

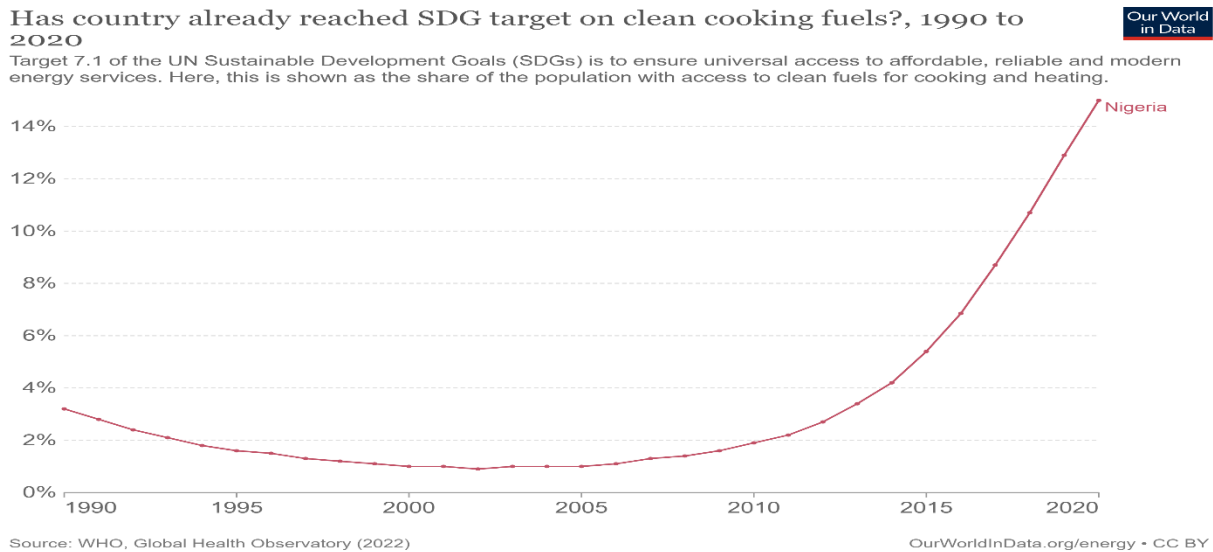
27/02/23

EL: Legal, Regulatory & Policy Data Intelligence:

Level of Access to Clean Fuels for Cooking in Nigeria

Electricity Lawyer is pleased to introduce its flagship and novel Legal, Regulatory and Policy Data Intelligence which involves an in-depth analysis of energy industry data from a legal, regulatory and policy angle to assist decision makers, investors and stakeholders in understanding the implications of energy market developments and make well-informed decisions on such basis.

The data intelligence highlights lessons for Nigeria regarding its attainment of the Sustainable Development Goal 7 (SDG 7) target for clean cooking.



The graph presented projects an increase from 2010 till 2020 for clean cooking fuel utilisation in Nigeria. The increase can be traced to the National Clean Cooking Scheme (NCCS), a project of the Federal Ministry of Environment's Renewable Energy Program that was introduced in September 2012, collaborating with the pot manufacturer Tower, and the energy company Envirofit, through its Rural Women Energy Security (RUWES) program on the manufacture and distribution of a specially designed bio-mass stove across the country.ⁱ

The National Assembly Intervention on Clean Cooking Initiative (NAICCI) was also introduced to improve the health of women who deal with respiratory infections and ailments brought on by indoor air pollution and smoke inhalation.ⁱⁱ This initiative also encouraged the adoption of clean cookstoves in members' constituents.

However, no concrete policy has been developed and adopted at the national level integrating clean cooking into national interventions to achieve the SDG target on modern energy service and clean cookingⁱⁱⁱ Lessons and practices in African countries like Ghana and Ethiopia could inform policy decisions in Nigeria to propel a rise in clean cooking in the region by creating a framework for national policy, strategy, and coordination for the cookstoves industry; and enhancing the capabilities of businesses along the value chain that have the ability to increase production.

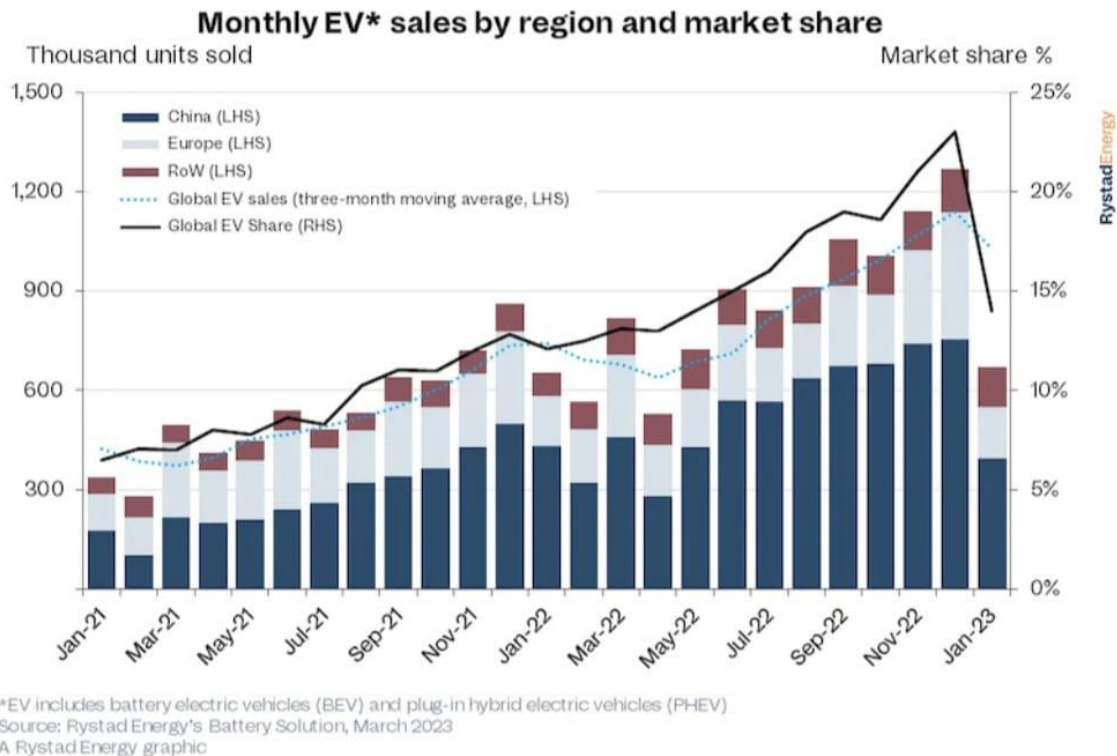
06/03/23

Lessons for Africa in Deploying Electric Mobility.

EL: Legal, Regulatory & Policy Data Intelligence

Electricity Lawyer is pleased to introduce its flagship and novel Legal, Regulatory and Policy Data Intelligence which involves an in-depth analysis of energy industry data from a legal, regulatory and policy angle to assist decision makers, investors, and stakeholders in understanding the implications of energy market developments and make well-informed decisions on such basis.

This week's intelligence series highlights lessons for African countries in their push for electric mobility.



The graph projected above depicts that in January 2023, compared to the previous month, Electric Vehicles (EV) sales in Europe and China, the world's largest market for EVs, fell by almost 50%.

Many European countries and mainland China cut EV subsidies at the start of the year, and a significant return is highly unlikely in the near future.^{iv} The US market however, which is just starting its electrification journey and is rolling out tax credits as a result of the Inflation Reduction Act, is one ray of hope for the global outlook.^v The United States was the only major market where both EV sales and market share increased.

African countries like Rwanda for instance, has exempted electric cars, spare parts, batteries and charging station equipment from VAT, import, and excise duties.^{vi}

Since there is a reduction in sales of EV in Europe and China due to a removal of incentives and subsidies, EV manufacturers will be willing to drive sales to Africa and take advantage of such incentives but there is no legal framework on ground for Rwanda in this regard, similar to other African countries like Kenya, Egypt, etc.

It is recommended that African countries entrench these incentives in a legal framework along with considerations and components like electric vehicle recycling and re-use, battery recycling and reuse, technical and environmental standards, and regulatory verifications to manage the influx of electric mobility intended.

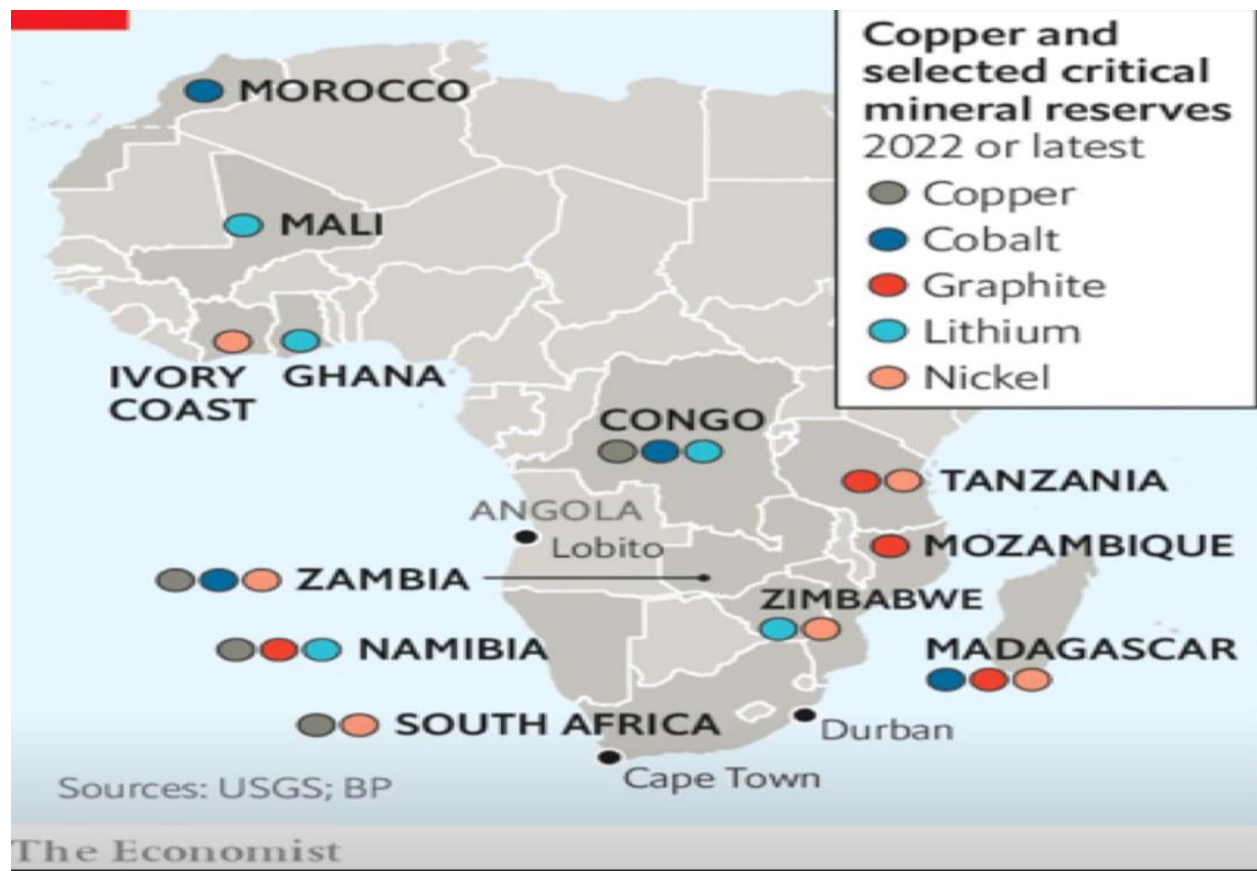
13/03/23

EL: Legal, Regulatory & Policy Data Intelligence

Practice considerations for exploring critical elements in African countries

Electricity Lawyer is pleased to introduce its Legal, Regulatory and Policy Data Intelligence which involves an in-depth analysis of energy industry data from a legal, regulatory and policy angle to assist decision makers, investors, and stakeholders in understanding the implications of energy market developments and make well-informed decisions.

The data intelligence highlights practice considerations for African countries regarding the exploration of critical elements.



The graph presented projects the critical elements available in different African countries. Africa is a hub of critical elements which are on high demand by foreign countries for production of electric vehicles and their batteries to foster the global energy transition.^{vii} This has put foreign countries on a race to explore these critical elements in Africa.^{viii} It is worthy of note that even with prior legal frameworks that govern the mining sector, African countries have put up different stance in relinquishing their critical elements.

Zimbabwe has recently placed a ban on the export of its unprocessed lithium.^{ix} The government plans to stimulate the nation's processing capacity in a bid to keep the value chain of the critical mineral in-country and take advantage of surging global prices.

While Zimbabwe has taken a seeming defiant stance, South Africa have entered a collaboration with United Kingdom on its critical minerals for future clean energy technologies and energy transition in hopes that the collaboration will lead to mutually beneficial projects and related initiatives, such as support of investment flow into the South Africa mining sector and grow new clean jobs.^x

Namibia has also taken a similar stance on its critical materials by entering into a partnership deal with the European Union to sell its rare earth minerals critical to the energy transition program.^{xi} Morocco has also recently taken an initiative to grant an exploitation license to a U.S company for its manganese extraction and sales to create clean jobs and stimulate local economic growth.^{xii}

It is recommended that while African countries endeavor to take economic advantage of these critical elements, recourse must be given to the environmental and social impacts of mining processes on the citizens as well as prioritize proper accountability and appropriation of investment flow and revenue derived.

20/03/2023

EL: Legal, Regulatory & Policy Data Intelligence

Practice considerations for exploring solar potential in African countries

Electricity Lawyer is pleased to introduce its Legal, Regulatory and Policy Data Intelligence which involves an in-depth analysis of energy industry data from a legal, regulatory and policy angle to assist decision makers, investors, and stakeholders in understanding the implications of energy market developments and make well-informed decisions.

The data intelligence highlights recommendations for African countries regarding the exploration of its abundant solar potential.

Africa Leads the World in Solar Power Potential

Average long-term practical potential solar energy output, by world region* (in kWh/kWp/day)



* Based on national averages from a total 209 countries. Calculated for utility-scale installations of monofacial modules at optimum tilt. Excl. land with identifiable physical obstacles but ignoring possible restraints due to land use regulations.

** Including the Caribbean

Source: Global Solar Atlas/The World Bank



statista

The graph presented projects that Africa has the world's greatest solar energy potential. Africa is the only place in the world where "excellent conditions" for solar power are exceeded^{xiii} yet still untapped. The International Energy Agency (IEA) estimates that Africa possesses 60% of the world's finest solar resources but only 1% of solar generation capacity.^{xiv} Africa can change this narrative through regulatory policies and financial mechanisms.

Through legislations and policies, Africa can exploit its solar potential by making national legislations and policies tailored to drive the actualization of its solar energy potential. This could include exemption from VAT and import duties on photovoltaic products and components.^{xv}

Such policies can also translate commercial barriers to the deployment of solar energy into viable capacity. Thus, it is recommended that on a public side, African governments generate substantial revenue by reducing the inefficiency caused by fossil fuel subsidies, which primarily benefit coal and oil resources.^{xvi} Subsidies are estimated to amount to 5.6 percent of Sub-Saharan African's Gross Domestic Product.^{xvii} Subsidies could be phased out gradually while protecting the vulnerable, and potentially raise funding for renewable-energy technologies like solar.

Additionally, on the private front, African countries should make significant efforts to attract private investment in its potential solar capacity. According to surveys, the greatest threat to private investment in solar energy in Africa is governance-related risks such as complex bureaucracy and changing regulation.^{xviii} Attracting private financing will necessitate governance improvements to reduce political risk; reforming the financial sector to stimulate the nascent green bond market, as well as reducing financial risk by transferring some of it to public actors, can help attract private investment.^{xix}

Multilateral financial institutions likewise play an important role at the international level in facilitating long-term financing to support clean energy investment like solar.^{xx} These institutions provide tailored advice on the effective deployment of climate finance in addition to identifying alternative sources of funding.^{xxi}

27/03/23

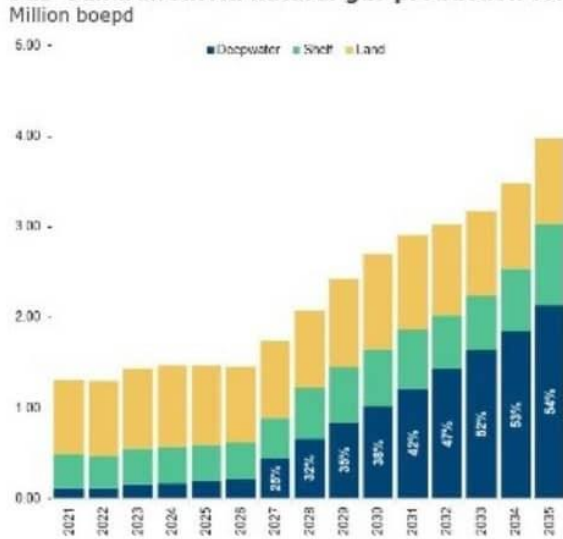
EL: Legal, Regulatory & Policy Data Intelligence

Practice considerations for Natural Gas in African countries

Electricity Lawyer is pleased to introduce its Legal, Regulatory and Policy Data Intelligence which involves an in-depth analysis of energy industry data from a legal, regulatory and policy angle to assist decision makers, investors, and stakeholders in understanding the implications of energy market developments and make well-informed decisions.

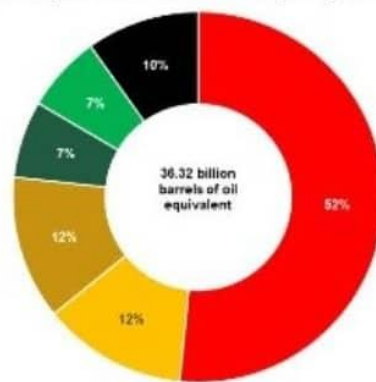
The data intelligence highlights recommendations for African countries regarding the exploration of its Liquefied Natural Gas.

Sub-Saharan Africa natural gas production forecast



Source: Rystad Energy UCube, Rystad Energy research and analysis

Sub-Saharan Africa deepwater recoverable natural gas resources by country



RYSTAD ENERGY

The graph depicts that Sub Saharan Africa is a hub for natural gas and its production is expected to increase significantly in the coming years^{xxii} while there will be a global shortage of LNG by 2026.^{xxiii} The use of gas as a transactional energy resource is being encouraged by global energy transition policies, which will lead to a rise in demand for liquefied natural gas (LNG). Africa's hydrocarbon-producing nations now have a big potential to make profit off LNG.^{xxiv} But, in order to build infrastructure that will enable production to rise and LNG exports to improve, major investments must be made in Africa's main and developing gas producing nations, including Mozambique, Nigeria, Niger, and Tanzania.^{xxv}

A lack of funding to build the necessary infrastructure to increase energy exports, despite Africa's potential to become a global energy hub, continues to be the principal obstacle preventing it from fully utilizing its gas reserves for economic progress.

As a result, it is recommended that African producers must give top priority to creating capital-attractive regimes through commercial friendly legislations and policies that make it possible to sign agreements with international nations and boost confidence in parties' contract adherence.^{xxvi}

Additionally, African governments must foster a commercial climate that attracts large oil and gas companies, regional and international financial institutions, to engage in infrastructure development for natural gas.^{xxvii} This is possible through enacting a policy/legislation that regulates appropriate pricing, competition and fiscal regime of the gas industry. In addition alternate methods of obtaining finance should be explored rather than hoping on international funding and grants.^{xxviii} For instance, Africa can use a combination of domestic private sector and public sector funding, look to Asian banks that are still willing to finance oil and gas developments in Africa, and use African-tailored solutions like the African Development Bank to accelerate the development of infrastructure for gas exports.

In conclusion, legislations will be the driving force for African countries to foster their natural gas production and export in order to take advantage of the forecasted shortage in the coming years.

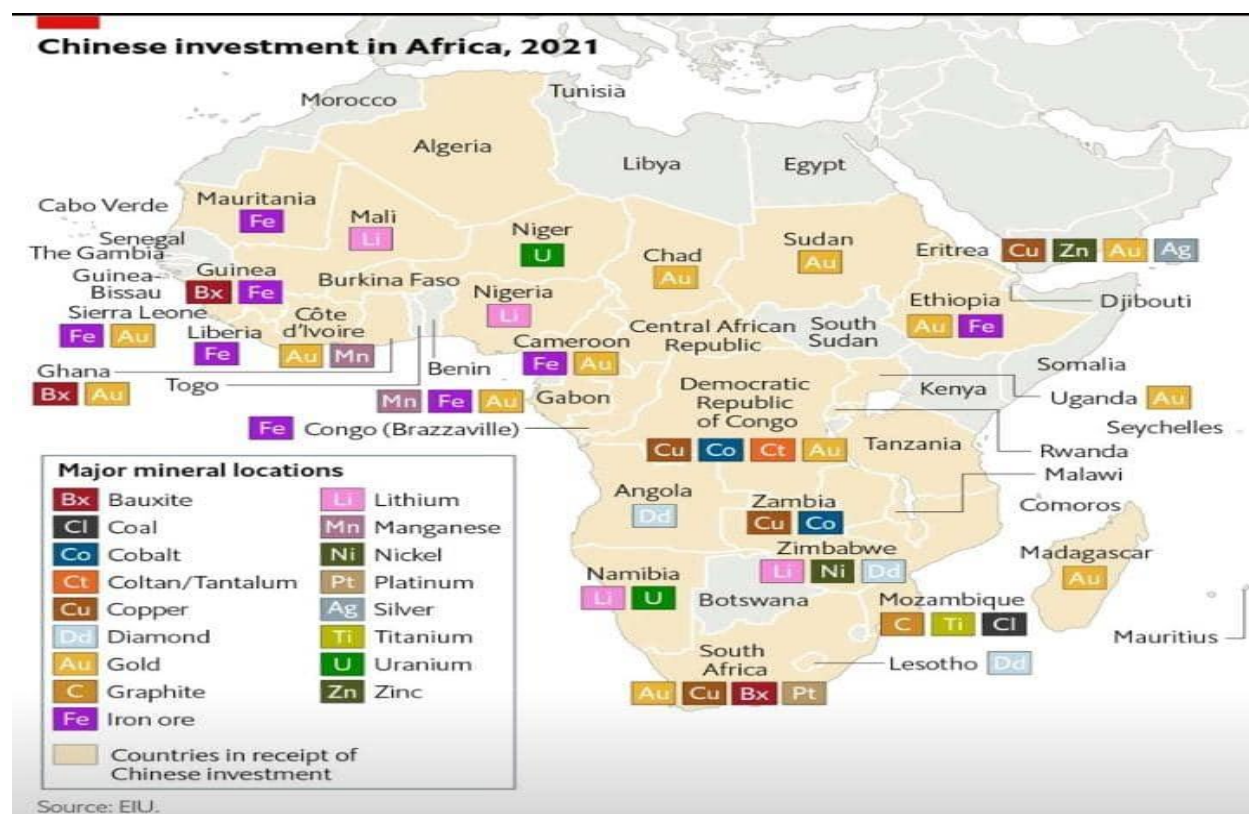
31/03/23

EL: Legal, Regulatory & Policy Data Intelligence

Practice considerations for Trade and Investment in African countries

Electricity Lawyer is pleased to introduce its Legal, Regulatory and Policy Data Intelligence which involves an in-depth analysis of energy industry data from a legal, regulatory and policy angle to assist decision makers, investors, and stakeholders in understanding the implications of energy market developments and make well-informed decisions.

The data intelligence highlights recommendations for African countries towards leveraging on foreign investment in her critical minerals.



The graph depicts China's investment in Africa, a home to about 30 percent of the world's mineral reserves^{xxx} and more than 40% of its mineral exports and about one-third of region's ore and metals exports go to China. China is heavily investing in Africa, building infrastructure and participating in numerous projects to increase access to electricity. It is anticipated that Africa will not only or primarily be a source of natural resources and raw materials, but that the development of the continent will also present incredible opportunities for trade and investment.

As a result, it is recommended that Africa will review its investment laws and policies that will position it to leverage on China's investment.

Although the majority of African nations have adopted generous investment laws, many of them have also implemented excessively high corporate taxes, high interest rates that are out of line with the needs of productive investments, uncompetitive wage rates, and strict labor laws, all of which act as deterrents to investment.^{xxx} As a result, many other African nations have not seen the anticipated results from their investment incentive packages.

Investment incentive systems are the primary policy instruments that can directly influence investment volume and allocation. Given the competitive global investment environment, African governments should overhaul their investment incentive packages, drawing on the experiences of other developing regions. Components like tax breaks, minimum wage and employment legislation, interest rate

policies, training allowances, depreciation allowances, profit repatriation policies, and foreign exchange transactions are few considerations that must be taken into account.^{xxxii}

Also, the banking and non-banking financial systems should be shaped to fulfill their responsibility for encouraging profitable investments and offering investors and corporate operations effective services.^{xxxiii} It is also important to encourage banks to think about financing profitable investments.

In conclusion, Africa's potential for investments is immense yet constraints on the investment climate are numerous. Africa can cope with the constraints by adopting the right policies, formulating, and implementing the right incentive packages.

07/04/23

EL: Legal, Regulatory & Policy Data Intelligence

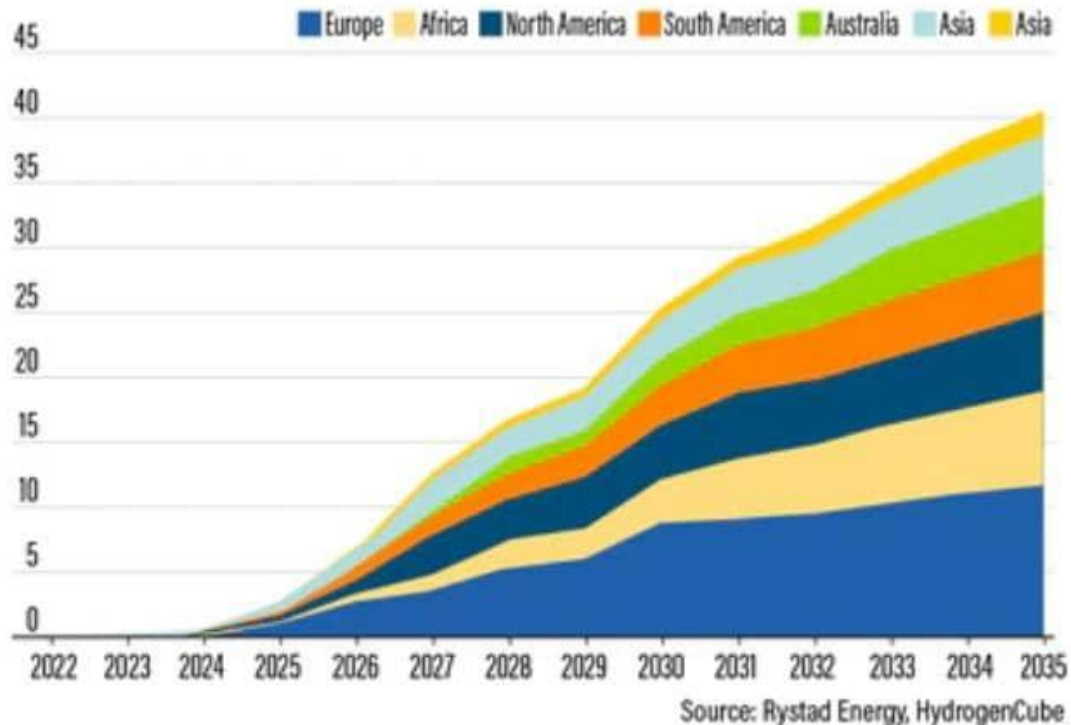
Practical considerations for Green Hydrogen Production in Africa

Electricity Lawyer is pleased to introduce its Legal, Regulatory and Policy Data Intelligence which involves an in-depth analysis of energy industry data from a legal, regulatory and policy angle to assist decision makers, investors, and stakeholders in understanding the implications of energy market developments and make well-informed decisions.

The data intelligence highlights recommendations for African countries towards leveraging on its green hydrogen potential.

GREEN HYDROGEN PRODUCTION, SPLIT BY CONTINENT

(Million tonnes, as of February 2023)



The graph depicts green hydrogen production per continent, amidst which Africa is projected to produce about 15 million tonnes of green hydrogen by 2035. Africa's abundance in renewable energy and its unparalleled minerals are critical not just for green hydrogen production, but also to produce electrolysers, needed for hydrogen (H₂) production.^{xxxiii}

According to a study by Rystad Energy, Africa's total declared electrolyzer pipeline capacity has reached 114 gigawatts (GW), 61% of which are associated with Sub-Saharan African nations.

³⁴

An estimated 70GW of electrolyzer pipeline for this African region has been announced, with Mauritania accounting for 50%, followed by South Africa and Namibia. As South Africa possesses nearly 90% of the world's platinum group metal reserves, essential to produce polymer electrolyte membrane (PEM) electrolyzers, Sub-Saharan Africa is in a unique position to establish a sustainable green hydrogen economy.

A green hydrogen economy will need aspirational policymaking, imaginative leadership, and substantial additional funding to^{xxxv}:

- Create collaborative innovation platforms to advance research and the creation of sustainably produced technology from Africa to sustainably increase the sector's competitiveness.
- Build the infrastructure for hydrogen energy to support H2 production and facilities for efficient H2 storage, transport, and refueling.
- Establish or enhance the legal framework(s) for green hydrogen, to support the entire value chain– from production to distribution.

The biggest barrier to constructing these hydrogen projects and the necessary infrastructure will be funding.^{xxxvi} However, alliances in Africa have been sought after by European nations. Hence, there is a demand on African countries to enact legal frameworks that will cater to such alliances with foreign countries, towards the production of green hydrogen, and electrolyzers, which will bring in investment and economic opportunities to the continent.^{xxxvii}

It is recommended that experts and stakeholders across the green hydrogen value chain, form a synergy that will spur the enactment of a robust legal framework for a hydrogen economy in Africa, which will eventually dovetail towards other economic benefits such as investments and green jobs across the continent.

