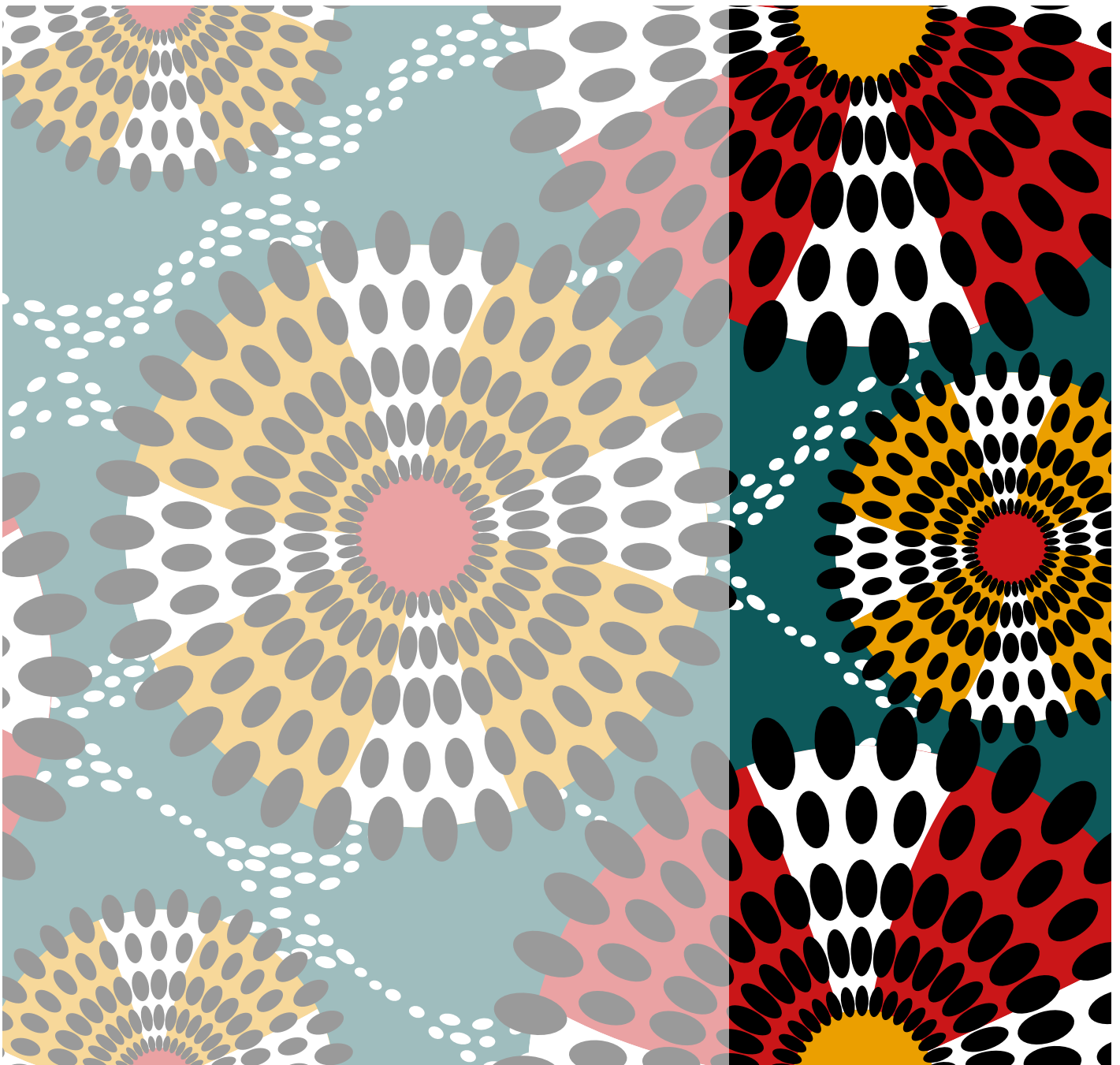
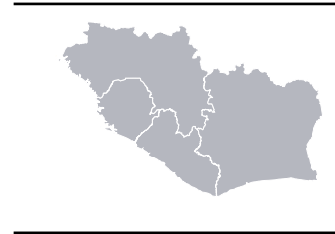


EXECUTIVE SUMMARY

RENEWABLE ENERGY MARKET ANALYSIS

MANO RIVER UNION REGION



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EXECUTIVE SUMMARY

**RENEWABLE ENERGY
MARKET ANALYSIS**

MANO RIVER UNION REGION





EXECUTIVE SUMMARY





The Mano River Union (MRU) region comprises four countries – namely, Côte d'Ivoire, Guinea, Liberia and Sierra Leone – with a combined population of nearly 56 million as of 2022. The region is rich in natural resources with large mineral reserves. The region's economies are commodity-dependent, with exports as a share gross domestic product (GDP) in 2019-2021 ranging from 13% in Sierra Leone to 20% in Côte d'Ivoire and Liberia, and 47% in Guinea. Ores and metals represent the largest share of merchandise exports in Guinea, Liberia and Sierra Leone, while in Côte d'Ivoire agricultural goods account for the majority share. Periods of high commodity prices result in boom periods; however, these have been short-lived and reversed due to external shocks over the past decade, including the Ebola crisis, the COVID-19 pandemic, and the food and non-food commodity price shocks resulting from geopolitical developments in 2022.

The MRU countries are increasingly faced with the need to devise inclusive and resilient growth trajectories that tackle a multitude of socio-economic development priorities, including economic diversification, poverty alleviation, job creation and local industry development, while addressing fiscal challenges and rising climate impacts.

Access to sufficient, reliable and affordable energy is fundamental for the region to meet its socio-economic development goals. The lack of energy access constrains economic activity, impacts the delivery of critical public services and places strains on government budgets due to fuel imports. All MRU countries boast abundant renewable energy resources. These resources could be harnessed to tackle the energy deficit and support broader development and industrialisation goals by strengthening domestic agriculture and industry, as well as by developing local value chains for energy transition minerals and technologies.

This report, developed by the International Renewable Energy Agency (IRENA) in partnership with the Mano River Union Secretariat and The Energy Nexus Network, aims to offer insights on the current status of the energy sector in the MRU region and highlight the key opportunities renewable energy solutions offer to meet growing energy needs. It analyses the policy and investment landscape, and offers recommendations for scaling up renewable energy adoption in the region.

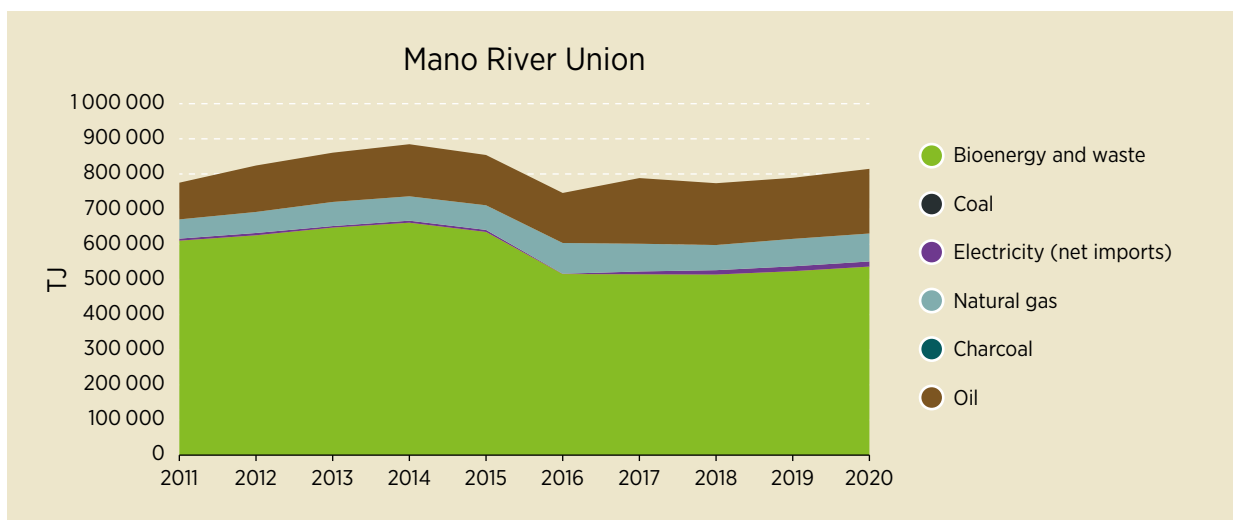
ENERGY IN THE REGION: AN OVERVIEW

Bioenergy remains the most widely used energy source in the region.

