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Energy & Natural Resources

ENERGY & NATURAL RESOURCES

INDUSTRY REVIEW

Brockville Investments Advisory

APRIL, 2023

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Africa Energy & Natural Resources Review

Energy Transition in view :

Will Africa achieve a just transition?

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ABOUT BROCKVILLE

Brockville is a research-based asset development & management firm. Our team is made up of industry experts and advisors with deep knowledge & experience covering oil & gas, renewable energy, power , mining, agriculture and financial services. We have access to data, expert opinions, and insights into important industry trends and information vital to investment decision-making.

We work in all segments including Upstream , Mid Stream and Downstream covering areas such as exploration, production, pipeline, transportation, trading, farming, exportation and more.

MEET OUR TEAM

We offer end-to-end research & project development services in the energy and natural resources sector. We cover engineering, scientific, geoscience , commercial , economic , strategic & market analysis.

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Brockville Provides research insights to enhance business decision making

African is enriched with abundant natural resources, ranging from minerals and metals to forests and arable land. The Energy & Natural Resources sector in Africa is a diverse industry that includes a range of activities such as oil and gas exploration, mining, agriculture, forestry, water management, and renewable energy development. There is a massive potential for growth and development in these sector, evident by the significant investments and development in recent years by. The sector plays a pivotal role in the economies of many African countries, contributing extensively to job creation, foreign exchange earnings, and improved livelihood and economic growth. One of the notable trends was the increasing focus on gas as a transition fuel and on renewable energy as an energy source. Some African countries have set ambitious targets for renewable energy adoption.

Energy Sector Review

The energy sector in Africa is dominated by fossil fuels, with oil and gas accounting for a significant portion of the region's energy mix. According to the Europe Africa Foundation, in 2021 Fossil fuels played a prominent part in energy provision in Africa, with oil, gas and coal the three leading commercially traded fuels for electricity generation. Oil remains the primary energy source for Africa, followed by natural gas and coal. These three fossil fuels account for 90.5% of energy consumption in Africa. However, the sector is undergoing gradual transformation, with increasing focus on renewable energy sources such as solar, wind, and hydropower. Despite the progress made in recent years, energy access remains a significant challenge in many African countries, with a large proportion of the population lacking access to reliable electricity.

The situation is particularly dire in sub-Saharan Africa, where less than half of the population had access to electricity in 2019, with only 27% in rural areas and 83% in urban areas. However, some North African countries and a few smaller economies with higher development levels, such as Mauritius, Seychelles, Egypt, and Tunisia, have achieved 100% electricity access. Among the largest economies, South Africa has an access rate of 85%, while Kenya and Nigeria are at 75.9% and 62%, respectively. In contrast, South Sudan has the lowest access rate of just 6.7%, with Chad following closely behind at 8.4%.

Renewable energy is an area of significant potential growth and opportunity in Africa. Many countries in the region have set ambitious targets for renewable energy adoption, and there have been significant investments in renewable energy projects in recent years. Solar energy is the most popular form of renewable energy in Africa, followed by wind and hydropower. The growing demand for renewable energy presents significant opportunities for investors and developers in the sector. Localized power systems such as Mini-grids can operate independently of the main grid, and have emerged as a potential solution to this energy challenge.

> For Africa, shifting to a low-carbon economy in a way that is fair and equitable for all and sundry, including employees, communities, and at risk groups is a complex process

For Africa, shifting to a low-carbon economy in a way that is fair and equitable for all and sundry, including employees, communities, and at risk groups is a complex process. The complexity involves ensuring that the costs and benefits of the transition are distributed in a just manner, and that no group is extremely affected. The idea of stabilising the need for economic growth and development with the requirement to reduce carbon emissions and mitigate the impacts of climate change has to be rigorously evaluated because many African countries are heavily reliant on fossil fuels for their energy needs, but are also vulnerable to the impacts of climate change including droughts, floods, and other extreme weather events.