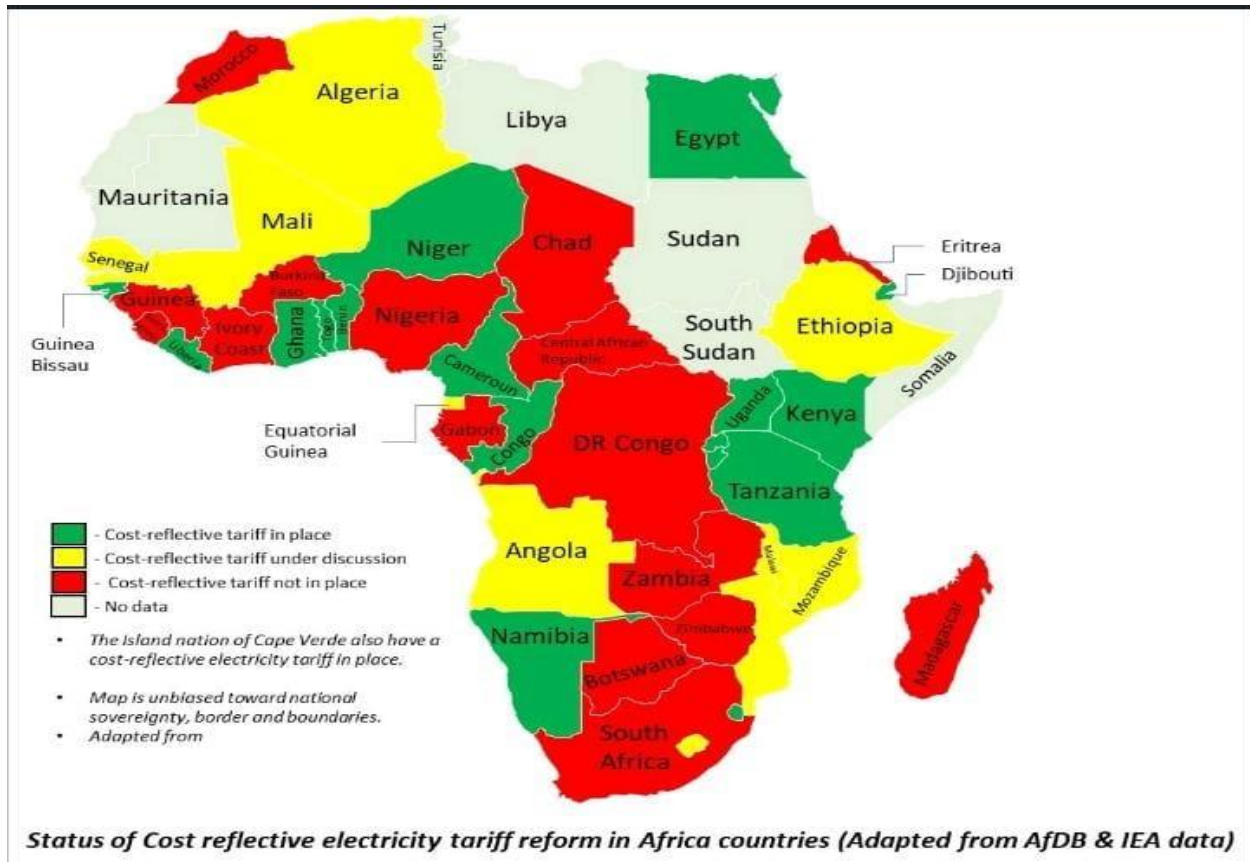
14/04/23

EL: Legal, Regulatory & Policy Data Intelligence

Practical considerations for Cost Reflective Tariffs in African countries

Electricity Lawyer is pleased to introduce its Legal, Regulatory and Policy Data Intelligence which involves an in-depth analysis of energy industry data from a legal, regulatory and policy angle to assist decision makers, investors, and stakeholders in understanding the implications of energy market developments and make well-informed decisions.

The data intelligence highlights recommendations for African countries towards optimizing cost reflective tariffs in the electricity supply industry.



The graph depicts majority of African nations still run an electrical market without cost-reflective pricing/tariffs. This indicates that the majority of African countries' power tariffs do not accurately reflect the full cost of supplying electricity, leading to ineffective markets and significant revenue collection shortages.

In an effort to maintain low rates and assure universal affordability, the government fills this revenue loss with subsidies.^{xxxviii} The government's subsidy/shortfall coverage system, which is an inefficient instrument for reducing poverty, has made it difficult for utilities to meet their operating expenses, let alone turn a profit.^{xxxix} Non-cost-reflective tariffs and other losses make it difficult for the sector to draw in investment, preventing the growth and extension of the infrastructure.

It is recommended therefore, that in order to prevent power utilities from defaulting on their debts due to rising expenses and other Aggregate Technical Commercial & Collection (ATC&C) losses, tariff reform and regulations are becoming even more important.^{xl} It is necessary to implement a cost-reflective pricing system where end users, free from government interference, pay the full and actual cost of the electricity they consume.

This framework will increase utility companies' financial stability for better services and relieve the government's financial burden on subsidy, which may be tailored towards targeted consumers who may not afford the cost reflective tariffs according to each electricity tariff band.^{xli}

Africa's electricity sector needs major investment, and implementing a cost-reflective tariff system is an important first step. This will eventually turn in private investment in the metering system and

electricity infrastructure across the power supply industry, as well as the much needed electricity access.^{xliii}

Furthermore, it will serve as a check on distribution companies, since they will be evaluated on the basis of availability (hours of supply), dependability (frequency and duration of interruptions), and quality (voltage and operating frequency)^{xliii}.

In conclusion, a tariff reform regulation will be a first step in the right direction of Africa's goal to achieve universal access to electricity as well as other challenges in its power utilities industry.

21/04/23

EL: Legal, Regulatory & Policy Data Intelligence

Practical considerations for Closing the Metering Gap in Nigeria

Electricity Lawyer is pleased to introduce its Legal, Regulatory and Policy Data Intelligence which involves an in-depth analysis of energy industry data from a legal, regulatory and policy angle to assist decision makers, investors, and stakeholders in understanding the implications of energy market developments and make well-informed decisions.

The data intelligence highlights recommendations in putting an end to estimated billing and closing the metering gap in Nigeria, as proposed by the President-elect in his manifesto and further evaluated by Electricity Lawyer (EL) in the [Power Sector Scenario Analysis Report](#) titled '**EL Power Sector Scenario Analysis : Projecting the Future of Nigeria's Power Sector based on the Six Point Power Sector Plan of the President-elect.**'

Figure 1: Closing the metering gap in Nigeria based on the RATS and HATS Scenarios



Source: Electricity Lawyer

The graph projects a 99% metering penetration in Nigeria by 2026, on a Reasonable Ambitious Target Scenario (RATS), and a 100% metering penetration by 2025 on a High Ambitious Target Scenario (HATS), in so far as the appropriate framework(s), policies, and programs are in place.

Over 5.85 million Nigerians on average were recorded to be on estimated billing as at the second quarter of 2022.^{xliv} Over the years, the Nigerian government has come up with different initiatives like the National Mass Metering Programme (NMMP) aimed at putting an end to estimated billing, increasing the metering rate and reducing collection losses in the Nigerian Electricity Supply Industry (NESI).^{xlv} The NMMP is a policy intervention, backed by the Central Bank of Nigeria (CBN), which grants electricity Distribution Companies (DisCos) long-term (10-year duration) loans with single-digit interest rates solely for the purpose of providing customers with meters.^{xlvi} Based on the policy objectives, the NMMP may only be used by local meter manufacturers or assemblers. Through the NMMP, a total number of 793,978 customers have been metered, since the inception of the policy intervention in 2021.^{xlvii}

To close the ratio of metered to unmetered customer(s) gap, it is recommended that the government develops and implements similar policies and programmes like the NMMP that can run concurrently and cushion the financial constraints of DisCos, given the huge metering gap.^{xlviii} Also, putting in place a cost-reflective tariff structure will help DisCos recoup their metering expenditures, within regulatory boundaries.^{xlix}

In addition, it is recommended that meter deployment and installation should be undertaken in areas with the highest collection losses, to further accelerate the closure of the current metering gap which will in turn result in the ability of the DisCos to earn sufficient revenue that can be geared towards network improvements, thus spurring increased energy access.

28/04/23

EL: Legal, Regulatory & Policy Data Intelligence

Practical considerations for Optimising Domestic Manufacturing of Prepaid Meters.

Electricity Lawyer is pleased to introduce its Legal, Regulatory and Policy Data Intelligence which involves an in-depth analysis of energy industry data from a legal, regulatory and policy angle to assist decision makers, investors, and stakeholders in understanding the implications of energy market developments and make well-informed decisions.

The data intelligence highlights recommendations for optimising the domestic manufacturing of prepaid meters in Nigeria, as proposed by the President-elect in his manifesto and further evaluated by Electricity Lawyer (EL) in the [Power Sector Scenario Analysis Report](#) titled '**EL Power Sector Scenario Analysis: Projecting the Future of Nigeria's Power Sector based on the Six Point Power Sector Plan of the President-elect.**'

Figure 2: Local Meter Manufacturing in Nigeria based on the RATS and HATS Scenarios



Source: Electricity Lawyer

The graph projects a 25% increase in local manufacturing of prepaid meters in Nigeria by 2025, on a Reasonable Ambitious Target Scenario (RATS), and a 40% metering penetration by 2025 on a High

Ambitious Target Scenario (HATS), in so far as the appropriate framework(s), and financial schemes are in place.

One of the means of closing the metering gap in Nigeria is smart metering, however, challenges of financial cost, investment and manpower have been recurrent. One major solution has been to incentivize local manufacturers of meters and invest into the capacity building and training of local content.

Research has shown that the success stories of smart meter rollout in other jurisdictions like Finland and Sweden were primarily based on regulatory mandates, favourable financial regulations for distributed system operators (DSOs), and social acceptance policies.ⁱ However, due to a lack of standard policies and financial initiative to drive the metering revolution, African countries are yet to fully embrace metering and its local manufacturing.ⁱⁱ Egypt, on the other hand, is one African country expected to play a critical role in propelling Africa's meter activity, and this has been traced to its regulatory framework that created favourable conditions for meter manufacturing and implementation.ⁱⁱⁱ

The much applauded National Mass Metering Programme (NMMP) that provides funds for only local manufacturers is one of such policies that has contributed to the closure of metering gap in Nigeria in a measure.ⁱⁱⁱⁱ Also the social initiative of the Momas Electrical Meters Manufacturing Company Ltd (MEMMCOL) training youths on meter manufacturing and installation is a framework that drives domestic manufacturing of meters.^{lv} Proliferation of such policies and frameworks like this will end Nigeria in the success story of metering like other jurisdictions and indefinitely achieve the projected target scenarios.

Hence, it is recommended that Nigeria also rolls out legal, social and financial frameworks that can drive the retaining of local content and investment in the meter manufacturing industry, like funding the capital take off of local manufacturers, initiating skill and expertise programmes for upskilling and retaining of local content and legal framework that stiffens the importation of meters.

05/05/23

EL: Legal, Regulatory & Policy Data Intelligence

Practical considerations for Focusing on Solar Energy in Nigeria

Electricity Lawyer is pleased to introduce its Legal, Regulatory and Policy Data Intelligence which involves an in-depth analysis of energy industry data from a legal, regulatory and policy angle to assist decision makers, investors, and stakeholders in understanding the implications of energy market developments and make well-informed decisions.

The data intelligence highlights recommendations for integrating solar energy in Nigeria's energy mix, as proposed by the President-elect in his manifesto and further evaluated by Electricity Lawyer (EL) in the [Power Sector Scenario Analysis Report](#) titled '**EL Power Sector Scenario Analysis:**

Projecting the Future of Nigeria’s Power Sector based on the Six Points Power Sector Plan of the President-elect.’

Figure 3: Solar Energy increase in Nigeria based on RAT and HAT Scenarios



Source: Electricity Lawyer

The graph projects a 99 % of solar energy mix capacity in Nigeria on a High Ambitious Target Scenario (HATS) by 2028, and the same 99% by 2030 on a Reasonable Ambitious Target Scenario (RATS), depending on the availability of cogent solar renewable energy framework, in terms of incentives, exemptions and financial investment.

Solar installation capacity in Africa has historically been driven by a limited number of “hot spots” such as South Africa, Morocco, and Egypt^{lv}, and more countries are beginning to adopt solar initiatives. As of 2021, the solar energy capacity in Nigeria amounted to around 33 megawatts.^{lvi} Research has proven that Nigeria has an abundance of renewable energy resources that are ready to be utilised and integrated into the country's energy supply mix, with solar PV holding the most promise.^{lvii} Nigeria's population is expanding quickly, and this has led to a significant imbalance between supply and demand for energy.^{lviii} Moreover, an excessive reliance on fossil fuels has negative socioeconomic, environmental, and health implications.^{lix} As a result, the government needs to give the development of solar PV systems a high priority nationwide.

Although the country has regulations such as the Nigerian Electricity Regulatory Commission **(NERC) Mini-Grid Regulation (2016), and National Renewable Energy and Energy Efficiency Policy (NREEEP), 2015** that emphasize the integration of renewable energy in the electricity mix with tax incentives and exemption(s), implementation, and pursuit towards it's actualisation has been minimal due to financial costs.^{lx} Thus, in order to make solar photovoltaic technology more affordable, additional components that are related to the solar photovoltaic can be subsidized.^{lxi} Additionally, the government should provide and implement incentives for the sector, such as subsidies, tax exemptions, etc. The initial high cost of solar technology in the nation can be reduced by these financial subsidies which will further incentivise private and international investments in the sector.^{lxii} Encouraging financial institutions to provide loans with 0% interest for the installation of solar power will also reduce financial constraints.^{lxiii}

In order to fully entrench its implementation, it is recommended that there should be legal benchmarks and authorities, such as standardization organizations, that should ensure that low-quality renewable energy items, solar components, in this instance, are kept out of the local market.^{lxiv} Prior to being accepted into the local market, all renewable energy items could be mandated to go through stringent certification examinations.

Finally, additional funding for research and development, capacity building and expertise is required from both the public and private sectors in order to assess the performance of different solar PV technologies across the nation and provide standards for future innovations that would be appropriate for local conditions.^{lxv}

12/05/23

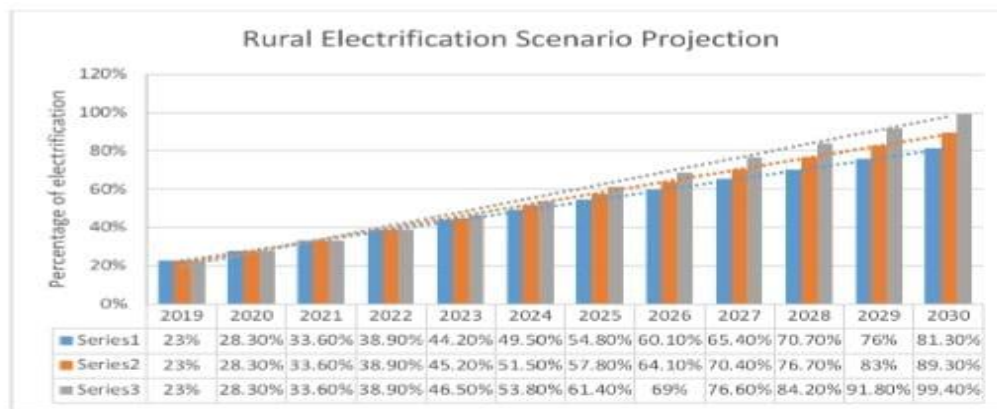
EL: Legal, Regulatory & Policy Data Intelligence

Practical considerations for Increasing Rural Electrification in Nigeria.

Electricity Lawyer is pleased to introduce its Legal, Regulatory and Policy Data Intelligence which involves an in-depth analysis of energy industry data from a legal, regulatory and policy angle to assist decision makers, investors, and stakeholders in understanding the implications of energy market developments and make well-informed decisions.

The data intelligence highlights recommendations for increasing rural electrification in Nigeria, as proposed by the President-elect in his manifesto and further evaluated by Electricity Lawyer (EL) in the [Power Sector Scenario Analysis Report](#) titled ‘EL Power Sector Scenario Analysis: Projecting the Future of Nigeria’s Power Sector based on the Six Point Power Sector Plan of the President-elect.’

Figure 4: Rural Electrification Scenario Progression between 2023–2030 under the BAU, RAT and HAT Scenarios



Series 1 (Blue) = BAU Scenario, Series 2 (Orange) = RAT Scenario, Series 3 (Grey) = HAT Scenario

Source: Electricity Lawyer

The graph projects a 90% of rural electrification in Nigeria on a Reasonable Ambitious Target Scenario (RATS) by 2030, and the same 100% by 2030 on a High Ambitious Target Scenario (HATS), which is dependent on the availability of favourable laws, polices, and plans relating to the rural scenery of Nigeria.

With an estimated national electrification rate of 55% and a rural electrification rate of only 39%, Nigeria has one of the lowest net electricity generation per capita rates in the world.^{lxvi} Nigeria will need to connect between 500,000 and 800,000 households each year, concentrating particularly on the rural areas, to attain universal access to electricity by 2030.^{lxvii} However, Nigeria intends to connect 513 000 households annually between 2020 and 2040 in order to obtain a 100% electrification rate by

that time.^{lxxviii} Both conventional and renewable energy sources—the latter having on-grid and off-grid applications—will be used to increase the rate of electrification.^{lxxix} This is being implemented through initiatives like the Rural Electrification Strategy and Implementation Plan of Nigeria 2006^{lxxx}, Nigerian Rural Electrification Agency (REA) created by the Electric Power Sector Reform Act in 2006^{lxxxi}; and the recent Nigerian Electrification Project^{lxxxii} to make it easier to deliver affordable electricity for domestic, commercial, industrial, and social activities throughout the nation's peri-urban and rural areas. However, the initiative has been limited due to factors such as domestic financing, and lack of subsidies.^{lxxxiii}

One African country that has made positive strides in rural electrification is Morocco which has been linked with long-term viability of financial capacity and effective regulation that attracted steady investments.^{lxxxiv} Morocco is a leading performer in executing its renewable energy strategies/targets which has led to electricity access and has nearly 100% of its rural areas electrified.^{lxxxv} Private companies contribute significantly to both the generation and distribution of more than half of the nation's electricity.^{lxxxvi} Morocco also has an ambitious electrification plan that guided rapid growth in rural access from 18 percent in 1995 to 99.5 percent by 2017.^{lxxxvii} Additionally, a financial restructuring process and a new regulatory agency also improved its operational and utility performance.^{lxxxviii} The country also pursued reforms in a selective and incremental manner.^{lxxxix}

It is thus recommended that Nigeria adopt practices like invitation of the private sector into the rural electrification initiative, especially through renewable energy resource and mini grid development. Electrifying the rural areas using the off-grid option will not only provide clean, sustainable energy, it will also provide revenue to the government and save some cost.

Additionally, policies and plans for rural electrification should include subsidies for rural electrification initiatives and plans, and availability of domestic financial institutions to subsidize costs.

Lastly, the Rural Electrification Agency should pursue reforms that will attract the inclusion of private and international investments in rural electrification for a robust financial sustainability. There should also be a well laid regulation for a step-by-step guide to increase rural electrification in an incremental manner at every stage of electrification with the help of electricity experts and professional personnel.

19/05/23

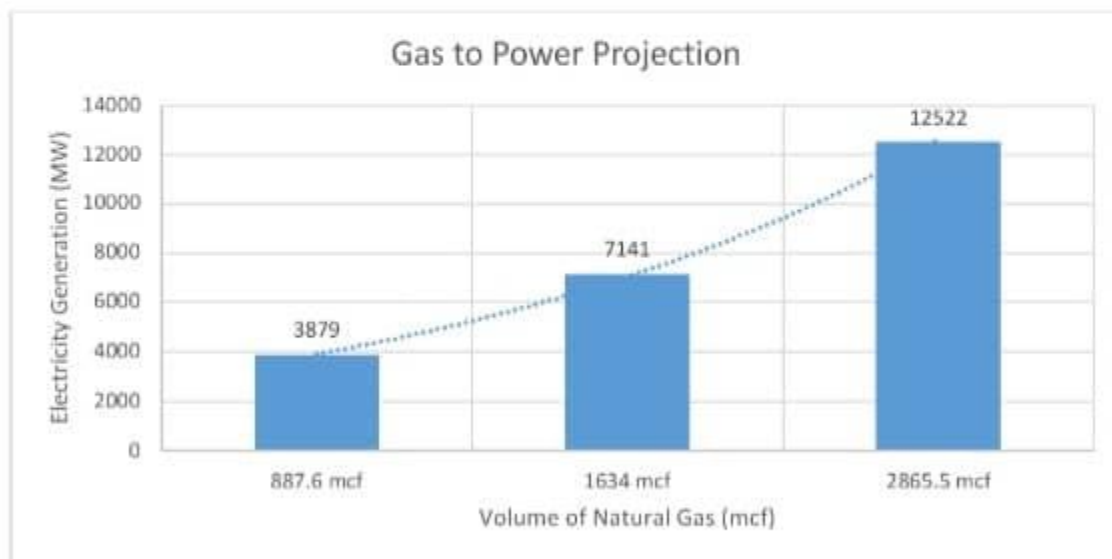
EL: Legal, Regulatory & Policy Data Intelligence

Practical considerations for Increasing Gas to Power in Nigeria.

Electricity Lawyer is pleased to introduce its Legal, Regulatory and Policy Data Intelligence which involves an in-depth analysis of energy industry data from a legal, regulatory and policy angle to assist decision makers, investors, and stakeholders in understanding the implications of energy market developments and make well-informed decisions.

The data intelligence highlights recommendations for increasing gas to power in Nigeria, as proposed by the President-elect in his manifesto and further evaluated by Electricity Lawyer (EL) in the [Power Sector Scenario Analysis Report](#) titled ‘EL Power Sector Scenario Analysis : Projecting the Future of Nigeria’s Power Sector based on the Six Point Power Sector Plan of the President-elect.’

Figure 5: Gas-to-Power Scenario
Progression between 2023–2030 under
the BAU, RAT and BAT Scenarios



Source: Electricity Lawyer

The graph projects an average available generation capacity of 7141MW of gas per day on a Reasonable Ambitious Target Scenario (RATS), and a total installed generation capacity of 12522MW per day on a High Ambitious Target Scenario (HATS).

Gas remains the cleanest of fossil fuels, and demand for gas is increasing due to a variety of factors, the most important of which is its status as a cleaner and preferable fuel for power generation.^{lxxx} Most crucially, the increase in gas demand is being driven by the global desire for cleaner fuels, with gas emerging as the preferred replacement for fossil fuel.^{lxxxi} It has been proposed that gas will be the last of the fossil fuels to be superseded by alternative energy sources.^{lxxxii} Nigeria is taking steps to join the trend of increasing gas use due to its large natural gas reserve. However, inadequate infrastructure,

sabotage, insecurity, pricing, and allocation of resources to the domestic market, etc have made the drive challenging.^{lxxxiii} Furthermore, the lack of an appropriate gas-pricing structure vis-à-vis a legal and regulatory framework is a key hurdle to the commercialization of gas for power.^{lxxxiv}

According to the Ministry of Petroleum Resources (MPR), Nigeria flares an excess of 700 million standard cubic feet (SCF) of gas per day from 178 flare sites, resulting in a loss of approximately \$10 billion in revenue annually, due to the country's inability to capture and commercialize flared gas.^{lxxxv} Nigeria can produce 600,000 MT of LPG per year and create 2.5 GW of power from new and existing Independent Power Plants if flared gas is adequately harnessed.^{lxxxvi} The goal of the gas-to-power plan is to promote the use of locally produced natural gas for power generation, hence increasing power supply to fulfill the country's domestic power needs.^{lxxxvii}

Thus, it is recommended that the current legal framework for gas must be changed to align with international best practices by reducing/eliminating the current high degree of 'state controlled' pricing.^{lxxxviii} To encourage local gas trading, domestic gas prices can be subsidized or benchmarked against international prices.^{lxxxix} Additionally, considering the government's objectives of developing the domestic gas-to-power industry, it is critical that the government provide adequate funds or cooperate with the private sector to develop the necessary infrastructure.^{xc}

Furthermore, proper security measures must be implemented to combat the threat of security-related activities, one of which is the infamous gas pipeline vandalism, which has a negative impact on gas availability and electricity generation.^{xc} The penalty for gas flaring must be enhanced to levels higher than those for marketing or re-injection, just like the Flare Gas (Prevention of Waste and Pollution) Regulation, 2018, which encourages producers to market gas by increasing flaring fees, which should prevent routine gas flaring.^{xcii}

26/05/23

EL: Legal, Regulatory & Policy Data Intelligence

Practical considerations for achieving Renewable Energy Targets across Sub-Saharan Africa (SSA)

Electricity Lawyer is pleased to introduce its Legal, Regulatory and Policy Data Intelligence which involves an in-depth analysis of energy industry data from a legal, regulatory and policy angle to assist decision makers, investors, and stakeholders in understanding the implications of energy market developments and make well-informed decisions.

The data intelligence highlights recommendations for improving and achieving renewable energy targets across Sub Saharan Africa (SSA).

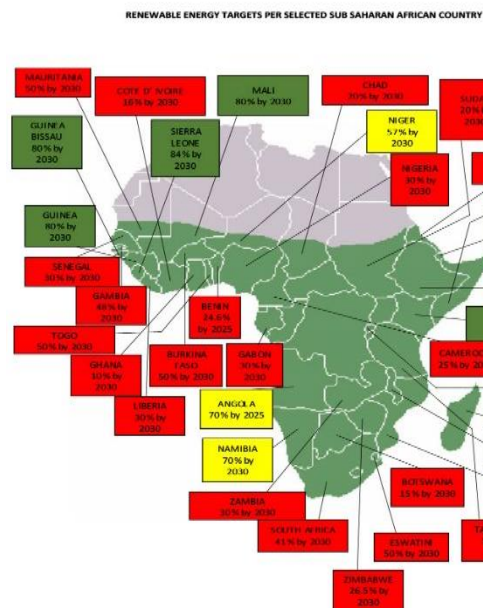


Figure 1

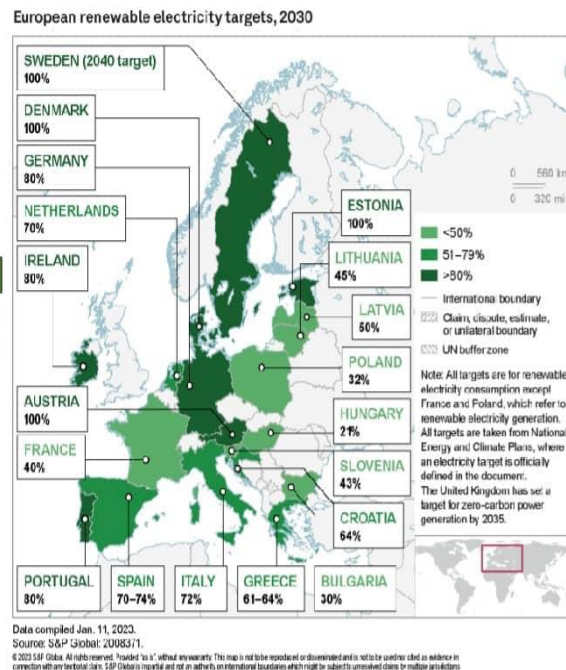


Figure 2

Modern renewable energy sources and technologies are gaining popularity around the world. These technologies have been supported for many years due to environmental and energy security concerns. In a variety of cases, they are currently regarded as the most cost-effective solution.^{xciii} The electricity sector offers great potential for transformation through expanded deployment of renewable energy technology^{xciv}, and as such countries have set renewable energy targets in a race to reach net zero by 2050, as portrayed in the figures in the schematic representation above. However, when the renewable energy targets of European countries and that of Sub-Saharan Africa are placed side by side, it is clear that European countries are more ambitious in their targets in comparison with SSA.

African countries are in a unique position; as they have the capacity to break free from the old centralized-utility model of energy provision, due to the abundance of renewable energy sources.^{xcv} Over the last decade, Africa has seen a rapid uptake of renewable energy. To date, 41 of the 54 nations have implemented at least one form of renewable energy target for specific technologies or sectors, in

Figure 1 is sourced from Electricity Lawyer. Figure 2 is sourced from S&P Global.

addition to dedicated off-grid policies for rural electrification and sustainable cooking.^{xcvi} However, the fair ambitions being spun out across the continent has been traced to the dearth of financial resources and appropriate legal and regulatory framework(s).

Mobilizing the necessary investments needed in Africa for the uptake of renewable energy, would necessitate governments and other stakeholders collaborating to create a favourable environment based on enabling policy and regulatory framework(s).^{xcvii} It is recommended that to implement investment promotion measures and attract both domestic and foreign investors to support the

sector's development, African governments must do more than rely on foreign donor support. Governments must also improve the availability of local financing by raising awareness of renewable energy applications in both grid-connected and off-grid market segments among local commercial banks and financial intermediaries.^{xcviii} Also, to entice private sector engagement and financing, governments must form public-private partnerships to share costs and risks.^{xcix}

It is also recommended that the development of national energy plans and renewable energy targets must be accompanied by supportive policy frameworks, within a broader set of cross-cutting policy tools.^c Policy options should be customized to specific country conditions and sector maturity, aimed at boosting firm-level competencies, building a domestic industry, encouraging education and research, and facilitating investment and technology transfer.^{ci}

Another way forward is to deploy regional energy plans across the continent. Governments in the region should collaborate to strengthen the role of power pools in harmonizing regional market trends, to further boost interconnections.^{cii} However, coordination on regional planning, harmonisation of standards and procedures, and other technical and institutional issues would need to be factored.

Additionally, a focus on rural electrification across countries within the region, will require beyond off grid technology and finances, but will also entail creating an institutional structure that promotes conversation and cooperation among the various parties participating in off-grid electrification projects to improve clarity and define roles and responsibilities.^{ciii}

In conclusion, the uptake and implementation of Africa's renewable energy targets will demand a collaborative approach from all applicable stakeholders.

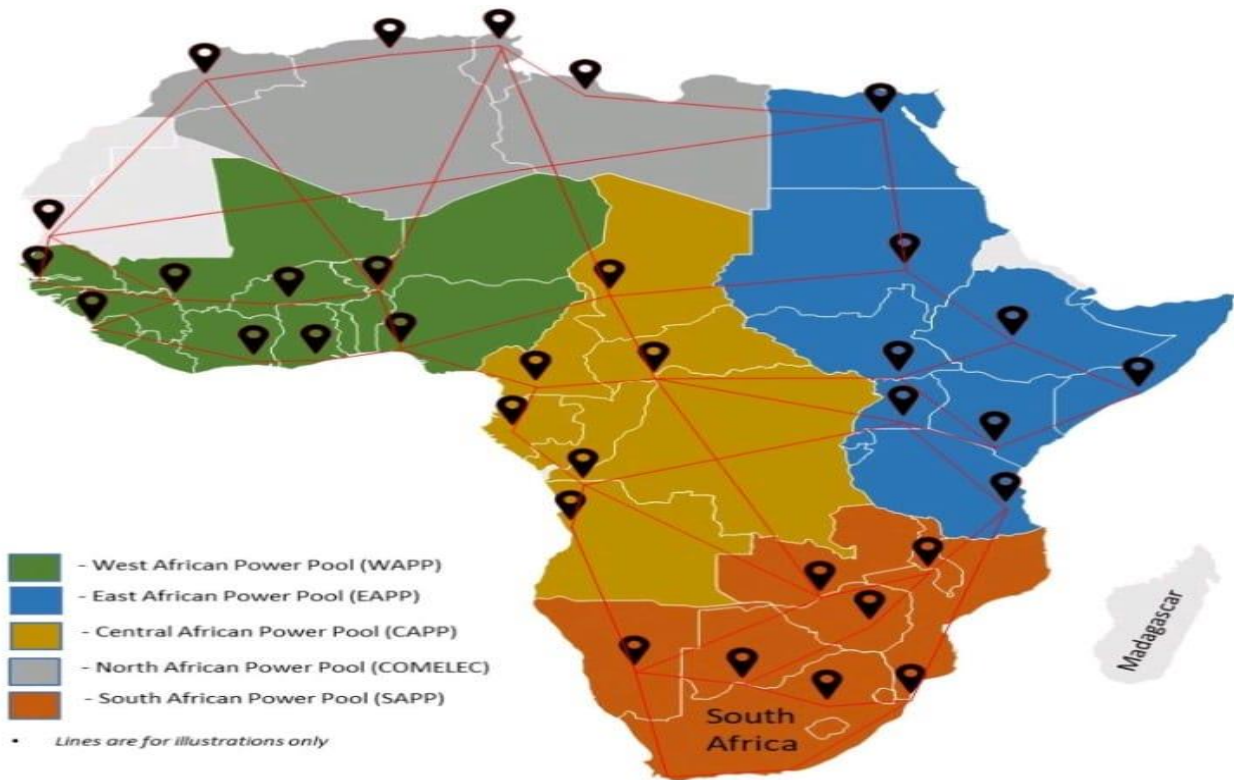
02/06/23

EL: Legal, Regulatory & Policy Data Intelligence

Practical considerations for achieving Africa Power Pools Interconnection

Electricity Lawyer is pleased to introduce its Legal, Regulatory and Policy Data Intelligence which involves an in-depth analysis of energy industry data from a legal, regulatory and policy angle to assist decision makers, investors, and stakeholders in understanding the implications of energy market developments and make well-informed decisions.

