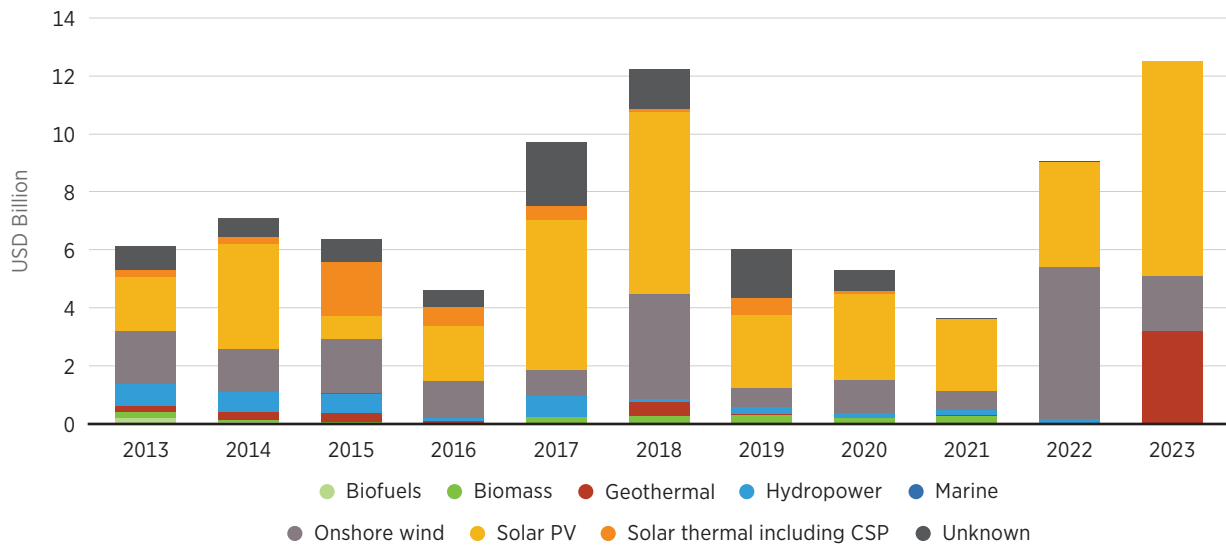
Investments in renewables first took off in Africa in the 2010s, driven by structured procurement programmes such as feed-in tariffs (FiTs) and auctions and further supported by credit-enhancement structures provided by development finance institutions (DFIs) and multilateral development banks (MDBs) (IRENA *et al.*, 2022). This allowed hundreds of independent power producer (IPP) projects, particularly for solar PV and onshore wind, to come online.

However, in the global context, while global investments in renewable energy have grown rapidly to total USD 2.8 trillion between 2000 and 2020, only 2% of that total went to Africa (IRENA *et al.*, 2022). This share further dropped in 2021 to less than 1% as the continent attracted just USD 3 billion of the USD 461 billion invested globally, reflecting the impacts of the COVID-19 pandemic and subsequent geopolitical and economic shocks (IRENA and CPI, 2023). While investments recovered later – almost tripling in 2022 and quadrupling in 2023 (compared to 2021 levels) – to USD 12 billion (Figure 9) (BNEF, 2023), investments in Africa remain far below the region’s true potential and needs. Disparities in overall energy transition investment² between sub-Saharan Africa and the rest of the world remain sky-high. While the region received just USD 13 per capita in energy transition-related investments during 2020-2023, advanced economies received 176 times more.³

² This includes renewable energy, electricity grids (transmission and distribution), electrified heat, electrified transport, hydrogen, carbon capture and storage (CCS) and energy storage.

³ Part of this is because energy-transition sectors (other than renewables) have yet to take off in sub-Saharan Africa.

Figure 9 Renewable energy investments in Africa by technology (2013-2023)

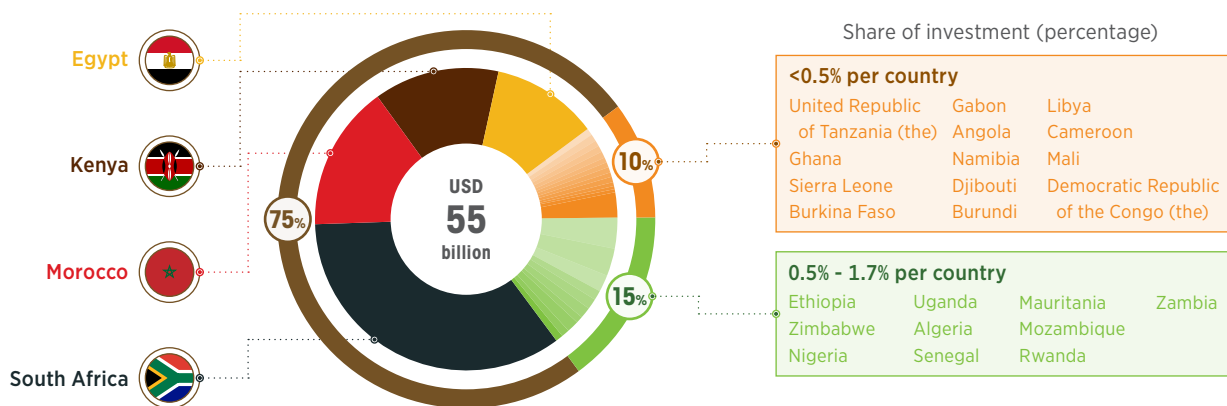


Source: (IRENA and CPI, 2023; BNEF, 2023).

Notes: Excludes data for hydropower >50 MW. About USD 5.6 billion worth of investments in Middle East and North Africa for the period 2013-2020 could not be disaggregated by region and has been excluded from the analysis. A substantial portion of investments in Africa also goes to large hydropower (>50 MW), which plays a crucial role in the region, particularly in sub-Saharan Africa. However, as data on large hydropower are limited, this is not covered in the figure. (IRENA and OECD, 2023) data on international public financial flows for renewables shows that in sub-Saharan Africa commitments for hydropower-related projects totalled USD 32 billion during 2010-2020 (62% of all public financial commitments towards renewables).

Similarly, within the continent, the majority of investments currently gravitate towards economies boasting relatively advanced policy, regulatory and investment frameworks. Southern Africa alone received about USD 22.4 billion, or 40% of the total renewable energy investment over the period of 2010-2020. This was followed by North Africa, which attracted USD 17.5 billion, or 32% of the total and which was concentrated in Morocco and Egypt. The top four recipients in Africa – Egypt, Kenya, Morocco and South Africa – received around 75% of all investments going to Africa in 2010-2020, highlighting the enormous disparities in investment flows within Africa (Figure 10) (IRENA *et al.*, 2022).