Energy trends

Africa remains a region with a chronic lack of electricity supply. Despite being home to around 20% of the world's population, the continent generated only 3.1% of the global total electricity supply in 2020, with less than 900TWh produced. According to data from BP, this electricity production is concentrated in a few countries, with South Africa and Egypt generating more than half of the total amount.

These localized power systems can provide reliable and affordable electricity to remote and underserved areas, and there have been significant investments in mini-grid projects in recent years. Regulatory and policy developments are critical to the growth and development of the energy sector in Africa. Many countries have implemented policies and regulations to encourage investment in renewable energy and improve energy access, and there have been significant efforts to harmonize energy policies across the region. However, there is still a need for greater policy coordination and implementation to fully unlock the potential of the sector.

In Africa, the energy challenge can be solved with a robust mix of energy sources, including gas. Though the fossil fuel sector is facing challenges, including environmental concerns and subsequent access to funding, The sector still presents opportunities for investment and growth, particularly in countries with large reserves such as Nigeria and Angola. There is also increasing interest in developing natural gas resources in the region, which could provide a cleaner and more reliable source of energy than oil.

Natural Resources Sector Review

The natural resources sector in Africa is diverse and includes minerals, forests, land, and water resources. The sector is a significant contributor to many African economies, with mining and agriculture being the primary drivers of growth. Several African countries heavily rely on the natural resources sector as a significant contributor to their GDP.

Mining is a significant contributor to many African economies, with the region being home to some of the world's largest reserves of minerals and metals such as gold, platinum, and diamonds. The sector has undergone significant transformation in recent years, with increasing focus on value addition and beneficiation. There have also been significant investments in new mining projects, particularly in countries such as South Africa, Ghana, and Zambia. Democratic Republic of Congo (DRC) is a significant producer of minerals, including cobalt, copper, and diamonds. The country is a leading producer of platinum, gold, and chromium. Zambia is a significant producer of copper, which accounts for approximately 70% of the country's export earnings and about 10% of its GDP. The mining sector, particularly gold, is a significant contributor to Ghana's economy, accounting for about 5% of the country's GDP and over 90% of its mineral exports. However, the sector faces several challenges, including environmental degradation, inadequate infrastructure, and governance issues.

The energy transition is driving the adoption of new technologies in the mining sector, such as electric vehicles and renewable energy-powered equipment. This presents both challenges and opportunities for mining companies as they adapt to new technologies and find ways to integrate them into their operations. This shift to energy transition has also led to Increased demand for critical minerals. At the same time, the energy transition is expected to increase the demand for critical minerals such as lithium, cobalt, and rare earth elements, which are used in the production of renewable energy technologies like batteries, solar panels, and wind turbines. This could create new opportunities for mining companies that have access to these resources. With this increased demand also comes increasing pressure to reduce greenhouse gas emissions. The mining sector is a significant contributor to greenhouse gas emissions, primarily through the use of diesel-powered equipment and the energy required for mineral processing. As countries work towards decarbonization, there will be increasing pressure on mining companies to reduce their emissions and transition to more sustainable practices.

Brockville Provides research insights to enhance business decision making

Agriculture is also a significant contributor to the African economy, accounting for over 15% of the continent's GDP. The sector employs over 60% of the African population and is the primary source of income for many rural communities. Africa has vast agricultural potential, with its fertile land and favorable climate. However, the sector faces several challenges, including poor infrastructure, low productivity, and climate change. Forestry and water management are also critical components of the natural resources sector in Africa.

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The energy transition is likely to have significant impacts on the agriculture sector, both in terms of opportunities and challenges.

The energy transition is driving increased demand for biofuels, which are derived from biomass such as crops or agricultural waste. This could create new markets for agricultural producers who can supply feedstocks for biofuel production.

