

# BEST PRACTISES

ON RENEWABLE  
ENERGY IN AFRICA

THE CURRENT  
STATUS

# Renewable energy in Africa: The current status

Electricity and energy are key issues today on the African continent: about two-thirds of its population does not have any access to electricity services. The situation in Sub-Saharan Africa is especially concerning and rural areas are particularly affected. Today, half of all energy use in Africa includes traditional biomass consumption, which has the dual disadvantage of being dangerous for human health and causing environmental damages through deforestation. Access to energy is a condition for human well-being, but the challenges of low electricity access and growing electricity demand are a real threat to Africa's development. Obviously, African states will have to combine their economic and social policies with energy plans in order to reach their development

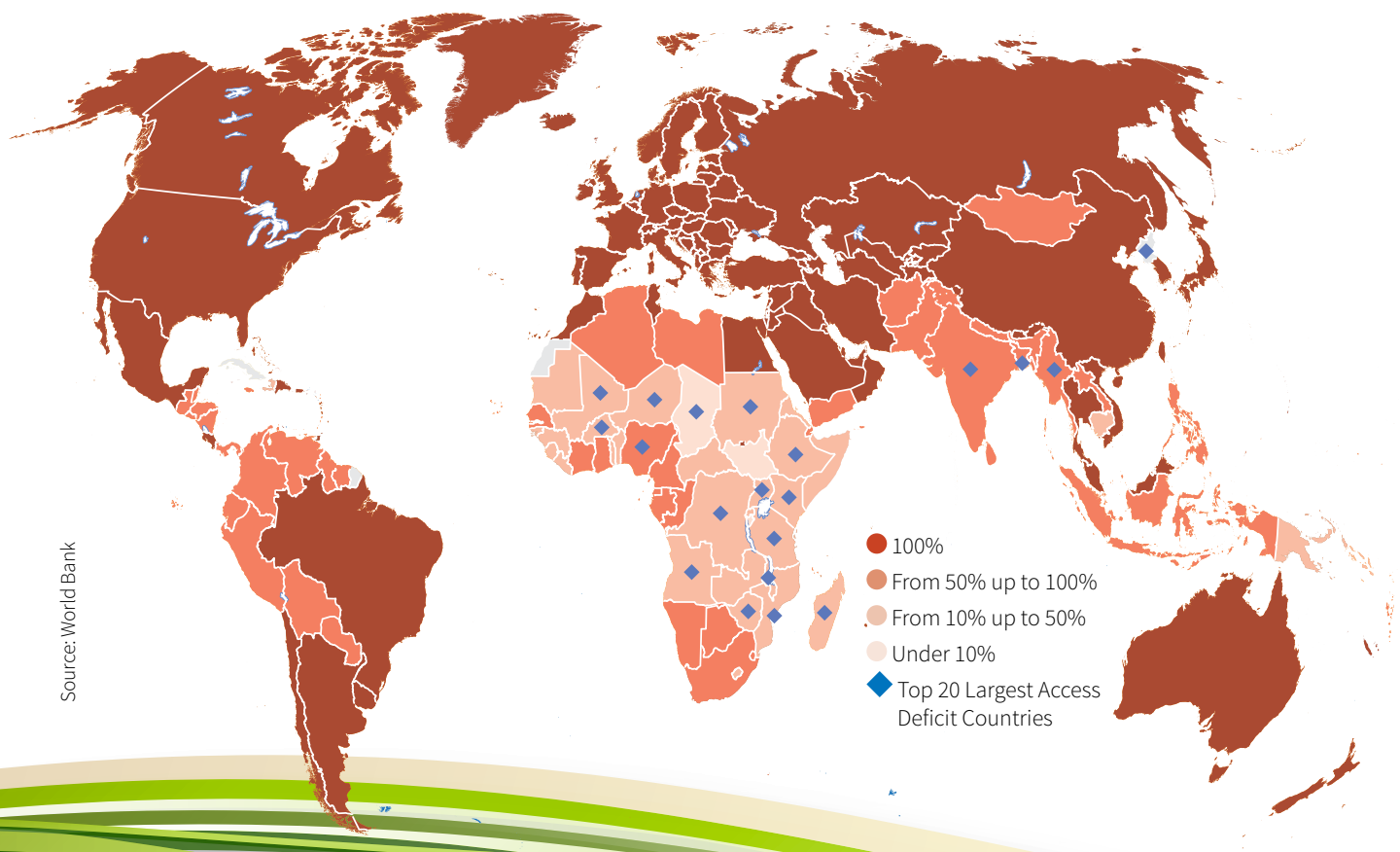
targets and the SDG7 goal: to “ensure access to affordable, reliable, sustainable and modern energy for all” until 2030.