Figure 10 Top recipients of renewable energy investments in Africa between 2010 and 2020



Source: (IRENA *et al.*, 2022).

Note: Excludes hydropower larger than 50 MW.

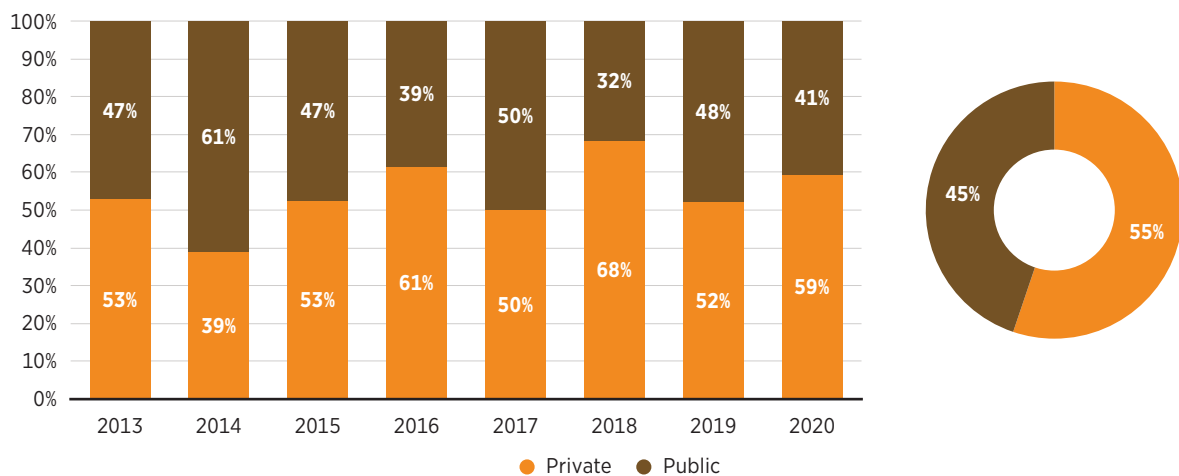


African countries often face some of the highest costs of financing in international capital markets compared to more developed markets and economies. For instance, the weighted average cost of capital (WACC) for utility-scale solar PV projects in Africa that have succeeded in securing funding (most likely with support from MDBs in the form of funding, risk mitigation, technical assistance, etc.) ranged from 6.9-10.7% between 2019-2021, compared to 2.2-10% in Western Europe⁴ (IRENA, 2023c).

It is worth noting that only 10% of infrastructure projects in Africa actually progress from the pipeline stage to financial closure, and that is mostly due to the risk perception of projects (Cornieti and Nicolas, 2023). The remaining 90% most likely face a much higher cost of capital. As a result, they are often unable to attract private sector investments and require a higher degree of public sector support.

Public finance accounts for 45% of direct investments in renewable energy assets in Africa compared to 24% globally (Figure 11). Furthermore, in sub-Saharan Africa only half of renewable energy investment between 2013-2020 originated from domestic sources. This compares with developed regions such as Europe and North America seeing more than three-fourths of investments from domestic sources in that period (IRENA and CPI, 2023).

Figure 11 Renewable energy investments in Africa by source, 2013-2020 (left), and average over the period (right)



Source: (IRENA and CPI, 2023).

⁴ Excluding Ukraine, where the WACC was 12.2%, likely impacted by the ongoing geopolitical crisis.

Generally, the international flow of public money to renewable energy for developing countries has been in decline since 2018, with a slight rebound in 2022, but still equivalent to less than half of the flows in 2016 (IEA *et al.*, forthcoming). Although the role of public finance, especially from international sources, plays a crucial role in deploying renewables and closing the energy access gaps, only 44% of international public financial commitments for renewables that went to Africa during 2013-2022 benefitted the 33 least-developed countries (LDCs) of the continent (IRENA and OECD, 2024).

Globally, multilateral DFIs accounted for about half of international flows coming from the public sector in 2020. Commitments from bilateral DFIs in 2020 fell 70% compared to 2019. As a result, multilateral and bilateral DFIs provided less than 3% of total global renewable energy investments in 2020 (IRENA and CPI, 2023).

In Africa, about 30% of the finance for IPPs engaged in power generation between 2010 and 2020 was contributed or arranged by MDBs and DFIs in the form of direct investment (equity and debt). This helped bring 16.5 GW of power generation capacity online, of which two-thirds was renewable based (IRENA *et al.*, 2022). Although MDBs and DFIs have leaned towards renewable energy investments in recent years, motivated by global climate imperatives and sustainability commitments, investments in conventional IPPs were still considerable in 2020 (IRENA *et al.*, 2022).

Support for IPPs from MDBs and DFIs takes many forms, including direct investment (equity and debt), technical assistance, risk mitigation and structured procurement programmes combining all those instruments (Chapter 3, Section 1). African DFIs – in particular the AfDB and the West African Development Bank – have become more prominent investors in African IPPs, providing finance to several renewable energy projects that reached financial close in 2020.

The G7 must act in concert to mobilise financing at affordable terms, which is urgently needed to facilitate higher energy access rates, create socio-economic benefits, enhance energy security and bolster resilience against climate change. DFIs and MDBs are to take on an important role in this regard, and the International Development Association (IDA) replenishment process is a good opportunity to increase their support towards renewables in Africa. Their importance is most exemplified in the off-grid renewables sector, which is key in achieving universal access to energy in the region. For example, investment by DFIs and MDBs in the off-grid renewables sector in sub-Saharan Africa quadrupled from USD 62 million in 2019 to USD 220 million in 2021, offsetting the drop of private investment into the sector (IRENA and CPI, 2023).

The scale of incoming financing for the energy transition in Africa remains well below what is required, the scope in terms of geographical distribution remains skewed, and the majority of financing remains non-concessional. International public finance needs to play a much larger role in the region, both as a provider of capital and as an absorber and mitigator of risk. The African LDCs in particular are often unable to attract private sector investments and require special international support, including from the G7. Potential areas for collaboration in crucial areas are detailed in Chapter 3.

3. AREAS FOR COLLABORATION TO ACCELERATE PARTNERSHIPS FOR RENEWABLES BETWEEN THE G7 AND AFRICA

Deploying renewable energy presents a strategic avenue for Africa to simultaneously address the continent's multiple economic, societal and climate objectives.

This section highlights areas for collaboration between the G7 and Africa with a focus on some of the main priorities in Africa, such as enabling access to finance, decarbonising the power sector, expanding energy access and supporting the productive use of energy, leveraging local resources and minerals to develop local value chains, and supporting cross-cutting development issues associated with the energy transition.