The agriculture sector is a significant energy consumer, particularly in areas such as irrigation and transportation. The energy transition could drive the adoption of more energy-efficient practices and technologies, such as precision agriculture and electric vehicles

Investment Opportunities

Key investment opportunities in the sector include renewable energy, mining, and agriculture. Gas to power solutions and renewable energy presents a significant investment opportunity, with countries like Nigeria investing heavily in gas and renewable energy projects to meet growing energy demand and address environmental concerns. Mining and agriculture also present significant investment opportunities due to the abundance of natural resources in the continent. However, the sector faces several challenges, including inadequate infrastructure, political instability, and environmental degradation. These challenges can affect the profitability of investments in the sector, making it necessary for investors to carefully assess the risks and opportunities before investing. Financing and funding options in the sector include private equity, venture capital, debt financing, and project financing. Multilateral development banks and export credit agencies also provide funding for projects in the sector. Public-private partnerships (PPPs) play a crucial role in the energy and natural resources sector in Africa by providing a framework for collaboration between the public and private sectors to develop and finance projects. PPPs help to address some of the challenges facing the sector, such as inadequate infrastructure and financing. They also provide a platform for the transfer of knowledge and expertise, promoting sustainable development in the sector.

Conclusion

The Energy & Natural Resources sector in Africa has experienced significant growth and development in 2023, with renewable energy investments, mining, and agriculture presenting significant investment opportunities. Regulatory and policy developments have also created an attractive investment climate in the sector. However, challenges such as inadequate infrastructure, political instability, and environmental degradation remain. Achieving a just transition in Africa is a critical issue that requires significant investment and collaboration among policymakers, industry leaders, and communities. African countries are highly vulnerable to the impacts of climate change and the transition to cleaner energy sources including gas as a transition fuel is necessary to mitigate these impacts. However, the transition must be done in a way that is fair and equitable for all stakeholders, including workers in the energy sector and communities that may be impacted by the transition. A just transition in Africa will require significant coordination and collaboration to ensure that the benefits of the transition are shared equitably among all stakeholders.

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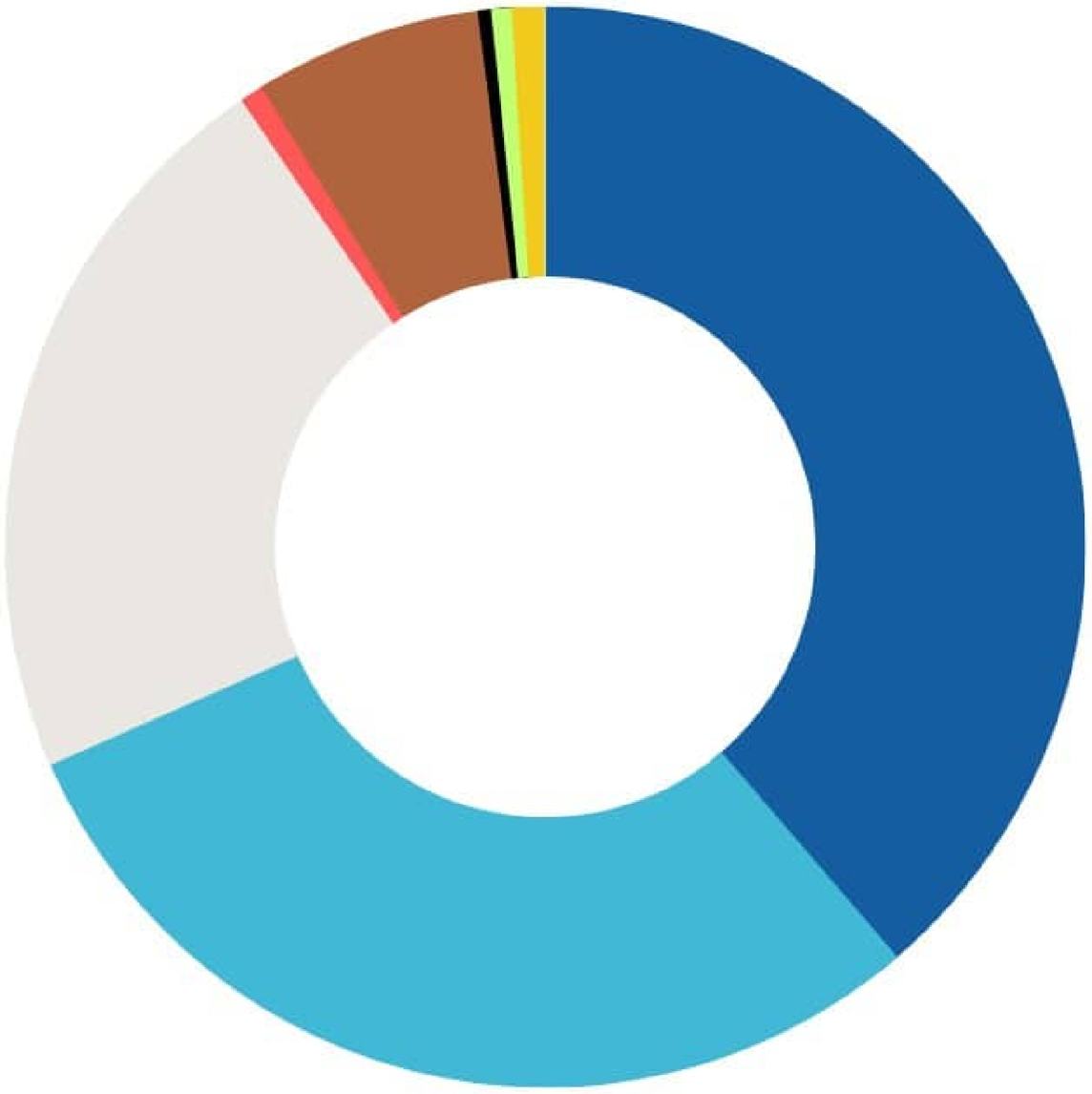
SECTOR HIGHLIGHTS