Solutions to the energy access issue in Africa lie in the transition to renewable energy. Its potential on the continent is considerable. Several resources are relevant in different areas, wind for example has a better quality in Northern and Southern regions, biomass and hydropower are more abundant in forested Central and Southern regions, while solar resources are significant everywhere<sup>1</sup>. In the power sector, the share of renewables could grow to 50 % by 2030. There is the possibility for hydropower and wind capacity to reach 100 GW capacity each, followed by solar capacity of over

90 GW<sup>2</sup>. Already, concentrated solar power, photovoltaics and wind turbines are deployed across the continent.

Many programmes and initiatives are implemented to promote the use of renewable energy, such as Electric Africa, the African–EU Renewable Energy Cooperation Programme (RECP) and AREI (African Renewable Energy Initiative). International actors are getting increasingly attracted to renewables in Africa such as China and India. Moreover, African countries have demonstrated political will and initial commitments to renewables, with national energy plans and targets. Several countries have adopted renewable energy policies and are working on regulatory policies (see following graph<sup>3</sup>).

## Share of population with access to electricity in 2016 (%)



## Renewable energy targets of African countries

	Share of total energy	Share of electricity	Planned capacity	Target year	Notes
Algeria	40			2030	5% by 2017
Benin				2025	50% of rural electricity
Burundi	2.1			2020	4 MW biomass, 212 MW hydropower, 40 MW PV and 10 MW wind
Cabo Verde		50		2020	
Côte d' Ivoire	5, 15, 20			2015, 2020, 2030	
Djibouti	30			2017	(solar PV off-grid)
Egypt	14			2020	(hydropower: 2.8 GW by 2020; PV: 220 MW by 2020, 700 MW by 2027; CSP: 1.1 GW by 2020, 2.8 GW by 2027; wind: 7.2 GW by 2020)
Eritrea		50		n.d.	From wind power
Ethiopia			6 810 MW	2013	760 MW of wind, 5 600 MW of hydropower, and 450 MW of geothermal capacity addition
Gabon	80			2020	
Ghana		10		2020	
Guinea		8		2025	6% of PV and 2% of wind
Guinea-Bissau	2			2015	From solar PV
Kenya			5 000 MW geothermal	2030	Double installed renewable energy capacity by 2012 and 5 000 MW of geothermal capacity by 2030
Lesotho		35		2020	Share of rural electricity
Libya	10			2020	
Madagascar	54			2020	
Malawi	7			2020	
Mali	15			2020	
Mauritania	20			2020	15% by 2015 (excl. biomass)
Mauritius		35		2025	
Morocco		42		2020	20% by 2012
Mozambique			6 000 MW and others	na	6 000 MW of wind, solar and hydro capacity (2 000 MW each) and installation of 82 000 solar PV systems, 1000 biodigesters, 3 000 wind pumping systems, 5 000 renewable-based productive systems and 100 000 solar heaters in rural areas
Namibia			40 MW	2011	Excluding hydro power
Niger	10			2020	
Nigeria		20		2030	18% by 2025
Rwanda		90		2012	
Senegal	15			2025	
Seychelles		15		2030	
South Africa		13		2020	
Swaziland				2014	20% of all public buildings installed with solar water heaters
Tunisia		25		2030	11% by 2016
Uganda		61		2017	
Zimbabwe		10		2015	10% share of biofuels in liquid fuels

## What are the challenges for spreading renewable energy in Africa?

2 The implementation of renewable energy is different for each national context, which is sometimes hindering the co-ordination of pan-African energy policies. Governance and cooperation tools (such as AREI) have been developed, but many African energy actors are still not aware about it and concrete implementation of energy projects through those initiatives is missing. Hence, the actors of the energy field are not well coordinated and identified. This lack of clarity

has proven to be difficult for attracting investments. The AREI for example received financial support mostly from the European Commission, Germany and France, but there seems to be no further interest from other countries or potential donors. If investments are missing, technical and knowledge support is also lacking in most of the African countries concerning renewable energy as well as climate finance and energy project management skills.