3.1 Areas for collaboration in increasing investments in infrastructure and enabling access to finance

As shown in Chapter 2, Section 4, African countries are diverse and have very different levels of development of renewable energy sectors and risks facing investors. It is therefore necessary to unbundle African markets according to their respective contexts to understand how their unique characteristics and circumstances shape different types of investment risks, the resultant cost of financing, and the areas for collaboration needed to support renewable energy deployment. This includes:

- Countries that successfully mobilised large amounts of private investments in renewable energy but are now hitting a ceiling due to technical constraints (e.g. risk of curtailment) or bankability risks (e.g. off-taker risk) such as South Africa. In this context, some policy adaptation and risk mitigation are needed to retain project bankability and private investors' engagement.
- Countries that have successfully completed some pilot projects, at times with considerable support from MDBs, but have not moved to the next phase of scaling up renewable energy deployment, particularly for solar and wind, such as Zambia and Mali. In this context, there is a need for more public sector engagement to make projects attractive to investors. This can be done either at the national level through the allocation of risks to stakeholders besides the private sector (e.g. government or public utilities) or with the support of international players through, for example, the involvement of MDBs and other players such as the International Finance Corporation's (IFC's) Scaling Solar Programme, or with a mix of both.

- Countries that have not been able to attract private investments due to constrained macroeconomic conditions or political conflicts that increase risks to the point where they cannot be mitigated through instruments, such as Zimbabwe and Mauritania. Neither the government nor the consumers have the resources to take on these risks, and projects may not become attractive to investors in the near term, but energy is urgently needed for energy access and socio-economic development. Here, the role of public finance is crucial, especially the role of MDBs, and public financing and policy must work strategically to shift the focus from bankability to impact potential. This requires investment decisions to be made based on factors that go beyond realising financial profits for private investors, to encompass short- and longer-term climate, environmental, socio-economic, and development goals. Box 3 showcases an analysis of the bankability vs. the potential impact of projects submitted to IRENA's ETAF Platform.⁵
- As the box shows, many projects in some of the least-developed regions do not move forward due to their low bankability score, regardless of the impact they might have on the communities and countries. This is partly a result of the dominant paradigm today, whereby renewable energy projects are viewed as private-sector led initiatives that are driven by their profitability. This situation calls for a different approach in some contexts, including a greater deployment of public funds that go into project development stages and not profit-making. In countries with constrained government budgets, the international community must step in.

Box 3 Bankability vs. impact potential: Analysis of ETAF pipeline of projects

IRENA conducted an analysis of projects submitted to its ETAF platform using two indicators/indices: bankability and impact potential.

A bankability index was formulated by analysing the project's unit cost score, which is calculated from the ratio of the total cost of the project to its capacity, the equity share of the project's total cost, the status of equity contribution (whether the equity is secured or not) and the ETAF secretariat's recommendation on the project (a point was awarded to projects that were recommended to the funding partners, whereas draft projects scored no points in this category).

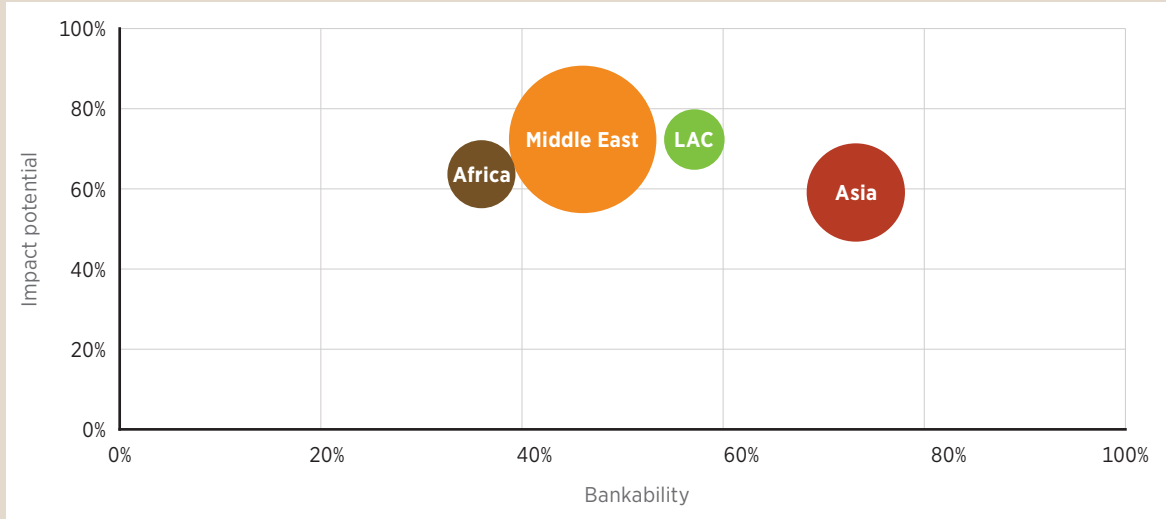
An index of impact potential was formulated by analysing the project's reported potential climate benefit (from emissions reduction) and the number of people that would benefit from deploying the project (in terms of energy access, affordability and jobs created). These values were drawn from the submitted information by the project developers.

According to these criteria, an analysis of 86 projects submitted to the ETAF Platform between December 2022 and February 2024 shows that although many projects did not fit the bankability criteria, they still ranked high in terms of their impact potential.

⁵ The Energy Transition Accelerator Financing (ETAF) Platform is an inclusive, multi-stakeholder climate finance platform managed by IRENA to advance the global energy transition in developing economies.

Figure 12 shows where projects fall on the bankability vs. impact potential spectrums by region. These projects were all vetted by the ETAF secretariat and submitted to the funding partners. The figure shows that projects in Africa, although falling short on the bankability index, demonstrated high potential impact.