It accounted for over 70% of total primary energy supply (TPES) between 2011 and 2020 in the region, with the share reaching up to 90% in Liberia (Figure S1). Bioenergy use is mainly for cooking, largely in the form of firewood and charcoal use due to the lack of access to clean cooking fuels. The share of natural gas has been steadily increasing: its contribution to the region’s TPES grew from about 7% in 2011 to 10% in 2020 and is expected to grow further as a result of new discoveries in Côte d’Ivoire. Côte d’Ivoire is the only major oil- and gas-producing nation in the region, with proven reserves of over 154 million barrels of oil and about 18 billion cubic metres of natural gas. At a regional-level, oil constituted almost 19% of TPES in 2020 and is experiencing rapid demand growth, particularly due to its use in the transport sector.



Figure S1 Primary energy supply by fuel type in the MRU region, 2011-2020



Source: UNSD (2022).

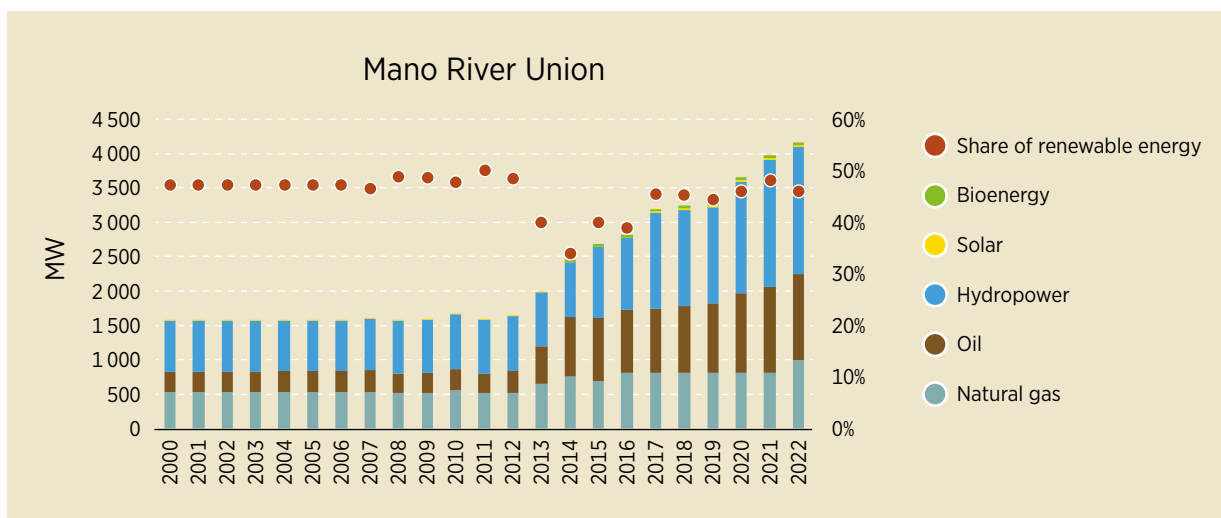
Note: TJ = terajoules.



Installed capacity in the power sector has more than doubled in the past decade, yet significant supply gaps remain. Installed capacity in the region has grown from 1659 megawatts (MW) in 2010 to 4158 MW in 2022 (Figure S2). A significant share of the new investments came after 2013, which coincided with the period when large natural gas plants in Côte d'Ivoire came on stream as well as

the commissioning of large hydroelectricity plants in the region. At a regional level, hydropower accounted for the largest share of installed capacity in 2022 (44%), followed by natural gas (30%) and oil (24%). Altogether, renewables accounted for over 46% of total installed capacity in 2022. Non-hydro renewables, mainly solar and bioenergy, accounted for about 2% of total installed capacity.

Figure S2 Total installed capacity by fuel type in the MRU region, 2000-2022



Source: IRENA, 2023b; UNSD, 2022; ANARE-CI, n.d.; INS, 2022.

Note: Includes on-grid and off-grid capacity. Does not include contracted capacity through regional interconnection from non-MRU countries; MW = megawatt.

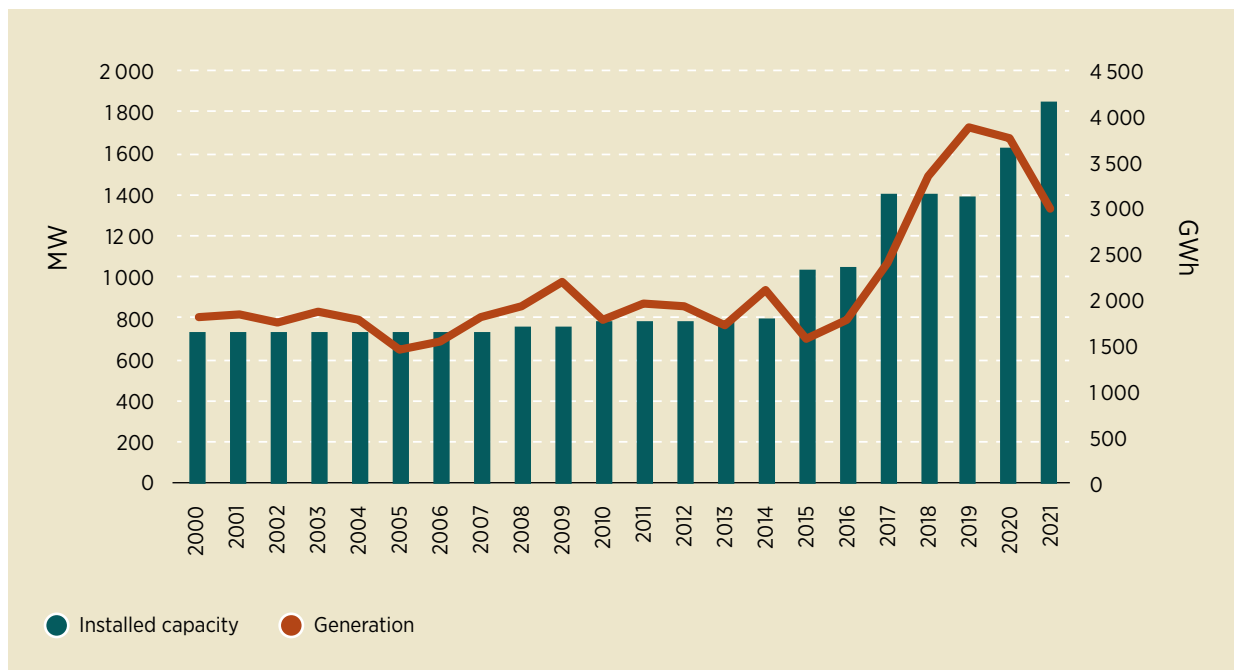


The electricity generation mix is dominated by natural gas, followed by hydropower and oil.

Generation has more than doubled in the region, from 6 951 gigawatt hours (GWh) in 2010 to nearly 1.5 terawatt hours (TWh) in 2021. Côte d'Ivoire alone accounted for about 75% of all electricity generated, followed by Guinea (20%). Compared to the installed capacity mix (where hydropower dominated, followed by natural gas and oil), the

generation mix in 2021 was dominated by natural gas (58%), followed by hydropower (22%) and oil (20%). This is largely due to variability in hydroelectricity generation attributable to the availability of water resources (Figure S3). Non-hydro renewables, although the fastest-growing source, still represented a marginal share of the generation mix at 0.2% in 2021. Together, renewables were responsible for 20% of the electricity mix.

Figure S3 Hydropower installed capacity and generation in MRU region, 2000-2021



Source: IRENA, 2023b; UNSD, 2022; ANARE-CI, n.d.; INS, 2022.

Note: MW = megawatt; GWh = gigawatt hours.