The data intelligence highlights recommendations for power pools interconnections in Africa.



Source: IRENA, Africa-EU Energy Partnership

The map depicts the African Continental Power System Masterplan, undertaken by the African Union Development Agency (AUDA-NEPAD) to lead the development of the master plan. The Continental Power System Masterplan will act as a road map for the continent's integration by creating a sustainable integrated power transmission network.^{civ}

Although, governments in Africa currently trade energy through "power pools" (electricity infrastructures and markets shared across economic blocs) in order to assist and fulfill territorial demand, a unified transmission network in Africa will facilitate cross-continental commerce with Europe and Asia via existing lines in North Africa, allowing African countries to source power from a diverse spectrum of competitive, clean energy sources.^{cv} It would also provide significant socioeconomic prospects within the continent by boosting interregional access to inexpensive African renewable energy resources, stimulating investment opportunities, employment growth, and eventually contributing to the region's sustainable development.^{cvi}

The Continental Master Plan is intended to connect the power pools, creating the world's largest geographical interconnectivity.^{cvii} An integrated transmission system will allow for the trade and development of power across numerous potential energy resources, including solar in North Africa, hydrogen development initiatives in Southern Africa, hydro resources in Central Africa, and geothermal in East Africa.^{cviii}

The framework will promote long-term development by encouraging investment, creating employment, and enhancing human capability in developing Africa's potential power resources.^{cix}

However, power pools can only be operational in regions with: fairly developed grid interconnections; adequate generating capacity to meet pool demand; a legal framework for cross-border electricity exchanges; trust and mutual confidence among pool members; and regional regulation and dispute resolution mechanisms.^{cx} Most of the sub-Saharan African power pools do not meet these requirements.

It is recommended that African governments address the issue of lack of trust and confidence among pool members through efficient governance and upholding rule of law^{cxii}; revamp transmission networks and tie lines^{cxiii}; boost their generating capacity and reserve margin^{cxiii}; create and/or reform the legal framework for electricity trading^{cxiv}; provide adequate rules for access to the transmission grid, including the establishment of wheeling charges^{cxv}; and develop regional regulation and an appropriate mechanism for resolving disputes.^{cxvi}

The availability of an adequate legal framework for contract enforcement in each of the countries participating in the interconnection is critical to the seamless negotiation and enforcement of contracts linked to power interconnections.^{cxvii} The establishment of an independent, skilled court with (usually) predictable channels for registering and prosecuting legal complaints permits contractors to continue with more confidence in agreeing to perform interconnection construction or operating operations. Reliable and impartial national courts also provide trading partners confidence that their interconnection-related disputes (if any) will be adequately resolved.

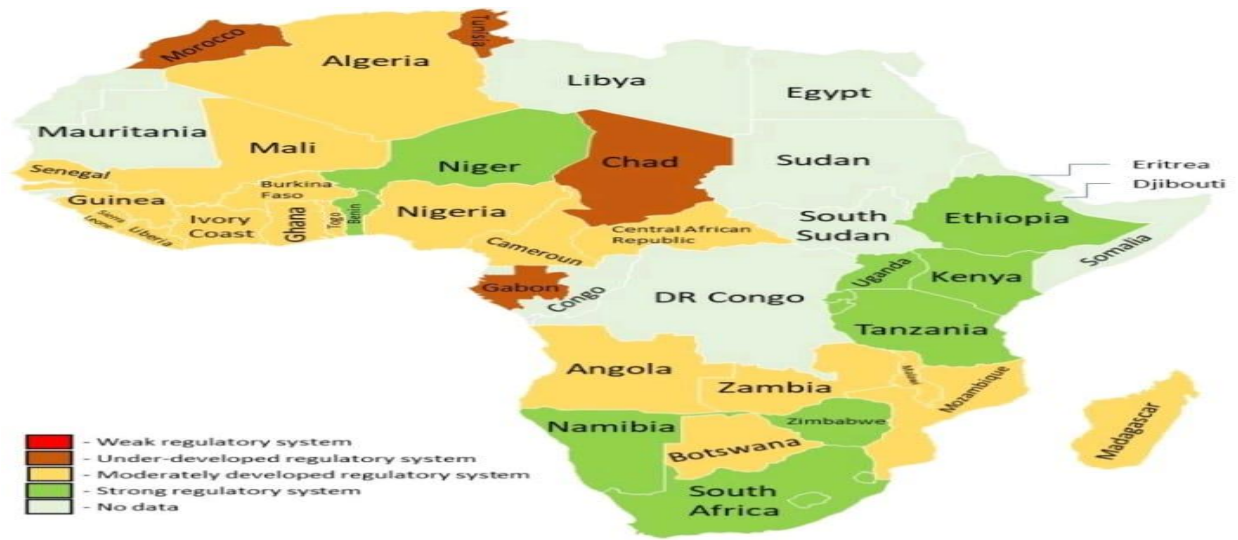
09/06/23

EL: Legal, Regulatory & Policy Data Intelligence

Practical considerations for achieving Strong Regulatory Systems in the Energy Industry

Electricity Lawyer is pleased to introduce its Legal, Regulatory and Policy Data Intelligence which involves an in-depth analysis of energy industry data from a legal, regulatory and policy angle to assist decision makers, investors, and stakeholders in understanding the implications of energy market developments and make well-informed decisions.

The data intelligence highlights recommendations for achieving strong regulatory systems in the energy industry.



GERI 2022: Global Electricity Regulatory Index

African countries are making great strides in establishing an effective regulatory framework for the electricity sector.^{cxviii}

According to a recent Global Energy Regulatory Index (GERI) research, African and Latin American nations have the highest index for energy regulation, with Uganda having the highest index among examined African countries.^{cxix} The GERI compares a country's legislative frameworks, decision-making processes, and economic and technical regulations in the electrical sector to theoretical best practices to determine how sectoral rules are positioned for long-term development.^{cxx} A high GERI suggests a strong regulatory framework for the electricity industry.

Many nations may have established good legal frameworks, but it does not always imply that the rules are being executed properly.^{cxxi} In SSA, the pace of implementing and democratizing created regulations has been slow. In many circumstances, international and transnational organizations fund, assist, and encourage the development of a regulatory system, indicating a possible low organic development.^{cxxii}

The following are the major issues of power sector regulation in SSA: Poor tariff methodology; lack of political and financial independence of regulators; implementation and enforcement of legislation; and regulatory body capacity development gaps.^{cxxiii}

While 75% of the countries surveyed have documented tariff methodologies, the majority lack essential features such as automatic tariff adjustments (absent in 85% of cases), schedules for major tariff reviews (missing in 81% of cases), and publication of the formulas used to determine end-user tariffs (not provided by 55% of countries).^{cxxiv}

The most common weaknesses in regulatory governance were in stakeholder independence (with an average score of just 29%). Many nations' energy laws lack provisions prohibiting regulating authority heads and board members from participating in conflicts of interest, such as working for regulated utilities at any time in their careers.^{cxxv}

The financial independence of regulators (with an average score of 59%) was another area of weakness in regulatory governance. In particular, motivating regulatory authority workers remains an issue in many nations (average score 31%). In 41% of the nations polled, regulatory authorities set lower pay than the utility businesses they monitor.^{cxxvi}

It is recommended that legal frameworks should be updated to incorporate the methods and norms used in decision-making and revising regulatory texts. This will make the regulatory process more predictable since stakeholders will be informed of the necessary regulatory procedures.^{cxxvii} Also, The tariff system, tariff review processes, and timeframe must be clearly specified in the regulatory framework in all regions. Tariff schedules must be incorporated into the tariff approach.^{cxxviii}

Furthermore, updating material on regulator websites is an issue in many places in Africa and their websites include a wealth of information on main and secondary regulations, but far less on industrial activity. It is recommended that to maintain the website and disseminate the material, regulators must hire a specialized IT and communications crew.^{cxxix} Also, to promote compliance, legislative frameworks should be updated to incorporate mandatory submission of data and information to authorities on defined deadlines, as well as penalties for non-submission.^{cxxx}

All legal frameworks should be revised to incorporate prohibitions on cross-appointment of upper management between utilities and the regulator. Provisions for staggered tenure should be included in sector legislative frameworks in all areas to protect institutional memory and allow for knowledge transfer.^{cxxxi} When regulators are autonomous and have less political involvement, they are more effective. Provisions in legislative frameworks governing board appointment and dismissal should be consistent with worldwide best practice.^{cxxxii}

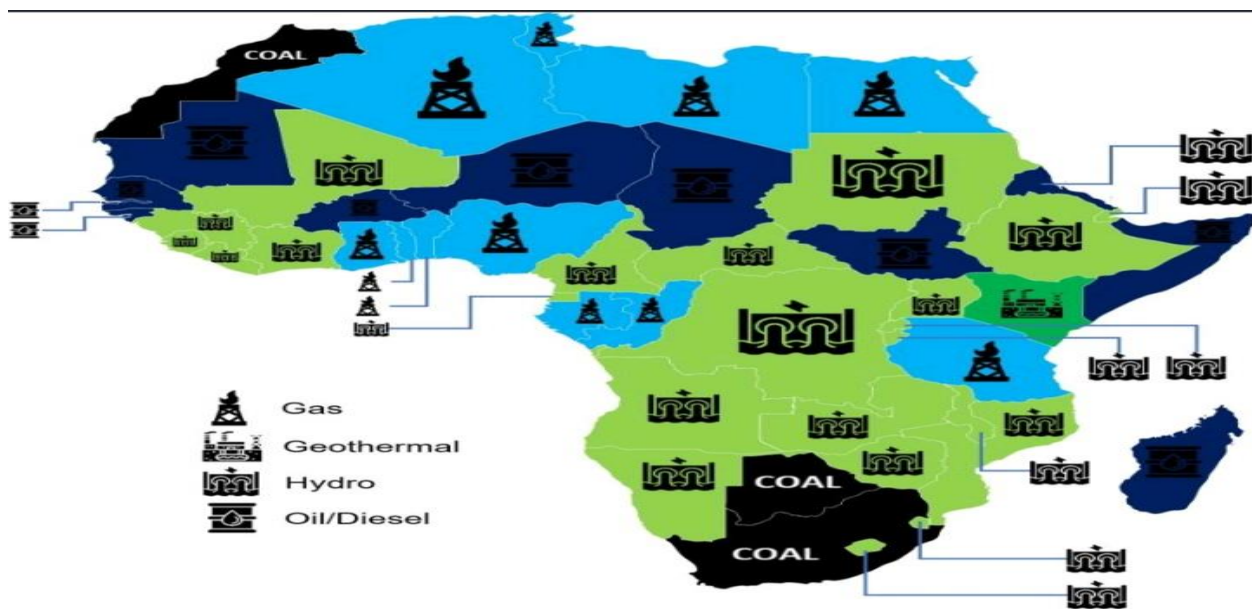
16/06/23

EL: Legal, Regulatory & Policy Data Intelligence

Practical considerations for achieving Clean Energy Electricity Source in Africa

Electricity Lawyer is pleased to introduce its Legal, Regulatory and Policy Data Intelligence which involves an in-depth analysis of energy industry data from a legal, regulatory and policy angle to assist decision makers, investors, and stakeholders in understanding the implications of energy market developments and make well-informed decisions.

The data intelligence highlights recommendations for achieving a clean energy electricity source in Africa.



The map depicts the dominant source of electricity in African countries, with hydro being the most dominant source. The possibilities for Africa’s energy transition appear promising, but the regulatory structure must be retooled to meet the continent’s energy demands.

With the global focus changing away from fossil fuels like petroleum and natural gas and toward zero-carbon energy in order to achieve sustainable development and climate resilience, it is anticipated that a fortunate Africa will prosper during the transition.

However, institutional, regulatory, legal, tariff structure, and frameworks for renewable energy are mostly absent or poorly implemented.^{cxxxiii} The proper legal and regulatory environment is critical, and this must be led by a policy that encompasses everyone – no one is left behind.

To enable businesses, a regulatory framework must be imposed. Regulations must be certain, transparent, uniform, and predictable. A clear source of funding, backed by legislation, is essential. To optimize its energy resources, Africa must partner on finance and infrastructure.

Furthermore, a continental integrated energy market can function as a stimulus to strengthen finance institutions to support energy development projects, fund innovative technologies to lower production costs, increase capacity, and maximize energy generation, which can improve access to various energy products. When investment expands, more capital becomes available for governments to allocate.

Closing the energy access and transition gap will require strategic deployment of all available resources, such as natural gas; a legal and regulatory overhaul to promote investment, a shift in domestic public finance away from fossil fuel subsidies and toward clean energy access, ambitious policies and programs, and institutional capacity building.^{cxxxiv} Skills development, reskilling, and job creation in the framework of a “just transition,” research and gender mainstreaming, grid connection, expansion, and integration programs, and decentralized solutions (renewable energy) with customised consumer

finance business models are all part of the picture. All of which are dependent on efficient legislations and policies in all sectors.

Policymakers must build a sound policy framework that can impact the cost-competitiveness of renewable energy. A well-designed long-term laws and an enabling environment for the implementation of renewable energy technology are required to provide investment security.

Policymakers must base their decisions on data and the experiences of individuals and communities to ensure that efforts to transition to clean energy are effective and sustainable. This necessitates a detailed awareness of the African continent's socioeconomic conditions, as well as the individual requirements and challenges faced by various governments and areas. This will ensure that the transition to sustainable energy is egalitarian and inclusive, benefiting all members of society.

23/06/23

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Practical considerations for achieving Electricity Data System in Africa

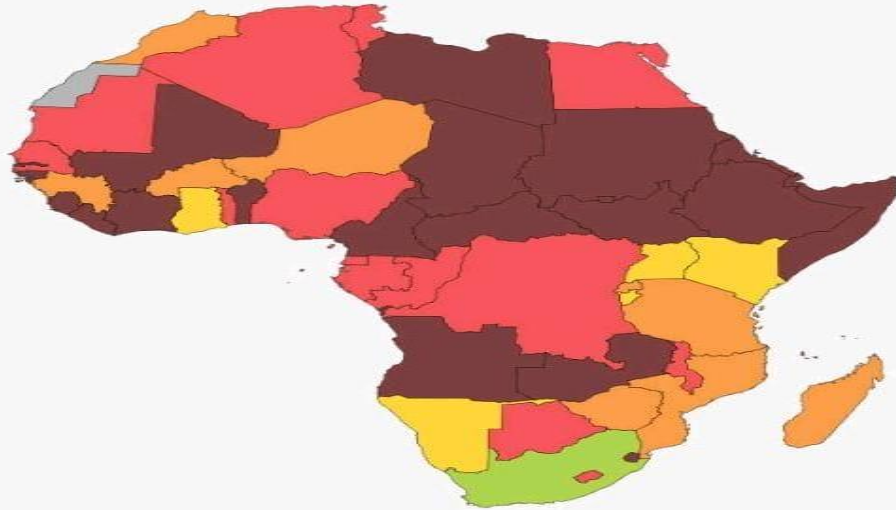
Electricity Lawyer is pleased to introduce its Legal, Regulatory and Policy Data Intelligence which involves an in-depth analysis of energy industry data from a legal, regulatory and policy angle to assist decision makers, investors, and stakeholders in understanding the implications of energy market developments and make well-informed decisions.

The data intelligence highlights recommendations for achieving electricity data system in Africa.

Availability of national electricity data in Africa

EMBER

- 0/5 - No publicly available data
- 1/5 - Little or low-quality / old data
- 2/5 - Annual mostly high-level data
- 3/5 - Better-than-annual data with some disaggregation
- 4/5 - Good (monthly-or-better) data with high detail
- 5/5 - Real-time data of high quality



Source: Ember Africa data transparency report

Africa's energy sectoral growth is hampered by a lack of reliable data on its energy grid.

This map shows how weak territorial electricity system statistics are present in almost all African nations. It is impossible to overstate the value of real-time information on the power grid. It is crucial for power sector governance, system planning, infrastructure development, R&D, market price, and investment stimulation.^{cxxxv}

The lack of data accessibility in Africa's power system can be attributed to the industry's underdeveloped capabilities.^{cxxxvi} The absence of real-time data synchronization and automation to quickly address system imbalance is also a crucial factor in Nigeria's ongoing grid collapse.^{cxxxvii}

To enhance data management in the African energy sector, technology (IoT) must be included into upcoming system developments as well as the generating fleet, transmission grid, and distribution system as they already exist.^{cxxxviii}

The following are data that are germane to the continent upscaling its energy access - installed base capacity, generation data; electricity supply mix ; electricity import and export data, electricity demand and supply data; system operation data; energy generation, consumption and storage data, live

electricity price data; generation, transmission and distribution updates and impacts; technical, commercial and policy data.^{cxvix}

Improving power sector data requires the cooperation of all stakeholders and market participants in the sector, however, law and policy makers are at the integral part of it. Legal frameworks and policies that take into considerations the need for technologies in the electricity industry will provide incentives that can promote investment into such infrastructure - technologies like smart grids, smart metering, drones, grid automation, power asset integrations, intelligent demand integration, etc.^{cxl} All these technologies are capital intensives, only a favourable legal and regulatory framework can be potent enough to draw such investments to the industry.^{cxli}

As a result, more reliable, consistent, and thorough datasets will be made available, which will enhance the understanding of power access tracking and analysis.^{cxlii} It is also anticipated to lead to more intelligent, targeted, and effective policy interventions. For example, digital technology can make it possible to gather extensive amounts of real-time, highly disaggregated data on power usage.^{cxliii} Advanced analytics may be used to manipulate huge data to reveal valuable consumer consumption insights that are crucial for business development and further investments.^{cxliv} This kind of innovation in data collection and manipulation can therefore be essential in expanding energy availability in Africa.

Africa must therefore pay close attention towards investing in data-smart technologies that will upscale its electricity infrastructure, which can also redirect more investment towards the continent due to available data for international investors and business developers.

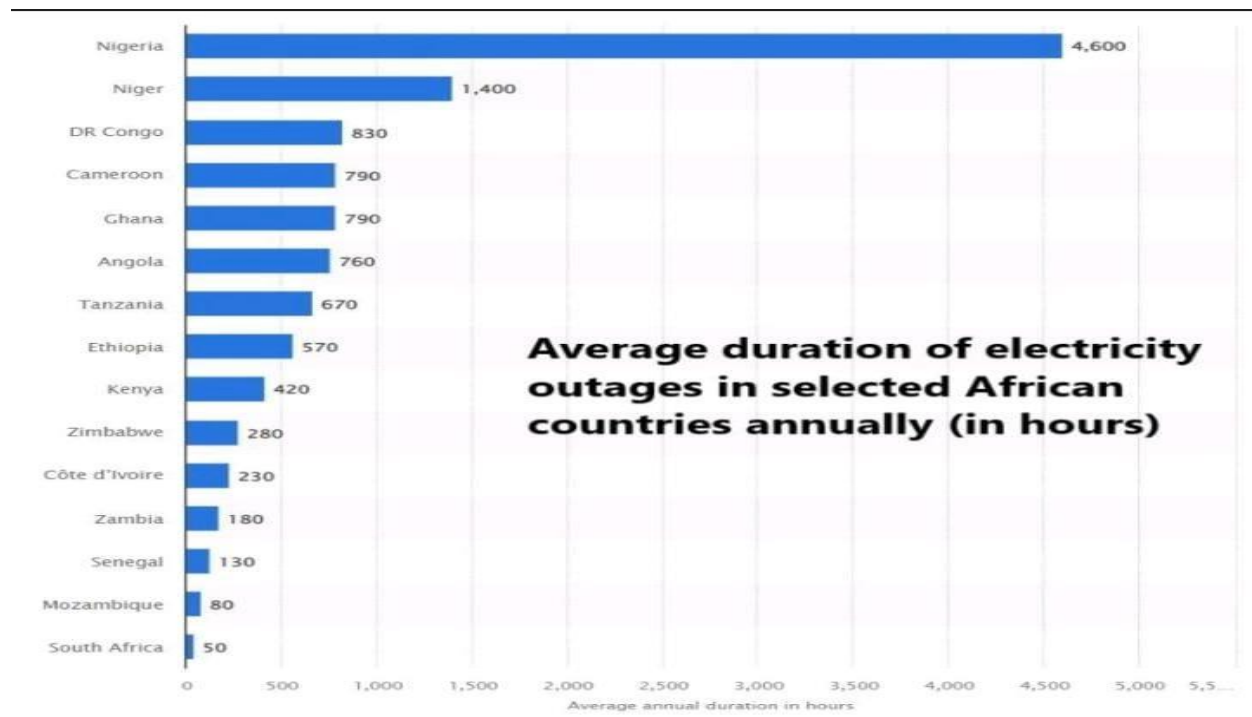
30/06/23

EL: Legal, Regulatory & Policy Data Intelligence

Practical considerations for Putting a Stop to Power Outages in Africa

Electricity Lawyer is pleased to introduce its Legal, Regulatory and Policy Data Intelligence which involves an in-depth analysis of energy industry data from a legal, regulatory and policy angle to assist decision makers, investors, and stakeholders in understanding the implications of energy market developments and make well-informed decisions.

The data intelligence highlights recommendations for putting a stop to power outages in Africa.



In terms of power outages on a continental level and (perhaps) globally, Nigeria is without a doubt the leader.^{cxlv} With an estimated average of 4600 hours per year, Nigeria outpaces all other African nations in terms of the length of electrical outages, with Niger coming in a distant second with 1400 hours.^{cxlvi}

The energy in Africa's enormous cities is sporadic, but there is no electricity at all in a sizable portion of the continent's rural areas.^{cxlvii} According to the International Energy Agency, 590 million people in sub-Saharan Africa — or 43% of all Africans — did not have access to electricity in 2021.^{cxlviii}

According to estimates from the World Bank, annual investments of close to \$20 billion are needed to achieve universal electricity throughout sub-Saharan Africa. Nearly \$10 billion of that amount is required each year to provide electricity to West and Central Africa and maintain it.^{cxlix} There are

numerous factors contributing to Africa's poor energy supply, including a lack of government oversight, and a lack of skilled workers to operate the national grids.^{ci} Unreliable infrastructure is by far the biggest contributor to power outages in Africa. Many African nations are unable to meet the enormous demand for producing and distributing power brought on by a rapid rise in population. Also, due to difficulties with backup generator operation, only the wealthy population and large-scale businesses have reliable access to energy. Theft and vandalism of electricity infrastructure in Africa, such as transformers and transmission lines, also present a serious problem.^{ci}

The solutions to these, according to research, is for utilities to guarantee maximum electricity bill collection. Cost reflective tariffs may be adopted but large- and medium-sized consumers should be prioritized and there should be consistency in increasing service quality. These can be measured via meter installations. The funds derived by utilities from the mentioned measures can be used in improving infrastructures, which will in turn bring private investments into the industry.^{ci}

Another crucial recommendation is to urge homes to install individual electricity meters to track energy usage. This will assist utilities to identify and precisely target disadvantaged consumers for possible subsidy disbursement. Prepaid meter installation can be advantageous for utilities as well as customers because it allows low-income households to pay in modest amounts throughout the month rather than all at once and ensures utility revenue.

Even while many Africans may electrify their houses by connecting to the grid, research shows that mini- and off-grid power, particularly from sources like solar, is necessary to light dwellings in many rural, and even urban parts of Sub-Saharan Africa.^{ci} Solar energy is transformed into electricity via a photovoltaic panel, which can then be used to directly power users or charge a bank of batteries. The grid then receives the stored energy from the batteries at times of peak demand.^{civ}

Africa may greatly alleviate its energy crisis by developing new facilities that include battery storage systems powered by photovoltaics. It will surely be costly since new technology must be used, such as large-scale solar farms that are connected to the grid and connected to battery energy storage, for example.^{civ} The funds required for these technologies can be channelled through stipulating favourable laws that will help in boosting both international and private investment in the industry like clean technology transfer, incentives and rebates for renewable energy technologies.

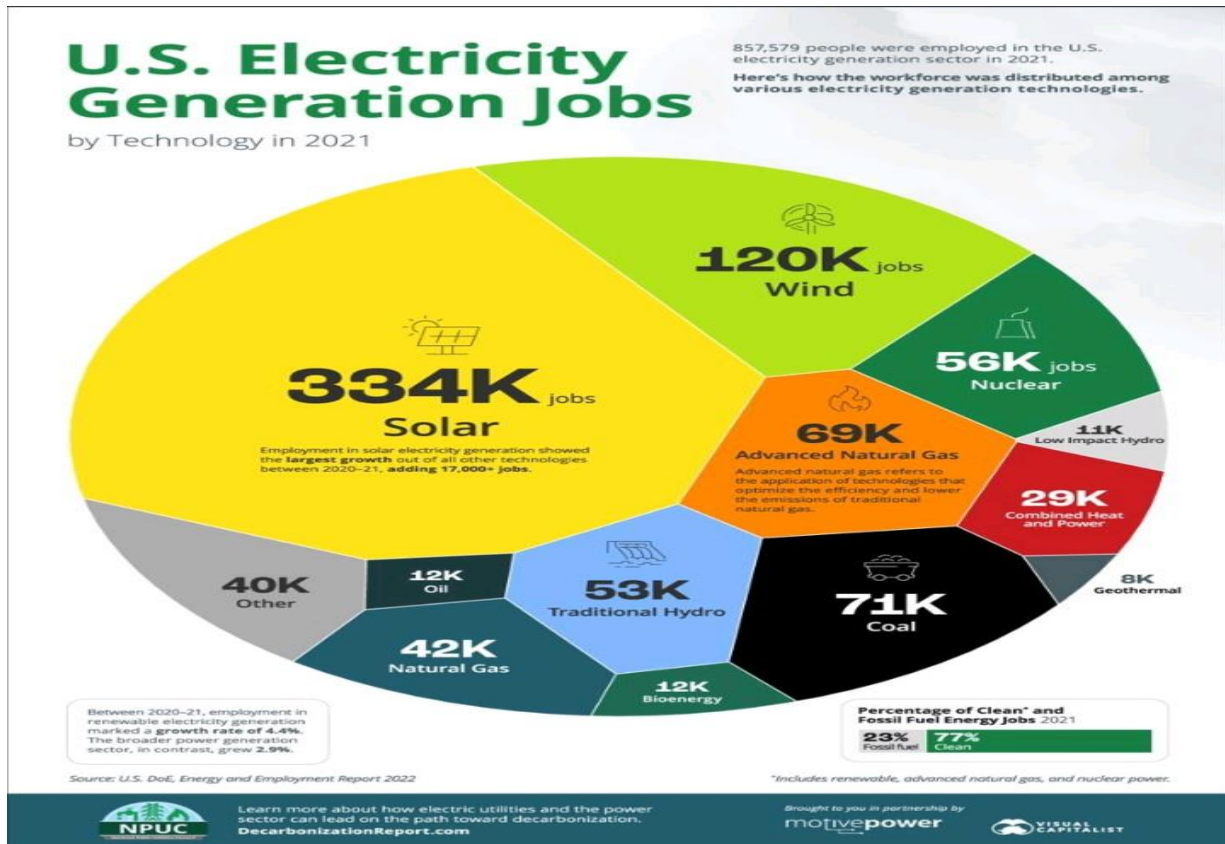
07/07/23

EL: Legal, Regulatory & Policy Data Intelligence

Practical considerations for Increasing Clean Energy Jobs in Africa

Electricity Lawyer is pleased to introduce its Legal, Regulatory and Policy Data Intelligence which involves an in-depth analysis of energy industry data from a legal, regulatory and policy angle to assist decision makers, investors, and stakeholders in understanding the implications of energy market developments and make well-informed decisions.

The data intelligence highlights recommendations for increasing clean energy jobs in Africa.



SOURCE: Element

The chart gives an overview of the job opportunities in the power sector of the United States of America (U.S.A), with solar alone accounting for close to 40% of the total employment in the power sector in the year 2021. Overall, renewables account for a significant portion of job opportunities alongside other traditional energy sources.

According to an analysis carried out by the International Energy Agency (IEA) World Energy Employment Report, Power generation employs over 11 million people worldwide and renewables provides for about 7 million jobs. It is evident from this data that there is a global shift in employments towards renewables which will require careful management through the creation of policies that will aid a successful transition to green employment(s).

The case study of the U.S.A is a lesson for African countries. Increased investment in renewable energy might result in at least 26 million additional jobs by 2050. According to a report by the African Development Bank (AfDB) and the International Renewable Energy Agency (IRENA). However, despite the lustrous outlook, Africa continues to trail behind in terms of growth and investment in renewable energy.^{cbi} According to IRENA's modeling, a systematic transition of Africa toward an energy system based on renewable energy could result in 6.4% higher GDP, 3.5% more job creation across the economy, and a 25.4% higher welfare index throughout the outlook period of 2020 to 2050

when coupled with the right policy basket. Greater fiscal stability and job creation are two of the most prominent prospects related to the energy transition in African countries that have been recognized by IRENA and the AfDB.

According to IRENA's model, jobs gained through the switch to renewable energy will outweigh those lost through the switch from traditional energy, including in many nations that produce fossil fuels.^{clvii} In view of this prospect for Africa, strengthening institutional capacity, wise policy choices, and a sizable financial and technological contribution from the international community will be required going forward.

It is recommended that Africa increase the capacity building opportunities for engineers and technicians in Africa's renewable energy sector. This will facilitate trainings, jobs acquisition, and careers advancement in the renewable energy sector through supporting technical colleges, taking online courses, and up scaling workers.^{clviii} Additionally, through policy understanding, leadership development, and advocacy, partnerships with African government officials can help hasten and strengthen policymaking for green manufacturing and investments. Financial provisions that cover the entire grant cycle—from planning and funding through project operations and sale—should be made available for green manufacturing enterprises in Africa.

In order to attract the required investments and put in place regulatory guidelines that will usher in green jobs to the continent, African countries must go for strong legislative frameworks that make provision for renewable energy integration on every sector of the economy. An all-inclusive legislative framework will be integral to Africa's smooth transition to green jobs, and sustainable development across the continent.