Figure 12 Bankability vs. impact potential of projects submitted to ETAF funding partners

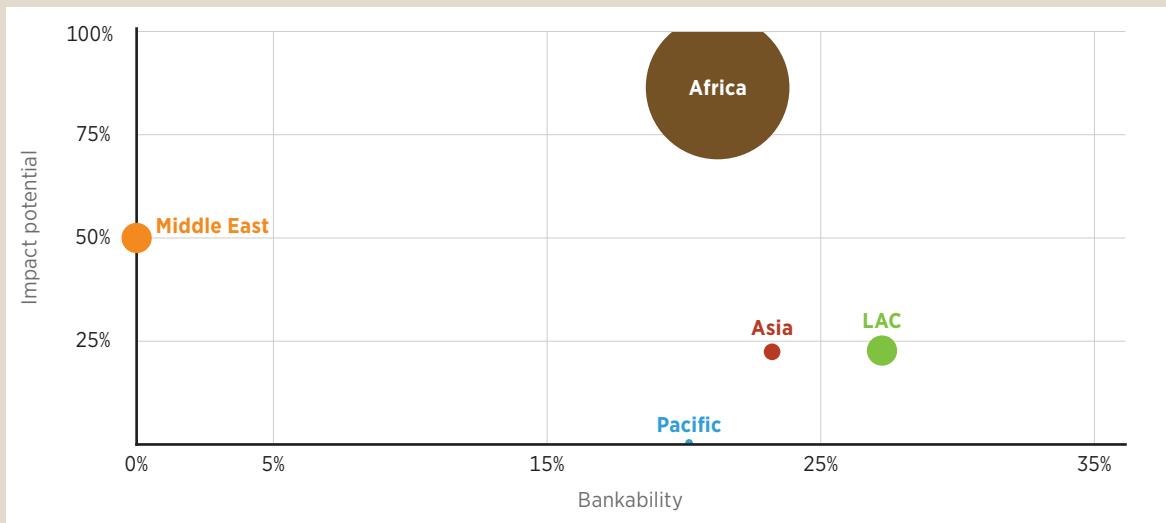


Source: (ETAF, 2024).

Note: The size of the bubbles represents the total capacity of projects submitted. LAC = Latin America and the Caribbean.

Figure 13 shows the bankability and impact potential of projects that were submitted to the ETAF platform but not sent to the funding partners due to incomplete documentation. It shows the staggering pipeline of potential projects in Africa with very high impact potential scores that are still in the draft stage and have not received financing.

Figure 13 Bankability vs. impact potential of projects with incomplete documentation not submitted to ETAF funding partners



Source: (ETAF, 2024).

Public funds need to be directed to countries and areas in Africa according to their needs. For example, in contexts where renewable energy deployment has already been deployed, public funds can be directed towards addressing grid-related risks. Other countries that have not yet been able to attract any private capital might require public funds to be disbursed in the form of grants for pilot projects or in the form of risk mitigation instruments.

With the macroeconomic and geopolitical hurdles facing most countries in Africa, public capital transferred through official development assistance from the G7 – including donations, grants, and concessional and market-rate financing from DFIs and export credit agencies – will be essential for financing the energy transitions on the continent, especially in countries that are increasingly fiscally constrained, such as African LDCs.

Government donors and multilateral and bilateral development banks have been active in generating the necessary finance through direct financing as well as instruments such as partial risk guarantees, liquidity facilities and breach-of-contract provisions, helping to bring multiple projects online (IRENA and CPI, 2023). However, existing initiatives have so far been insufficient in mobilising investments at the required scale (*i.e.* volume) and scope (*i.e.* the distribution of investments, which remains largely concentrated in a handful of economies). A systematic shift in investment decisions is needed that allows African countries to deploy renewable energy at the pace and scale required. The G7 can lead this shift by providing the necessary finance and grant mechanisms that support their African partners in this effort, with a special focus on LDCs.

Public funds from G7 members can flow into the energy transitions through intermediaries (*e.g.* governments, multilateral and bilateral DFIs and global funds such as the Green Climate Fund or Just Energy Transition Partnership) using a variety of instruments, structured as per the categories of IRENA's broad policy framework. They include:

- **Deployment policies** dictate that public funds can flow as direct investments in government-owned transition assets, public-private partnerships or in designing and funding policies that can attract or support private investment (*e.g.* concessional funds, capital subsidies, grants and tariff-based mechanisms such as auctions, FiTs and feed-in premiums and risk mitigation instruments that attract private capital). Although risk mitigation instruments are vital to attract private capital, they should not be viewed as the sole priority and when they are implemented, they should be introduced in a way that aligns with the local context and limitations. For example, there is a need to focus on instruments beyond sovereign guarantees which are increasingly difficult to provide for many developing country governments – due to constrained fiscal space.
- **Integrating policies** stipulate how public investments can fund infrastructure and assets that integrate renewables into the energy system and are crucial for attracting private capital in projects (*e.g.* regional and national transmission lines). Public investment in enabling infrastructure such as grid expansion and flexibility is vital.

- Under **enabling policies**, public money can support long-term energy planning, capacity building and training, research and development, the development of local industry and value chains as well as technical assistance offered via multilateral development banks and inter-governmental organisations such as IRENA. For instance, for African nations to maximise the socio-economic benefits of the global energy transition, farsighted industrial policies will be necessary. Examples of such policies for the sourcing of critical materials for the energy transition are discussed in Section 3.4. A circular economy will be an important aspect of this, as will be finance for and promotion of new industries and business ideas and models. This can also include support for capacity building for policy making to provide effective incentives and rules; business incubation initiatives; supplier development programmes; support measures for small and medium enterprises; promotion of industrial clusters; as well as a set of well-designed local content incentives and requirements (IRENA, 2017c, 2023a, 2023c).
- Under **structural change and just transition policies**, public funds can go into policies to ensure that the energy transition promotes social inclusion, community benefits among many other priorities such as ensuring that the lowest income populations do not end up paying the most for basic energy access. For example, building and investing in a skilled and diverse workforce is critical for African countries to develop job-creating value chains inside their own countries. This, in turn, is crucial also to avoid job losses. Providing people currently working in the fossil fuel sector with viable, new work prospects in transition-related sectors is crucial to securing popular and political support for the transition in Africa. A key avenue into job creation in transition-related sectors is timely investment in people, including through education, and vocational training and (re-)skilling. Employment and wage improvements should form part of the sector's development, helping renewable energy deployment tangibly contribute to people's welfare. Dedicated policies for recruitment, and education and training opportunities could support access to job opportunities for women, youth, and marginalised people into the energy sector, in addition to effective communication and transparency about opportunities (IRENA, 2019, 2022, 2023c; IRENA and AfDB, 2022b; IRENA and ILO, 2023).

In terms of power sector investment specifically, the CMP offers priority power sector infrastructure projects that are well-defined for collective finance mobilisation efforts by African stakeholders. The project definitions take into account a broad range of criteria that are similar to those accounted for in the index of impact potential discussed above.

Regarding resource mobilisation, according to the CMP at least USD 1 trillion is required by 2040 to build the infrastructure necessary to advance universal energy access and transformative socio-economic development across Africa, as detailed in Chapter 2, Section 3. Investment is crucial not only in grid-connected renewable generation projects, but also in strengthening domestic and transnational grids. The expansion of renewables must be paralleled, if not preceded, by significant strengthening of grid systems. This includes in-country backbone transmission networks and cross-border interconnectors that are necessary for the physical interconnection of Africa's continental energy infrastructure. Priority projects identified through the CMP process offer excellent opportunities for international finance.