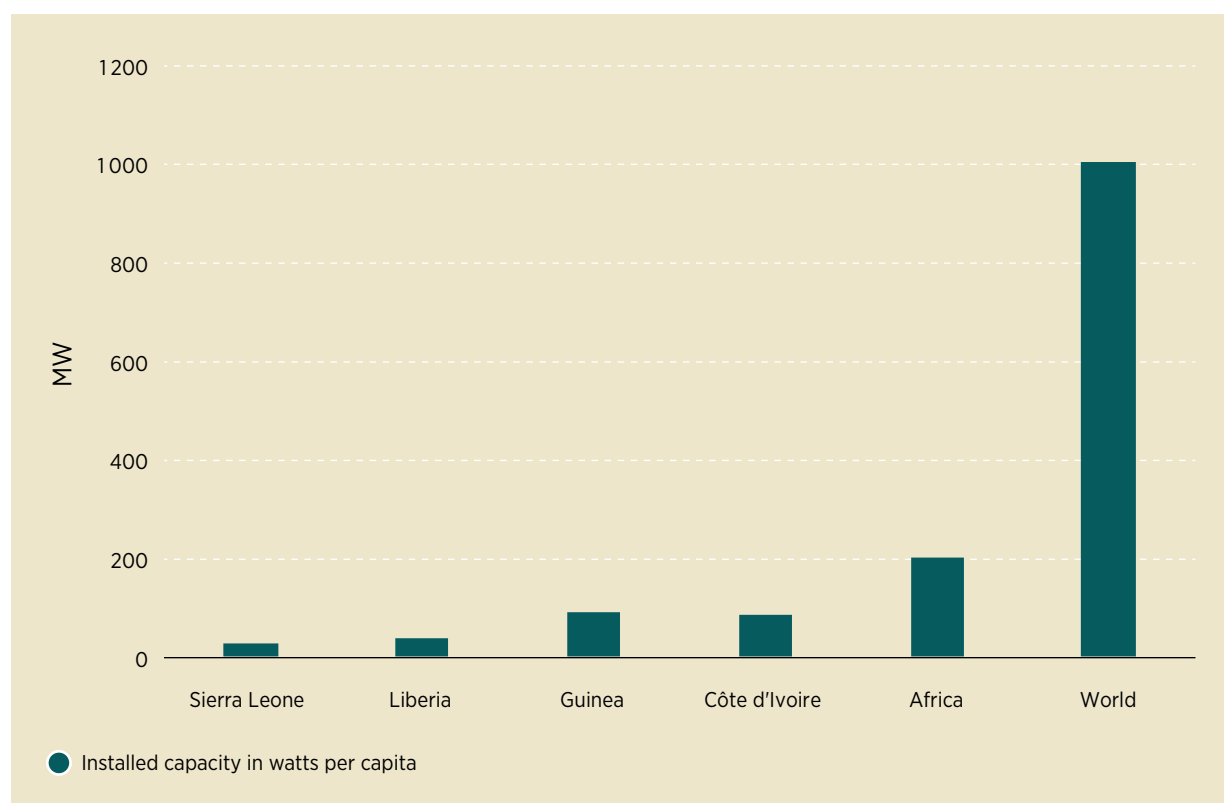


Oil-based generation has grown alarmingly in recent years. Total capacity grew from about 319 MW in 2012 to 1255 MW in 2022. Oil-based generation capacity accounted for more than half of installed capacity in Sierra Leone and Liberia. The countries currently face a significant capacity deficit – a challenge further compounded by the vulnerability of existing installed capacity to a changing climate, especially during the dry season when water levels in the hydro reservoirs are low. In Côte d'Ivoire, oil-based generation grew rapidly in 2021 to 300 GWh (from 36 GWh in the previous year) to cope with the reduction in

hydropower output resulting from a prolonged dry season.

Investments in power generation capacity need to be significantly ramped up to meet unmet demand in the region. Electricity demand is projected to grow at 5% annually in the region, rising to nearly 30 TWh in 2030. Figure S4 compares the per capita installed capacity of the countries in the region with the continental and global average, highlighting the significant gap that presently exists in the generation segment.

Figure S4 Installed capacity per capita, 2022



Note: MW = megawatt.

Regional electricity trade offers opportunities to meet growing demand, export surpluses and manage variability. The commissioning and operationalisation of the Côte d'Ivoire-Liberia-Sierra Leone-Guinea (CLSG) Interconnection project is a major step in efforts to establish a regional electricity infrastructure that enables countries to benefit from accessing low-cost electricity supply while managing variability in domestic generation. At present, Côte d'Ivoire is the lone supplier of electricity within the network, with 973 GWh of exports in 2022 across the MRU region and the West Africa Power Pool. With its significant hydropower and solar potential, Guinea is also part of multiple regional interconnections, including the Gambia-Guinea-Guinea-Bissau-Senegal Gambia River Basin Development Organisation (OMVG) and the Guinea-Mali OMVG Interconnection Project. While regional trade has grown, investment in domestic generation and transmission and distribution infrastructure must be pursued in tandem. Obtaining diverse supply options is important to mitigate energy security challenges due to cross-border generation deficits, as seen with Côte d'Ivoire in 2021 due to a prolonged dry season. A key mitigation strategy must also be to diversify the electricity mix with non-hydro renewable energy sources.

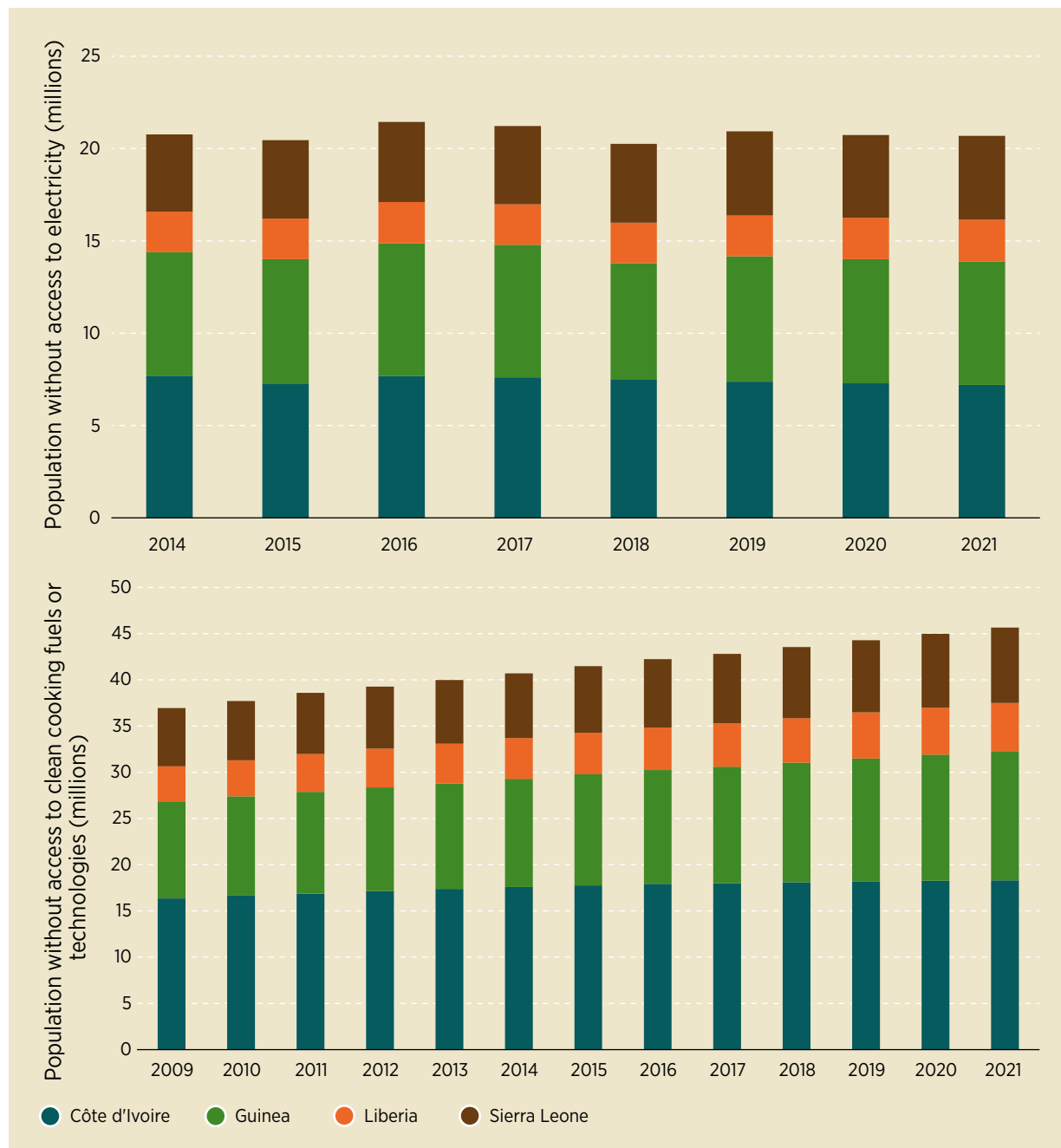
Access to modern energy remains a key challenge for the region. The total number of people without electricity access in the region has largely remained constant at around 21 million since 2014 (Figure S5). Total access rates in 2021 were highest in Côte d'Ivoire

at 71%, followed by Guinea (47%), Liberia (30%) and Sierra Leone (27%). Electrification rates in rural areas continue to lag national averages. In 2021, Côte d'Ivoire recorded a rural electrification rate of 45%, while 21% of the rural population had access in Guinea, only 8% in Liberia and just 5% in Sierra Leone. Several factors are driving the low access rates, including the low generation capacity and poor coverage of the grid, as well as affordability challenges in a region where per capita income levels are below the sub-Saharan average.