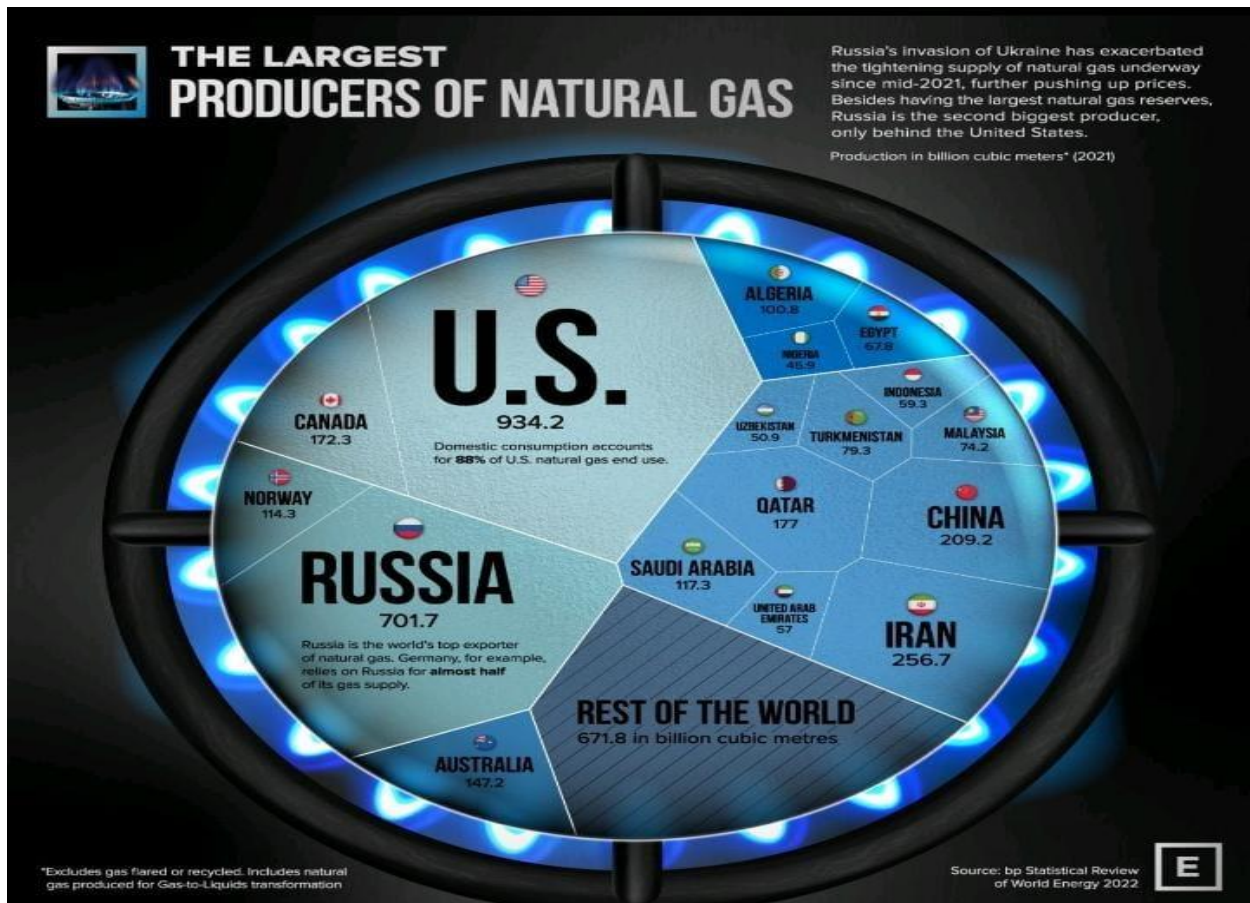
14/07/23

EL: Legal, Regulatory & Policy Data Intelligence

Practical considerations for increasing Gas Commercialisation in Nigeria

Electricity Lawyer is pleased to introduce its Legal, Regulatory and Policy Data Intelligence which involves an in-depth analysis of energy industry data from a legal, regulatory and policy angle to assist decision makers, investors, and stakeholders in understanding the implications of energy market developments and make well-informed decisions.

The data intelligence highlights recommendations for increasing gas commercialisation in Nigeria.



SOURCE: Element

The image depicts Nigeria as one of the top producers of natural gas compared to other Sub-Saharan Africa (SSA) countries in Africa. Nigeria contains the largest gas deposits in Africa and is currently the largest LNG exporter on the continent, with over 200 Tcf of proven gas reserves.^{clix} The Nigerian government launched a "Decade of Gas" campaign last year to promote investments in gas infrastructure and boost gas penetration throughout the economy.^{clx} However, a number of issues still need to be resolved in order to fulfil present demands and address suppressed demand, including the supply of gas, dispersed demand centres, an unclear macroeconomic outlook, and a continuous lack of foreign currency.^{clxi}

As a by-product of oil extraction, associated gas accounts for the majority of Nigeria's gas production. Sadly, the nation is currently dealing with high levels of petroleum theft that have caused its oil production to drop to historic lows, significantly affecting the supply of gas.^{clxii} Such instability has an impact on the entire value chain: earlier last year 2021, Nigeria LNG made a notable disclosure that it was only producing at 68% of its capacity as a result of theft of crude oil and pipeline vandalism, among other issues.^{clxiii}

Despite efforts from both the public and commercial sectors, gas infrastructure continues to be insufficient.^{clxiv} The creation of an enabling environment and the futureproofing of its projects will determine its ability to attract investments. Between 2022 and 2030, investments in LNG supply will be concentrated on low-cost, adaptable projects with a small carbon footprint and a rapid time to

market.^{clxv} Unfortunately, Nigeria has a reputation for project execution delays as well as expense overruns. Nigeria needs to do better in a world where the timeliness of project completion is becoming a deciding element in investment choices.

Although the federal government has been commended for the numerous frameworks like Nigeria Gas Flare Commercialisation Programme in 2016, The National gas policy of 2017, and Gas Flare (Prevention of Waste and Pollution) Regulation 2018, their implementation must be taken seriously and the long-term action plans in the 2017 policy must also be adhered to.^{clxvi} Additionally, the government continues to control the domestic price of natural gas, a practice criticized by many business leaders as encouraging inefficiency because the price set may not accurately reflect the true cost of gas.^{clxvii} To maximize profits from gas across the value chain, proper gas pricing procedures that take into account the present and future dynamics of the gas market must also be rigorously implemented.^{clxviii}

Gas infrastructures can be rehabilitated through concessions and improved to be automated and equipped with the technology for proper monitoring.^{clxix} Due to Nigeria's transmission network's limited capacity, gas use in the power sector is restricted. To enable the evacuation of more power from the current power plant, regional power transmission infrastructure development and/or expansion of the existing national transmission system are required. Also, investments in power transmission infrastructure will enable evacuation of more electricity and increase gas utilisation for power generation.^{clxx}

Finally, there is low awareness of the cost-effectiveness of using gas, particularly for transportation and home needs, which the governments and private institutions can alleviate via awareness programmes to encourage clean cooking agenda.

21/07/23

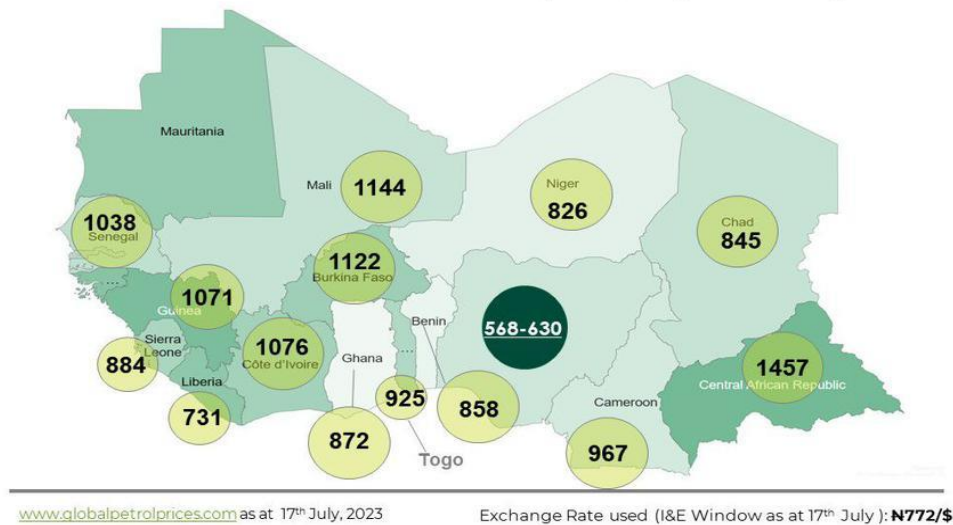
EL: Legal, Regulatory & Policy Data Intelligence

Practical considerations for mitigating effect Fuel Subsidy Removal in Nigeria

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The data intelligence highlights recommendations for mitigating effects fuel subsidies in Nigeria.

Gasoline Price Across Some West Africa Countries (Naira/Litre) – Post Deregulation



The chart shows petroleum prices in Africa, which indicates that at the current rate of petrol, the only difference between petrol prices in Nigeria, and the neighbouring countries is the absence of taxes on

the prices, because Nigeria does not charge tax on petrol.^{clxxi} Nigeria must eliminate its subsidies to enhance its debt management. Due to the increasing debt burden, Nigeria's revenue receipts are being crowded out by its debt service obligations.^{clxxii} In 2016, Nigeria's debt service as a percentage of revenue was 96.8%. While this number decreased to 70.4% in 2019, it increased to a projected 102% in 2022.^{clxxiii} At this rate, Nigeria's debt service obligations will increase to as high as 160% of revenue by 2027.

These and other considerations seem to have influenced the Government to adopt the "sudden death" approach to removing PMS subsidy without delay to address the country's insufficient revenues, growing fiscal deficits, and crowding out effect on public investment spending. Because of the subsidy, the price of fuel in Nigeria is lower than in neighboring countries, creating an arbitrage opportunity for merchants to buy petrol in Nigeria and sell it at a higher price in those nations.^{clxxiv}

Targeted social safety net programs will assist to alleviate the burden on low-income households, but a variety of measures at each level of government will be required to reduce the negative impact of subsidy elimination on the various segments of the working population.^{clxxv}

The implementation of mass transit schemes for the urban working population at the state and federal levels could provide additional assistance to the commuting poor in key states such as Lagos, Kano, Rivers, Ogun, and the Federal Capital Territory of Abuja.^{clxxvi}

The importance of Gas as a Transitional Fuel source has been highlighted by the Government in terms of its Transition to Net Zero in line with the Paris Agreement. Crowding in private sector and multilateral resources to increase gas utilisation should also be considered, given the Government's limited fiscal resources. In this regard, partnership with the private sector to bring in investments, expertise, and innovation provides numerous benefits beyond sharing the financial burden. This collaboration will allow the government to tap into private sector resources and efficiency to implement development projects.

The deployment of new technologies to improve the poor and vulnerable Nigerians is recommended. Some of these technologies can include utilising greener and more environmentally friendly energy sources in fuelling public transportation.

There can also be acceleration of investment infrastructure projects and public works. With an increasing urban population comes a need for larger and better social amenities and Nigeria currently faces challenges in providing sufficient public amenities to its growing population. Therefore, by providing temporary employment opportunities, similar programs have the potential to serve as a valuable tool for providing employment opportunities while upgrading infrastructure.

EL: Legal, Regulatory & Policy Data Intelligence

Practical considerations for promoting Solar PV Manufacturing in Nigeria.

Electricity Lawyer is pleased to introduce its Legal, Regulatory and Policy Data Intelligence which involves an in-depth analysis of energy industry data from a legal, regulatory and policy angle to assist decision makers, investors, and stakeholders in understanding the implications of energy market developments and make well-informed decisions.

The data intelligence highlights recommendations for promoting solar PV manufacturing in Nigeria.



(Source: Wood Mackenzie)

The graph depicts the export revenue of China from solar Photovoltaic (PV) manufacturing between 2018 and 2022. This can be a lesson for Nigeria, as a country with the availability of silicon, a major component of solar panels.

Sustainable Energy for All, a United Nations-affiliated Non-Governmental Organisation, finds benefits in African local production of renewable energy technology.^{clxxvii} Sustainable Energy for All's Renewable Energy Manufacturing Initiative (REMI) notes in its Africa Renewable Energy Manufacturing: Opportunity and Advancement report that growing renewable energy adoption and the availability of raw materials needed to produce renewable energy technology can help the continent expand its clean energy industry.^{clxxviii} However, the REMI research emphasizes that hurdles such as insufficient enabling regulations, high capital expenditures for setting up production units, and insufficient energy to power manufacturing activities must be overcome.^{clxxix}

According to the International Renewable Energy Agency (IRENA), Nigeria can meet about 60 per cent of its 2050 energy demand with renewable energy sources.^{clxxx} However, this will require the implementation of initiatives that reduce solar energy costs locally. One such initiative that IRENA recommends is the development of local renewable energy technology manufacturing capacity.^{clxxxi}

While Nigeria has some policies in place to help businesses migrate to clean energy, local manufacturers and prospective entrepreneurs do not have easy access to finance. However, with favourable investor attitudes toward local manufacturing capacity growth, this may be changing. Blue Camel developed a solar PV panel assembly in Kaduna in 2018, capable of generating 10,000 solar panels.^{clxxxii} All On, an impact investor, and Auxano, a Lagos-based solar panel assembler, struck a \$1.5 million investment agreement in 2020.^{clxxxiii} The cash will allow the company to increase its capacity by more than 50%. Kaduna state and China's Ming Xin Mineral Separation Nig Ltd. formed a partnership in January 2023 for the construction of the country's first lithium-processing plant, which will manufacture lithium-ion batteries.^{clxxxiv}

It is therefore recommended that in order for Nigeria to meet the large-scale market demand of solar PV and make economic profits from it just as China does, certain investments must be made. Nigerian government should establish incentive packages tailored to the situation of their respective countries in order to attract investments in this area like providing land at nominal prices for potential industries; government support for industrial workforce training; providing free worker recruitment services; income tax reduction; tax deduction for labour cost; developing targeted customs duties for importing a few critical components; and financial incentives for research and development.^{clxxxv} There can also be an introduction of utility procurement policy, which has the potential to encourage users to buy locally manufactured technologies with preferential prices rather than imported technologies.^{clxxxvi}

Localization encompasses not only the manufacture of technologies, but also the full value chain of the energy industry in order to generate sustainable energy for everybody. Localizations such as enabling a local environment, localization of funding, and local participation in the design, development, and marketing value chain are regarded as critical aspects in supporting local capacities in the growth of the Nigerian energy sector.^{clxxxvii} As a result, governments should seek to include the concept of localization into their efforts to build resilient energy infrastructure.

Using the Triple Helix Model (University-Industry-government) which is considered as one of the effective ways of producing and disseminating organized knowledge for the economic development of countries, the government can inculcate solar manufacturing in each of the systems. This model provides the opportunity to synergize resources of the three actors in order to facilitate innovation and technology development activities.^{clxxxviii}

All these can be couched in developing enabling policies to promote allocation of sufficient funding for the success of renewable energy technology development and deployment in Nigeria.

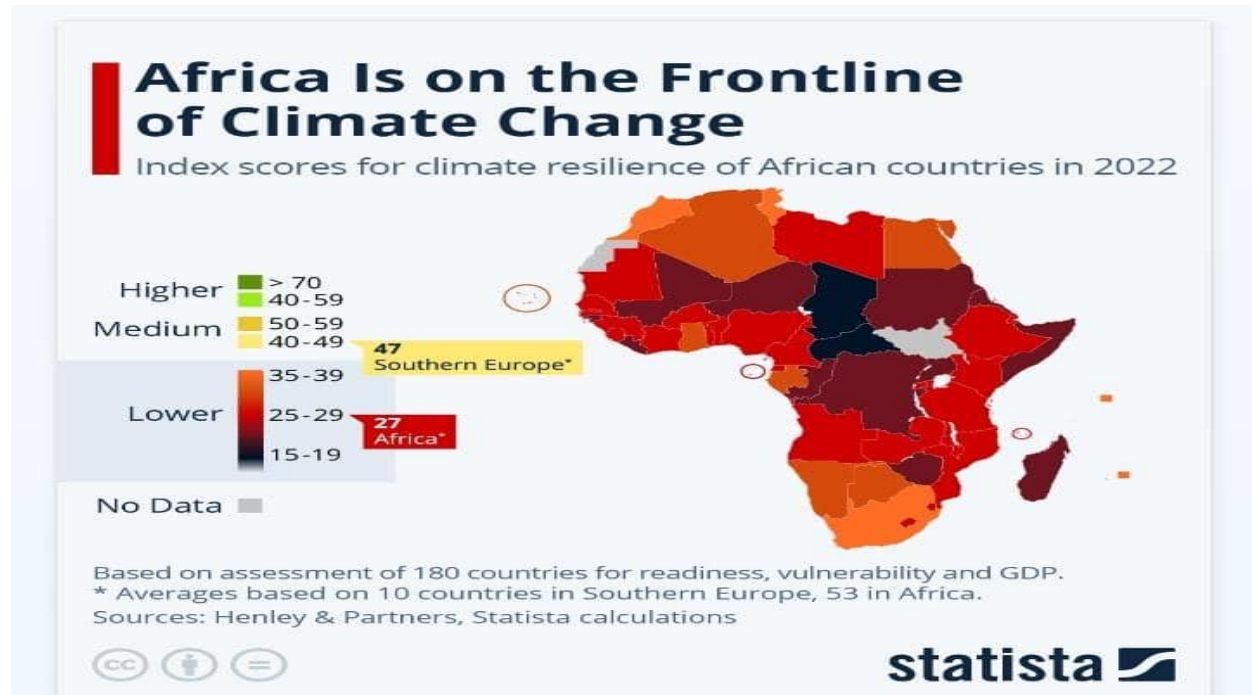
04/08/2023

EL: Legal, Regulatory & Policy Data Intelligence

Practical considerations for Encouraging Climate Resilience in Africa

Electricity Lawyer is pleased to introduce its Legal, Regulatory and Policy Data Intelligence which involves an in-depth analysis of energy industry data from a legal, regulatory and policy angle to assist decision makers, investors, and stakeholders in understanding the implications of energy market developments and make well-informed decisions.

The data intelligence highlights recommendations for encouraging climate resilience in Africa.



Statistics reveal that Africa contributes the least to climate change. Although Africa has made a very small contribution to the greenhouse gas emissions that have triggered the current climate emergency,^{clxxxix} Africa stands as the most vulnerable to the effects of climate change. Consequently, Africa must fight just as hard as the rest of the globe to build resilience and combat the effects of climate change.

Climate resilience is the ability to successfully manage and adapt to the effects of climate change while halting the deterioration of those effects. Climate change induced challenges has so far arisen across several sub-regions of the continent. This has placed a sense of urgency on regional climate adaptation and climate resilient action for the sustenance of African nations.

Road assets are particularly vulnerable to climate stressors. The World bank have predicted that climate change will take a heavy toll on the African road system.^{cxc} Climate stressors such as higher temperatures, increased precipitation, or flooding affect the durability of road assets and infrastructure.^{cxc} Climate-related damage to the road infrastructure will also result in frequent disruptions to the movement of people and goods, with direct consequences on economic

productivity. Therefore, proactive investments for road pavement improvements are recommended to account for higher temperatures, especially considering that the incremental cost of such resilient measures is relatively low.^{cxcii}

Climate resilience has great potential to alleviate the negative impacts of climate change. However, the planning and design of infrastructure in Africa are consistently conducted largely without taking climate change into account. At the project levels, a World Bank report demonstrates that adapting infrastructure planning and design has great potential to reduce climate change impacts. Thus, failing to adjust designs to improve infrastructure performance over a range of climate futures may result in economic loss for societies in the long term.^{cxci} As such, there is a need to develop new technical standards for project design and planning. A multi-stakeholder technical working group could be established, to develop voluntary technical guidelines on how to apply the notions of climate resilience, to real-life infrastructure planning and design.

Although climate resilience analysis must necessarily become a regular part of Africa's program and project preparation, experience on the ground is limited and technical capacity is scarce. As a result, applied knowledge hub(s) that could provide technical assistance services across the continent for the assessment of climate impacts and, in particular, the analysis of adaptation options in project design is recommended.^{cxci}

Africa's lack of modern energy access jeopardizes its development ambitions and ability to build climate resilience. Consequently, advancements toward low-carbon energy sources are critical for reducing global greenhouse gas (GHG) emissions, but they must be compatible with attaining the continent's development goals and satisfying the unmet energy demands of about 600 million Africans.^{cxci} Africa is richly endowed in energy and mineral resources, such as lithium, graphite, cobalt, nickel, copper, and rare earth minerals—all of which are new market opportunities for the energy transition. With Africa's limited lock-in to fossil-based energy technologies, these opportunities could help the continent build a climate-resilient and integrated sustainable energy sector.

Policies to achieve climate resilience and a just energy transition in Africa should be inclusive, and all round, "leaving no one behind." This transition requires close consideration of the equity implications and challenges associated with prevailing energy poverty, low energy consumption and energy needs for economic growth and transformation.^{cxci}

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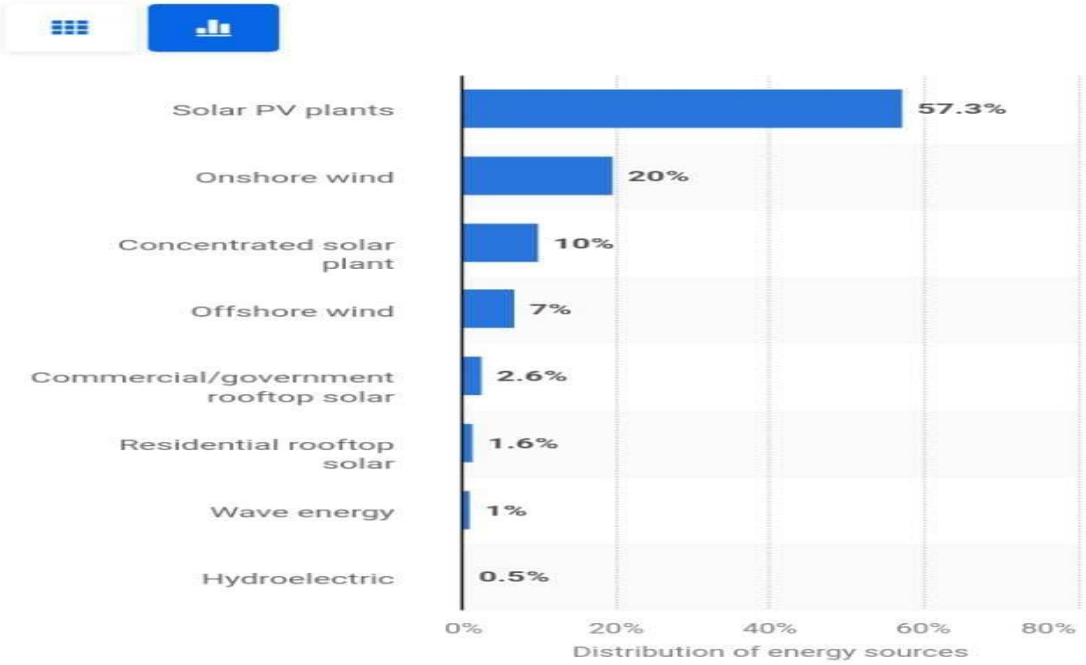
EL: Legal, Regulatory & Policy Data Intelligence

Practical considerations for Achieving Energy Transition in South Africa.

Electricity Lawyer is pleased to introduce its Legal, Regulatory and Policy Data Intelligence which involves an in-depth analysis of energy industry data from a legal, regulatory and policy angle to assist decision makers, investors, and stakeholders in understanding the implications of energy market developments and make well-informed decisions.

The data intelligence highlights recommendations for achieving energy transition in South Africa.

Projected energy mix in a 100 percent renewable energy transition in South Africa in 2050



© Statista 2023

The graph depicts South Africa's plan for its energy mix in order to achieve 100% energy transition by 2050. However, South Africa's renewable energy sector is finding it challenging to infiltrate the energy system and markets. This is owing to the exclusionary effect of existing energy laws, which were created to suit conventional fossil fuels in centralized and vertically integrated energy systems.^{cxvii}

It is perhaps easier for renewables to overcome economic barriers than it is for these sources to overcome legislative and institutional impediments that have little to do with renewables' sustainability potential. This dilemma is particularly acute in emerging nations whose energy systems have not achieved full liberalization.^{cxviii} In a fully liberalised electricity market, renewable sources may find it simpler to penetrate the market because the market is more active due to engagements from private sector and investor. This is in stark contrast to the situation in several developing nations, where state-owned utilities continue to monopolize not only the industry, but also how it is regulated and dictate policy orientations. Thus, climate change, security of supply concerns, corruption and the inefficiency

of Eskom's monopoly calls for the opening of the electricity supply industry to decentralization for further integration of decentralized renewable energy systems.^{cxix}

It is also recommended that stimulating a renewable energy market for the proposed energy mix in South Africa can be effected through a framework underpinned by key minimum features. Firstly, the objects of the framework must be to promote a gradual transition that is founded on sustainable energy, energy security, climate change policy and the national development plan, rather than conventional fossil fuel sources.^{cc} Secondly, the framework law should be embedded in principles of energy justice, environmental justice and climate justice, as governing norms for participatory decision-making for many stakeholders and the public. Thirdly, while providing incentives and possible state support, the framework law should promote socially owned renewable energy structures across the proposed energy mix to allow the private sector to participate in such projects.^{cci}

Furthermore, it is recommended that the government bring together different organizations, all of which have an important role to play in advancing the energy movement in South Africa — including unions, academia and the private sector.^{ccii} This is because researchers and non-profits can work together to increase pressure on the government to take actions, in keeping with energy transition via research and development; social programmes, and corporate commitments relating to renewable energy in the corporate world.

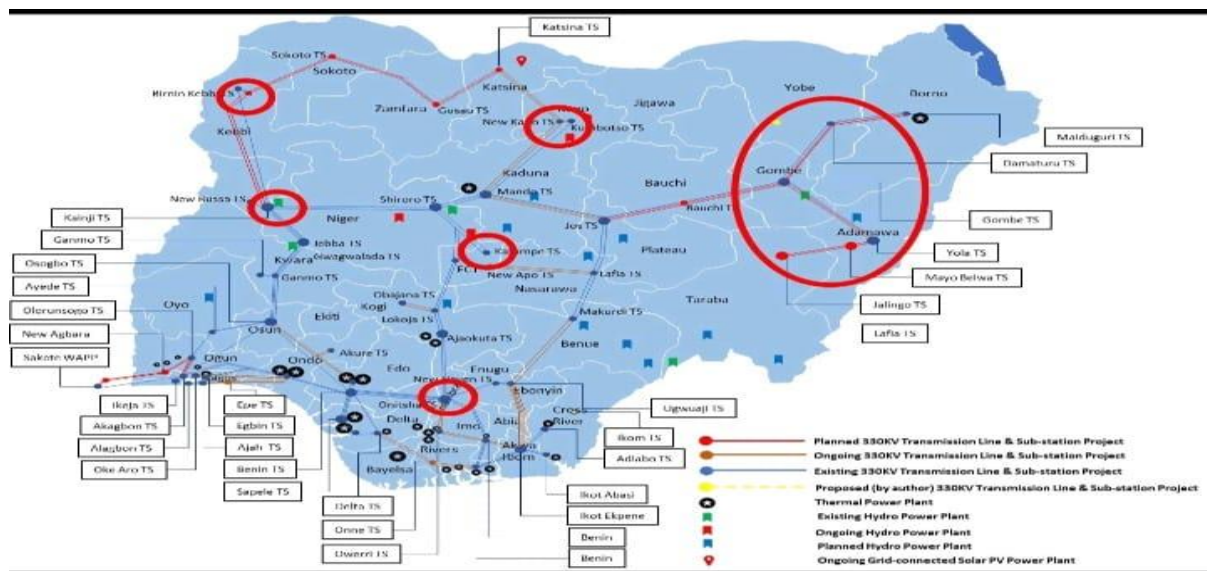
18/08/23

EL: Legal, Regulatory & Policy Data Intelligence

Practical considerations for Improving the Transmission System in Nigeria.

Electricity Lawyer is pleased to introduce its Legal, Regulatory and Policy Data Intelligence which involves an in-depth analysis of energy industry data from a legal, regulatory and policy angle to assist decision makers, investors, and stakeholders in understanding the implications of energy market developments and make well-informed decisions.

The data intelligence highlights recommendations for improving transmission system in Nigeria.



SOURCE: Transmission Company of Nigeria

The map portrays Nigeria transmission grid/lines with the weakest points of the national grid being the transmission stations around three regions: Gombe, Yola and Kano.

Nigeria's transmission network has long been a weak link in the country's electricity value chain. Despite recent advances, the Transmission Company of Nigeria (TCN) has repeatedly failed to deliver more than 5.4GW of power to a country with a population of about 200 million people.^{cciii} The national grid is prone to system failures and frequently fail to transmit the available generation capacity. In 2017-18, about 28 system breakdowns occurred owing to faults and load disturbances, resulting in partial or total blackouts across the country.^{cciv}

The majority of the transmission grid's weak areas are in northern Nigeria, distant from the power generating firms (Gencos) in the south.^{ccv} This highlights the importance of siting power generation infrastructure closer to northern Nigeria in order to reduce transmission losses, which are a big concern in the current system.^{ccvi}

It is also required that the Nigerian government expands transmission lines and construct more substations to extend its reach and improve the reliability of power supply. The construction of additional relief lines to critical 330kV lines, such as the Alaoji-Onitsha line to correct current disturbances within its coverage should also be explored.^{ccvii}

Furthermore, it is recommended that the government remove overgrown vegetation from distribution network lines by installing poles and properly tensioning lines. Rainstorms and other severe weather can destroy vulnerable wires, resulting in large-scale distribution load outages.^{ccviii} To reduce the occurrence of equipment failures, the government should equally consider the refurbishment of sky wires and transmission equipment, replace vandalized sky wires that expose the lines to lightning strikes, and replace antiquated transmission equipment.

More importantly, there is need to purchase more reserves for generating power stations equipped with functioning automatic generation controls in order to regulate frequency changes and prevent system collapse. There is also a need for digital control center construction to be expedited. The TCN will be able to digitally monitor the grid in real time, trace and rectify system collapse faults after the Supervisory Control and Data Acquisition (SCADA), Electricity Management System (EMS), and telecommunication networks are completed.^{ccix}

Finally, there is need to initiate protection mechanisms for important transmission-distribution interfaces to reduce tripping of vital transmission lines and substation damage due to faults.^{ccx}

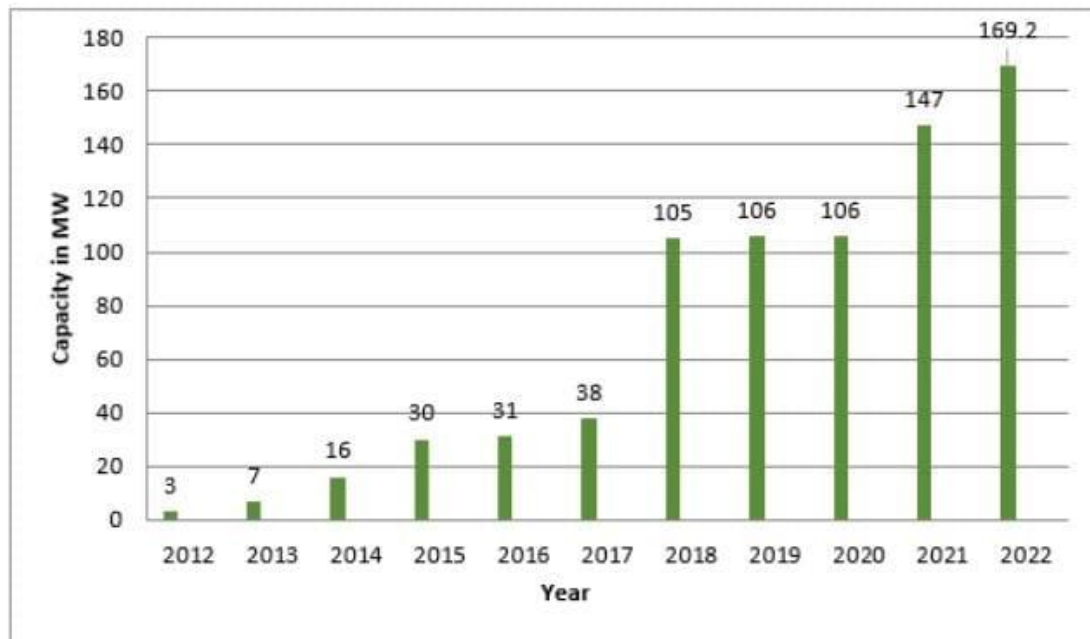
25/08/23

EL: Legal, Regulatory & Policy Data Intelligence

Practical Lessons African Countries Can Learn from Kenya to Achieve Increased Renewable Energy Capacity in their Energy Mix.

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The data intelligence highlights lessons African countries can learn from Kenya to achieve increased renewable energy capacity in their energy mix.



Kenya's total installed solar energy capacity 2022

Source: IRENA; AFSIA; KENPRO

The graph shows Kenya's solar energy capacity from 2012-2022. The steady increase occurred between 2017-2020 which represents the phase of ushering policies, plans, and legislations in relation to renewable energy in the country.