The G7 can aid in identifying and piloting innovative climate finance mechanisms to attract private investments in renewable energy and grid infrastructure. Additionally, they can support African institutions in organising investment forums to showcase their projects. The APRA Investment Forum, scheduled for September 2024, is one such platform (Box 4).

Box 4 APRA Investment Forum

Under the auspices of APRA, Kenya and IRENA will convene an investment forum in September 2024. The forum will serve as a venue for political dialogue on green industrialisation outlined in the Nairobi Declaration, focusing on mutually beneficial topics such as the diversification of supply chains for manufacturing, critical materials and green hydrogen. The project matchmaking session will demonstrate concrete examples of progress in the implementation of the COP28 pledge to triple renewables and a practical example of a successful public-private co-operation project.

The forum will comprise the following:

- High-level political segment: Discussion on African priorities such as energy infrastructure, access to finance, private sector engagement, supply chain development and skills (youth in particular), with mutually beneficial strategies for addressing these priorities.
- Project facilitation segment: Discussion on lowering the barriers to scale up investment; innovations, guarantees and mechanisms to de-risk projects; and reducing the cost of capital. Discussion will also address green industrialisation and set the stage for the matchmaking segment.
- Matchmaking segment: Connection of business partners and facilitation of investment opportunities for project developers, investors and financing institutions. Renewable energy and wider supply chain projects will be considered. IRENA's ETAF and the CIP are the primary platforms for project consolidation, with several projects from APRA countries ready for matchmaking.
- Capacity-building segment: Benefiting from the presence of diverse stakeholders, capacity building and technical support sessions will be organised on the margins on the forum. Project developers will be targeted to strengthen the ability to create a robust pipeline of projects that are attractive to investors.

This forum could be a pioneering example of concrete G7 support to Africa.

Furthermore, adequate funding for the project preparation phase is a critical success factor for mobilising finance. Attention must be paid to financing preparatory activities such as pre-feasibility studies, feasibility studies, environmental impact assessments and social impact assessments to ensure a robust pipeline of commercially attractive projects.



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3.2 Areas for collaboration in expanding energy access and supporting the productive use of energy

An estimated USD 30 billion in annual funding is needed in grid/mini-grid and stand-alone renewable generation, transmission and distribution infrastructure, and around USD 6 billion is needed in clean cooking technology and fuels to reach universal energy access (IEA *et al.*, 2023). Public financing is key to facilitating these investments. Most of this public finance will come from international sources, and the G7 has a large role to play.

In terms of energy access, public finance has a core role to play in:

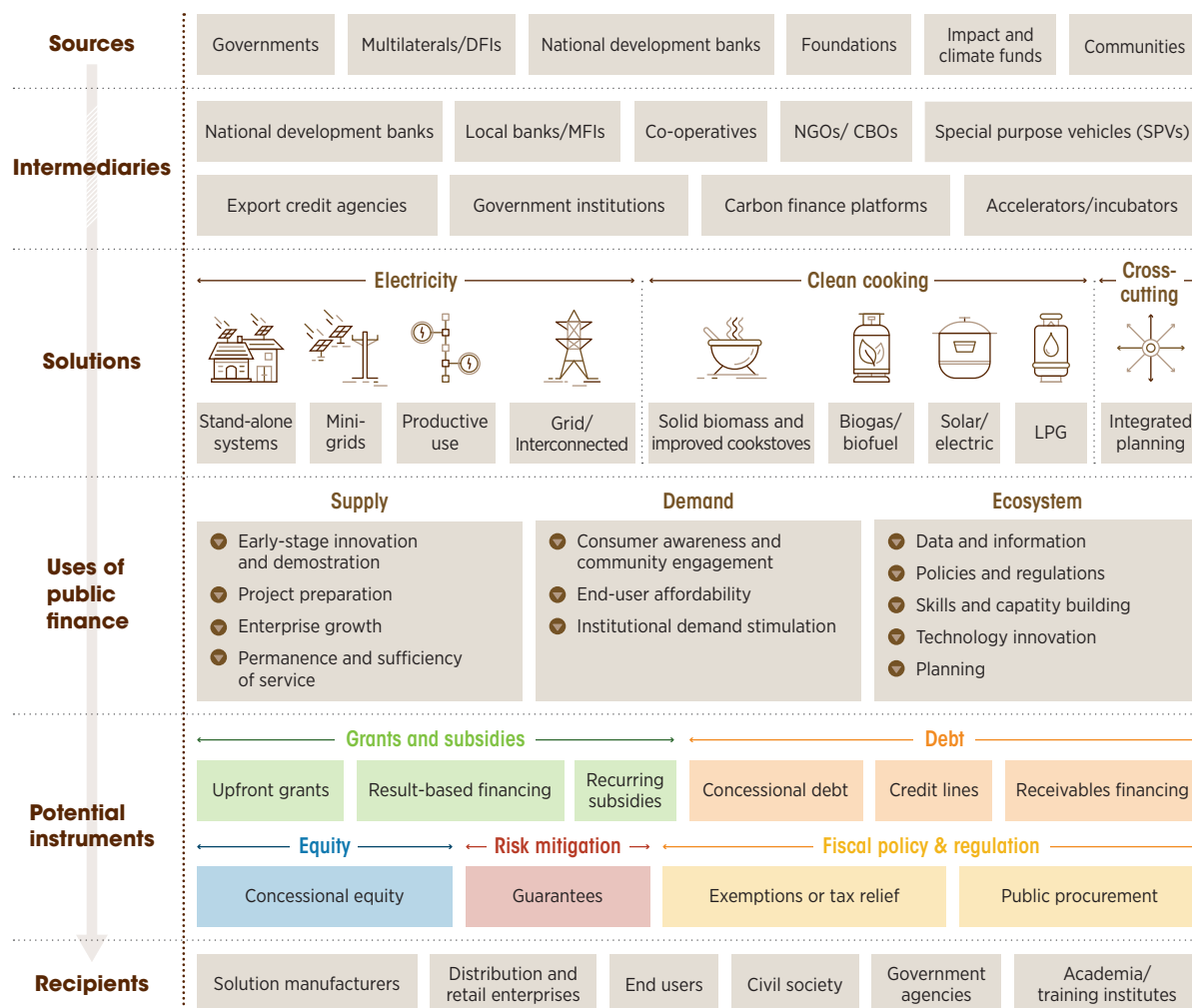
- deploying energy services to areas unaddressed by the market (e.g., planning and building the energy infrastructure)
- investing in the environment that supports energy deployment and shapes its sustainability and resilience (such as education, capacity building, awareness raising and skills development) and supports its productive use (such as commercial businesses, agriculture and industrial development)
- ensuring energy access to last-mile, underserved and marginalised communities
- bridging end-users' affordability gaps
- de-risking and catalysing private capital effectively through policy and regulatory instruments

Ensuring access to tailored financing instruments will be key to building sustainable markets and local value creation. Public financing commitments to energy access and appropriate instruments need to be scaled significantly. Public financing needs vary depending on the technology solution (stand-alone systems, mini-grids, clean cooking solutions) and the stakeholders in the ecosystem, including end-users and enterprises.