Energy Mix In Africa

In 2021 Fossil fuels played a prominent part in energy provision in Africa, with oil, gas and coal the three leading commercially traded fuels for electricity generation. Oil remains the primary energy source for Africa, followed by natural gas and coal. These three fossil fuels account for 90.5% of energy consumption in Africa.



Source	%
Oil	38.7
Gas	29.7
Coal	22.1
Nuclear	0.7
Hydro	6.8
Bio Energy	0.4
Solar	0.6
Wind	1

Africas Energy Generation Mix

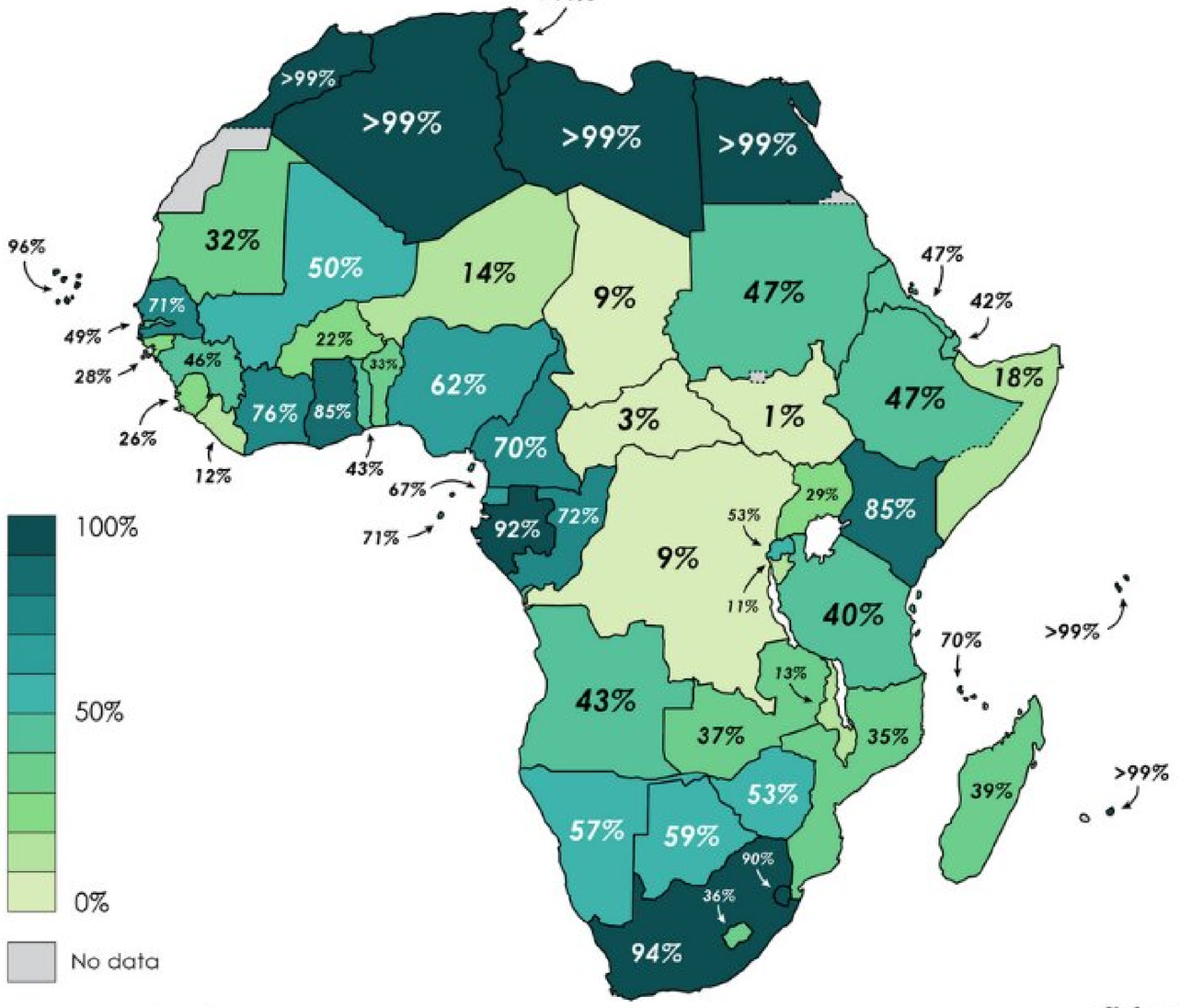
Adapted from BP Energy Outlook, 2020

Electricity Access In Africa

Despite the progress made in recent years, energy access remains a significant challenge in many African countries, with a large proportion of the population lacking access to reliable electricity. There are significant disparities between African countries.

Access to electricity in Africa

By the proportion of the population, 2019 data



Source: The International Energy Agency

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Country	% Access	Country	% Access
Algeria	99.9	Equatorial Guinea	41.9
Angola	43.9	Eritrea	22.9
Benin	67.9	Eswatini	42.9
Botswana	63.9	Ethiopia	45.9
Burkina faso	23.9	Gabon	87.9
Burundi	9.9	Gambia	38.9
Cabo Verde	74.9	Ghana	85.9
Cabo Verde	61.9	Guinea	33.0
Central African Republic	4.9	Guinea-Bissau	21.9
Chad	8.9	Kenya	75.9
Comoros	29.9	Lesotho	32.9
Congo, Democratic Republic of the	19.9	Liberia	3.9
Congo, Republic	28.9	Libya	100
Cote d'Ivoire	66.9	Madagascar	18.9
Djibouti	48.9	Malawi	11.9
Egypt	100	Mali	34.9