The energy transition is happening in some African countries, although mostly through a top-down approach and co-operation between the relevant ministries and big energy companies. The integration of academia, civil society, youth, and women as well as small and medium sizes companies is not happening yet in many places. A real participatory process on energy policies has to be established, with concrete people-centred approaches and strategies. ➔

Energy transition cannot happen without the support of all those involved in the energy sector, starting with consumers. The gaps between people's need and institutional capacities may grow without this participatory and decentralised approach. Top-down governance of the energy system goes, along with a centralized approach to electrification in many cases, where access to energy is assumed to be synonymous to a grid connection. However, the quality of the grid is sometimes not allowing a stable energy access. The very nature of renewable energy, being locally available, as well as the energy access situation with many people in rural or remote areas lacking access to energy make a perfect case for decentralized solutions. The extent to which decentralized solutions are incorporated in national energy policies differs across the continent.

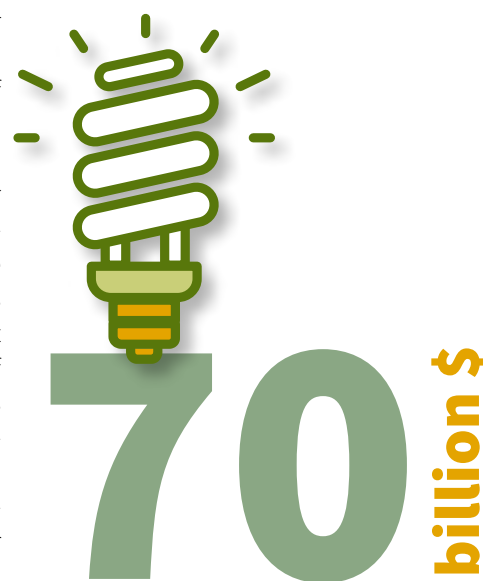
Beside the above-mentioned challenges in the energy transition, the question of technology is a main factor in the chances of success of renewables in Africa. According to the IRENA Africa 2030: Roadmap for Renewable Energy Future, "Technologies needed [...] are available, reliable and cost-competitive"<sup>4</sup>. The four key technologies, biomass for cooking, hydropower, wind and solar power, have huge potential and are becoming increasingly affordable. Still, there exists some remaining technical challenges relating to the accessibility of renewable energy technologies. One of these challenges is the lack of weather data providing information about the availability of solar and wind resources and allowing the integration of extreme weather events in the planning of projects. As a solution, re-

gional project planning and investments in regional electricity connections could contribute to minimising climate-related risks. Secondly, a small local economy in remote communities can result in a lack of qualified renewable energy electricians and insufficient access to technical support centres. Therefore, the economy may depend on imported technology and imported technical skills. In general, one of the main technical challenges is to design the renewable energy technologies for a small-scale local context to provide autonomy to remote regions. Innovation is already playing a crucial role in this, producing renewable mini-grids and battery storage.

The renewable energy market in Africa is very new and has to be developed further. In the Sub-Saharan region, the connection of households to the power grid is rare and unreliable, and African citizens have the longest duration of power outages in the world. Moreover, the relative electricity prices are still very high for Africans (4000 % of GDP per capita)<sup>5</sup>. Investments are very much needed in the energy sector and they require the involvement of the private sector, as public funding capacities are too tight in many countries. Potential sources of finance are available in Africa, such as private foundations, development finance institutions, national or local banks, bilateral donors and international climate finance.<sup>6</sup> However, getting funding for energy projects for local firms and African groups is still not easy. It is highly linked with the political frame: the energy sector requires modernization of institutions and regulations, as well as a stable market in

order to create an attractive environment for the potential investors. A national/local regulatory agency would be a solution and could allow a transparent framework to attract investment and ensure security for energy projects (energy planning, insurance of skills and human resources etc.)<sup>7</sup>.