Well-designed public investments should emphasise an integrated approach across stakeholders, agencies and solutions; target the underserved; be flexible to changes in the market; ensure proportionality between public and private funds; invest in results monitoring; and have an exit plan in place when feasible. IRENA's framework presented in Figure 14 aims to shed light on the breadth of stakeholders and tools available for policy makers and investors seeking to deploy public finance to improve modern energy access for all.



Figure 14 IRENA framework to deploy public finance for energy access



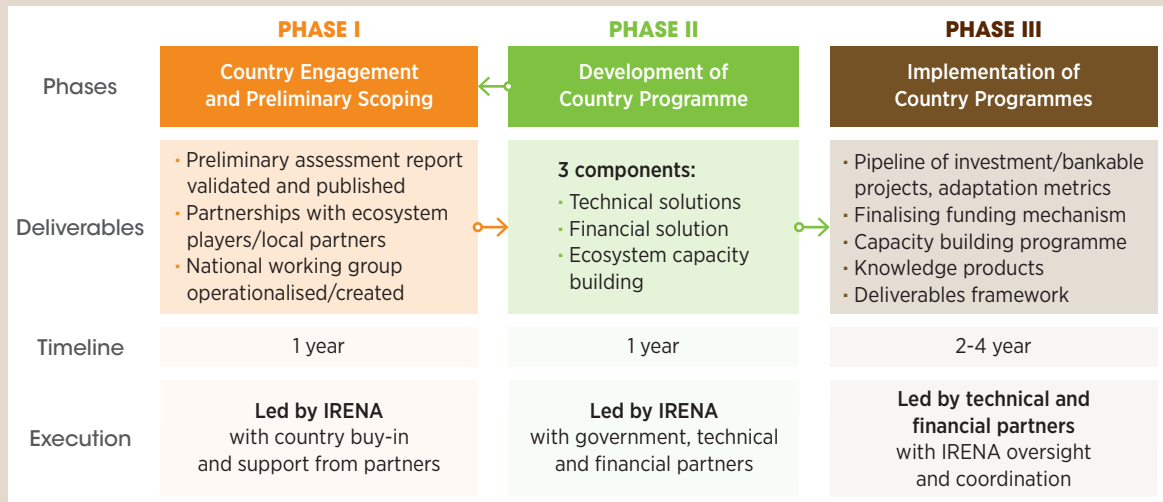
Box 5 Empowering Lives and Livelihoods: Renewables for climate action

To promote renewable energy solutions for productive uses and social infrastructure for local communities, the United Arab Emirates and IRENA launched the “Empowering Lives and Livelihoods” initiative at COP28 in Dubai. It aims to create a partnership with governments, philanthropists, development partners and the private sector, among other stakeholders, to connect people and livelihoods through renewable energy solutions in the agri-food and health sectors.

The initiative is open to all countries across the globe, but priority is given to LDCs and Small Island Developing States with a major focus on Africa. It aims to strengthen value chains in both the agri-food and health sectors, simultaneously driving equity benefits – especially for women, who are most impacted by climate change, lack of clean energy, and access to resource and opportunities.

The initiative supports achieving various SDGs (such as SDG2, SDG3 and SDG7) and is also well aligned with the AU climate strategy. Based on country context, the initiative aims to develop programmatic design and support partners, including governments, to implement and scale up efforts for which bilateral or institutional support from partners like G7 countries is highly desirable.

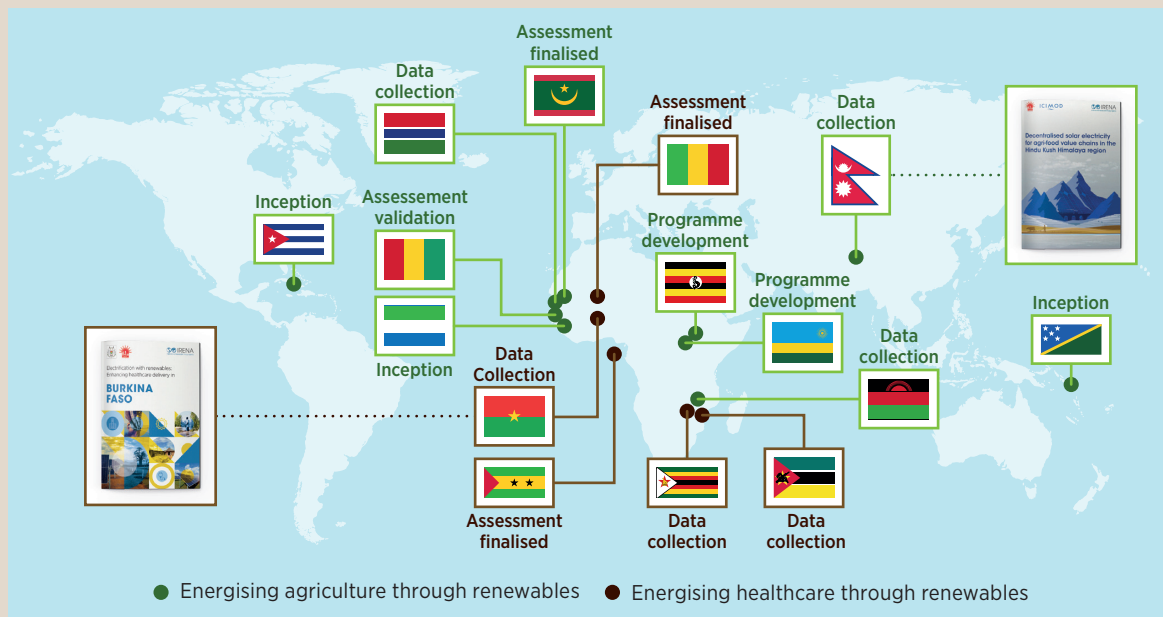
Figure 15 Empowering Lives and Livelihoods initiative



IRENA is currently engaging with 15 countries in Phase I, i.e. preliminary country assessments, with 12 of these countries located in Africa. G7 countries like Italy and Germany, in addition to Belgium and the United Arab Emirates, are already supporting the initial assessments in several countries. These assessments will lead to the development of tailored country programmes (Phase II) for implementation (Phase III).