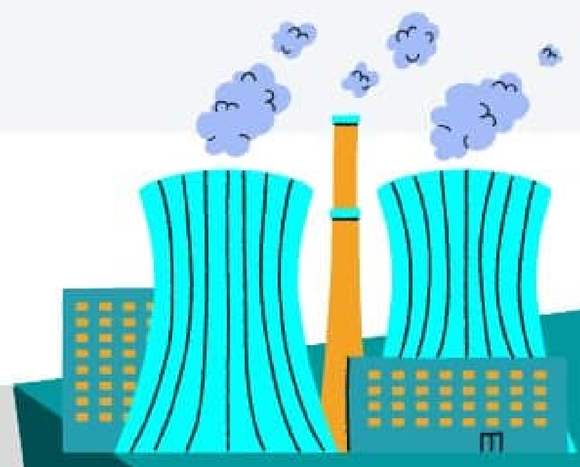
Country	% Access	Country	% Access
Mauritania	57.9	Togo	32.9
Morocco	99.9	Zambia	40.9
Mozambique	31.9	Zimbabwe	41.9
Namibia	48.9	Ethiopia	45.9
Niger	7.9	Gabon	87.9
Nigeria	64.9	Gambia	38.9
Rwanda	47.9	Ghana	85.9
Sao Tome and Principe	66.9	Guinea	33.0
Senegal	69.9	Guinea-Bissau	21.9
Seychelles	99.9	Kenya	75.9
Sierra Leone	15.9	Lesotho	32.9
Somalia	13.9	Liberia	3.9
South Africa	84.9	Libya	100
South Sudan	6.9	Madagascar	18.9
Sudan	36.9	Malawi	11.9
Tanzania	32.9	Mali	34.9

Source: World Bank's Global Electrification Database (GED).

TOP 30 ONGOING POWER PROJECT IN AFRICA

TOP 30 ONGOING POWER PROJECT IN AFRICA	CAPACITY	CAPEX
Makambako Solar Project - Tanzania,	6 MW	$16.5 million
Red Sea Wind Power Project - Egypt,	120 MW	$400 million
Zina Solar Power Project - Niger,	130 MW	$130 million
Malindi Solar Group Project - Kenya,	130 MW	$155 million
Cascade Solar Power Project - Morocco,	150 MW	$300 million
Nzema Solar Power Station - Ghana,	155 MW	$400 million
Khoumagueli Solar Power Plant - Gabon,	70 MW	$150 million
Senergy 2 Solar Power Project - Senegal,	160 MW	$160 million
Alitar Solar Power Plant - Morocco,	170 MW	$170 million
Djermaya Solar Power Plant - Chad,	32 MW	$50 million
Bokpoort Concentrated Solar Power Plant - South Africa,	50 MW	$260 million
Akuo Kita Solar Power Plant - Mali,	50 MW	$80 million
Lambaréné Solar Power Plant - Gabon,	50 MW	$65 million
Bongo Solar Power Plant - Togo,	50 MW	$50 million
Katsina Solar Power Project - Nigeria,	50 MW	$100 million
Sonabel PV Power Plant - Burkina Faso,	52 MW	$60 million
Tomé Solar Power Plant - Guinea-Bissau,	50 MW	$68 million
Bangweulu Solar Power Plant - Zambia,	54 MW	$100 million
Duba Solar Park - Egypt,	200 MW	$310 million
Tulu Moye Geothermal Power Project - Ethiopia,	520 MW	$2.5 billion
Ouarzazate Solar Power Station - Morocco,	582 MW	$3.9 billion
Kafue Gorge Lower Hydropower Project - Zambia,	750 MW	$2 billion
Azura-Edo Gas Power Project - Nigeria,	461 MW	$880 million
Kpone Thermal Power Station - Ghana,	450 MW	$900 million
Engro Thar Block II Coal Power Project - Pakistan,	660 MW	$1.1 billion
Olorunsogo II Power Station Expansion - Nigeria,	600 MW	$450 million
Karuma Hydropower Project - Uganda,	600 MW	$1.7 billion
Qua Iboe Power Plant - Nigeria,	540 MW	$1.1 billion
Zungeru Hydroelectric Power Project - Nigeria,	700 MW	$1.3 billion
Mambilla Hydropower Project - Nigeria,	3,050 MW	$5.8 billion

Source: African Energy Live Data Platform (2022)