Progress on clean cooking continues to lag. About 83% of the MRU's population, or nearly 46 million people, did not have access to clean cooking fuels or technologies in 2021, with the figure continuing to grow at great expense to people's health and the environment. The majority of those living without access are in Côte d'Ivoire (18 million), followed by Guinea (14 million), Sierra Leone (8 million) and Liberia (5 million). Overall, Côte d'Ivoire remains the only country that has seen a marked growth in total clean cooking access, with total access rates rising from 17% in 2009 to 32% in 2021. The use of gas has grown rapidly over the past decade, with coverage rising from 19% in 2012 to 30% in 2021. In Guinea, Liberia and Sierra Leone, biomass use has been decreasing, being displaced in large part by charcoal. In 2021, 35%, 49% and 36% of the population used charcoal in Guinea, Liberia and Sierra Leone, respectively. The charcoal value chain is also largely informal in nature, supporting the livelihoods of a significant share of the population, bringing its sustainability into question.



Figure S5 Electricity and clean cooking access landscape in the MRU region, by country



Source: World Bank (2023b); WHO (2023b).

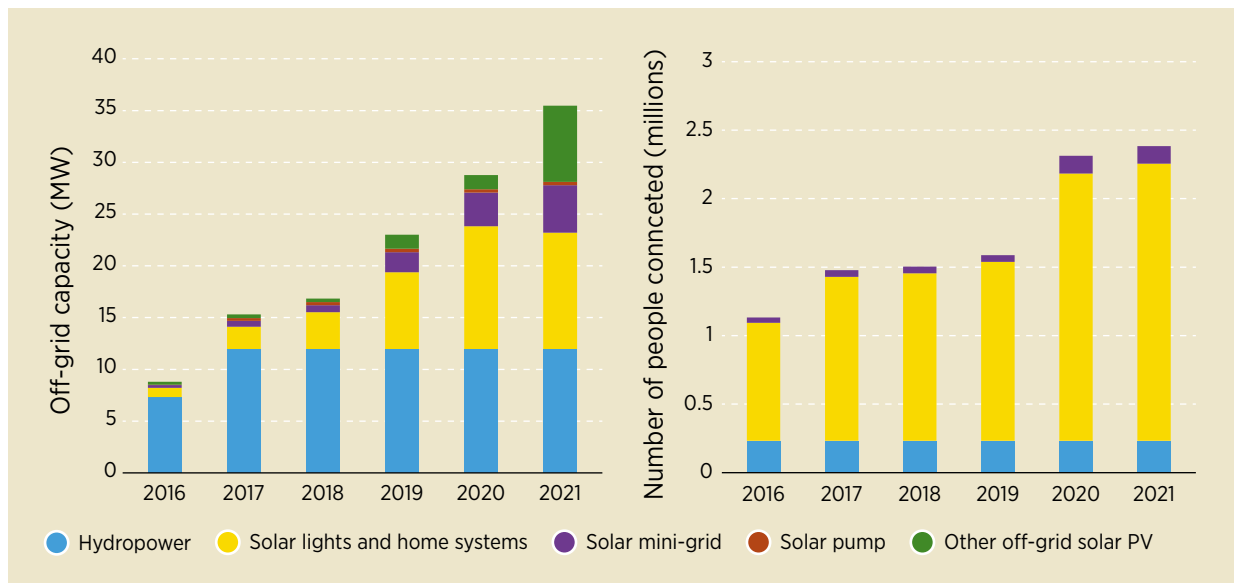


Decentralised renewable energy (DRE) solutions – standalone systems and mini-grids – are proving to be important tools to expand electricity access.

Between 2016 and 2021, the total installed capacity of DRE solutions in the MRU region increased from 9 MW to 35 MW (Figure S6). As of 2021, over 2.4 million people had accessed electricity services through off-grid solutions in the region. The majority of these people used standalone solar systems, including solar lights and home systems. The adoption of standalone solar systems has grown, supported by a combination of enabling policies, the entry of the private sector and decreasing technology costs. Hydro-based mini-grids have a long track record in the region, particularly in Guinea, Liberia and Sierra Leone. In recent years, the adoption of solar-based mini-grids has grown as well, driven by declining costs and stronger support from government and development partners. Sierra Leone in particular has seen rapid growth in mini-grid adoption, which has been catalysed by the Rural Renewable Energy Project, with over 54 systems deployed.



Figure S6 Off-grid renewable energy capacity and number of people connected in the MRU region



Source: IRENA (2022a).

Note: MW = megawatt.

THE RENEWABLE ENERGY POLICY AND INVESTMENT PARADIGM

Renewable energy technologies have seen a rapid reduction in costs, enhancing their overall competitiveness against fossil fuel-based solutions for new infrastructure investments.

At a global level, the weighted average levelised cost of electricity (LCOE) for utility-scale solar photovoltaic (PV) decreased 3% between 2021 and 2022 to USD 0.049/kWh (United States dollar per kilowatt hour). For onshore wind, the weighted average LCOE fell about 5% in the same time period, from USD 0.035/kWh to USD 0.033/kWh. In 2022, the global weighted average LCOE of both hydropower and bioenergy for power projects stood at USD 0.061/kWh. Electricity generation costs from solar PV mini-grids fell from USD 0.55/kWh in 2018 to USD 0.38/kWh in 2022, with a pathway to USD 0.20/kWh in 2030. Overall, new renewable power increasingly lies within, or under, the fossil fuel cost range. While the global LCOEs are not immediately transferable to the MRU region, tapping into the cost advantage of renewables in the power sector requires targeted interventions to reduce capital costs, strengthen local markets and develop a project pipeline at national- and regional-level.

Renewable energy targets have been set by countries in the MRU region and are reflected in national plans and nationally determined contributions (NDCs).

All MRU countries have submitted NDCs under the Paris Agreement of the United Nations Framework Convention on Climate Change (UNFCCC), along with revisions in 2021-2022. Renewable energy, alongside energy efficiency, features prominently as a key mitigation measure for the energy sector. With the exception of Sierra Leone, the NDCs of all the MRU countries include dedicated renewable energy targets focused mostly on the power sector. However, these targets are often not aligned with targets set as part of national renewable energy policies or action plans. At the regional level, the ECOWAS Renewable Energy Policy adopted in July 2013 set a target to increase the share of renewable energy in

the region's electricity mix to 35% in 2020 and 48% in 2030 (excluding large hydropower, this would be 10% and 19%, respectively).

Access to affordable, long-term financing will play a crucial role in translating the region's targets into reality.

Traditionally, the region's energy infrastructure (mainly hydropower) has almost exclusively been financed through public financing from both international and national sources. Over the past decade, private capital participation has seen an upward trend in certain market segments (e.g. solar PV, hydropower, bioenergy). This has been enabled by regulatory interventions at the national level and concessional equity and debt, along with technical assistance facilities, offered by development finance institutions (DFIs). Export credit agencies (ECAs) have also been playing an active role in financing renewable energy projects in the MRU region. ECAs have traditionally focused on hydropower development, particularly in Côte d'Ivoire and Guinea. Grant-based technical assistance facilities to support project origination and undertake resource assessment and market development investments are increasingly available, covering both generation and transmission, and distribution infrastructure development. Examples include the EU-Africa Infrastructure Trust Fund (EU-AITF), GET.transform, New Partnership for Africa's Development Infrastructure Project Preparation Facility (NEPAD-IPPF), AfDB and SeforALL.

Public financing will continue to play a crucial role in supporting the adoption of renewable energy in the region.