For instance, the development of the National Energy Policy, 2018 was instrumental to the government of Kenya's commitment to the provision of affordable quality energy for all Kenyans. The government aims to achieve affordable quality energy for all Kenyans through the provision of clean, sustainable, affordable, competitive, reliable, and secure energy services at the least cost while protecting the environment.^{ccxi} The National Energy Policy document offers a thorough analysis of the energy sector's current state and the policy framework as of 2018. It also contains policy recommendations for a number of subthemes, including coal, renewable energy (particularly geothermal and hydro), electricity, energy efficiency and conservation, land, environment, health, and safety, energy services, energy financing, pricing, and socioeconomic issues.^{ccxii} This paved the way for the adoption of the Energy Act No. 1 of 2019 (the Energy Act) to, among other objectives, promote the generation of renewable energy in Kenya. African countries can learn from this developing an analysis that shows the current status of their energy sector across various economic sectors to decipher the lapses and proffer recommendations on how renewable energy can be integrated in each sector.

Furthermore, the Energy Act established the Renewable Energy Resource Advisory Committee intended to play an advisory role to the Cabinet Secretary for the Ministry of Energy and Petroleum on the criteria for allocation of renewable energy resource, licensing of renewable energy resource areas, management of water towers and catchment areas, development of multi-purpose projects such as dams and reservoirs for power generation and management and development of renewable energy

resources.^{ccxiii} African countries can follow this mechanism of gathering energy experts that can stimulate the need and provision of renewable energy in the country.

Also, the Energy Act allows grid-connected consumers who own an electric power generator of a capacity not exceeding one megawatt to supply the excess power to a distribution licensee or retailer, if that consumer has a generation facility that is located in the area of supply of the distribution licensee.^{ccxiv} Under the Energy Act, every distribution licensee is mandated, upon receipt of an application, to make available the net metering service to any electricity consumer that the licensee serves. African countries can make room for net metering provisions like Kenya to encourage private investment into the industry.

Finally, the Energy Regulatory Commission ("ERC") passed the Energy (Solar Photovoltaic Systems) Regulations (the "Regulations") in 2012.^{ccxv} These rules were created as a consumer protection tool to prevent the entry of subpar solar products and professionals who are either underqualified or poorly trained. All individuals designing and installing solar PV systems, as well as all manufacturers, sellers, distributors, and contractors for solar PV systems, are required by the Regulations to hold an ERC license. A list of licensed technicians and contractors is also provided on the ERC website. African countries can follow suit in making renewable energy technology and expertise subject to regulations which will lead to more private investment in renewable energy, especially in residential sectors where applicable.

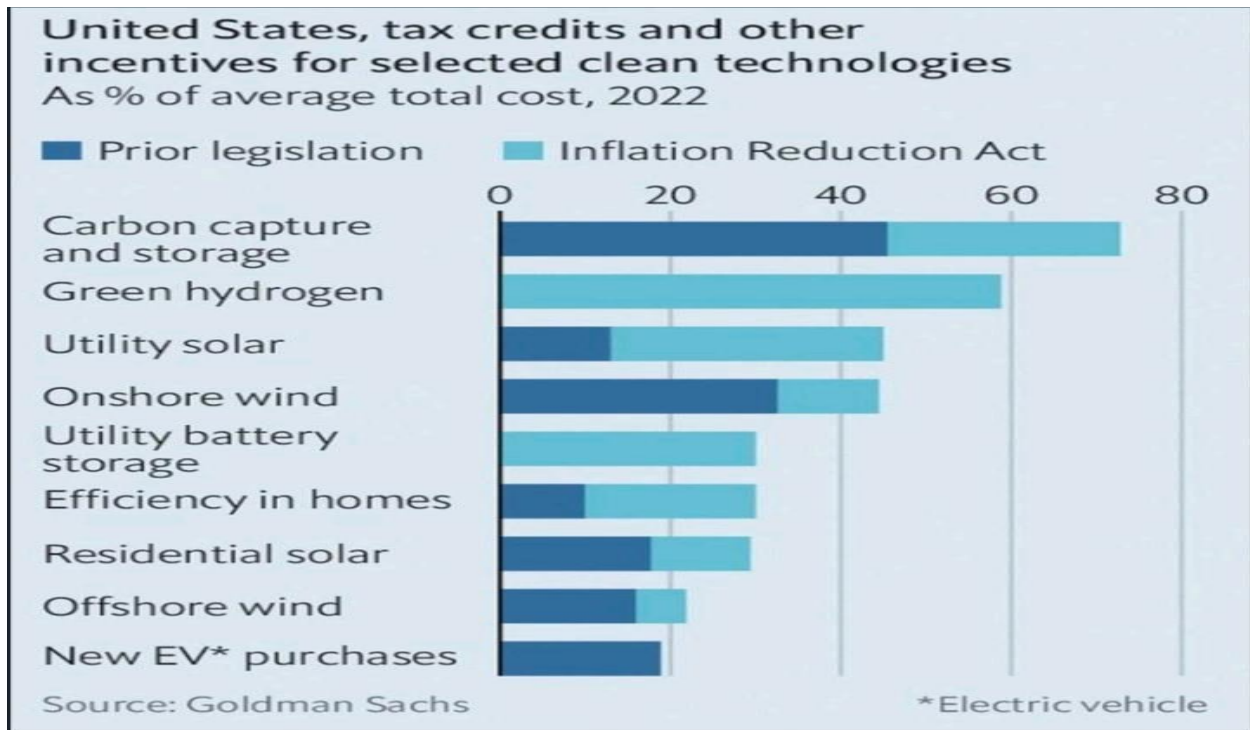
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Practical considerations for Improving Investment in Clean Energy Technology in Africa.

Electricity Lawyer is pleased to introduce its Legal, Regulatory and Policy Data Intelligence which involves an in-depth analysis of energy industry data from a legal, regulatory and policy angle to assist decision makers, investors, and stakeholders in understanding the implications of energy market developments and make well-informed decisions.

The data intelligence highlights lessons African countries can learn from the United States of America for improving investment in clean energy technologies.



SOURCE: Goldman Sachs

The United States Inflation Reduction Act (IRA), 2022 has become widely recognized for being a game-changer in the push for green technology and domestic clean energy manufacturing via tax credits and other incentives. These incentives serve as examples for African countries to emulate in each country's bid to drive investments in the clean technology space.

The Inflation reduction Act provides for incentives for private investment.^{ccxvi} The majority of the energy and climate funding is in the form of tax credits and corporations are the largest recipients, with an estimated \$216 billion worth of tax credits. These are designed to catalyze private investment in clean energy, transport, and manufacturing. Many of the tax incentives in the law are direct pay, meaning that an entity can claim the full amount even if its tax liability is less than the credit. African countries can also inculcate this system of providing tax credits for companies in clean energy technology space throughout the clean energy technology value chain activity to encourage the deployment of these technologies.

The Act also provides for consumer incentives.^{ccxvii} About \$43 billion in IRA tax credits aim to lower emissions by making electric vehicles (EVs), energy-efficient appliances, rooftop solar panels, geothermal heating, and home batteries more affordable. Under the Act, qualifying electric vehicles are eligible for a tax credit of up to \$7,500 and \$4,000 for new and used vehicles, respectively, while qualifying home improvements are eligible for a tax credit of up to 30 percent of the total cost, capped at \$1,200 per year. For heat pumps, the credit is capped at \$2,000 per year. The energy-efficient home improvement credit may be available to homeowners who upgrade and adapt their house heating and cooling systems. This credit is offered for the installation of new doors, windows, skylights, insulation, and heat pumps that help a home's temperature to be more efficiently controlled.^{ccxviii} The credit may

also pay for a home energy assessment, water heaters, and electrical system modifications required for the installation of new electric equipment. African countries can also formulate consumer incentives that will encourage household utilization and investment into clean technologies like solar photovoltaic (PVs) in form of net metering and the likes.

A further mechanism by the IRA to drive investments and unlock the full EV consumer credit, is the requirement for a scaling percentage of critical minerals in the battery to have been recycled in North America or been extracted or processed in a country that has a free-trade agreement with the United States.^{ccxix} The battery must have also been manufactured or assembled in North America. African countries can also come up with similar mechanisms to trap investments in the critical minerals sector and encourage local content and local investments.

Also, the European Commission recently revealed its rules for its first European Hydrogen Bank auctions, offering renewable hydrogen production subsidies of up to €4.5/kg (\$4.9).^{ccxx} African countries that take a similar route by providing subsidies across renewable energy technologies that are feasible in each African nation in place of fossil fuels subsidies, to further encourage the investment in all renewable energy sources available to each country.

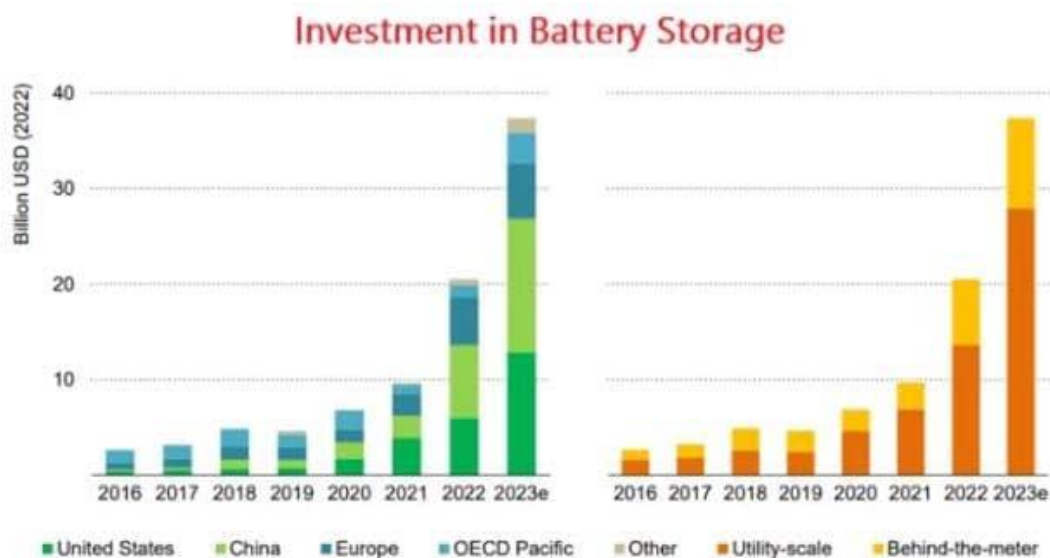
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Practical considerations for Improving Investment in Battery Storage Manufacturing in Africa.

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The data intelligence highlights considerations for improving African countries investment in battery storage manufacturing.



SOURCE: International Energy Agency

The graph shows recent investment in battery energy storage in advanced countries owing to the emergence of renewable energy electricity and the need to address the challenge of seasonal variations. African countries have large deposits of the minerals essential for battery manufacturing. Africa possesses 80% of the global platinum reserves, 50% of the global cobalt deposits, 40% of the global nickel deposits, and significant lithium deposits. This has positioned Africa as an important supplier of integral minerals and metals incidental to developing clean energy technologies such as electric vehicles and utility-scale battery storage.

Furthermore, the cost of developing a lithium-ion precursor factory in Africa has been estimated to be three times less expensive than in China and the United States.^{ccxxi} As a result, Africa is an ideal location for the production of lithium-ion batteries. However, Africa must set itself up to produce lithium-ion batteries and utility scale battery storage in order to tap into the future market of electric vehicles and battery energy storage, which some estimates will be worth several trillion dollars^{ccxxii}. Battery energy storage can help to stabilize the grid by providing reserve power to mitigate grid disruptions.^{ccxxiii} It can help to improve the reliability of power supply by providing backup power during power outages. However, the creation of battery manufacturing facilities in Africa faces major challenges.

According to the Natural Resource Governance Institute's (NRGI) Triple Win report, no single African country has all of the minerals required to build batteries, hence countries will need to pool mineral supply to attain the minimum scale and reliability.^{ccxxiv} They will also need to ensure that they are not devoting too much of their mineral resources to export.

Institutional issues occur as well. The Peterson Institute for International Economics discovered that none of the four critical mineral-rich African countries – the DRC (cobalt), Mozambique (graphite), Madagascar (graphite and nickel), and Guinea (bauxite) – have the energy infrastructure needed to

expand capacity for refining, in which raw critical minerals are processed into the ingredients for green energy technologies.^{ccxxv} The identified barriers can be tackled by African countries investing in their minerals production and refining capacity.

Despite its strong reliance on raw battery metals from Africa, China manufactures 74% of the world's lithium-ion batteries and continues to expand battery plant operations. Even American manufacturers are compelled to rely on Chinese imports.^{ccxxvi} However, this is changing. Tariffs on Chinese exports to the US are forcing American companies to diversify their battery production away from China. African countries can profit from this trend by investing in battery manufacturing.^{ccxxvii} The African Continental Free Trade Agreement (AfCFTA) enables African countries to create regional supply chains that meet global demand at a lower cost. With the ratification of AfCFTA, African countries will be able to capitalize on anticipated interruptions in global battery flows caused by the US-China trade war and begin creating their own regional supply chains.

Furthermore, to exploit its minerals African countries can develop legal, regulatory and fiscal mechanisms that will incentivise battery manufacturing within their borders. Chinese firms including Zhejiang Huayou Cobalt, Sinomine Resource Group, Chengxin Lithium Group and Canmax Technologies have spent more than \$1 billion over the past two years to acquire and develop lithium projects in Zimbabwe.^{ccxxviii} The country outlawed the export of raw lithium ore to prevent artisanal miners from mining and smuggling the material, instead allowing only lithium concentrates to be exported. The country currently intends miners to expand beyond the production of concentrates, which are exported out of the nation for further processing, primarily to China. African countries can follow suit in establishing laws and heavy taxes that will reduce the exportation of these mineral outside the borders of Africa without being domestically profitable to the country. This local battery manufacturing can then be used as a back up for energy storage and augment generation capacity.

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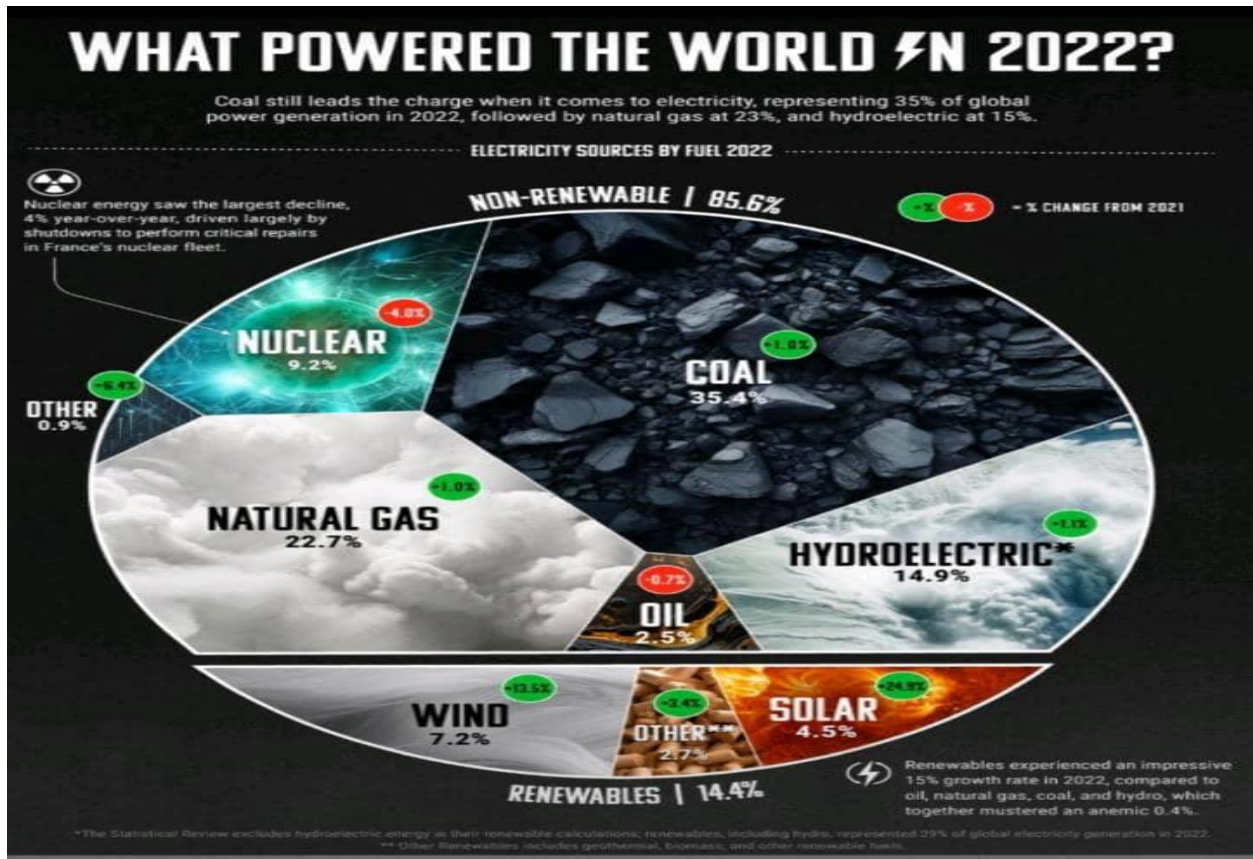
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Practical considerations for Improving the use of Renewables in the Global Energy Mix.

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decision makers, investors, and stakeholders in understanding the implications of energy market developments and make well-informed decisions.

The data intelligence highlights considerations for improving the use of renewables in the global energy mix.



SOURCE: Elements

The picture portrays the energy sources that powered the world in 2022, with non-renewables having a larger share than renewables. This shows how much investments need to be done by the world to transition to large scale adoption of renewables. The global transition to clean energy is accelerating. Renewable energy output has more than doubled globally over the last decade, and its percentage of total primary energy consumption has increased from 9% in 2011 to 13% in 2021.^{ccxxix} Despite increases in renewable energy, the consumption of fossil fuels continues to increase to fulfill rising energy demand. Between 2011 and 2021, global energy demand increased by 14%, fueled primarily by emissions-intensive sources.^{ccxxx}

While global cooperation and coordination are essential, domestic regulatory frameworks must be modified quickly to streamline and accelerate renewable energy projects and, spur private sector investment. National/domestic policies and processes must also be in place to reduce market risk and enable and incentivize investments, including streamlining planning, permitting, and regulatory

processes and avoiding bottlenecks and red tape.^{ccxxxii} Clear and robust policies, transparent processes, public support, and the availability of modern energy transmission systems are key to accelerating the uptake of wind and solar energy technologies.^{ccxxxiii}

Subsidies for fossil fuels are one of the most significant financial impediments to the world's transition to renewable energy. According to the International Monetary Fund (IMF), around \$5.9 trillion was spent in 2020 alone on supporting the fossil fuel sector, including explicit subsidies, tax advantages, and health and environmental damages that were not included into the cost of fossil fuels.^{ccxxxiiii}

Additionally, to secure vital raw materials, components, and labor competencies, countries will need to enhance global supply chains.^{ccxxxv} Promoting recycling and reuse may help minimize demand for key resources, while long-term agreements and relationships with suppliers may provide a hedge against fluctuations in critical supply.^{ccxxxvi}

To accelerate the integration of renewables and cleantech into the energy system, old infrastructure will need to be modernized and repurposed, and new assets will need to be developed. Investing in the development and modernization of the power grid will be critical to ensuring that areas with high potential for renewable energy generation are integrated and linked to demand centers.^{ccxxxvii}

Furthermore, there must be a streamlining permission processes to expedite renewables and cleantech implementation. Streamlining the permit procedure and reducing the number of required project-approving agencies could help projects move faster.^{ccxxxviii} Land access might be made easier by pursuing initiatives that benefit local populations and developing land-efficient solutions like offshore wind. The use of alternative lands, such as wastelands or agrivoltaic land, which is used for both agriculture and solar-photovoltaic-energy generation, as well as out-of-the-box solutions such as floating solar photovoltaics, could help expand the areas suitable for renewables installation.^{ccxxxix}

Socially, to manage economic disruptions that occurs in order to promote energy affordability and generate equitable possibilities for affected and vulnerable populations, subsidies and other compensatory methods are likely to be necessary to ensure energy affordability for the most disadvantaged users.^{ccxxxix} Regions, particularly those reliant on fossil fuels, will need to diversify their GDP and industrial footprints more quickly. Workers in high-risk industries like fossil mining will require protective measures they can fall back on, like skill programs designed to build a new generation of skills.

A more orderly transition will therefore need to be a just transition, one that recognizes the specific challenges that developing countries experience and that responds with collective, global, and unified action, which will require all stakeholders to take decisive, and coordinated action at their various national level. This will definitely amount to a unified global energy transition action.

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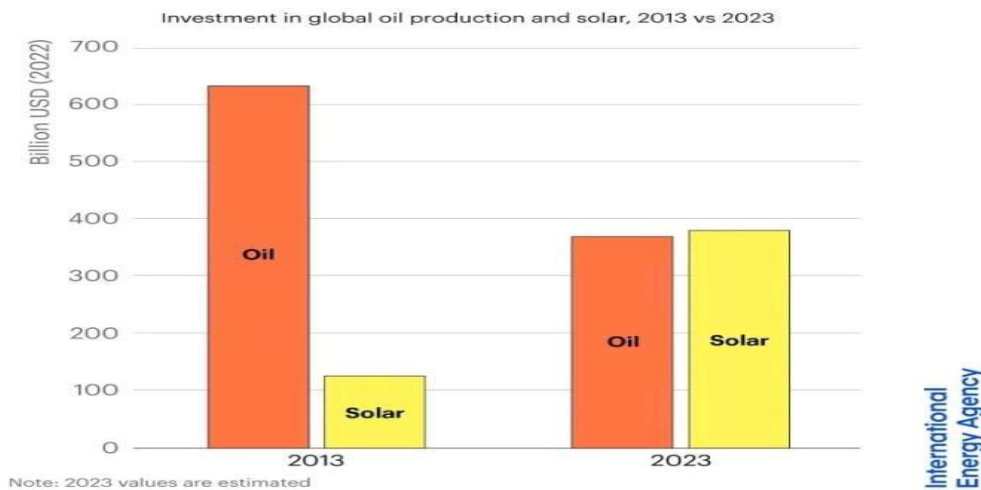
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Practical considerations for Improving investment in solar energy in Africa.

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The data intelligence highlights considerations for improving investment in solar energy in Africa.

Solar is set to attract more capital than oil production for the first time ever in 2023



SOURCE: International Energy Agency

The estimation of the graph shows that solar will attract more global investment in 2023 than oil production. This is a call for African countries to shift their expenditure to solar energy.

The most affordable source of power now is solar. The cost of solar energy equipment has decreased dramatically, according to recent research. For example, the weighted average cost of power for large-scale solar photovoltaic (PV) infrastructure decreased by 88 percent between 2010 and 2021.^{ccxli} Increased productivity and technical developments are also the reason for this startling decline.^{ccxli} However, it is also a product of creative finance structures, as well as government incentives and laws. However, the Africa region has, to a large extent, not yet been able to take advantage of the lower costs of PV technologies and attract investments to deploy. Enabling policies are not being implemented quickly or effectively enough, the situation is worsened by the inadequacy of existing regulatory frameworks. They are often out of step with current energy policies and, even where they are aligned, also suffer from poor implementation.^{ccxlii} Also, consumer demand for solar energy is affected by the lack of skilled labour and low-quality equipment.^{ccxliii} It is recommended that there should be quality standards to re-establish consumer confidence in solar technologies. In addition to setting quality standards, there is a need for regional and national quality assurance frameworks

through standards and testing laboratories, as well as closer involvement of the customs authorities to support the enforcement of policy and regulatory frameworks around standards.^{ccxliiv} There should also be programmes in place that will cater to strengthening the technical skills of installers.

Furthermore, there should be an implementation of a proactive policy of expanding the market by systematically installing solar power on public-sector infrastructure, which helps reduce greenhouse gas emissions while contributing to the development of national solar markets.^{ccxliiv}

The lack of data on the solar energy market in West Africa is the first major impediment for private investors. There has to be support of access to information, market data, and risk assessments by providing market research and feasibility studies in countries, as well as a database to host this information like the ECOWAS Observatory for Renewable Energy and Energy Efficiency (ECOWREX).^{ccxlivi} Similarly, UNDP's Derisking Renewable Energy Investment (DREI) tool that provides users with a detailed risk map and recommends targeted derisking mechanisms, will be important in promoting investment.^{ccxliivii}

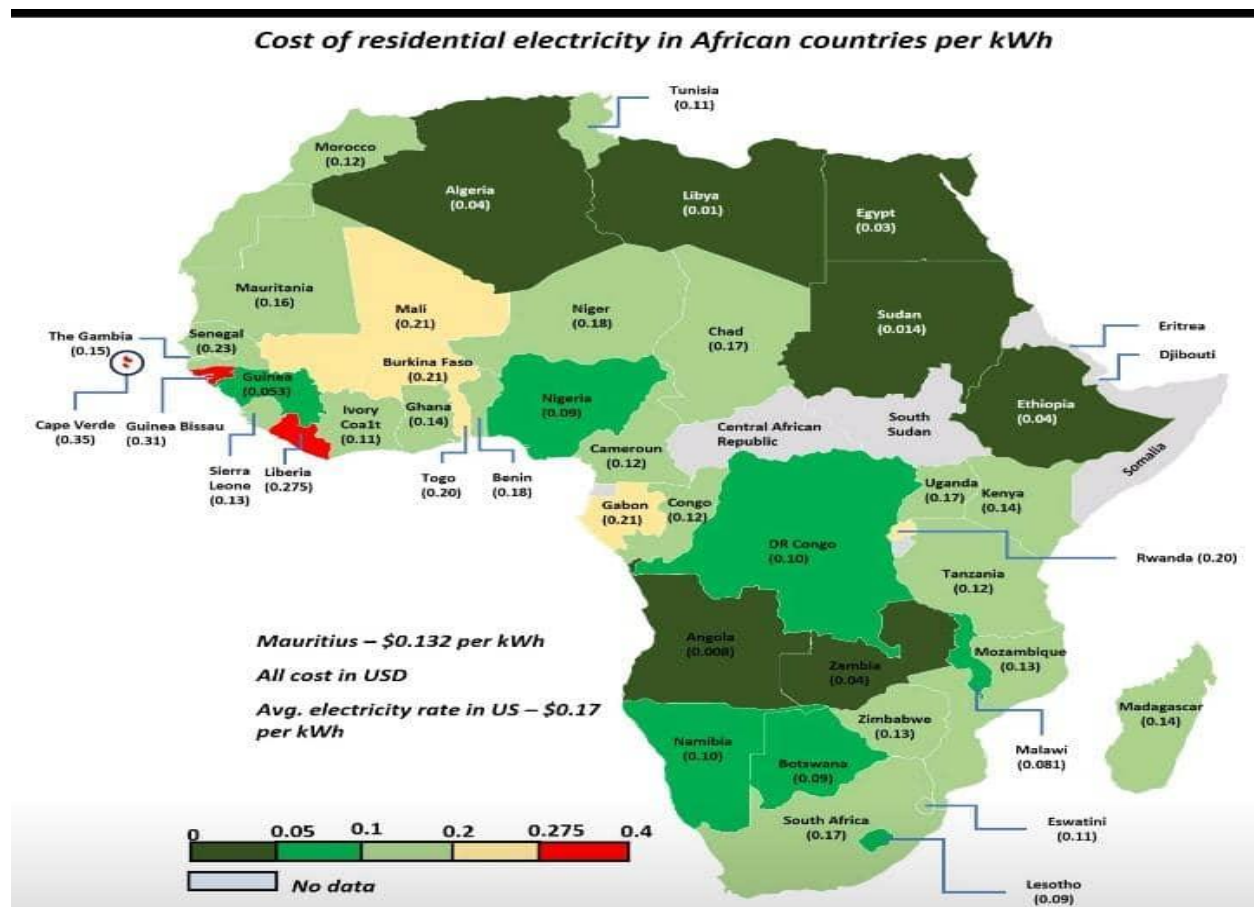
Finally, African countries must promote the positive effects of solar energy for productive uses especially in the agriculture and small industry sectors, to create demand for solar technologies, and set up a guarantee fund to encourage investments by making it easier for businesses to obtain funding from financial institutions and at lower interest rates through blended finance schemes to solve the barrier of high interest rates for corporations.

EL: Legal, Regulatory & Policy Data Intelligence

Practical considerations for Ensuring Cost-Reflective Tariffs for Energy Access in Africa.

Electricity Lawyer is pleased to introduce its Legal, Regulatory and Policy Data Intelligence which involves an in-depth analysis of energy industry data from a legal, regulatory and policy angle to assist decision makers, investors, and stakeholders in understanding the implications of energy market developments and make well-informed decisions.

The data intelligence highlights considerations for ensuring cost-reflective tariffs for energy access in Africa.



SOURCE: Bayode Akomolafe

The map shows the cost of residential electricity in African countries which is on the average, higher than what is obtainable in the United States, though the supply has been static unstable and electricity utilities faces illiquidity. Thus, many African nations are faced with both a non-cost-reflective tariff and a static electricity supply.

Tariff setting is one of the core processes necessary for the effective functioning of an electricity system.^{ccxlviii} It not only captures the needs and interests of consumers, utilities, and policy makers, it determines the sustainability of the electricity system as a whole. The tariff should provide an opportunity for the utility to earn a reasonable return on its prudently incurred investments for providing reliable electric services and must be fair and affordable for each customer class so that different types of consumers are satisfied with the rate charged for electrical energy consumed.^{ccxlix}

To start with, tariff setting requires accurate data on utility performance, but most African power authorities have historically had significant difficulties in assuring data transparency and accuracy. To overcome this significant obstacle, African electricity regulators should create strategies to encourage utilities to provide the necessary documentation and report accurate data, such as simple templates for periodic reporting requirements.^{cd} They should also create effective monitoring and enforcement procedures for accurate data reporting through the use of external independent auditors for data verification.

Similarly, the requirement that the tariff guarantee the potential for cost recovery is one of the core tenets of tariff policy. In other words, the tariff ought to reflect costs. Only a cost of service analysis can produce cost-reflective rates. The accuracy of the costs obtained from such studies affect the appropriateness of the tariff determined. However, the majority of African utilities have not been able to carry out thorough cost of service studies (CoSS).^{cdli} There are still questions about the effectiveness of the analysis and the precision of the output costs whenever such investigations are undertaken. Strategies for adopting a CoSS must be developed by key industry specialists due to its significance for efficient tariff fixing.

Furthermore, the costs of electricity generation, transmission, and distribution in most developing countries, including African countries, is very high due to a number of factors, ranging from aging infrastructure, the need to adopt rapidly advancing, expensive technologies, inadequate technical and managerial capacity, non-prudent procurements, etc.^{cdlii} This results in high end-user tariffs, with attendant affordability issues. For instance, due to aging infrastructure, the cost of service is high and volatile due to frequent breakdowns and need for regular maintenance (or in some cases, replacement). Under these circumstances, it is difficult to achieve a balance between cost and revenue through a cost-reflective tariff. African countries must therefore look for alternative electricity sources like renewable energy which may have lower operational and running costs than many thermal and/or conventional power sources.^{cdliii}

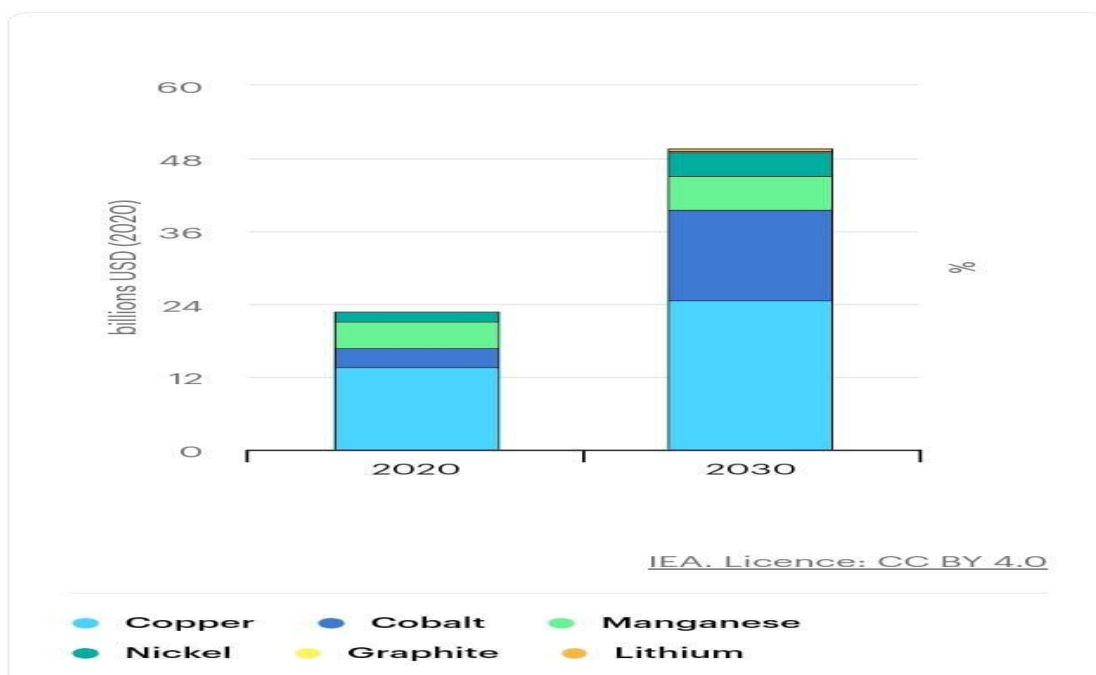
06/10/23

EL: Legal, Regulatory & Policy Data Intelligence

Practical considerations for Optimising the Extractive Sector as a Source of Revenue for in Sub-Saharan Africa.