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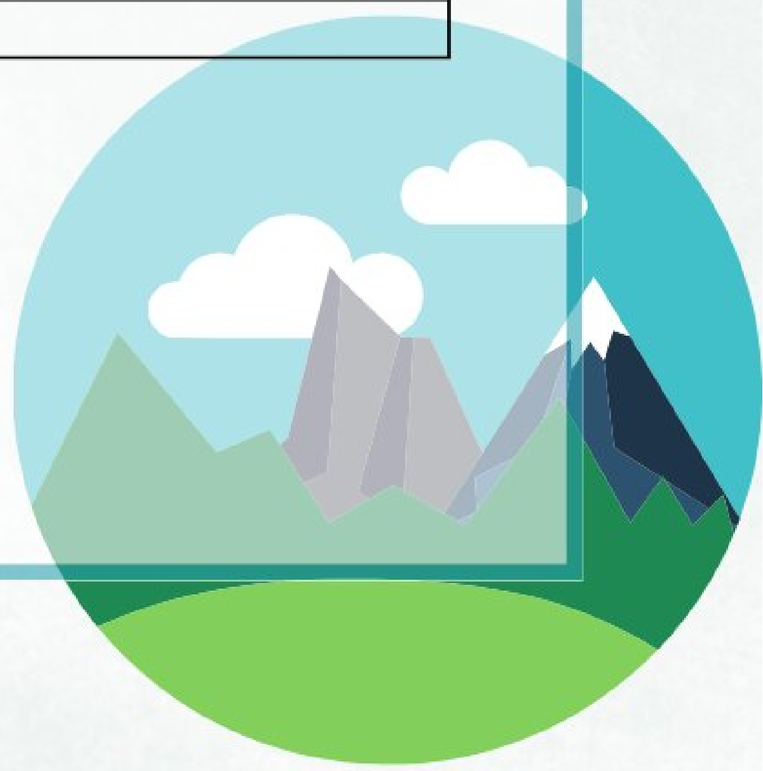
TOP 30 PLANNED POWER PROJECT IN AFRICA

TOP 30 PLANNED POWER PROJECT IN AFRICA	CAPACITY	CAPEX
Kenyatta University Solar Plant - Nairobi, Kenya	10 MW	$14 million
Nigerian Solar City Project - Kano, Nigeria	10 MW	$16 million
Benguela Solar Power Project - Benguela, Angola	100 MW	$300 million
Djibouti Geothermal Power Project - Asal Rift, Djibouti	100 MW	$500 million
Redstone Concentrated Solar Power Plant - Postmasburg, South Africa	100 MW	$600 million
Katsina Wind Farm - Katsina State, Nigeria	100 MW	$186 million
Lamu Coal Power Station - Lamu, Kenya	1,050 MW	$2 billion
Itobe Coal Power Project - Kogi State, Nigeria	1,200 MW	$4.4 billion
Abuja Smart City Project - Abuja, Nigeria	1,350 MW	$4.5 billion
Akon City Solar Project - Mbodiene, Senegal	1,000 MW	$6 billion
Lagos Island Smart City Project - Lagos, Nigeria	1,000 MW	$5 billion
Bumbuna II Hydropower Project - Bumbuna, Sierra Leone	143 MW	$486 million
Adama III Wind Power Project - Adama, Ethiopia	153 MW	$345 million
Nkula A Hydropower Plant Expansion - Malawi	180 MW	$300 million
Ayitepa Wind Power Project - Greater Accra, Ghana	225 MW	$525 million
Rabai Gas Power Plant - Rabai, Kenya	231 MW	$365 million
Soubre Hydroelectric Power Station - Soubre, Cote d'Ivoire	275 MW	$571 million
Lake Albert Oil Field Project - Uganda	200 MW	$3 billion
Nouakchott Solar Power Station - Nouakchott, Mauritania	30 MW	$40 million
Tasiast Solar Power Plant - Tasiast, Mauritania	30 MW	$40 million
Kinangop Wind Power Project - Kinangop, Kenya	60.8 MW	$138 million
Lake Turkana Wind Power Project - Turkana, Kenya	310 MW	$690 million
Cenpower Kpone Independent Power Project - Kpone, Ghana	340 MW	$900 million
Gurara II Hydropower Project - Kaduna State, Nigeria	360 MW	$1.2 billion
Olorunsogo II Power Station Expansion - Ogun State, Nigeria	600 MW	$450 million
Karuma Hydropower Project - Karuma Falls, Uganda	600 MW	$1.7 billion
Engro Thar Block II Coal Power Project - Tharparkar, Pakistan	660 MW	$1.1 billion
Zungeru Hydroelectric Power Project - Niger State, Nigeria	700 MW	$1.3 billion
Kafue Gorge Lower Hydropower Project - Kafue River, Zambia	750 MW	$2 billion
Rusumo Falls Hydroelectric Project - Kagera River, Tanzania/Rwanda	80 MW	$470 million
Tulu Moye Geothermal Power Project - Tulu Moye, Ethiopia	520 MW	$2.5 billion
Mambilla Hydropower Project - Taraba State, Nigeria	3,050 MW	$5.8 billion
Batoka Gorge Hydroelectric Scheme - Zambia/Zimbabwe	2,400 MW	$4 billion
Grand Inga Dam Project - Congo River, Democratic Republic of Congo	40,000 MW	$80 billion
Lubilia Kawama Hydropower Project - Lubilia, Congo	4,800 MW	$14 billion