The financing is needed to bridge the funding gaps in early stage project development (e.g. feasibility studies) and deliver junior equity and debt to attract more private capital into the sector. Tackling various risks – including those associated with off-takers, politics and currency – requires public financing instruments to work in tandem to strengthen the viability of renewable energy projects. Public financing outlays are also necessary for the stability of an enabling fiscal regime for renewable energy products, which directly impact affordability

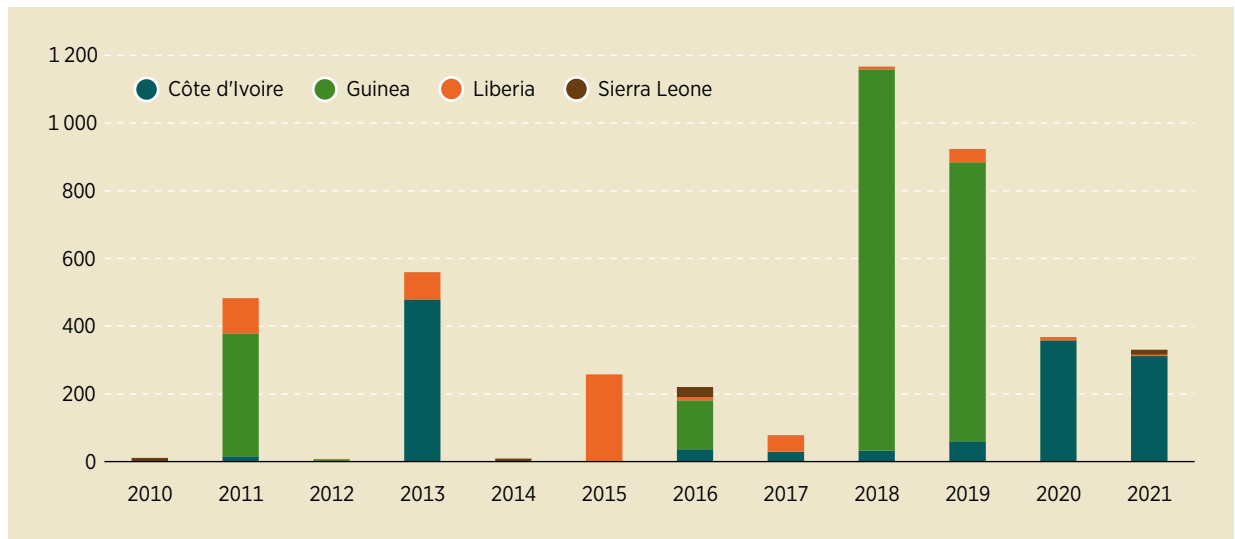
for consumers. On the demand side, particularly in the context of electricity and clean cooking access solutions, public financing will play a crucial role in bridging the affordability gap through direct or indirect consumer financing channels. Investments are also necessary in the wider ecosystem for education and training, standards and quality assurance, firm-level incubation support, and local value chain development, among other measures.

International public financial flows for renewable energy in the region have shown a fluctuating trend.

In an increasingly fiscally constrained environment, realising the region’s renewable energy potential will hinge on scaling up support through public financing institutions, particularly through international collaboration between the Global North and the Global South, which may take the form of grants and

concessional lending. Where feasible, these funds should leverage private capital. However, this should not come at the cost of denying basic infrastructure development that can underpin socio-economic growth and development in the region. Between 2010 and 2021, about USD 4.4 billion of international public financing was invested in renewables in the MRU region (Figure S7). Guinea attracted the majority share (56%), followed by Côte d’Ivoire, Liberia and Sierra Leone. The spurts in investments are connected to large project-level transactions, particularly those related to hydropower. Of the total international financing between 2010 and 2021, about 78% was for hydropower projects. Large investments in one year may be followed by very low investment activity, showcasing the lack of a consistent pipeline of renewable energy projects being funded.

Figure S7 International financial flows in support of renewable energy (USD million, 2020 PPP)



Source: IRENA and OECD (2022).

Note: PPP = Power purchase parity.



POTENTIAL AND PROSPECTS FOR SOCIO-ECONOMIC OUTCOMES

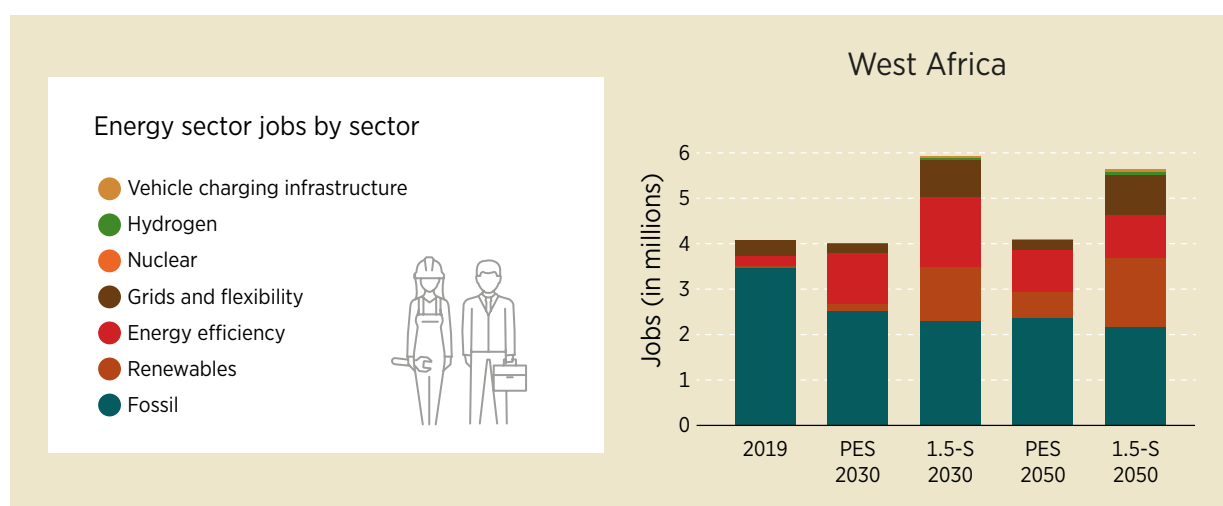
In the power sector, the present levels of renewables deployment represent less than 2% of the total potential 95 gigawatts (GW) available to the region.

Countries in the region have announced targets and plans to further increase renewables adoption. It is estimated that the share of renewables in the region's power capacity mix will rise from 46% in 2022 to at least 61% by 2030. Several factors will influence the trajectory of this growth. These include declining costs related to technology itself and local market development, the need to diversify the energy mix to mitigate risks associated with overreliance on a single resource (renewable or otherwise), and new opportunities offered by regional interconnections.

In addition to meeting energy demand, renewables also present opportunities for countries to support

economic growth, employment generation and general welfare. The economy-wide impacts of investing in renewables will strongly depend on the existing economic structure of countries; the availability of economic, financial and institutional factors; and the presence and potential for the development of transition-related skills. IRENA estimates for West Africa indicate that scaling renewables aligned with its 1.5°C Scenario (1.5-S) could boost the region's GDP by 1.6% more than a business-as-usual (Planned Energy Scenario, or PES) case¹ between 2021 and 2050. Linking renewables deployment with efforts to develop local industries and building of supply chains would contribute to increasing the economic impact of investing in the energy transition. The energy transition would also significantly benefit job creation in West Africa's energy sector, with the potential to create more than 2 million additional jobs by 2030 (Figure S8).

Figure S8 Energy sector jobs by sector in West Africa, 2019-2050



¹ IRENA's *World Energy Transitions Outlook* outlines a vision for the transition of the energy landscape to reflect the goals of the Paris Agreement. The analysis builds on two of IRENA's key scenarios. The Planned Energy Scenario is the primary reference case providing a perspective on energy system developments based on governments' energy plans and other planned targets and policies in place. The 1.5°C Scenario describes an energy transition pathway aligned with the 1.5°C climate goal and bringing carbon dioxide (CO₂) emissions to net zero by mid-century. It prioritises readily available technology solutions, which can be scaled up to meet the 1.5°C goal.