Electricity Lawyer is pleased to introduce its Legal, Regulatory and Policy Data Intelligence which involves an in-depth analysis of energy industry data from a legal, regulatory and policy angle to assist decision makers, investors, and stakeholders in understanding the implications of energy market developments and make well-informed decisions.

The data intelligence highlights considerations for raising revenue from the extractive sector in Africa.



SOURCE: International Energy Agency

The majority of the world's reserves of several transition minerals already reside on the African continent. 19% of the world's metal supplies needed to create a typical battery electric vehicle are found in African nations.^{ccliv}

In addition to already being important for the energy transition, Africa's mineral wealth is also the least concentrated in the world and is yet largely undiscovered. More exploration is probably going to turn up new deposits that will speed up the transition and provide Africans access to fresh subterranean wealth.^{cclv}

To possess this wealth and revenue, reducing geological risk for businesses will be a need for attracting exploration investment in Africa. To accomplish this, African governments may promote geological surveys that provide businesses a preliminary indication of the potential location of deposits.^{cclvi} Then, businesses can do more extensive exploration to confirm this possibility. But the cost of these surveys is high. Donor support for surveys would uncover new minerals that would supply the energy transition as well as help the mining and revenues of African nations. New surveys are especially needed as many previous surveys were conducted before the recognition that certain minerals are critical to transition technology. As the African Development Bank's African Mineral Development Centre theory of change advocates, governments should also cooperate on surveys with neighboring countries.^{cclvii} Geology does not respect national boundaries; knowledge about minerals on one side of a border can help exploration efforts on the other.

Governments also ought to create value chains, particularly those that aid Africa's own energy transition. There is a sizable potential market in the continent for stationary battery storage for use in

mini-grids and two- and three-wheel electric cars. This will make lithium, iron, and phosphate battery chemistry-based African enterprises be successful. Although Africa does not currently generate a lot of lithium, but African businesses could begin by making batteries, move up the value chain to make cells and cathodes, and then use their own natural resources to fuel these operations.^{cclviii}

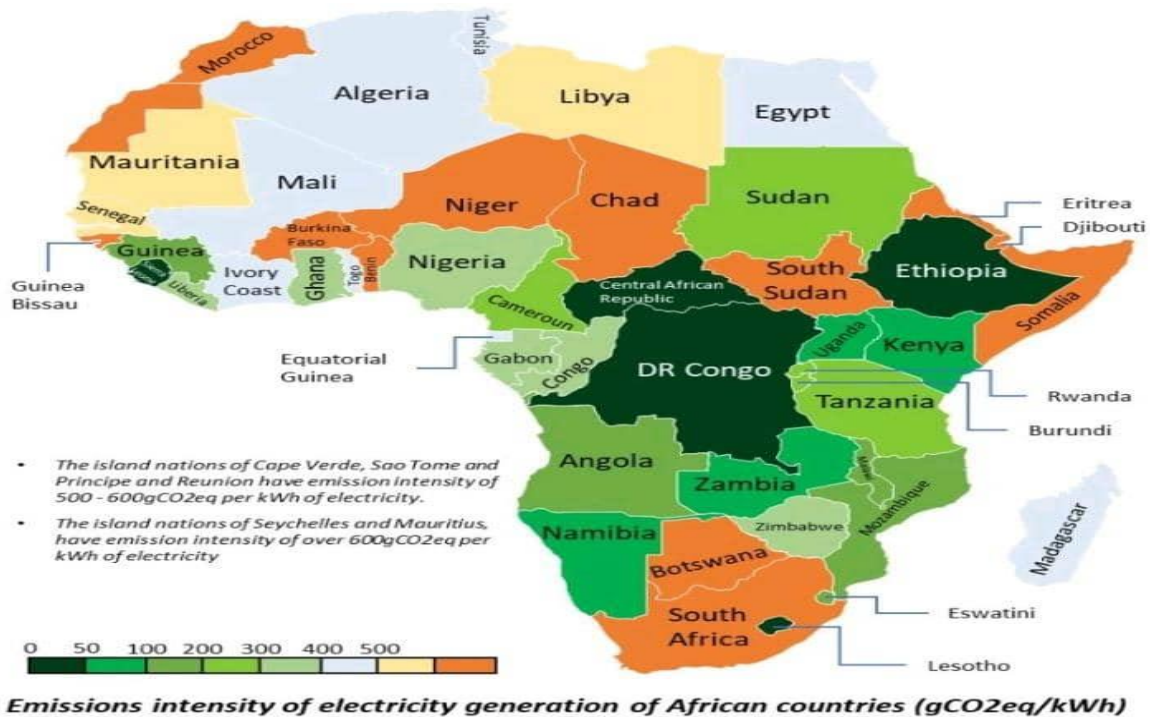
No single African country has all the minerals required to produce batteries, particularly lithium. Countries will need to pool mineral supply to achieve the minimum scale and reliability in case supply from one mine stops. Governments in the region will also have to closely collaborate and partner to create an African battery production industry. Recognizing this, the DRC and Zambia have established a “Joint Battery Council.”^{cclix}

The private sector should also play a key role in driving technological innovation in the critical minerals industry. For example, companies could invest in research and development to develop new extraction and processing methods that are more efficient and environmentally-friendly.^{cclx} Additionally, companies could adopt new technologies, such as automation and robotics, to improve the efficiency and sustainability of critical minerals extraction and processing. This will help to ensure that the critical minerals industry remains competitive and sustainable in the long term to procure enough revenue for the country.

Practical considerations for Reducing Emission Intensity of Electricity Generation in Africa.

Electricity Lawyer is pleased to introduce its Legal, Regulatory and Policy Data Intelligence which involves an in-depth analysis of energy industry data from a legal, regulatory and policy angle to assist decision makers, investors, and stakeholders in understanding the implications of energy market developments and make well-informed decisions.

The data intelligence highlights considerations for reducing emission intensity of electricity generation in Africa.



SOURCE: World Bank, EMBER and Statista

Africa carries the heaviest burden of climate change effects despite contributing less than 4% of the GHG emissions.^{cclxi} While Africa's carbon footprint is now low, rising population, improving standard of living, relative peace, and rising commodity prices, all of which raise metabolism, will increase emissions on the continent.^{cclxii} To meet the electricity needs of over 500 million people in Africa, electricity generation per capita will need to increase by a minimum of 20 times.^{cclxiii}

Also, despite Africa's modest carbon footprint, emissions have been increasing throughout the years. For example, emissions from land usage increased by 20% between 2000 and 2018.^{cclxiv} In 2018, the agriculture industry emitted 2.2 Gt CO₂eq, accounting for 24% of world emissions, up from 18% in 2000.^{cclxv}

The Africa continent does not have an “old economy” that needs to be decarbonized. It can invest right away in the green economy that we need — an economy that is net positive for the planet and

the people. To prevent any increases in emissions, Africa must take the lead and begin decarbonizing as soon as possible. Fortunately, the continent's low carbon footprint, natural treasure endowment, and significant renewable energy potential present a clear path for carrying out the decarbonisation plan. Africa holds the key to accelerating global climate action.

Africa requires a massive increase in energy production and use, which should primarily come from Africa's abundant renewable energy sources, such as solar, hydropower, wind, and geothermal, with a complementary role for sustainable biomass and synthetic fuels (such as green hydrogen) in displacing fossil fuels.^{cclxvi} To go forward with the increase of renewable energy manufacturing capacity, clearer roadmaps and long-term energy planning will be critical for winning investor trust in local and regional renewables supply chains, as well as myriad of incentives in the legal framework.

Regardless of what individual governments can accomplish on a national level, there is a limit to how much can be accomplished in Africa without regional cooperation. Each African country offers unique comparative advantages, ranging from a diverse range of (complementary) critical minerals distributed around the region to manufacturing capability and renewable energy possibilities, as well as access to important trade routes. All of these complementary assets can be part of a well-planned strategy – perhaps an African green deal? – to build an efficient regional industrial ecosystem based on low-carbon technologies.^{cclxvii}

Furthermore, countries with high emission intensity can also explore natural gas as a transitory energy source as part of their energy transition plan. According to the International Energy Agency, coal-to-gas switching has saved around 500 million tonnes of CO₂ - an effect equivalent to putting an extra 200 million electric vehicles running on zero-carbon electricity on the road over the same period.^{cclxviii} Given the time it takes to build up new renewables and to implement energy efficiency improvements, this also represents a potential quick win for emissions reductions. Hence, this will demand for a roadmap and national strategy for African countries to implement natural gas as an energy transition fuel.

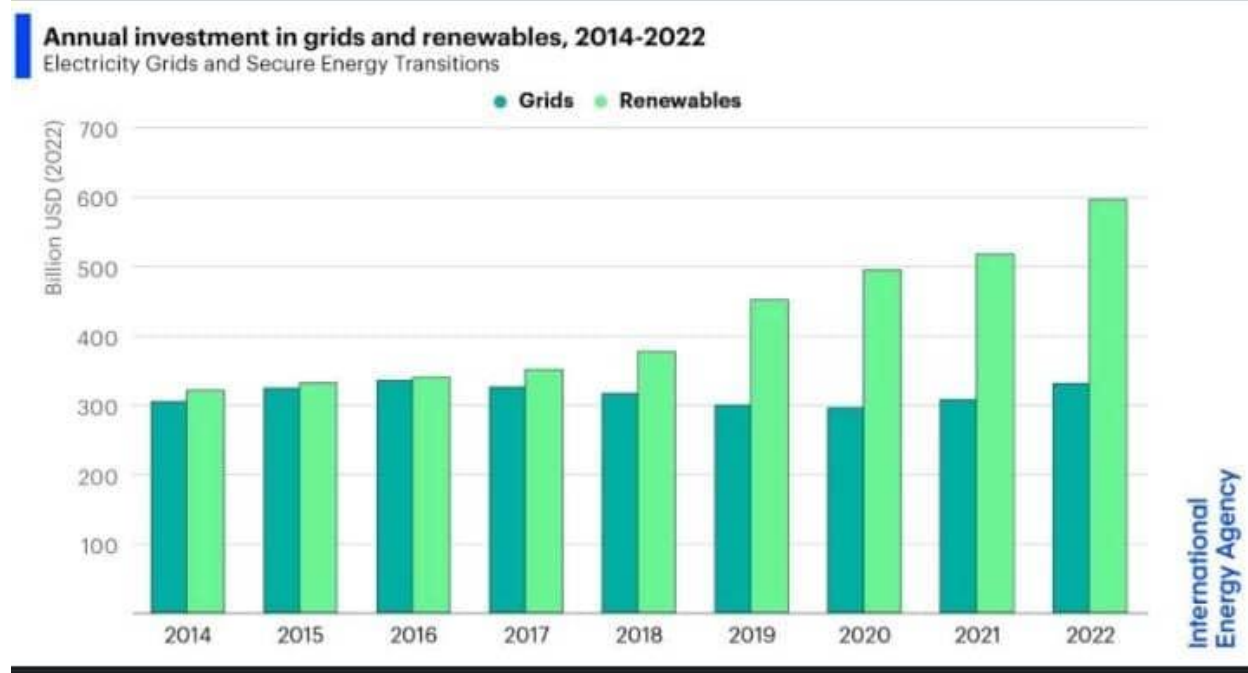
20/10/23

EL: Legal, Regulatory & Policy Data Intelligence

Practical considerations for Increasing Global Grid Investment and Innovation for Energy Transition.

Electricity Lawyer is pleased to introduce its Legal, Regulatory and Policy Data Intelligence which involves an in-depth analysis of energy industry data from a legal, regulatory and policy angle to assist decision makers, investors, and stakeholders in understanding the implications of energy market developments and make well-informed decisions.

The data intelligence highlights considerations for increasing global grid investment and innovation for energy transition.



SOURCE: International Energy Agency

The graph shows the annual investment in grids and renewables. However, there is a decline in grid investment from 2019-2022. This will lead to bottlenecks in integrating renewables in the grids on the longrun.

Grids, the foundation of today's power networks, will become more crucial as the transition to clean energy develops, yet they are now given insufficient attention. For more than 100 years, grids have

been supplying electricity to homes, companies, and industries.^{cclxix} Modern energy system transformation is being driven by clean energy transitions, which have also increased the importance of electricity in all types of economies. In order to achieve net zero emissions, nations' grids must be bigger, stronger, and more intelligent. Expanded grids are essential to enabling such levels of expansion as the world ramps up electrolysis-based hydrogen production, deploys more electric vehicles, and installs more electric heating and cooling systems.^{cclxx} Grids are essential to decarbonise electricity supply and effectively integrate renewables.

Regulations need to be reviewed and revised to allow the deployment of new grids as well as better asset utilization. Grid regulation must provide grids with incentives to adapt quickly to changes in electricity demand and supply.^{cclxxi} For this, it is necessary to remove administrative obstacles, recognize and reward dependability and good performance, and promote innovation.

The biggest impediments to grid expansion vary by area. While access to capital and high capital costs are major obstacles in many emerging market and developing economies, particularly in Sub-Saharan Africa, the financial stability of utilities is a major concern in some nations, like India, Indonesia, and Korea. Financial obstacles can be removed by enhancing grid company compensation, promoting targeted grid investment, and raising cost transparency.^{cclxxii}

Building out grids necessitates secure supply chains and a skilled workforce. Governments can support supply chain expansion by creating firm and transparent project pipelines, standardizing procurement, and technical installations, and building in future flexibility by ensuring interoperability of all system elements.

There is also a substantial shortage of skilled personnel throughout the supply chain, as well as at operators and regulatory bodies. It will be critical to develop a talent pipeline, incorporate digital skills into power industry curriculum, and manage the effects of the energy transition and growing automation on workers through reskilling and on-the-job training.^{cclxxiii}

Finally, it is important that grid networking be put at the heart of national energy policy actions commensurate to renewable energy targets and integration to fully aid the energy transition agenda in nations.

27/10/23

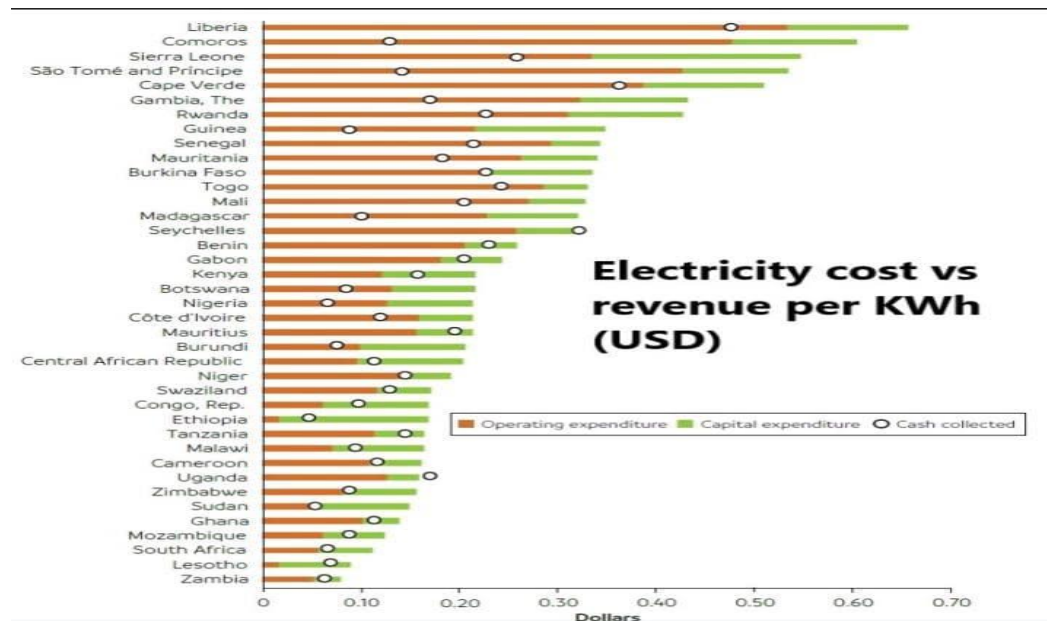
EL: Legal, Regulatory & Policy Data Intelligence

Practical considerations for Recovering Electricity Expenditure for Power Utilities in Sub Saharan Africa.

Electricity Lawyer is pleased to introduce its Legal, Regulatory and Policy Data Intelligence which involves an in-depth analysis of energy industry data from a legal, regulatory and policy angle to assist

decision makers, investors, and stakeholders in understanding the implications of energy market developments and make well-informed decisions.

The data intelligence highlights considerations for recovering electricity expenditure for power utilities in Sub Saharan Africa.



SOURCE:
World Bank

The graph shows the operating and capital expenses as well as the revenue received by electricity utilities in Africa with a huge disparity. More than half of African utility companies are operating at a deficit, primarily as a result of non-technical losses, as they are unable to pay their operational costs.^{cclxxiv} The only electricity providers that have recovered all of their capital and operating expenses are Seychelles and Uganda.

The major factor for these losses is electricity theft. Energy theft threatens service delivery and advancements, reduces profit margins, and is a major issue for utility corporations. Meter tampering, theft via unauthorized connections, theft of copper wire and transformer oil, unpaid bills, and the purchase and sale of illicit prepaid vouchers are just a few examples of the different ways that electricity theft presents itself.^{cclxxv}

Africa's utility inefficiencies cost the continent \$4.5 billion a year in lost revenue. Kenya Power had 23.5% of losses in 2021 - Northern Electric Distribution Company in Ghana reports a \$3 million monthly deficit and a \$300 million outstanding bill; 50% of Liberia's electricity production has been lost due to theft, costing the firm \$48 million; and Ethiopian Electric Utility had an annual deficit of about \$100 million prior to COVID.^{cclxxvi}

The repercussions of energy theft and non-technical losses are extensive, impacting not just power utilities but also the broader community. Power utilities suffer financial setbacks that make it difficult for them to make infrastructural improvements, service enhancements, and reliable power supply assurances.^{cclxxvii} These losses also impair the utilities' ability to supply customers with reasonably priced electricity and obstruct the development of universal energy access.^{cclxxviii} Furthermore, energy theft

tilts the playing field because honest consumers are forced to foot the bill for losses brought on by theft and nonpayment.^{cclxxxix}

Smart meters lower the risk of theft by recording abnormalities, detecting tampering attempts, and enabling remote monitoring. Power companies can improve billing accuracy and revenue collection by utilizing cutting-edge technologies, such as Internet of Things (IoT) devices and data analytics, to detect and immediately respond to theft.^{cclxxx}

Reducing energy theft requires active community engagement. In order to inform customers about the significance of paying for the electricity they use, power companies can set up outreach initiatives. Transparent and easily comprehensible billing information can enable customers to make well-informed decisions and help lower non-payment rates. Power utilities can incentivize customers to report energy theft and work together to address the problem by building trust and a sense of ownership.^{cclxxxi}

Increasing options for payment can improve billing precision and rates of collection. Convenience and accessibility for customers can be improved by providing flexible payment plans, prepaid billing systems, mobile payment platforms, and agent networks.^{cclxxxii} Power utilities can address the unique requirements and preferences of various consumer categories by expanding their payment options, which will ultimately lower non-payment and promote an accountable culture.

Also, making use of data analytics can yield insightful information about trends in consumption, anomalies, and possible theft cases. Advanced analytics techniques can be used by power companies to prioritize investigations, identify high-risk locations, and effectively allocate resources.^{cclxxxiii} With the use of predictive analytics, it is possible to spot patterns and trends and take proactive steps to reduce losses and increase billing accuracy.

The abovementioned measures cannot be utilized in isolation. To reduce non-technical losses and procure revenue, a comprehensive understanding of the entire electricity provision cycle is necessary for utilities. Once this is clearly mapped, effective measures can be identified and implemented to mitigate such non-technical losses.

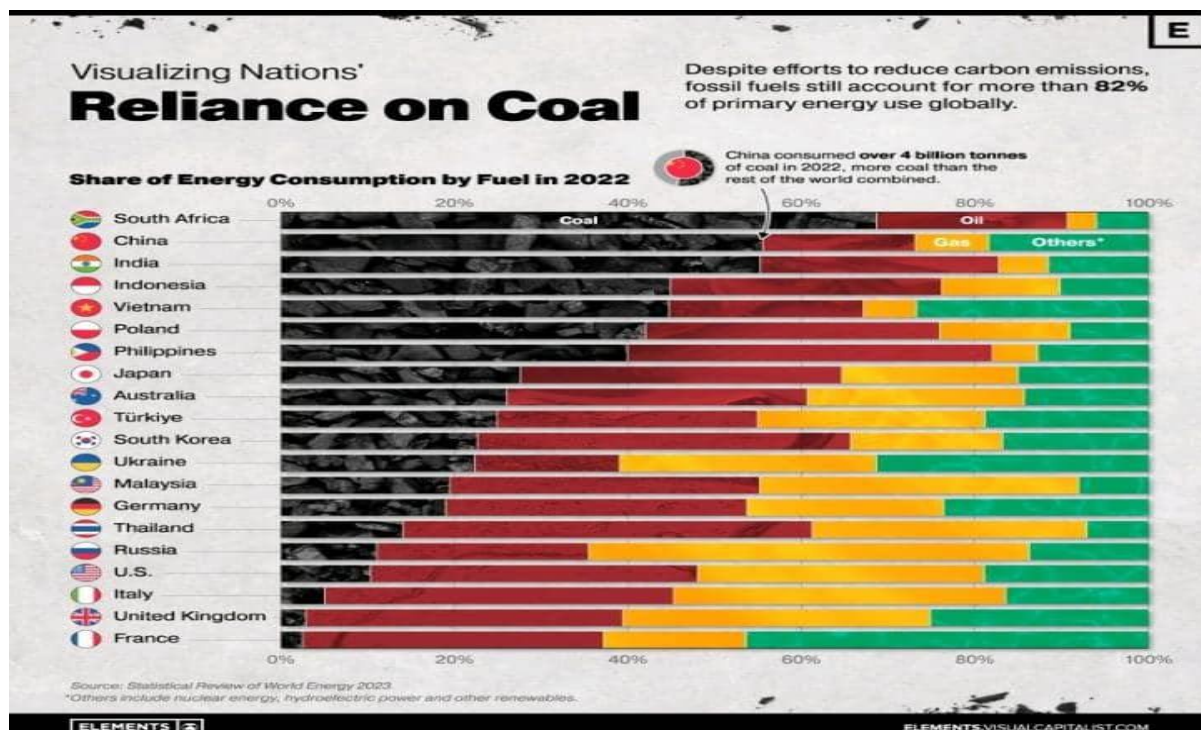
03/11/23

EL: Legal, Regulatory & Policy Data Intelligence

Practical considerations for Transition from Coal to Clean Energy in South Africa.

Electricity Lawyer is pleased to introduce its Legal, Regulatory and Policy Data Intelligence which involves an in-depth analysis of energy industry data from a legal, regulatory and policy angle to assist decision makers, investors, and stakeholders in understanding the implications of energy market developments and make well-informed decisions.

The data intelligence highlights considerations for transition from coal to clean energy in South Africa. SOURCE: Elements



The image shows the list of countries with heavy reliance on coal as a power source, with South Africa leading the list. Within Africa, South Africa is the largest greenhouse gas emitter.^{cclxxxiv} Eskom, South Africa's utility, plans to close more than 20% of its current coal-fired power capacity by 2030, and the majority of the remaining capacity by 2050, and replace it with renewable energy sources.^{cclxxxv} A just transition entails a shift away from fossil fuels, with the benefits shared by all. The change will enhance environmental and health conditions while also creating new and better jobs. Importantly, affected communities will be able to undergo the change at a low cost and benefit from a stronger climate-resilient economy. However, with millions of livelihoods linked to the coal value chain, achieving a just transition will be difficult and must be done carefully.^{cclxxxvi}

South Africa must divide the energy sector into parts and deal with power supply differently in each segment. Solar and other forms of electricity generation, for example, can credibly and dependably meet the power needs of families and business outlets. Eskom can therefore focus on baseline energy and ensuring that its power supply is stable and cost-effective by relieving it of around 40% of national demand, which comes from residential and commercial outlets.^{cclxxxvii}

The electricity generation sector must also be liberalized as soon as possible. Solar energy choices are now available for households, as well as the majority of small and medium-sized businesses and commercial firms, thanks to advancements in generation technology. This has the potential to generate a significant number of jobs in the production and service/maintenance sectors of the industry. This industry's manufacturing section is concerned with the production of solar panels, cabling, and other related accessories.^{cclxxxviii} To optimize impact, Eskom and the Industrial Development Corporation of

South Africa (IDC) must work together to ensure policy consistency and coordination in the construction of 3 to 5 manufacturing outlets for the production of solar panels and associated fittings.^{ccxxxix} This is an essential component of an integrated energy policy. Technically, such things must be manufactured prior to the policy transition. If not, there is a significant and unneeded strain on the balance of payment as a result of a fast increase in imported commodities.

For South Africa to expand further, careful coordination and sufficient funding of manufacturing operations are essential. When the renewable sector's manufacturing of solar panels and all connected accessories is increased, the country has the ability to generate significant growth and employment creation.

Also, the financial sector, especially the banking system need to provide the required asset financing facilities to enable willing households, manufacturing enterprises, farming and commercial firms to install solar and other generation and storage facilities.^{ccxc}

Furthermore, South Africa can increase investment in green hydrogen. This strongly aligns with Germany's and the EU's geopolitical objectives, as their hydrogen programs consider South Africa a target country for manufacturing and exporting hydrogen, although, a hydrogen economy is projected to materialise only around 2050, as the technologies for producing and transporting hydrogen are still in prototypical stage and are currently subject to subsidized research.^{ccxcii}

Finally, there should be an encouragement for green job creation to assist workers in transitioning out of the coal value chain. The spread of renewable energy will produce jobs, but problems will include mismatches in work location and required qualifications, as well as education and training. Addressing these issues is critical for assisting workers displaced by the decarbonization transition and preparing the young for the future.^{ccxciii}

10/11/23

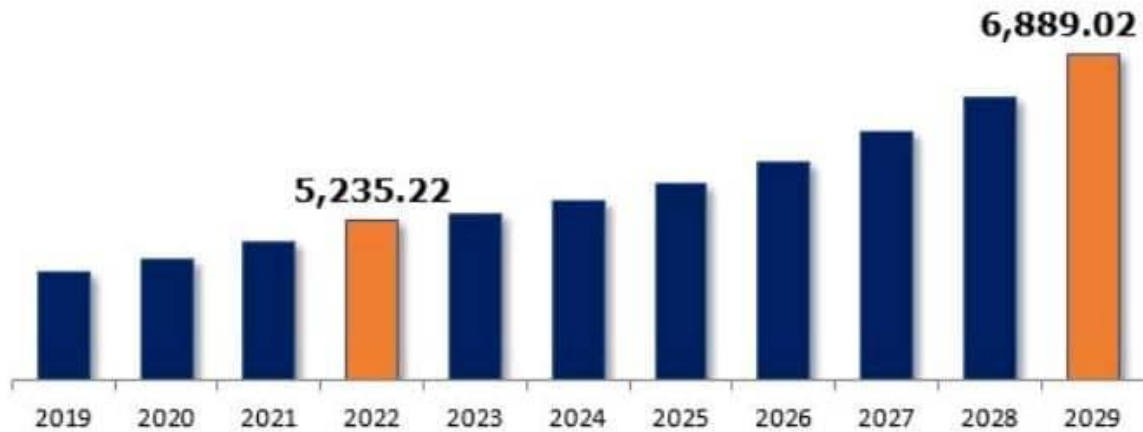
EL: Legal, Regulatory & Policy Data Intelligence

Practical considerations for Adopting CNG and LNG as Alternative Fuels in Africa.

Electricity Lawyer is pleased to introduce its Legal, Regulatory and Policy Data Intelligence which involves an in-depth analysis of energy industry data from a legal, regulatory and policy angle to assist decision makers, investors, and stakeholders in understanding the implications of energy market developments and make well-informed decisions.

The data intelligence highlights considerations for adopting CNG and LNG as alternative fuels in Africa.

Global CNG and LPG Vehicles Market Size By Value (USD Million), 2019–2029



Source: BlueWeave Consulting

SOURCE: BlueWeave Consulting

Road transport in Africa accounts for nearly 13% of global CO₂ emissions, and with recent increases in oil import prices, the government is stepping up efforts to develop cleaner engines that run on alternative fuels such as batteries, compressed natural gas (CNG), autogas (LPG), and a variety of biofuels.^{ccxciii} Due to the region's declining air quality and increasing air pollution, the government is encouraging end users to convert their conventional fuel vehicles to bio-fuel vehicles such as CNG and LPG fuel, as these fuels are environmentally friendly and emit less carbon dioxide. Switching to CNG can help mitigate greenhouse gas emissions.^{ccxciv} In every situation examined and tested, CNG has been proven to be less expensive than competing fuels in terms of fuel cost and efficiency. The difference varies between 35% and 75% when compared to diesel and gasoline, 20% when compared to electric vehicles, and 60% when compared to gasoline-electric hybrid vehicles as well.

In addition, companies from Middle East are investing in Africa to robust the CNG fuel station infrastructure. For instance, in August 2022, companies from Iran invested USD 2.5 billion to robust the services of natural gas supply in the South Africa. In addition, Nigerian companies announced their plans to work with Nigerian government to build 10,000 fuel station for CNG.^{ccxcv} Considering these prime factors, demand for compressed natural fuel is anticipated to witness the highest growth potential.

LPG is usually kept in specially built bottles with valves and regulators and mishandling of these containers, has the potential to cause leaks, underscoring the critical importance and recommendations

of safety standards.^{ccxcvi} These regulations/safety standards provide important instructions for both users and manufacturers to follow in order to ensure the safe use and storage of LPG. Many African countries have recognized the importance of establishing a robust regulatory framework to govern the LPG sector. These regulations aim to standardize safety practices, promote industry growth, and protect consumers. One notable initiative is the West African LPG Summit, a collaborative platform that brings together stakeholders, policymakers, and industry experts to discuss regulatory challenges and share best practices.^{ccxcvii} Several countries have implemented comprehensive LPG regulations. For instance, in Nigeria, the Department of Petroleum Resources (DPR) oversees the LPG industry, ensuring compliance with safety guidelines and promoting investment in LPG infrastructure, while Ghana has the National Petroleum Authority (NPA) responsible for regulating the LPG sector, ensuring compliance with technical standards and licensing requirements.^{ccxcviii}

For the adoption of CNG, the areas that require more attention are the development of emissions regulations, the adoption of safety standards and the periodic testing of CNG cylinders, guidelines and audits of conversion workshops and vehicle inspection, a quality control maintenance program, and the certification of conversion kits^{ccxcix}, which should be integrated into extant legal frameworks relevant to regulation of gas in African countries.