Source: Various



GREEN JOBS OF THE FUTURE

As the world transits to a green future, young people will need to develop skills for the green jobs of the future. This however can get tricky since the future is not yet here. A report published by Dell Technologies and the Institute For The Future (IFTF) 85 per cent of the jobs that will exist in 2030 haven't even been invented yet.

The green economy will need young people with a range of different skills. Image: GEO-6 for Youth, UN Environment Programme

Sectors such as Farming and architecture will need new green skills according to the United Nations Environment Programme. For a Just Transition to be possible, here are the skills young people in Africa will need for the green jobs of the future

Here are six key skill categories that can help you build a successful career in the future

Skill	Descritpion	Some Roles
Science	workers with a strong science background	environmental scientists, biologists, hydrologists and biochemists
Architectural and planning	energy efficient buildings, fewer resources used to construct and operate them	Architects and planners
Green engineering and tech	design and maintain solar panels, wind turbines, low emissions vehicles and other green economy technology.	Engineers in green sectors
Agriculture	sustainable farming organic farming, urban farming and precision agriculture	Data experts to measure and improve farming efficiency.
Environmental justice	intersection of human rights and environmental rights.	Environmental & human Right Lawyers
Systems	Design, operate and monitor a wide range of systems. skills in macroeconomics to build sustainability into long-term infrastructure projects.	System Analyst

Source: weforum

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RESEARCH & PROJECT DEVELOPMENT

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Our Services

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01

Market Research

Our market research services are designed to help clients better understand the demand for their products or services. Our approach involves conducting in-depth surveys, analysing market trends and data, and providing actionable insights and recommendations that enable our clients to make informed business decisions. Our market research helps client understand the competition, customer needs, and regulatory environment, and identify opportunities for growth. We also identify gaps in the market that can help them develop new products and services that meet the needs of customers.

02

Feasibility Studies

With feasibility studies, we help clients to determine the viability of new projects or investments. Our team of experienced consultants conduct rigorous analysis of technical, economic, and regulatory factors, as well as identifies potential risks and opportunities, to provide our clients with comprehensive feasibility reports that inform their decision-making. We also identify the infrastructure requirements, including location, capacity, and cost, and developing a plan for infrastructure investment.

03

Policy and Regulatory Analysis

Our policy and regulatory analysis services are designed to help clients navigate the complex legal and regulatory environment in the oil, gas, power, energy, mining, climate, construction, manufacturing, plastic recycling, agriculture, and other related sectors. We analyze government policies and regulations, identify potential areas of regulatory risk particularly as it affects commercial terms of business agreements, and provide practical recommendations that enable our clients to comply with the law and mitigate potential risks.

04

Project Management Support

Our project management support services are designed to help clients effectively plan, execute, and monitor their projects. Our team of experienced project managers provides oversight and guidance throughout the project lifecycle, ensuring that our clients' projects are delivered on time, on budget, and to their specifications.

05

Other Services

Other Services Include:
Supply Chain Analysis,
Technology Assessment
Stakeholder engagement

Other Services Include:
Business planning
Financial & Economic Modelling
Technical Studies

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