In addition to supplying continuing support on needs assessments, G7 countries can fund the country-specific investment programmes across the agriculture and health sectors. This funding can occur either bilaterally, through government-to-government partnerships with IRENA as a technical partner, or through institutional support to IRENA targeted at the selected countries. The progress to-date under the initiative is depicted below:

Figure 16 IRENA progress under the Empowering Lives and Livelihoods initiative



Disclaimer: This map is provided for illustration purposes only. Boundaries and names shown on this map do not imply the expression of any opinion on the part of IRENA concerning the status of any region, country, territory, city or area or of its authorities, or concerning the delimitation of frontiers or boundaries

3.3 Areas for collaboration in critical minerals for the energy transition

As discussed in Chapter 2, Section 1, Africa is endowed with a number of strategic critical materials that are key to the global energy transition. Such resources hold great promise to spur long-term economic benefits, green job creation and sustainable local development, if managed effectively. The G7 can collaborate with African nations in the following key areas:

- **Support effective regulation and social and environmental safeguards.** Developing and implementing regulatory frameworks that promote responsible and sustainable mining practices, environmental protection, and adherence to international standards for labour rights and social responsibility is necessary. This need is particularly urgent in artisanal and small-scale mining (ASM), where 8 million ASM miners across seven⁶ African nations alone endure poor working conditions, low wages and insufficient social protection (IRENA, 2023a).
- **Realise new opportunities in supply chains.** The G7 can support African countries to move beyond primary ore exports and embrace higher-value activities such as mineral processing. By prioritising mineral processing, nations can potentially improve their trade balance, lower transportation and infrastructure costs within the sector, and stimulate local economic growth, thereby further advancing the development of clean energy markets in Africa.
- **Decarbonise mining operations.** Mining and processing activities involve significant electricity and diesel use. Leveraging solar, wind or batteries on-site could yield substantial savings and decarbonise these operations. The G7 can support the development of innovative decarbonisation projects in African nations by enabling technology transfer initiatives, facilitating financing, and providing technical expertise and capacity-building support to create truly sustainable value chains for energy transition technologies.
- **Actively engage against corruption.** Addressing the governance of critical material projects is needed to reduce corruption risks, avoid tax revenue losses from inadequate tax frameworks and better manage revenue allocation from these projects. These measures are critical to ensure transition minerals projects do not replicate past negative experiences that harm people and the environment. The G7 should proactively collaborate with African governments, industry stakeholders, businesses (including their own) and civil society to improve regulatory frameworks aimed to increase accountability, transparency and public participation.

⁶ *Burkina Faso, DR Congo, Ethiopia, Ghana, Sudan, the United Republic of Tanzania and Zimbabwe.*

3.4 Areas for collaboration in strengthening institutional frameworks and capacity

The energy system is intrinsically linked to the smooth functioning of the economy, the well-being of people and the sustainability of ecosystems. Successful energy transitions in Africa offer opportunities for inclusive development. Yet much depends on putting in place adequate structural and institutional underpinnings to strengthen supply chains, shore up the skills base and allow greater local value creation that benefits the local population broadly. There are major areas for collaboration on this front whereby the G7 can support African nations through the transfer of public funds and capacity building.

The development of a pipeline of commercially attractive projects is a key area of capacity building that is identified as a prerequisite for successful implementation of the CMP. Technical assistance from the international community can focus on bolstering African stakeholders' capacity in project preparation. This involves streamlining and standardising the project preparation process, leveraging framework contracts to expedite procurement, and aligning with international climate finance goals.

Robust energy planning can also foster an improved environment for mobilising investments in clean energy and infrastructure. Africa showcases a number of excellent examples of national, regional and continental power sector planning carried out by respective African authorities. These efforts should extend across all African countries. In addition, alignments with international climate finance must be strengthened, and power sector planning needs to be further integrated with the broader energy and economic sectors.

The CMP has provided a groundbreaking platform for co-ordinated planning at the regional and continental power system level (Box 6), but sustaining and strengthening such an effort is essential. This requires maintaining and investing in institutional as well as human capacity. In addition, the CMP effort needs to extend to national authorities by building or significantly reinforcing national planning.



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Box 6 Key roles of planning: The successful case of the CMP, a groundbreaking platform for co-ordinated infrastructure planning and institutional capacity building

The main deliverable of the CMP – which is currently being finalised with the support of international partners, including IRENA – is to identify a list of priority investments for electricity generation and transmission. This Africa-led initiative will thus play a critical role in facilitating investments in the continent’s energy transition, as it will provide investors with a ready set of projects with the official backing of African governments.

While major renewable generation projects will be included in the CMP, there will also be a strong focus on both storage and large-scale cross-border transmission infrastructure that will be essential to maximise the use of the continent’s renewable energy resources. To this end, the CMP has provided the regional power pools of Africa with a key role in the CMP development processes, to build on the institutional capacity in place. At the same time, the CMP recognises that domestic transmission and distribution infrastructure must be enhanced in parallel to any major continental-scale infrastructure development so that renewable projects do not fail in the last mile. Certain countries may emerge from the process as “renewable champions” within the continent. These countries can play an important role as exemplars in renewable energy implementation and innovation.

Recognising the diverse challenges and opportunities across the continent, the CMP also extends beyond a mere plan for infrastructural development and places a strong emphasis on the development of institutional capacity across the continent. The initiative is in the process of equipping experts from official planning institutions at the regional and national levels with the knowledge required to effectively carry out the process of energy planning and to utilise advanced modelling methodology with the support of IRENA and the International Atomic Energy Agency (IAEA), alongside other development partners. By cultivating a resilient, informed and skilled institutional base in conjunction with the planning documents, the CMP will result in a strong foundation for sustainable energy planning practice in the coming decades.

This vision underlines the benefits of a collaborative approach to energy planning on both regional and continental scales, rather than as individual country efforts. Building more connections within and between regions will enhance electricity trade, accelerate the adoption of renewable energy technologies, and simultaneously decrease overall system costs and carbon emissions. It is a strategy designed to empower the entire continent with a secure, cost-effective and environmentally friendly energy system.

While robust and effective long-term planning reduces investment risks, it is critical that energy planning and climate investment planning be more integrated. NDCs offer a framework for countries to articulate their climate action goals, balancing national aspirations with the availability of enabling resources. Sharing experiences among African nations, along with support from the international community, can play a pivotal role in strengthening the connection between the long-term energy planning and financing of energy infrastructure projects. The G7 can support capacity building in energy planning while avoiding duplication of efforts. More concrete areas of collaboration around NDCs are described in Box 7.