It is therefore recommended that countries adopt strict standards for cylinders to ensure their safety and integrity. Cylinders must undergo periodic testing, such as hydrostatic testing, to verify their structural integrity and compliance with safety specifications.^{ccc}

Furthermore, it is critical to promote safety education and awareness among customers, distributors, and industry professionals. To educate users about potential hazards and best practices, training programs and campaigns on safe handling, installation, and use of the gases should be implemented. Also, safety labels and instructions on cylinders and appliances can assist consumers in understanding proper usage and precautions.

Regular inspections and audits by regulatory bodies should be mandated to ensure compliance with safety standards. These inspections should focus on facilities, distribution networks, and consumer premises to identify and rectify potential safety hazards.

A well-regulated LPG & CNG sector attracts investment and creates employment opportunities, however, stipulated regulations should be in place ab initio.

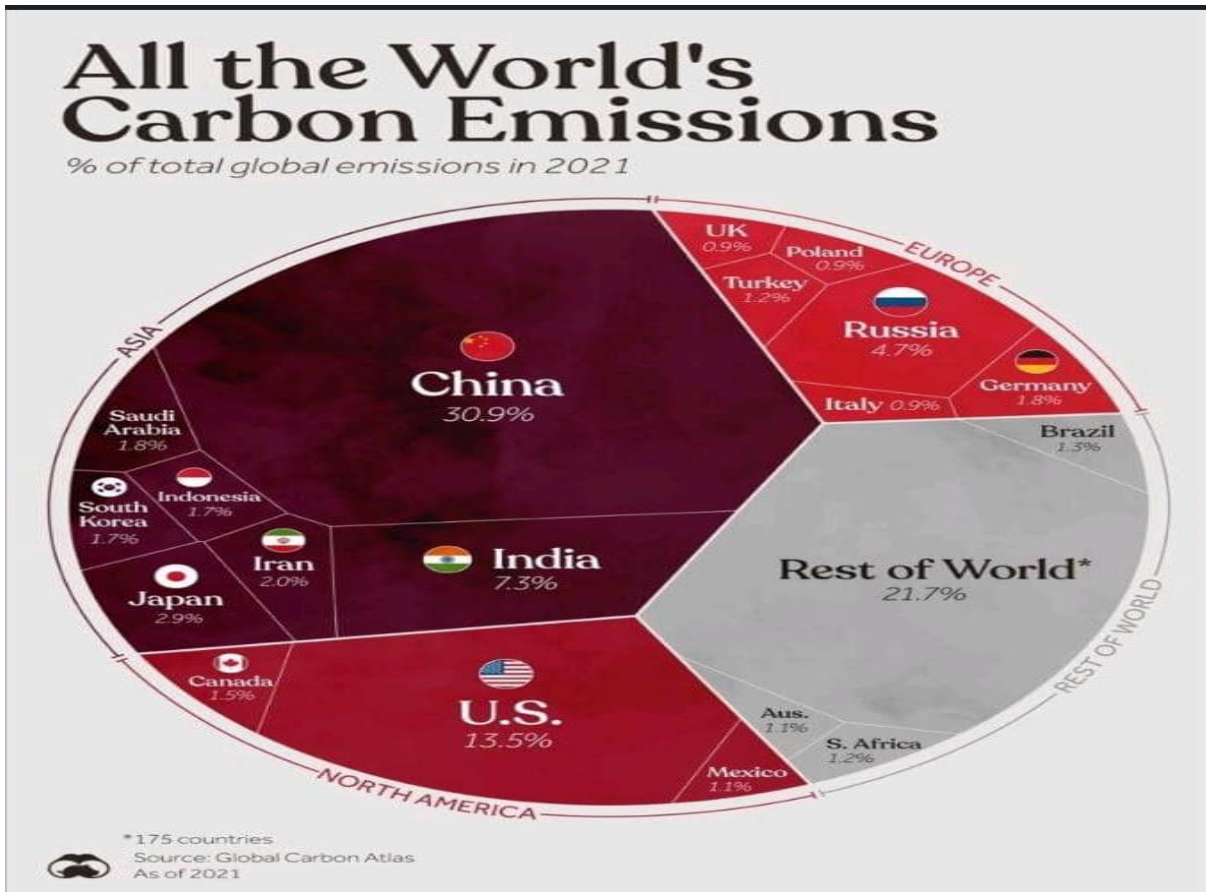
17/11/23

EL: Legal, Regulatory & Policy Data Intelligence

Practical considerations for Achieving the \$100 Billion Climate Finance Pledge to Combat Climate Change in Developing Nations.

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The data intelligence highlights considerations for achieving the \$100 billion climate finance pledge to combat climate change in developing nations.



SOURCE: Global Carbon Atlas

The chart above shows that majority of the global carbon emissions come from industrialized and developed nations. According to former National Aeronautics and Space Administration (NASA) scientist James Hansen, industrialization in Europe, North America, Australia, and Japan was responsible for 77 percent of global emissions between 1751-2006.^{ccci} Rich industrialized nations still account for more than one third of emissions, even though China is the country with the highest share at the moment.^{ccci} In contrast, less than 4% of the world's emissions currently come from Africa and other developing nations.^{ccciii}

According to Oxfam's Climate Policy Lead Nafkote Dabi, 'Wealthy countries bear a disproportionate amount of the blame for the climate crisis. They have a dual responsibility to reduce emissions at

home and to assist developing countries with the costs of rebuilding homes and replanting crops after storms, as well as switching from dirty energy sources to cleaner, lower-carbon ones."^{ccciv}

At Conference of Parties (COP)15 in 2009, developed countries committed to a collective goal of mobilising USD 100 billion per year by 2020 to support climate action in developing countries. Developed countries' commitment to mobilise \$100 billion a year by 2020 to support developing countries on climate action is both an intensely important symbol of trust and foundational to progress on climate action by developing countries.^{cccv} Although donors collectively fell short of the goal in 2020, but there is an opportunity to step up and deliver. Fulfilling the \$100 billion pledge involves more than just adding up the numbers; it also involves assessing the structure and influence of climate finance as well as fostering ambition for 2025 and beyond.^{cccv} Developing nations annually have significantly more needs than \$100 billion. Therefore, climate finance needs to keep expanding over time and contribute to hastening the overall shift in financial flows required to carry out the Paris Agreement via a number of strategies.^{cccvii}

The private sector and the official sector must work together to greatly expand the mobilisation of private finance.^{cccviii} Current developments highlight the enormous potential that exists for the private sector to mobilize and direct funding, as well as to make climate investments in developing nations, including energy transitions. Through blended finance, private capital can be mobilized and investments that would not otherwise materialize can be made. Nevertheless, the amount of private capital being raised now is simply too small; it will need to grow significantly. Specifically, inadequacies in the policy and regulatory framework, a dearth of well-prepared, bankable projects, insufficient risk mitigation mechanisms, and a lack of financial channels linking deep sources of funding with investments are barriers impeding private finance for sustainable infrastructure and climate that should be looked into.^{cccix}

All parties should pursue innovative solutions to scale up and leverage climate finance.^{cccx} Strong private philanthropic donations are one option to mobilize concessional financing since they can cover needs that other donors might not be able to. Voluntary carbon markets are another means of raising debt-free capital. There is potential to raise financing in the many tens of billions of dollars, which could be directed toward objectives like expediting the phase-out of coal and restoring damaged land and forests. However, mechanisms must be put in place to ensure the quality and integrity of such finance.

Additionally, assisting nations in creating and putting into practice domestic policies that might hasten the large-scale mobilization of funds and enable them to execute Nationally Determined Contributions (NDCs) in a manner consistent with recipient nations' national development goals is pertinent.^{cccxi} This is a fundamental element of bilateral climate finance for many developed nations. Developed countries should collaborate with partner nations to help promote investment-friendly business climates, including sound governance and transparency.

24/11/23

EL: Legal, Regulatory & Policy Data Intelligence

Practical considerations for Combating Plastic Waste to Foster Energy Transition

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The data intelligence highlights considerations for combating plastic waste to foster energy transition.



SOURCE: Organisation for Economic Co-operation and Development

The graph shows the level of global plastic waste recycled which is less than 10% contributing to pollution and climate change. An astounding 8 million tons of plastic enter the ocean annually, posing a threat to marine life and degrading natural environments. This amount is anticipated to increase because, according to a recent Pew Charitable Trust estimate, 90 million tons of plastic may find their way into the world's aquatic ecosystems by 2030 if waste management practices remain the same.^{cccxi} A major instance is the current situation at the urban areas of Sierra Leone, including the capital city of Freetown, grappling with a significant plastic waste problem that has extended to the sea, leading to alarming consequences for marine life.^{cccxi} According to a 2019 country brief titled, *Plastic Waste Inputs from Land into the Ocean*, Sierra Leone is a renowned net importer of plastic and in that year alone, nine million kilograms of plastic entered the country as imports.^{cccxiv}

Unlike other materials, plastic does not biodegrade. It can take up to 1000 years to break down, so when it is discarded, it builds up in the environment until it reaches a crisis point.^{cccxv} This pollution chokes marine wildlife, damages soil and poisons groundwater, and can cause serious health impacts apart from its contribution to climate change.^{cccxvi}

Policy shifts can reduce plastic waste and pollution by incentivizing changes in both business and consumer behavior, as well as in plastic design, alternatives and recycling. Among the most popular and effective legal tools employed by governments are bans and limits on single-use plastic products, which outright forbid their manufacture, distribution, or use. The fact that ban laws are flexible enough to grant exclusions for medical supplies and other essential uses, while simultaneously encouraging the use of substitute products like cloth or paper bags, has contributed to their success in part.^{cccxvii}

Governments can also impose taxes to deter the production or use of single-use plastics, or offer tax breaks, subsidies and other fiscal incentives to encourage alternatives to single-use plastic products. Portugal and Denmark, in particular, have effectively increased the usage of recycled and reusable products through the employment of these economic mechanisms. Certain companies (like supermarkets or plastic manufacturers) or certain goods (like plastic coffee cup lids or soda bottles) may be subject to taxes and incentives.^{cccxviii}

Furthermore, product regulations, certifications, and standards for labeling can be developed to inform the public about the dangers plastic poses to human health and safety during use and manufacture, as well as about the environmental effects of plastic.^{cccxix} Standards for material composition, reusability, recoverability (to guarantee the product may be recycled), biodegradability, and compostability can all be established by legislation pertaining to single-use plastic items. This strategy can encourage consumers to select sustainable goods.

Also, programs known as Extended Producer Responsibility (EPR) can make sure that producers of single-use plastic products continue to be accountable for them for the entirety of their life cycles. By making manufacturers accountable for single-use plastics throughout the collection, recovery, recycling, or reuse of their products, these legislative measures help ensure more environmentally friendly designs. For instance, an EPR system implemented in 1991 in Germany mandated the payment of a license fee that was contingent on the quantity and kind of packaging manufacturers annually placed into the market.^{cccxx}

Finally, cold plasma pyrolysis can be used to convert plastics into hydrogen, methane and ethylene. Hydrogen and methane produce small amounts of soot and carbon dioxide when burned, making them a cleaner source of energy than fossil fuels.^{cccxxi} The ethylene produced can be used to create more plastic products and contribute to a circular economy - where waste materials are recycled into new, marketable products and added back into the economy. Although this is subject to more research and development, it further engenders the energy transition agenda in nations.

The adoption of the above mentioned mechanisms will promote sustainable production and consumption of plastics from product design to environmentally sound waste management through resource efficiency and circular economy approaches.

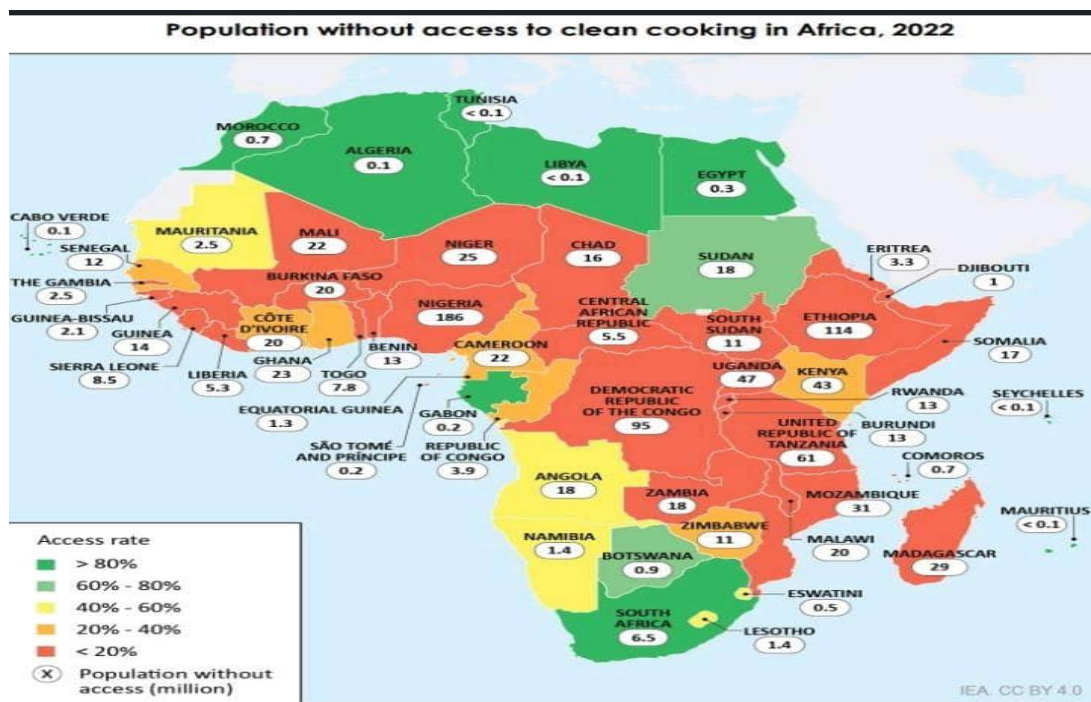
01/12/23

EL: Legal, Regulatory & Policy Data Intelligence

Practical considerations for Improving Access to Clean Cooking in Africa

Electricity Lawyer is pleased to introduce its Legal, Regulatory and Policy Data Intelligence which involves an in-depth analysis of energy industry data from a legal, regulatory and policy angle to assist decision makers, investors, and stakeholders in understanding the implications of energy market developments and make well-informed decisions.

The data intelligence highlights considerations for improving access to clean cooking in Africa.



SOURCE: International Energy Agency

The map shows the population without access to clean cooking in Africa in 2022 with majority of countries having access rate of less than 20%. Clean cooking refers to using purer fuels and energy-efficient modern stoves for domestic use. Over the last decade, in a growing number of developing countries, there has been a welcome shift toward the use of more clean and sustainable cooking technologies and fuels, away from the traditional practice of cooking over smoky open fires. In Sub-Saharan Africa (SSA), however, over 82% of the population (~700 million people) remains dependent on solid fuels such as charcoal, dung, fuelwood, and other biomass for cooking purposes—and this number is projected to increase to 900 million by 2030.^{ccccxii}

The lack of widespread access to clean fuels and cooking technologies has been shown not only to endanger health and exacerbate gender inequality, but also to harm the world's fragile climate through deforestation caused by unsustainable wood harvesting and the use of polluting fuels in inefficient stoves.^{ccccxiii} These activities emit greenhouse gasses and climatic pollutants including black carbon, the second-largest contributor to climate change after carbon dioxide.^{ccccxiv}

Affordability is one of the known barriers towards adopting clean cooking technology and barriers in Africa. However, subsidies can help bridge the affordability gap by reducing the upfront and recurring costs of clean cooking systems; they have been instrumental in expanding clean cooking in South Africa. The South African government focused on creating regulation to ensure safe devices, as well as funding cookstove and fuel initiatives in areas where electricity is not available to further propagate clean cooking.^{ccccxv} China's coal-to-electricity program, in which a ban on household coal use was implemented alongside subsidies for new technologies, demonstrates policy mechanisms that jointly consider clean fuel adoption and disincentives for the use of polluting fuel.^{ccccxvi}

Despite noteworthy actions in the area of clean cooking initiatives, there is a considerable need to intensify awareness, especially in rural areas. Rural regions barely have access to conventional information channels like tv and social media, which could result in low awareness in these areas. Thus, there is a need for the government to invest in a lot of in-person and radio awareness.^{ccccxvii}

Furthermore, empowerment and mentorship programs for women entrepreneurs in the clean cooking value chain have proven effective in promoting a more gender-inclusive workforce.^{ccccxviii} Better representation of women in energy sector policy and decision-making and more active participation of women entrepreneurs in the clean cooking value chain are important ways to advance gender equity and ensure that efforts to expand access meet the needs of cookstove users.^{ccccxix}

Finally, there will be a need to involve a wide array of actors and stakeholders. Local and national governments, research institutes, international aid organisations, financial institutions, and civil society organisations all have a role to play in the transition.^{ccccxx} In order to be effective, there is a need to coordinate and strengthen their efforts in capacity-building, awareness creation, facilitating dialogue and scaling up finance to enable access for both retailers and consumers. Donor organisations could engage with governments and the private sector to provide technical assistance for institutional capacity building and the establishment of technical standards for cookstoves, financing research and development of efficient technologies that benefit human health and the environment.^{ccccxxi}

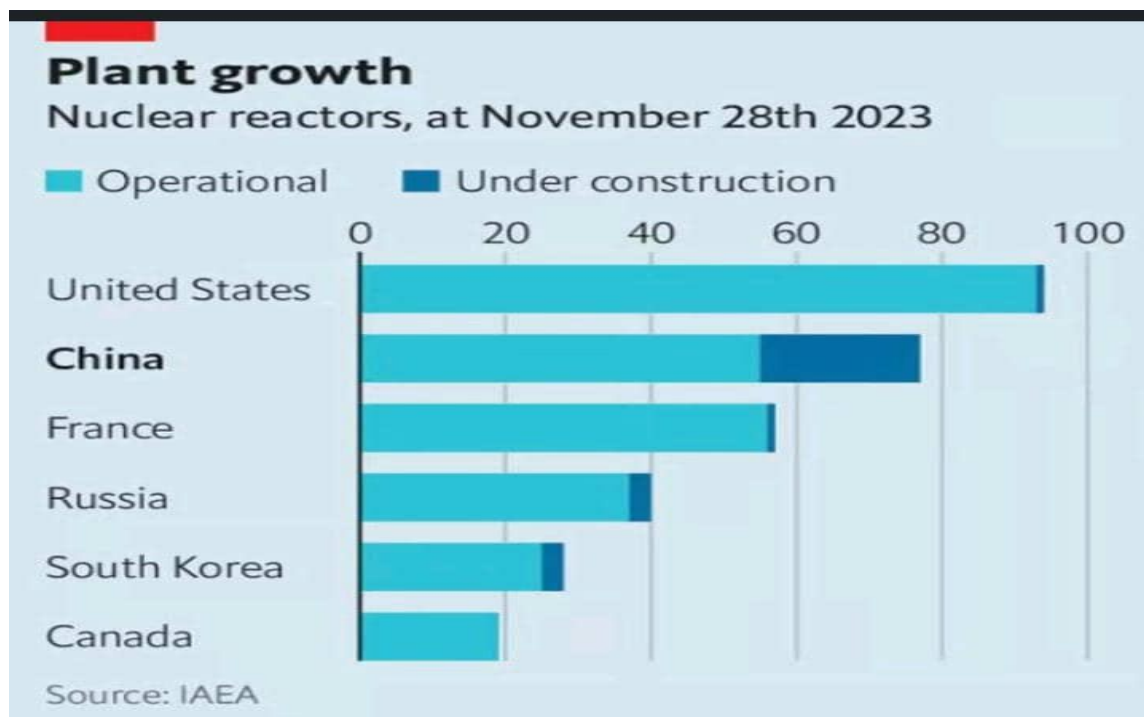
08/12/23

EL: Legal, Regulatory & Policy Data Intelligence

Practical considerations for Adopting Nuclear Energy in Africa's Energy Mix.

Electricity Lawyer is pleased to introduce its Legal, Regulatory and Policy Data Intelligence which involves an in-depth analysis of energy industry data from a legal, regulatory and policy angle to assist decision makers, investors, and stakeholders in understanding the implications of energy market developments and make well-informed decisions.

The data intelligence highlights considerations for adopting nuclear energy in Africa's energy mix.



SOURCE: International Atomic Energy Agency

One of the highlights of recently concluded Conference of Parties (COP) 28 is the adoption of nuclear energy in the global energy mix. The graph, however, shows the status of nuclear reactors globally as at November 28 2023 of which no African country features in. The need to look at nuclear energy as a major component of Africa's future energy mix is imperative, as it does not emit greenhouse gases during operation.^{cccxxxii} The continent presently has only one nuclear power station, which is located in Cape Town, South Africa, although other African countries like Ghana, Uganda, Rwanda, etc., hope to establish nuclear power facilities as a step forward.^{cccxxxiii} There are, however, international treaties and procedures that states must follow.

The decision to implement nuclear power requires expert and public input in the early stages of the development of the policy.^{cccxxxiv} African governments, through a national advisory and consultative process should seek expert views and consult the general population as well as those of the individuals, agencies and organizations, which represent various interest groups. Prominent and experienced technical, financing and policy experts with balanced views should be drawn into this process as advisors to the government and moderators and coordinators of public discussion forums.^{cccxxxv}

Any African country aspiring to embark on a civil nuclear power program needs to develop a robust legislative and regulatory framework. The Forum of Nuclear Regulatory Bodies in Africa (FNRBA) was established in 2009 to improve, strengthen, and unify broad nuclear development challenges. This is a step in the right direction for African countries as the nuclear technology is highly legislated and regulated.^{cccxxxvi} The International Atomic Energy Agency (IAEA) is mandated by the United Nations to guide and advise countries wanting to introduce nuclear power into the energy mix. Thus, in order to be ready for this technology, African governments need to develop legislation and infrastructure

that will enable effective regulation of the industry and each country is required to have a regulatory body with sovereign powers of regulation and enforcement.^{cccxxxvii}

The issues of nuclear project safety, cost, and environmental management of nuclear waste are well known to the public and the proponents of nuclear power will need to demonstrate that they are properly addressed and their impacts on the development programme are considered.^{cccxxxviii} Hence, the public should also be included in the environmental assessment process for the particular location and project, particularly individuals who live in the region surrounding the potential site. However, after the valid public concerns have been resolved to the satisfaction of the government and regulatory permissions for the project have been given, a legislative structure should be in place to safeguard the project from unnecessarily disrupting usage of the public input process.^{cccxxxix}

In addition, nuclear power projects have a long duration of development and implementation and it is necessary for African government to provide assurances through policy and legislation that the long-term interests of the investors are not adversely affected by political changes.^{cccxl}

Furthermore, the financing of a nuclear power plant is the most challenging element of the realization of the project. The major reason for the difficulty in financing is a high capital cost of nuclear plant in particular with reactor units with larger outputs. As a result, there has been no nuclear project financed in recent years without the direct or indirect involvement of the government of either the country offering the technology or the country receiving it. The means of financial involvement of the government may include direct supply of funds to the project, guarantee of loans from export credit agencies and commercial banks, guarantee of long term power purchase agreements, etc.^{cccxli}

Finally, development of adequate local knowledge and expertise for the development of the nuclear power plant is part of the basic infrastructure and in the long run is the most economical option for African countries.

Nuclear energy has the potential to help African countries achieve developmental outcomes, specifically electrification and increased access to energy by taking into considerations highlighted legal, regulatory and policy mechanisms.

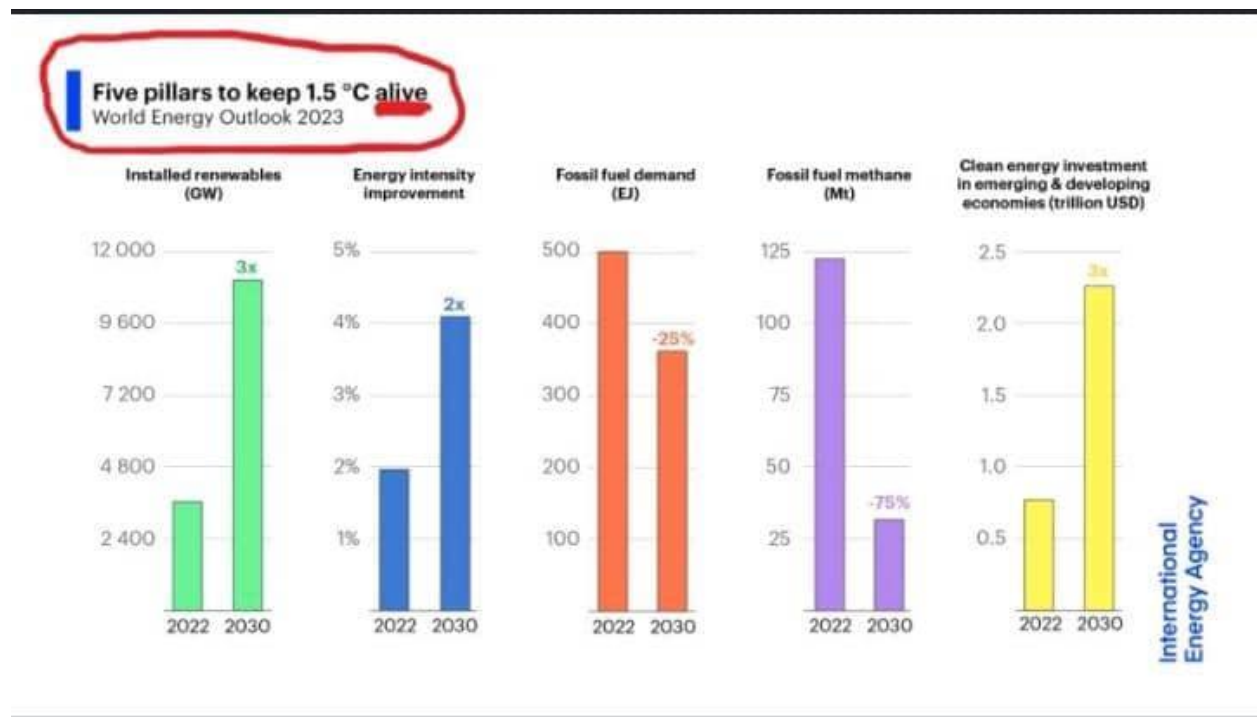
15/12/23

EL: Legal, Regulatory & Policy Data Intelligence

Practical Considerations for Keeping 1.5C Alive as Recommended by the International Energy Agency.

Electricity Lawyer is pleased to introduce its Legal, Regulatory and Policy Data Intelligence which involves an in-depth analysis of energy industry data from a legal, regulatory and policy angle to assist decision makers, investors, and stakeholders in understanding the implications of energy market developments and make well-informed decisions.

The data intelligence highlights considerations for keeping 1.5C alive as recommended by the International Energy Agency.



SOURCE: International Atomic Energy Agency

The IEA's recent World Energy Outlook 2023 shows that keeping the door open to 1.5 °C requires agreement and action on five interdependent measures.^{cccxlii} Those central pillars for action between now and 2030 as depicted on the graph above are: to triple global renewable power capacity; double the rate of energy efficiency improvements; cutting methane emissions from operations by 75%; establish large-scale financing mechanisms to triple clean energy investment in emerging and developing economies; and decline in the use of fossil fuels.^{cccxliii} These pillars are lofty initiatives that will definitely demand legal, regulatory and policy approaches to be delivered.

It is however important to note that none of the five pillars work without the others. And achieving them will also require a host of accompanying measures, such as expanding electricity grids, scaling up low-emissions fuels, and building more nuclear plants.^{cccxliv}

To increase installed renewables, renewable energy technology should be a global public good - meaning available to all, and not just to the wealthy. It will be essential to remove roadblocks to knowledge sharing and technological transfer, including intellectual property rights barriers.^{cccxlv} A robust supply of renewable energy components and raw materials is also essential. More widespread access to all the key components and materials - from the minerals needed to produce wind turbines and electricity networks, to electric vehicles - will be key which will take significant international coordination to expand and diversify manufacturing capacity globally.^{cccxlvi}

Energy efficiency and intensity are critical tools for financial viability and energy security as energy demand and the pursuit of clean energy options continue to intensify.^{cccxlvii} Energy efficiency building blocks should include regulatory actions (standards) to raise the bar of new equipment and construction efficiency; and integrated planning to prioritize energy efficiency in national economic and environmental policies across countries.^{cccxlviii}

Fossil-fuel subsidies are one of the biggest financial barriers hampering the world's shift to renewable energy and encouraging fossil fuel demand. Fossil fuel subsidies are both inefficient and inequitable. Shifting subsidies from fossil fuels to renewable energy will only cut emissions, it also contributes to the sustainable economic growth, job creation, better public health and more equality, particularly for the poor and most vulnerable communities around the world.^{cccxlix}

Methane emissions could be reduced very quickly if countries and companies were to adopt a set of tried and tested measures and policy tools related to leak detection and repair requirements, technology standards, and a ban on non-emergency flaring and venting.^{cccxli} In the oil and gas sector, these measures would cut methane emissions from operations by half. There is a role for governments in implementing and enforcing policies and regulations to incentivise or require early company action, but oil, gas and coal companies carry primary responsibility for methane abatement and should move quickly towards a zero tolerance approach to methane emissions without waiting until legislation compels them to do so.^{cccxlii} Banks, investors and insurers have an opportunity to add to the pressure for more rapid action by incorporating methane abatement into their engagement with the hydrocarbon industries with the aim of promoting strict performance standards, verifiable methane reductions, and transparent and comparable disclosures on measured emissions.^{cccxlii} There is also scope

for consumers to work with suppliers to create a market for certified low-emissions fuels and to provide economic incentives for methane abatement.