COMPREHENSIVE ACTIONS TO ACCELERATE RENEWABLES GROWTH AND MAXIMISE BENEFITS

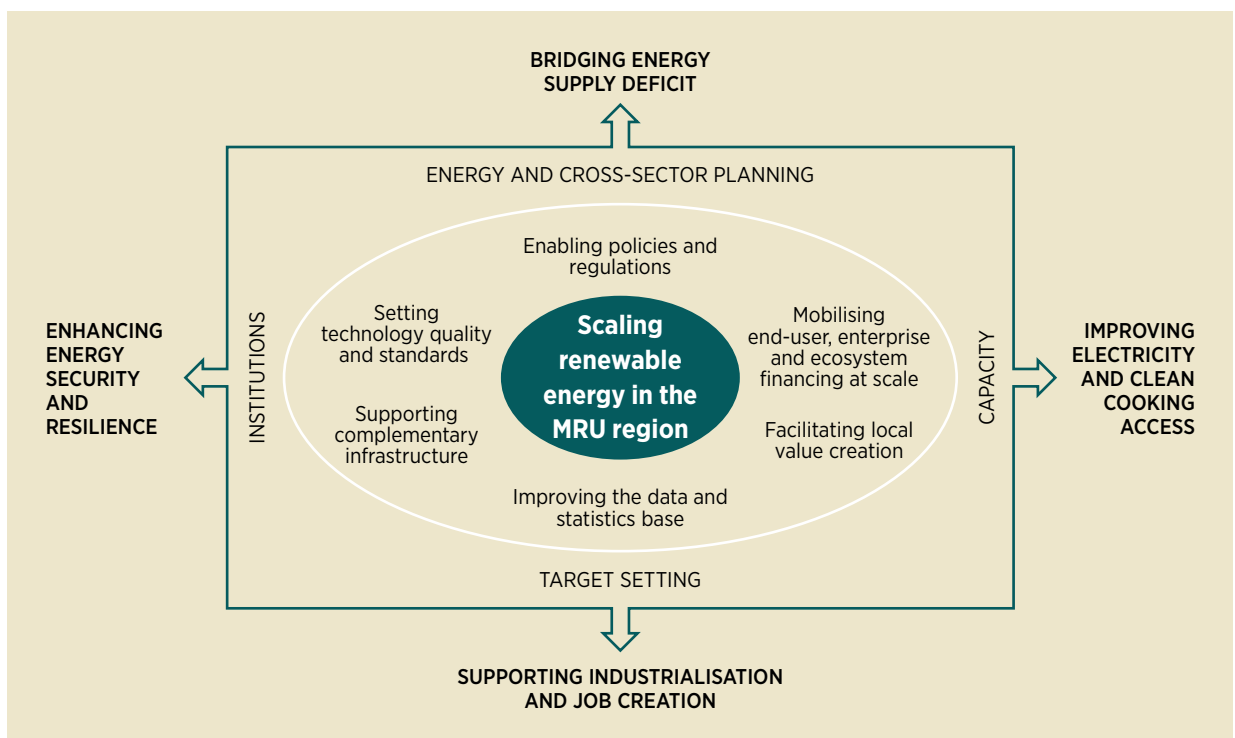
For the full potential of renewables to be realised, a number of deliberate actions need to be undertaken at both the regional and national levels. Based on the analysis carried out, this report proposes a set of recommendations structured across areas illustrated in Figure S9 to accelerate renewable energy adoption in the region in support of energy and broader development goals.



Policies and regulations will be the foundation on which the renewables sector can expand to its true potential in the region. National energy sector plans and policies would benefit from a review to account for recent developments in the renewable energy sector, including cost reductions and the emergence

of a domestic market. Dedicated renewable energy policies are necessary to provide the legal and regulatory basis for set targets and public and private investments in the sector. These investments include those related to land acquisition, grid interconnection, quality and technical standards, and remuneration

Figure S9 Action areas to accelerate renewable energy adoption in the MRU region



models. Policies also need to target the different market segments, such as utility-scale, captive power, decentralised renewables and other applications across sectors. Going beyond the power sector, the policies need to address end-use sectors, including heating/cooling and transport, which account for the largest share of final energy consumption in the region but so far have not received adequate attention.

Targets already set for increasing access to modern energy services and renewables would benefit from periodic reviews and progress benchmarking.

Alignment between the various national plans and strategy documents, including national renewable energy action plans (NREAPs), national energy efficiency action plans (NEEAPs), investment prospectuses, NDCs, and targets and policies is needed to provide a clear vision for the sector's trajectory. Furthermore, governments, in partnership with development partners, may develop a pipeline of renewable energy projects and invest in pre-feasibility social, technical and economic studies, thus preparing the groundwork for attracting private sector investments as part of a long-term, transparent procurement process.

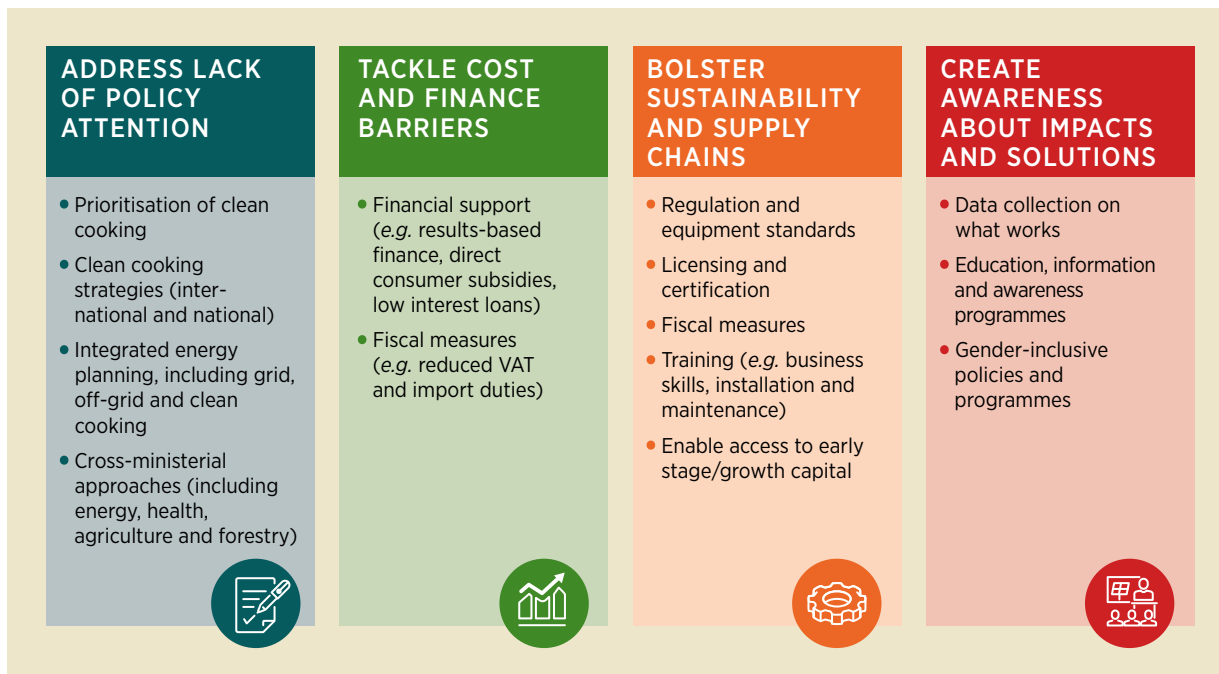
The planning and policy framework for DRE solutions needs to be strengthened.

National electricity access plans should mainstream the role of DRE solutions, including standalone systems and mini-grids, reflecting their cost-competitiveness and adaptability to meet electricity needs for residential, public services and productive applications. Dedicated and stable policies and regulations are needed to support their deployment. The success and lessons from ongoing programmes, including the Rural Renewable Energy Project (RREP) mini-grid programme in Sierra Leone, should be incorporated into more ambitious programmes aligned with national energy access targets. Renewable energy mini-grids, in particular, require a regulatory regime that offers clarity on legal and licensing framework,

tariff determination, main grid arrival implications, and public financing structures. Attracting private capital into the sector at scale and ensuring no one is left behind will require a remuneration model that provides for the gap between revenues from tariff (national uniform, or regulator approved) and the determined cost of service to be filled on an ongoing basis. This is crucial for the scale-up for mini-grids alongside existing support delivering upfront or results-based grants, as well as concessional debt and equity support, for the sector. Stability is key for incentives targeting the sector, including fiscal exemptions that directly impact the affordability of DRE products and services.

Clean cooking adoption must be prioritised given the lack of progress to date.