Box 7 Recommendations for collaboration around NDCs

Recognising the need for escalating ambition between NDC rounds, particularly regarding the tripling of renewable energy capacity, the G7 could benefit from collaborating on solutions addressing structural, institutional, and capacity-building needs for NDC support. The following areas offer fertile ground for G7 and African partnership in achieving NDC targets:

- **Infrastructure finance:** NDCs provide valuable insight into a nation's climate goals and the necessary resources to achieve them, particularly regarding the infrastructural transformation required for renewable energy tripling. G7 support should strategically target finance and technical expertise to address gaps in grid modernisation and extending energy access.
- **Domestic support:** While external support is critical, the G7 should work with African nations to promote a diversified approach to financing and technical assistance, reducing overreliance on any single source and fostering long-term sustainability. Innovative financing models, such as blended finance, can mobilise both private and public capital while fostering the domestic resources and skills needed for self-sufficiency.
- **Bolstering investor confidence:** The G7 can play a key role in reducing perceived investor risk associated with NDC conditionality. This can be achieved through robust risk mitigation tools (e.g. guarantees, insurance) and by promoting transparent NDC implementation with clear tracking and reporting frameworks.
- **Tailored, needs-driven solutions:** G7 support must align with the specific barriers and energy priorities outlined within each nation's NDC. Bespoke policy support, capacity-building initiatives, and financing solutions addressing storage, grids, and access in a manner sensitive to local contexts will prove most effective. Prioritising African leadership and ownership throughout is essential for solutions that support national development trajectories.
- **APRA Alignment:** The G7 can utilise the APRA initiative as a guiding framework, which could ensure alignment with the above areas. Supporting and amplifying APRA's action plans maximises the potential for renewable energy deployment and integration, ensuring efforts complement one another rather than overlap.



4. RECOMMENDATION ON FOCUS AREAS FOR THE G7-AFRICA PARTNERSHIP

The partnership between the G7 countries and Africa holds significant promise to foster prosperity and unlock Africa's immense growth potential, with energy playing a crucial role. A wide range of collaboration opportunities are identified in this report, including:

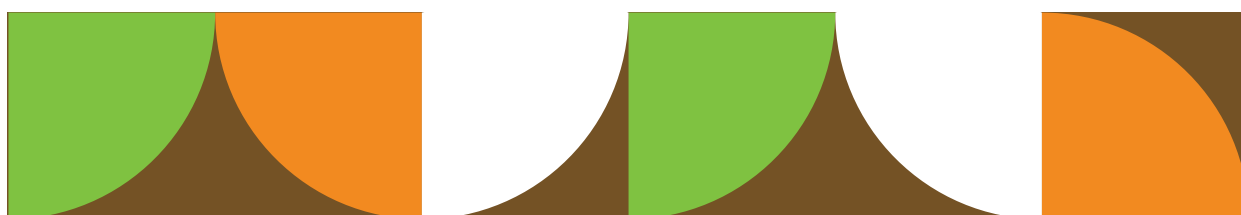
- **Increasing in infrastructure and enabling access to finance:** Both public and private finance flows into the energy transition in Africa are sorely lagging behind the rest of the world. Stronger international co-operation will be required to expand the availability of funds and transform lending to developing nations. A major opportunity exists to support the development of a pipeline of infrastructure projects in renewable generation, national and transnational grids, and storage that are attractive to investors.
- **Expanding energy access and supporting the productive use of energy:** Extensive room remains for donor governments and development partners to scale up public capital in African countries. This capital can be used to develop the infrastructure and enabling policy ecosystem required for providing affordable, reliable and modern energy access for all. Modern access must also be understood in the sense of going beyond basic residential electricity to supporting productive use, *i.e.* commercial businesses, agriculture and industrial development.
- **Effectively managing critical minerals for the energy transition:** It is essential to ensure mining projects for the energy transition are subject to strong environmental and social safeguards. These safeguards must ensure transition minerals are produced sustainably, produce benefits for local communities, and respect human rights and the environment, while also helping to generate revenues to build sustainable infrastructure and support socio-economic development locally.
- **Strengthening institutional frameworks and capacity:** African stakeholders are looking to enhance long-term planning capacity to deliver on their existing strategies. They are also looking to strengthen policies to support a just transition, based on a robust skills base and workforce, and to create local value that brings broad benefits to the local population.

The G7-Africa partnership could help accelerate and reinforce sustainable and resilient development in Africa. The APRA initiative also stands ready as an existing African-led platform to facilitate such collaboration.

The following specific recommendations for the G7 can act as concrete steps to commence the agenda outlined in this report:

- The G7 can support African countries to identify and develop projects with transformative impacts by facilitating access to existing project development facilities. These are projects such as the Sustainable Energy Fund for Africa (SEFA) hosted by AfDB, the Climate Action Window of the African Development Fund, and the Project Preparation Facility (PPF) of Africa50. The G7 can also establish dedicated facilities within African institutions.
- The G7 can increase public financial flows for Africa's energy transitions through multiple channels (e.g. governments, multilateral and bilateral DFIs, and global funds such as the Green Climate Fund and JETP) to drive energy transition projects through various strategies (e.g. direct investments in assets or in the enabling ecosystem) and policy instruments. At the same time, the push for reforming the way MDBs support developing economies must continue to emphasise the energy transition as a driver for sustainable socio-economic development.
- G7 countries, as the main shareholders of MDBs, can leverage their influence on global and development finance architecture to lower the cost of capital flows to the African continent. The IDA replenishment process is in addition a good opportunity to increase support of renewables in Africa. Portfolio approaches across different countries and projects may help to reduce risks in countries or projects with exposure to higher risk.
- The G7 can provide support by reinforcing the capacity of African institutions to govern the energy transition. This includes, but is not limited to, institutional ability to deliver integrated long-term planning, policy development, project preparation and resource mobilisation. Existing capacity building strategies, such as those in support of the African Union's Continental Power Systems Masterplan, have demonstrated success and can be leveraged.
- The G7 can signal its commitment to Africa's energy transition by supporting increased ambition in the upcoming NDC revision cycle (NDC 3.0), aligning with the Nairobi Declaration's goal to more than triple renewable energy capacity by 2030. The G7's powerful position offers the opportunity to provide targeted support in critical areas like capacity building, infrastructure development, and technology transfer, accelerating progress toward the Nairobi Declaration's goals and demonstrating tangible leadership in the global pursuit of a just energy transition. The G7 is invited to join forces with the APRA initiative to enable this recommendation.

Together, the G7 and Africa can pave the way to harnessing Africa's growth potential, fostering shared prosperity, environmental sustainability and global economic development.



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