Finally, one of the biggest challenges remains the energy demand growth: solutions to enable economic growth and extend access to modern energy are essential. Electricity demand in Africa is projected to triple by 2030, which means that the power sector will require investments of USD 70 billion per year on average between now and 2030.<sup>8</sup> Renewable energy can be a solution to cover this growing demand.



Needed investments in the power sector per year until 2030 to meet the electricity demand in Africa.

# What is the potential for renewable energy in Africa?

## 3

Renewable energy is representing a real opportunity for the continent: all of the African countries possess significant renewable energy potential. For example, solar resources across Africa are very well distributed, with a theoretical solar energy reserve estimated at almost 40 % of the entire globe: Africa is the sunniest continent in the world.<sup>9</sup>

This huge potential could enhance the African energy sector's attractiveness for investors (from within Africa, but also internationally). This is already happening, with renewable energy costs decreasing while investments are still growing. Installed capacity for renewables has now overtaken coal in the world and Africa is a key player in that process.<sup>10</sup> Investment for renewable energy is nowadays encouraged by government support me-

chanisms, such as feed-in tariffs (FITs) or price auctions.

Africa has a late-comer advantage in that most energy infrastructure has yet to be built. The implementation of renewable energy has other perspectives compared to highly industrialised countries, with a softer transition and the possibility to avoid the fossil fuel trap. Thus, Africa could move faster than most industrialised countries have done. The continent is heavily vulnerable towards climate change impacts, such as droughts and extreme weather events. Offering solutions from a highly impacted continent would be positive and encouraging for the international community, allowing the African countries to become climate leaders. Having African coordination mechanisms on energy, such as AREI, should

help the most vulnerable countries and people to have clean, affordable and reliable energy access. Renewable energy can be an opportunity for African countries to cooperate and work together to develop policies.

As explained above, electricity demand in Africa is projected to triple by 2030, offering a huge potential for renewable energy deployment and investments in Africa. Renewables could account for two-thirds of the total investments in generation capacity or up to USD 32 billion per year. Realising this opportunity will create significant business activity in Africa.<sup>11</sup> Furthermore, renewable energy technologies can be spread locally, on a small scale, enabling new forms of financing and uses, as well as broadening electricity access with a people-centred approach.

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## 4

### **South Africa: Setting a good example for reducing renewable technology costs**

Coal supplies around 70 % of the primary energy and more than 90 % of electricity in South Africa.

However, the country has pledged to reduce its carbon emissions and drew up an ambitious renewable energy program. South Africa installed a competitive tender system, creating an attractive renewable energy market for private developers and financiers. Thus, the country could rapidly observe a price fall. South Africa has been ranked among the top 10 countries in the world with the best Renewable Energy investments.<sup>16</sup>

One of the key decisions by the government was to accept the market entry of independent power producers. The government decided to leave the management of renewable energy implementation to the Public Private Participation Unit in the National Treasury, allowing for a good overview of

the national implementation, clarity, transparency and good conditions for investors.<sup>17</sup> South Africa currently owns 48 % of all renewable energy projects on the African continent. With the Renewable Energy Independent Power Producer Procurement Programme (REIPP) having started in 2011, approximately 1,361 MW concentrated solar power and photovoltaic plants have already been installed.

South Africa's target is to reach 8,400 MW installed capacity of renewable energy by 2030 and 13 % of renewable energy in the share of electricity by 2020.<sup>18</sup> Although the South African programme has clearly been beneficial to the industry across the continent, the private sector participation or investment in the power sector is still insufficient, even if the confidence in for renewable energy projects has been growing since the REIPP was launched.