The number of people living without clean cooking access in the region continues to increase alarmingly. Renewables-based clean cooking options, including solid biomass, bioethanol, biogas and electric cooking, are gaining traction and must be supported as part of a holistic and ambitious clean cooking plan. Countries are encouraged to develop integrated clean cooking plans that assess the role of different solutions and put in place adequate policy mechanisms to facilitate adoption. Fiscal incentives covering fuels and stoves – as well as measures to strengthen local enterprises, enhance access to consumer financing, and improve awareness and support technology innovation to cater to end-user needs and preferences – are necessary as part of a holistic policy framework, as illustrated in Figure S10. Regional initiatives, including the West Africa Clean Cooking Alliance (WACCA) and the West & Central Africa Alliance for Biodigester Promotion, can play a crucial role in strengthening national efforts through finance and technical capacity mobilisation. The setting up of a dedicated Clean Cooking Delivery Unit within the Office of the President in Sierra Leone to co-ordinate action on an urgent basis is an important step and could be considered by other countries in the region.

Figure S10 Clean cooking policy framework – key aspects

Source: IRENA and AfDB (2022).

DFIs should mobilise the entire spectrum of offerings to support sector growth. Concessional financing – as debt, equity, guarantees or technical assistance funds – has played a crucial role in the renewable energy development in the region. A range of products is needed, tailored to the sector’s needs and segments. For utility-scale generation and large-scale transmission infrastructure projects, along the lifecycle, technical assistance funds are crucial for project preparation and feasibility analysis. These funds should be accompanied by guarantees to tackle various risks, including off-taker, currency and political risks. After technical assistance funds are sourced, adequate debt and equity in project vehicles are needed. Here, the deployment of junior and subordinate concessional capital can play an important role in unlocking commercial capital; however, public financing will need to play the majority role in some market contexts. The DRE sector, on the other hand, continues to face a significant equity

gap, alongside local currency debt access challenges, to meet enterprise working and growth capital requirements. Local enterprises in the sector could also benefit from technical assistance facilities to build internal capacity, as well as grants to bridge the end-user affordability gaps. Climate financing, mainly through voluntary carbon markets, is unlocking new forms of revenue streams for enterprises in the DRE sector. Recognising renewables as a key mitigation activity under the Article 6 of the Paris Agreement could unlock international financing for the sector. However, efforts are needed to strengthen accountability and transparency frameworks along with equitable benefits sharing.

Project pipelines need to be strengthened. At present, renewable energy investments continue to flow on a project-by-project basis. Targeted efforts are needed to strengthen the project pipeline by deploying public financing to undertake resource assessment,

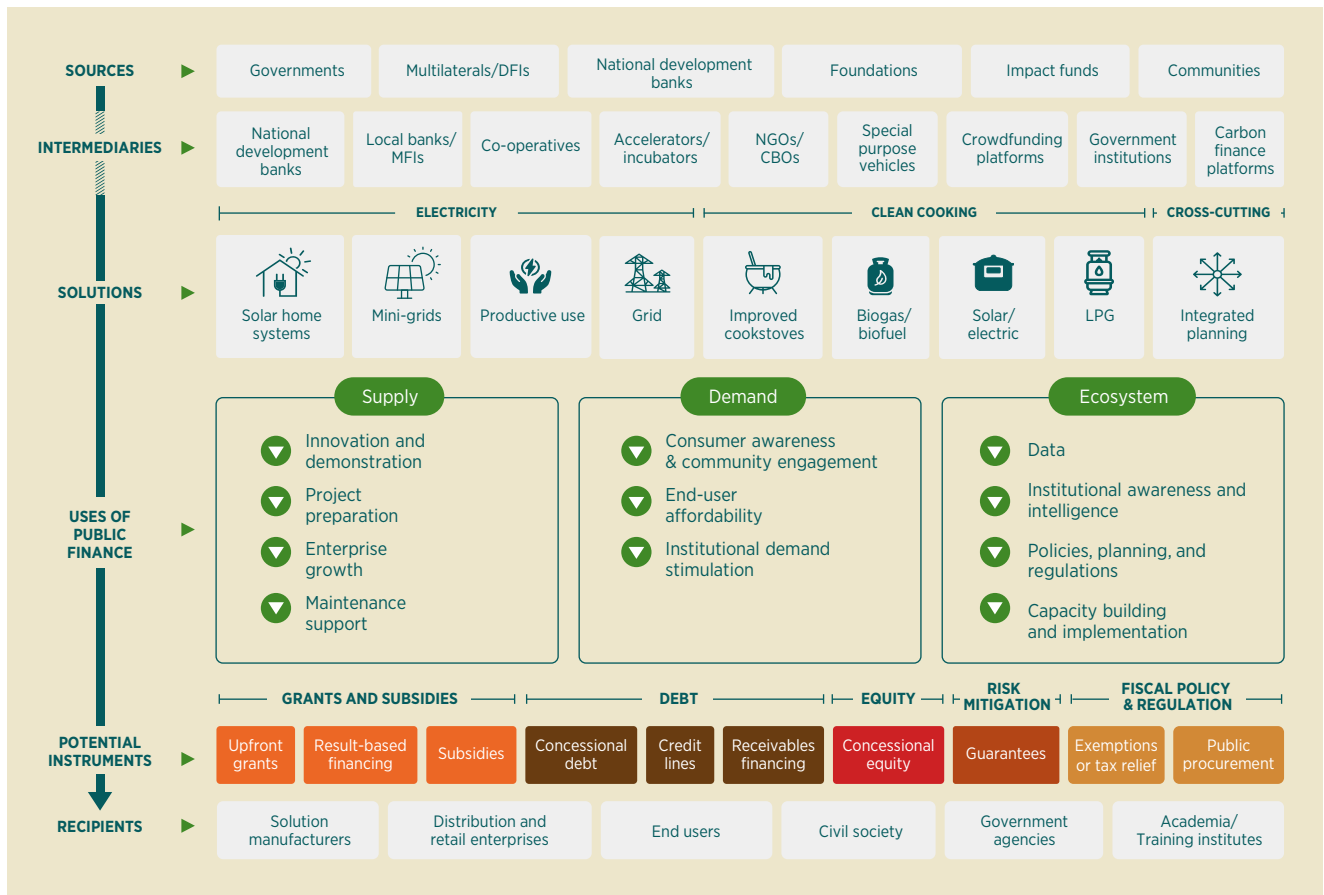
strengthening planning and target setting, supporting policy and regulatory market development, and building the capacity of local enterprises through technical assistance programmes, venture-building support and transaction advisory services.

Renewable energy investments should be prioritised to tackle short-term demand gaps. Though there are ongoing projects in the four MRU countries in renewable energy technologies, especially in the construction of large hydropower stations, the MRU country governments are still committing significant resources to power plants using expensive fossil fuels, which creates a financial strain on national treasuries. This is particularly the case with regard to the concerning rise in the installed capacity of oil/fuel-based power plants in the region, which makes power systems susceptible to volatility in international fuel prices, as recently seen in 2022-2023. Initiatives such as the World Bank's Regional Emergency Solar Power Intervention (RESPITE) programme should be expanded to channel new energy sector investments away from fossil fuels where cost-effective renewable options exist, as well as to phase out existing assets beginning with oil/fuel-based generation on an urgent basis.

Holistic energy access financing programmes are necessary for DRE solutions. A mix of public financing support is available to the DRE sector in the region, targeting end-users, enterprises and the broader enabling environment (Figure S11). Greater co-ordination among the government, donors and other development entities is necessary to plug the various financing gaps in the sector and support the delivery of DRE production and services in a sustainable manner. For instance, results-based financing programmes should be complemented by dedicated funding facilities delivering concessional debt and equity. In addition, technical assistance support and ongoing (operating expense) subsidies should be provided when needed to ensure the viability of service delivery, particularly in areas most likely to be left behind. Dedicated funding facilities are also needed to strengthen DRE adoption for livelihoods (e.g. in agriculture) and public services (e.g. in healthcare). Beyond technology solutions, access to funding is also necessary to support energy-efficient technology innovation, appliance financing and market creation efforts (e.g. creating market linkages for agricultural products).