## 5. Morocco: An example for large-scale renewable energy implementation

Morocco's electricity consumption is projected to double by 2025 and to increase fivefold by 2050. Currently, Morocco is importing 96 % of its energy supplies as fossil fuels from abroad.<sup>12</sup> The country is still heavily relying on coal, gas and oil for electricity production and in the energy sector, making it dependant on international fossil fuel prices. Thus, Morocco's energy actors and policy makers realised the need to increase energy security and also take measures to tackle climate change – both issues can be partly solved by adopting more renewable energy. The Kingdom has rapidly become a renewable energy champion in Africa and the world: It has set targets to increase the share of electricity generating capacity from renewables to 42 % by 2020 and 52 % by 2030 as well as reducing energy consumption by 12 % by 2020 and 15 % by 2030 through enhanced energy efficiency. With the quick implementation of immense solar and wind projects, Morocco was already able to produce 400 GWh from solar thermal technologies, 1662 GWh from solar energy and 3000 GWh from wind in 2016.<sup>13</sup> The

most well-known renewable energy project in Morocco is called Noor, its three components making up the biggest concentrated solar power plant in the world. The power plants are distributed between Ouarzazate (South of the country) and in Midelt (North-central). The latter construction was just finalized and the plant has been in operation since October 2018. The project was supported through investments from the World Bank, as well as from the European Union, the African Development Bank and bilateral finance from countries such as Germany and France.<sup>14</sup> The workers hired on the sites were mostly Moroccans and the three plants are planned to produce 500 MW at the conclusion of the project.<sup>15</sup>

For many countries, Morocco's energy transition can be inspiring and can serve as a path to follow. However, the country is also facing challenges, mainly in the implementation phase: several energy projects are behind schedule, and a real participatory strategy and decentralized approach of the energy transition still needs to be established.

## Lessons-learned

From the existing renewable energy projects in Africa, IRENA and other international organisations have compiled assessments. For the energy transition to be successful, a competent, transparent and independent programme of leadership should be introduced at the earliest possible opportunity with clarity on social and environmental performance standards and socio-economic development goals.<sup>19</sup> Governments, but also all the relevant actors of the energy sector (energy companies, consumers

and citizens, cities as well as academia) should develop common goals and strategies.

During recent years, massive global implementation of renewable energy has led to important cost reductions and performance improvements, both around the world, but also on the African continent. Benefits from renewable energy are already recognisable for some countries. Meeting the energy demand in a cost-effective, secure and environmentally sus-

tainable way in Africa through renewable energy is definitely an effective path to strengthen socio-economic development, as energy is a key sector for most development issues.

IRENA developed some prospects in their global REmap 2030 analysis for Africa. Collectively, the "REmap Options" (modern renewable technology options) could supply 22 % of Africa's total final energy consumption by 2030, compared to 5 % in 2013.



## Next Steps

# 7

The necessary actions and policies will differ from country to country, as Africa has a variety of economic profiles and energy resource endowments and needs. Broadly, however, most African countries seem to want to work towards the same goals, which are to ensure sustainable energy access and energy security, to diversify their energy mix, and reap the socio-economic and environmental benefits.<sup>20</sup>

Accelerating the implementation of renewable energy requires governments, policy makers and regulators to establish an institutional framework and national strategies. Deployment policies are effective, but energy policies should be planned in an integrated manner in coordination with other development policies. Energy, as a cross-cutting issue, can lead to benefits in other sectors such as poverty reduction, less polluting public transportation and agriculture.

Investment promotion measures are needed to attract both domestic and foreign investors, as well as the encouragement of Public-Private Partnership to share investment costs, risks and benefits. In parallel, there is a need to raise awareness among local financial institutions about the grid-connected and off-grid renewable energy market.

Regional cooperation should facilitate large-scale renewable energy deployment. By working together, African countries have the opportunity to become energy champions and innovators. However, the actual cooperation mechanisms, such as AREI for example, should be used in a constructive and effective way, with commitments, gover-

nance rules and participation from the entire energy sector on the continent (such as civil society, private sector and academia amongst others).

Even with large-scale implementation of renewables, off-grid renewable energy solutions are also highly important to improve access to modern energy services and contribute to poverty reduction. That would require dedicated policy and regulatory frameworks in order to boost potential investments.

### 1. Step

Establishment of national energy frameworks and strategies

### 2. Step

Encourage Public-Private Partnerships with investment promotion measures

### 3. Step

Develop regional cooperation on the continent to implement large-scale renewable energy projects

### 4. Step

Boost investments for off-grid renewable energy solutions to tackle energy access issues



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