Figure S11 Holistic public financing framework for universal energy access

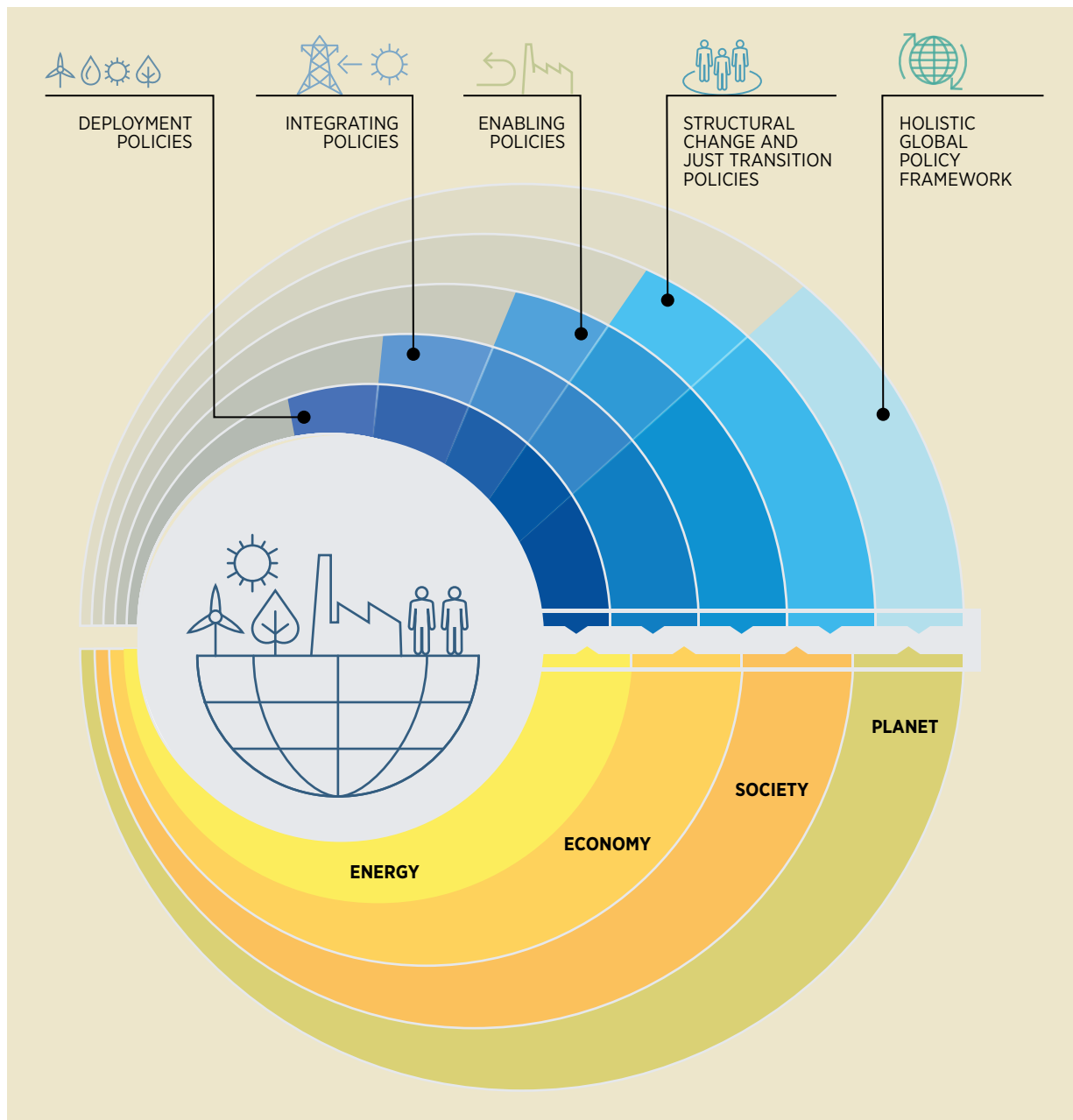


Note: DFI = development finance institutions; MFI = micro finance institution; LPG = liquefied petroleum gas.

National and regional assessments of opportunities for local value creation in the renewable energy sector are needed. Countries in the region boast abundant renewable resources as well as critical minerals for the energy transition, such as lithium. The energy transition offers the opportunity to not just meet growing energy demand across sectors, but also to build local supply chains for renewable energy products and services to ensure one form of commodity dependence (*i.e.* fossil fuels) is not replaced with another. A detailed assessment is needed to inform decision making on opportunities for value creation by leveraging existing industries and building new ones, as well as to identify complementary infrastructure needs (*e.g.* logistics).

Holistic policies are necessary to support the energy transition and maximise benefits. Leveraging experience from implementing policies to maximise local value creation from the oil and gas and mining sectors, governments in the MRU region are encouraged to assess opportunities for job creation and enterprise development in the renewable energy and critical mineral supply chains. An appropriate mix of industrial and education and training policies, complemented by trade and financial policies, can allow the region to be not just a consumer of energy transition technologies, but also to actively participate in regional and global value chains (Figure S12). A long-term view is necessary, backed by stable policies and a commitment to the development of a local renewable energy industry.

Figure S12 A comprehensive mix of policies is needed to accelerate renewable energy adoption in the MRU region



Source: IRENA, 2021c

Planned investments in education and training are needed to meet the skill needs of a growing renewables sector. A range of skills is necessary for the renewables sector to grow. Planning to develop

those skills locally is an important first step for domestic employment generation and value creation from the energy transition. Standardising job-task analysis for various skills needed in the sector across

the region – and equipping and aligning national technical and vocational education and training centres with the development of those skills – is necessary. Furthermore, service-oriented roles, including accounting, auditing, techno-economic assessment, and financing and legal services, can be localised through dedicated training and capacity-building initiatives, as well as through policy mandates requiring partnerships with local firms for international investors and project developers.

Partnerships with local technical institutes and incubation centres should be strengthened to support research, development and demonstration.

Renewable energy solutions are well-equipped to be adapted to local conditions and needs, particularly in rural areas where the energy deficit is the largest. Tailored technology solutions that cater to diverse end-uses and local preferences are necessary to accelerate adoption and maximise long-term sustainability. This specifically concerns electricity and clean cooking access solutions in the residential, productive and public services sector. Capital support for technical institutes and incubation facilities will enable local researchers and enterprises to design suitable solutions, pilot in the field, and utilise testing infrastructure to deploy and deliver quality products and services. Such facilities could also benefit from south-south co-operation initiatives.

National transmission and distribution networks should be strengthened to enhance connectivity and reduce technical and commercial losses.

Within the MRU countries, especially in Guinea, Liberia and Sierra Leone, there is not adequate transmission access to potential renewable energy sites. Transmission access to such sites is critical, as some renewable energy resources may be located far from urban population load centres. Transmission and distribution access is also important for direct third-party sales between renewable energy generators and consumers, coupled with enabling regulations. Countries should therefore prioritise investing in network infrastructure in tandem with the deployment

of renewable energy. Efforts are also needed to reduce technical and commercial losses on the distribution side to bolster the capacity of distribution utilities to re-invest in infrastructure development and to better target end-consumers in need of financial support to maintain access.

Renewable energy and energy efficiency should be pursued across end-use sectors in tandem.

This effort requires proactive public policy measures, including adopting building codes, certificates and labels for appliances for buildings and industry; behaviour change measures; audits; and fiscal and financial incentives. Designing and implementing these measures require close consultations across sectors. For effective implementation, these measures must also be accompanied by complementary policies focusing on education and training and industry development. Significant opportunities exist in the MRU region, particularly in the buildings sector, which includes lighting and other appliances. However, tailored financing schemes are necessary (e.g. buy-back/exchange schemes, utility financing, energy efficiency service companies) to facilitate the shift.

Linkages between energy supply, productive uses and public services should be improved.

Renewables offer the opportunity to translate investments in electricity connections and kilowatt hours into higher incomes for communities and enterprises, as well as local jobs, greater adaptive capacity and overall well-being. Achieving this transformative change requires greater efforts than simply deploying renewable energy systems. It requires investing in an ecosystem that positions the diversity of people's livelihoods across sectors (e.g. agriculture) and community needs (e.g. healthcare and education) at the centre of energy access efforts. This change also requires delivering tailored energy solutions and the financing, capacity and skills, market access, and policy support to realise the full benefits of energy access. Such an approach will be crucial to maximise benefits and support inclusive development efforts within the region.

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EXECUTIVE SUMMARY

RENEWABLE ENERGY MARKET ANALYSIS

MANO RIVER UNION REGION