Finally, to increase financing mechanisms to increase clean energy investments will need to involve investment in human and institutional capacity and strong energy sector governance to help generate a pipeline of well-structured programmes and projects.^{cccliii} Also, there should be an enhanced international support, including significantly more concessional finance and technical assistance to mitigate country and project risks and to act as an anchor for new instruments and platforms capable of attracting domestic and international investment capital at scale.^{cccliv} Bilateral and multilateral development banks have an important role to play in advising on policy frameworks, financing and helping to develop early-stage projects, and using concessional capital to mobilise larger multiples of private capital.^{ccclv}

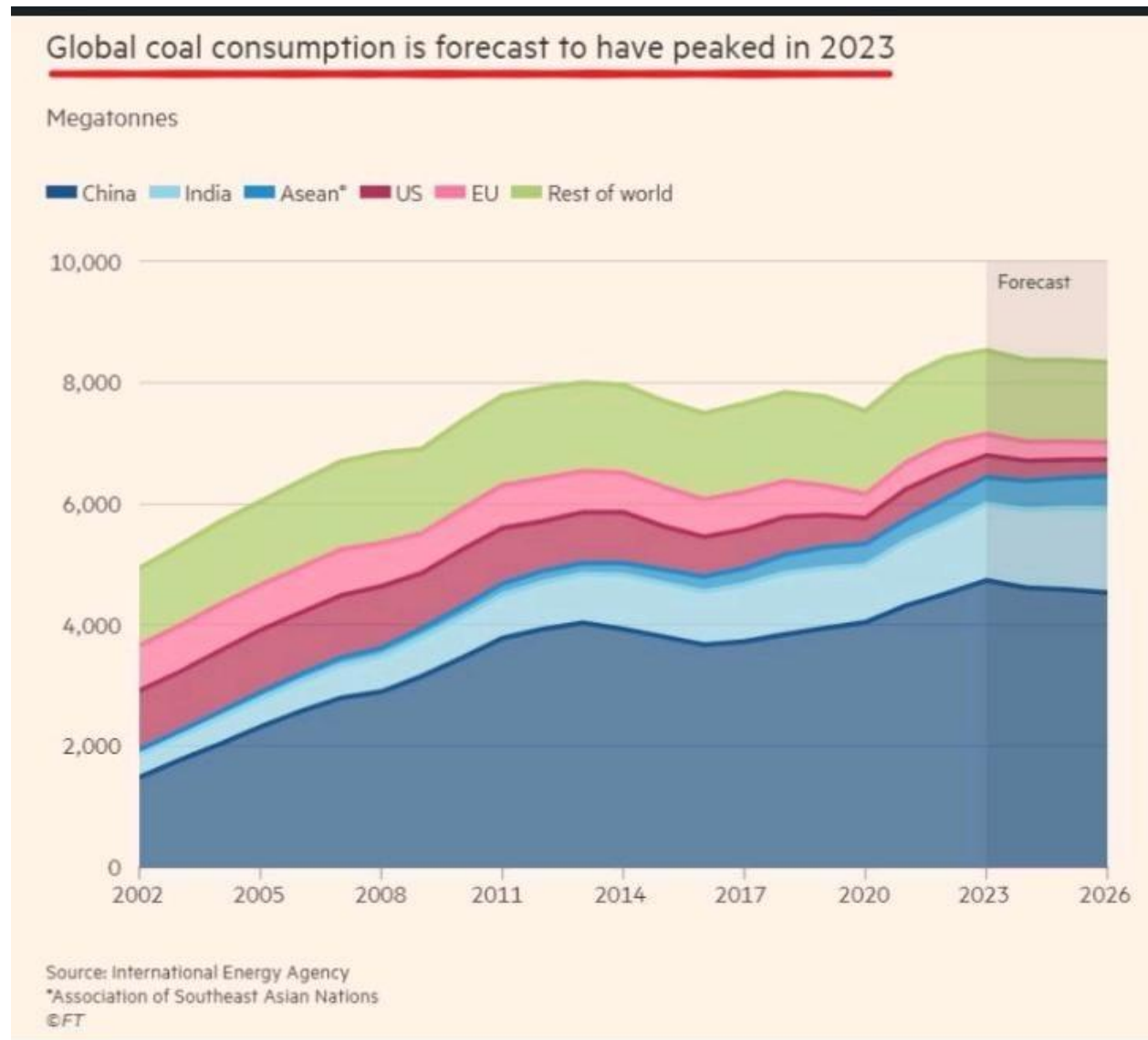
22/12/23

EL: Legal, Regulatory & Policy Data Intelligence

Practical Considerations for Abating Global Coal Consumption

Electricity Lawyer is pleased to introduce its Legal, Regulatory and Policy Data Intelligence which involves an in-depth analysis of energy industry data from a legal, regulatory and policy angle to assist decision makers, investors, and stakeholders in understanding the implications of energy market developments and make well-informed decisions.

The data intelligence highlights considerations for abating global consumption.



SOURCE: International Energy Agency

To avert the worst consequences of the climate crisis, the world must handle a major carbon emitter: coal. Coal, the world's greatest source of power, accounting for 30% of total global carbon dioxide (CO₂) emissions.^{ccclvi} To stay below the critical 1.5°C global warming barrier, coal power use must be reduced by 80% between 2018 and 2030.^{ccclvii} Every future pathway for the global energy sector that avoids severe impacts from climate change involves early and significant reductions in coal-related emissions.^{ccclviii}

A massive scale up of clean sources of power generation, accompanied by system-wide improvements in energy efficiency, is key to unlock reductions in coal use for power and to reduce emissions from existing assets.^{ccclix} Ceasing the addition of new, unabated coal-fired assets to power networks is a

crucial need for reducing emissions from coal. The International Energy Agency (IEA) reports that over the past ten years, the number of new project approvals has decreased significantly.^{ccclx} However, there is a chance that the current energy crisis will encourage a renewed willingness to approve coal-fired power plants, especially in light of the IEA's finding that approximately half of the 100 financial institutions that have supported coal-related projects since 2010 have not committed to restricting such financing, and another 20% have only made weak pledges.^{ccclxi}

In the absence of an outright ban on coal plants, controlling their impact on the climate can provide a means to phase out coal. This may also include pressuring national governments to enforce implementation of existing regulations or establishing regulations to curtail its use. In 2010, Tokyo introduced a cap-and-trade scheme to achieve efficiency improvements in buildings and introduced mechanisms to reward the procurement of renewable energy, which has reduced coal consumption and cut several million tonnes of emissions.^{ccclxii}

For individuals working in the coal power industry and their communities, the transition to clean energy can have significant social and economic impacts. Coal-industry jobs are mostly outside city jurisdictions, but where they are within municipal boundaries, nations must help to ensure a just transition for those workers. This may involve converting the fossil-fuel infrastructure to renewable energy such as in Germany, for example, the Prosper-Haniel coal mine is being converted into a 200MW pumped storage hydroelectric reservoir; as well as investing in training and compensation programmes to help equip workers for a new role in a low-carbon industry.^{ccclxiii}

For residential and building sectors, nations can consider regulating emissions with building codes that will incentivise public and private building owners to supply the building with renewable electricity. New York City, for instance will require existing large buildings to meet strict emissions limits from 2024 – and those limits will get stricter over time.^{ccclxiv}

In the case of emerging markets and low-income countries, the international community can provide financial and technical assistance (e.g., the know-how needed to build grids that work with intermittent power sources, such as wind and solar) and limit financing of new coal plants.^{ccclxv} Cleaner alternatives like natural gas can also help bridge the energy transition towards a greener future.^{ccclxvi} Carbon capture and storage technology may be a viable solution to ease the transition away from coal, but it is currently less cost-competitive than other low-carbon energy sources such as solar and wind.^{ccclxvii}

Finally, stricter environmental policies, carbon taxes, and affordable energy substitutes are crucial. For example, a carbon pricing scheme helped the United Kingdom reduce its dependence on coal by 12.4 percentage points from 2013 to 2018.^{ccclxviii} In Spain, government subsidies favoring renewable electricity generation helped reduce coal dependence between 2005 and 2010.^{ccclxix}

It clear that there is no one single approach to putting coal emissions into decline. Factoring the use of coal in various sectors of the economy will be a step in the right direction in abating the consumption of coal, which will be a multi-approach solution tailored to each country's need.

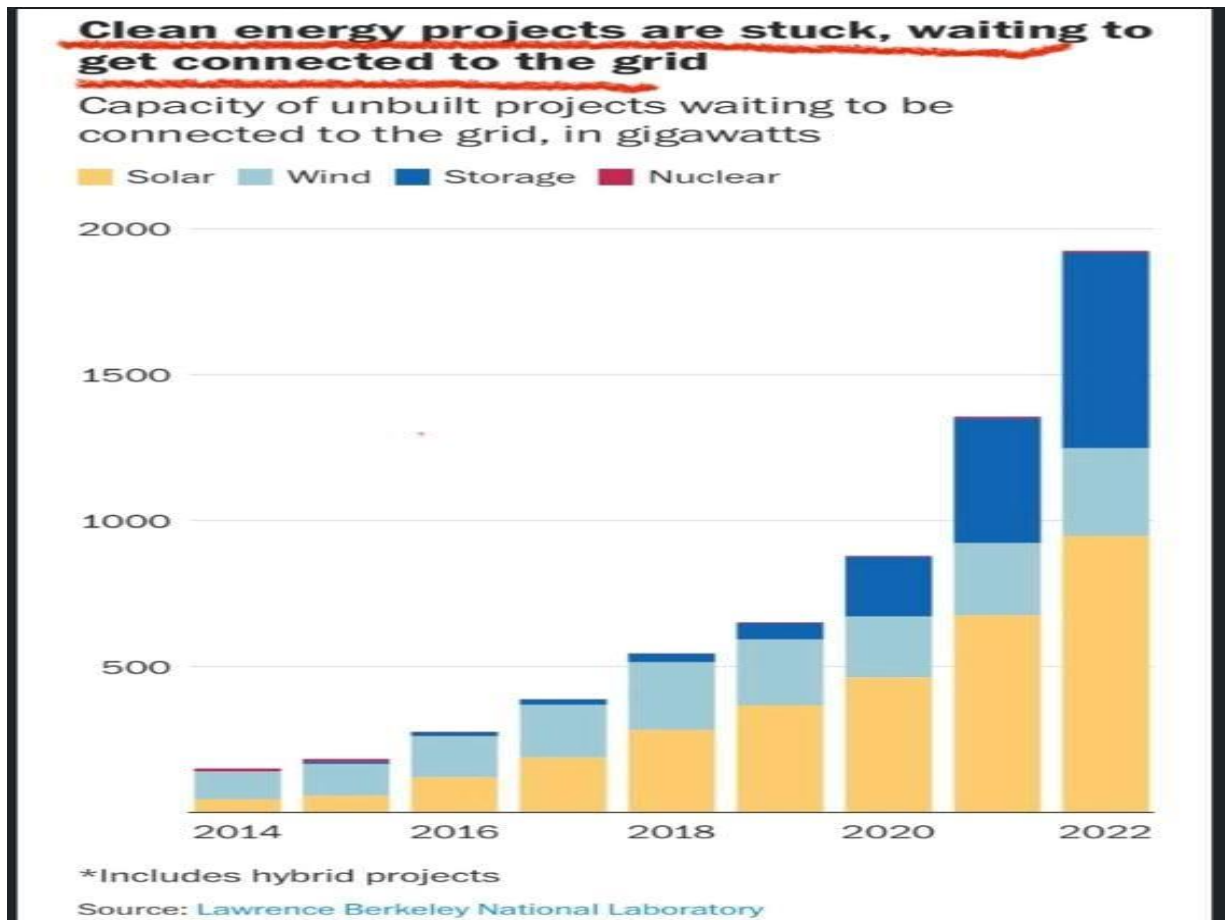
11/01/24

EL: Legal, Regulatory & Policy Data Intelligence

Practical Considerations for Integrating Clean Energy Projects to Grids.

Electricity Lawyer is pleased to introduce its Legal, Regulatory and Policy Data Intelligence which involves an in-depth analysis of energy industry data from a legal, regulatory and policy angle to assist decision makers, investors, and stakeholders in understanding the implications of energy market developments and make well-informed decisions.

The data intelligence highlights considerations for integrating clean energy projects to grids.



SOURCE: Lawrence Berkeley National Laboratory

The chart shows the increased rate of clean energy projects waiting to be connected to the grid year on year. Renewable energy projects, such as solar power plants, wind farms, and hydropower installations, play a vital role in transitioning to a clean and sustainable energy future.^{ccclxxx} To maximize their impact and ensure a reliable energy supply, it is essential for these projects to be seamlessly integrated into the existing power grid.^{ccclxxxi} Connecting renewable energy projects to the grid allows for the effective integration of clean energy into existing power infrastructure. However, this process requires technological concerns, legal restrictions, and collaboration between project developers and grid operators.^{ccclxxxii} Before a power project can be operational, the grid operator must examine its connections with the power grid to determine transmission infrastructure modifications required to support the project and apportion those upgrade costs to developers.^{ccclxxxiii} Most interconnection queues have massive backlogs, and the assessment procedure might result in years of delays.

Renewable energy integration/connection will involve renovations and adjustments to the current grid infrastructure. Transmission and distribution infrastructure must be improved to handle greater capacity, allow for bidirectional power flow, and connect remote renewable energy sources.^{ccclxxxiv} These infrastructure improvements need considerable expenditures/investments and careful planning to assure grid dependability and resilience.^{ccclxxxv}

Also, to effectively integrate renewable energy, grid management and control techniques must be agile and adaptable. There will be need for advanced algorithms and real-time monitoring systems to allow grid operators to optimize electricity flow, balance supply and demand, and minimize possible grid instabilities.^{ccclxxvi}

Furthermore, grid integration is premised on the notion that market participants have sufficient information to make efficient generation siting and technology decisions on projects. However, there has been continued concern that inadequate access to information is contributing to high volumes of interconnection requests, high project withdrawal rates, interconnection processing delays, and an overall inequitable system.^{ccclxxvii} Regulations can be made to spur improved access to and quality of interconnection data with the industry. There can also be orders made to require regulators to make a significant amount of information on interconnection study models and modeling assumptions (“study data”) available to interconnection customers.^{ccclxxviii} This information can either be available publicly or, upon request through nondisclosure agreements.

Grid interconnection standards and regulations vary across jurisdictions. They are typically defined by regulatory authorities and grid operators to govern the technical, safety, and contractual aspects of grid connection.^{ccclxxix} Permitting procedures coupled with comprehensive interconnection standards are necessary. A comprehensive set of requirements nationwide will reduce uncertainty and ambiguity for all stakeholders and ensure that state-of-the-art equipment/project is installed.^{ccclxxx}

Connecting renewable energy projects to the grid can be challenging. Grid capacity limits, grid access restrictions, difficult administrative processes, and financial concerns are all examples of such challenges. However, measures such as grid expansion and improvements, faster regulatory procedures, and supporting policies may assist overcome these issues and make grid connection easier for renewable energy projects.

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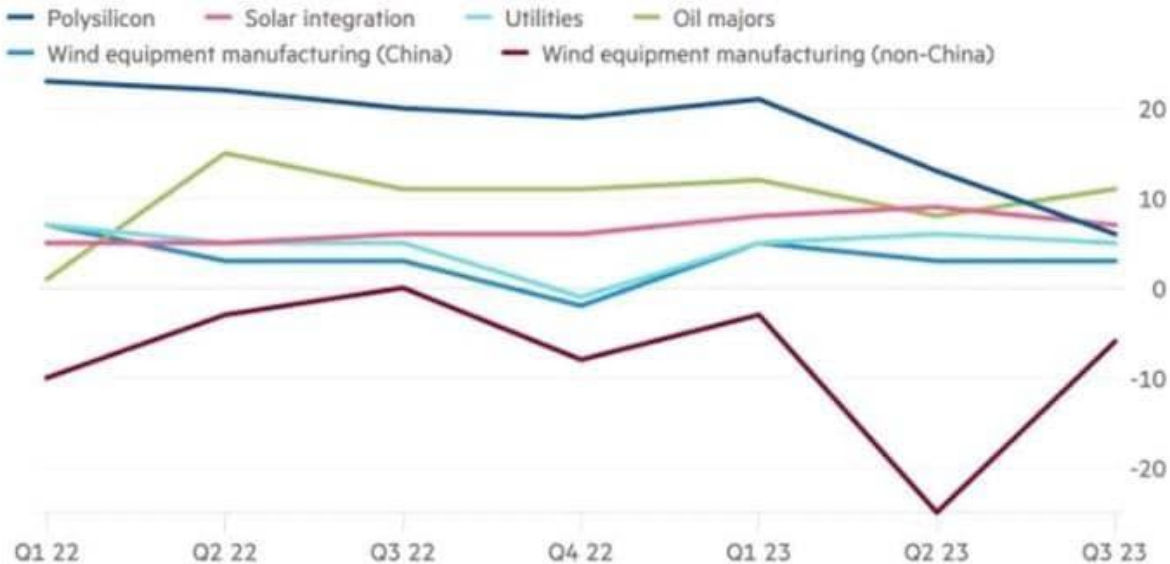
Practical Considerations for Promoting Financial Profitability of Renewable Energy Companies.

Electricity Lawyer is pleased to introduce its Legal, Regulatory and Policy Data Intelligence which involves an in-depth analysis of energy industry data from a legal, regulatory and policy angle to assist decision makers, investors, and stakeholders in understanding the implications of energy market developments and make well-informed decisions.

The data intelligence highlights considerations for promoting financial profitability of renewable energy profits.

Renewable energy companies struggle to achieve profitability amid narrow margins

Weighted average net margins (%)



Source: International Energy Agency Renewables 2023

© FT

SOURCE: International Energy Agency

The chart shows the struggle of renewable energy companies to make profits in commercial operations. Despite a strong push from governments and international organisations for companies and consumers to support a global green transition, energy companies have been struggling to make a profit from solar, wind and other energy projects in the face of several challenges.^{ccclxxxix} However, by deploying various legal, regulatory and financial schemes, countries can stimulate the profitability of renewable energy projects. The law for the transition of electric power was promulgated by the German government in early 1991 to promote the development of renewable energy for the purpose of being able to provide high standard subsidies and preferential loans in conducting and supplying electricity.^{ccclxxxiii} National governments can exemplify this mechanism suitable to each country.

Individuals and corporations investing in renewable energy projects may be eligible for investment tax credits (ITCs). This can be applied to tax liabilities, hence reducing their tax burden. By decreasing the upfront expenses and boosting the return on investment, ITCs offer a favorable climate for the viability of renewable energy businesses.^{ccclxxxiii} For example, the United States provides a federal investment tax credit for solar energy projects, which is a credit against income tax equivalent to a percentage of the investment's value. This campaign has greatly contributed to the increase of solar installations around the country.

Furthermore, employing the use of production tax credits by national governments can help to increase revenues and reduce expenditure of renewable energy companies. Production Tax Credits (PTCs) are subsidies given to renewable energy producers based on how much power they produce. These credits are generally granted per kilowatt-hour of renewable energy generated, guaranteeing a

steady cash stream throughout the project's life. PTCs lower investment risks while increasing the profitability of renewable energy projects. For example, the federal output tax credit has significantly boosted wind energy output in the United States. This incentive has played an important role in increasing wind generating capacity around the country.

Also, governments can provide grants and subsidies towards certain renewable energy projects. Grants and subsidies are direct financial contributions made by governments to help develop and implement renewable energy technology.^{ccclxxxiv} These revenues can be used to pay a wide range of expenses, including research and development, equipment procurement, and project installation costs. Grants and subsidies help renewable energy companies become more profitable while also boosting innovation and market competitiveness. For example, the European Union's Horizon Europe program provides subsidies for renewable energy research and development initiatives. These funds encourage innovative ideas and assist bring new technology to market. By implementing various government incentives and subsidies, countries can stimulate the profitability of renewable energy projects.

Increasing financial profitability for renewable energy companies involves a combination of strategic planning, operational efficiency, and market positioning, all of which can be made effective via the tools of legal, regulatory and financial instruments.

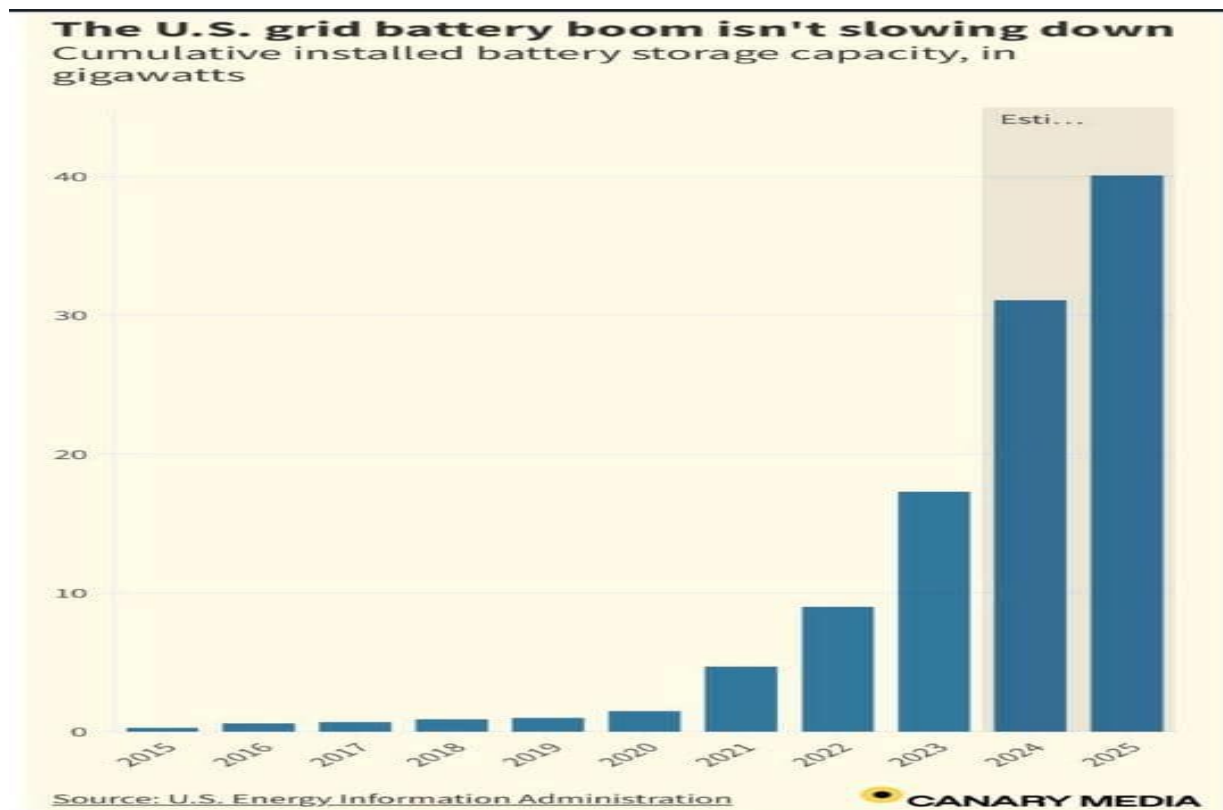
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Practical Considerations for Promoting Battery Energy Storage Systems in Africa.

Electricity Lawyer is pleased to introduce its Legal, Regulatory and Policy Data Intelligence which involves an in-depth analysis of energy industry data from a legal, regulatory and policy angle to assist decision makers, investors, and stakeholders in understanding the implications of energy market developments and make well-informed decisions.

The data intelligence highlights considerations for promoting battery energy storage systems in Africa.



SOURCE: U.S Energy Information Administration

The graph shows the increase in capacity of United States grid battery storage and its forecast till 2025 due to the favorable extant legal framework. African countries can use US as a case study to encourage BESS investment and utilization via their legal and regulatory framework.

Attractive costs for solar and wind power and cutting-edge innovations are making clean energy a compelling proposition in Sub-Saharan Africa, which faces the world's largest gaps in electricity access. However, solar and wind power are variable by nature, making it essential to find effective ways to store the electricity they produce to use when it is needed most. Energy storage – batteries in particular can help to solve the problem.^{ccclxxxv} Batteries are critical to supporting sub-Saharan Africa's energy access goals. Batteries play a role in both an off-grid and weak-grid context, by enabling the use of decentralized energy technologies, such as solar home systems (SHS), and improving the reliability of the grid. Through their impact on energy access, batteries unlock significant improvements in health, education and productivity.^{ccclxxxvi}

A first step will be to increase partnerships between stakeholders across African countries and internationally. Given the fragmented or immature nature of each market, these coalitions will be essential to: inform the development of regulation and standards by policy-makers; ensure the creation of sustainable business models and market incentives that align with policy ambitions; and increase awareness of the most effective policies and industry techniques.^{ccclxxxvii} In all markets, strong government leadership will be a major success factor in promulgating legal and financial frameworks and mechanisms favourable to battery energy storage systems in Africa.^{ccclxxxviii}

Furthermore, utility-scale BESS requirements may include determining appropriate project deployment sites, establishing safety standards to prevent hazards (such as fire, thermal runways, explosive, chemical, and toxic leaks, and so on), and addressing asset end-of-life issues. This will necessitate the development of a regulatory agency armed with technical know-how and standards for renewable energy technology.^{ccclxxxix}

Also, there may have to be market restructuring in Africa. Many African nations still maintain vertically integrated monopolies today. In terms of electricity, this means that utilities handle the generation, transmission, distribution, and retail tasks. This restricts BESS's capacity to compete in the electrical market, which uses a large number of independent power producers. For instance, the United Kingdom (UK) model is a perfect platform to quickly deploy BESS capacity into the electricity system, as a result of the UK's unbundled energy industry and wholesale market.

Finally, there are limited incentives and goals in place in Africa to promote investments in BESS technologies. Energy storage procurement goals for utilities are one of the quickest ways to promote energy storage, as was undertaken in California, (United States of America). The financial incentives available to industrial, commercial, and household clients to construct and use energy storage systems is a major area of concern for developed European nations. Although the U.S. Storage Act, which would have offered a 30% tax credit for installed energy storage, was not passed, it is still a great tool that can be adopted by African governments.

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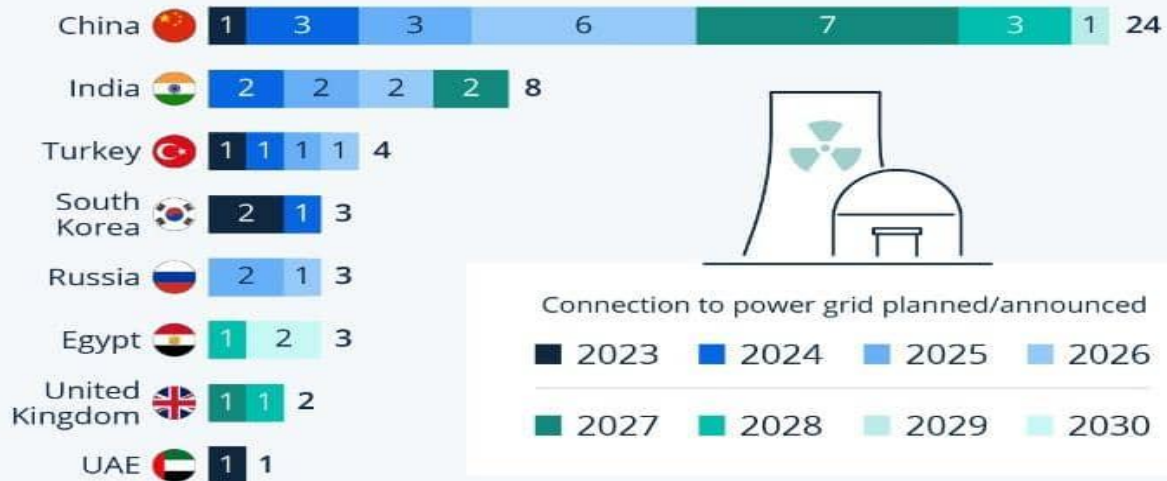
Practical Considerations for Promoting Nuclear Energy as an Energy Source in Africa's Energy Mix.

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The data intelligence highlights considerations for promoting nuclear energy as an Energy Source in Africa's Energy Mix.

The Countries Committing to Nuclear Power

Countries with the most nuclear power plants currently under construction*



* Excluding plants whose construction is currently paused
Source: World Nuclear Association



statista

SOURCE: World Nuclear Association

The graph shows countries' commitment to nuclear power in terms of construction of power plants, where Egypt is the only African country. The need to look at nuclear energy as a major component of Africa's future energy mix is imperative, as it does not emit greenhouse gases during operation. While many African countries have shown interest in nuclear energy in later years such as the Revised Energy Policy of Uganda for 2023 which promotes nuclear energy alongside renewables, targeting a 45% contribution from nuclear power to achieve a total capacity of 52,841 MW by 2040.^{cccxc} This is similar to Kenya that presently stands at Phase 2 of the International Atomic Energy Agency's (IAEA) milestone approach, positioning itself for the construction of its inaugural nuclear power plant (NPP) by 2031, with construction slated to commence by 2027.^{cccxi}

However, expert and public participation is crucial throughout the early phases of policy formation for implementing nuclear power. African governments, via a national advisory and consultative process, should solicit expert opinions and consult the general public, as well as people, agencies, and organizations representing diverse interest groups.^{cccxcii} Experts from technical, financial, and policy fields with diverse perspectives should serve as government advisers and moderators for public debate platforms.

In order to further nuclear energy development, African governments must take a strategic approach to engaging with nuclear reactor manufacturers. Maintaining competitive tension throughout the procurement process is critical for guaranteeing a thorough selection of the most qualified manufacturer.^{cccxciii} This entails asking different manufacturers to bid on the project and evaluating them based on technical knowledge, experience, and cost concerns.

Before beginning a nuclear energy project, African countries must establish a clear vision of their energy requirements, available resources, and stakeholder status.^{cccxciv} This strategic vision is critical in selecting the most appropriate reactor technology for the nation's needs. Additionally, recognizing the necessary resources for development and operation is critical.

Furthermore, the public is aware of the concerns surrounding nuclear project safety, cost, and environmental management of radioactive waste; thus, proponents of nuclear power will need to show that these concerns are appropriately addressed and that their effects on the development program are taken into account.^{cccxcv} Therefore, the public, especially those who reside in the area surrounding the possible site, should be included in the environmental assessment process for the specific location and project.

In addition, nuclear power projects have a long duration of development and implementation and it is necessary for African government to provide assurances through policy and legislation that the long-term interests of the investors are not adversely affected by political changes.^{cccxcvi}

Finally, Collaboration on a regional scale is strongly encouraged for the advancement of nuclear energy projects in Africa. Regional cooperation allows countries to pool resources, share knowledge and expertise, and collectively address the challenges associated with building and operating nuclear reactors. Establishing a common regulatory framework through collaboration ensures standardized safety and security measures across the region.

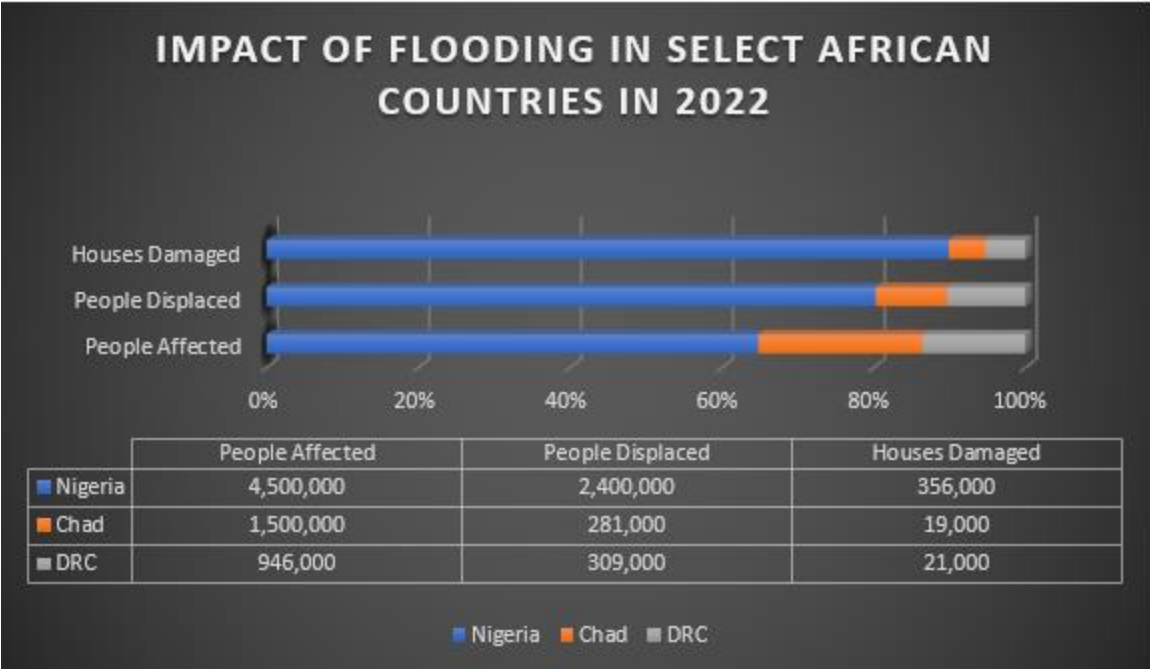
08/02/24

EL: Legal, Regulatory & Policy Data Intelligence

Practical Considerations for Combating Water-Related Climate Change Risks in Africa.

Electricity Lawyer is pleased to introduce its Legal, Regulatory and Policy Data Intelligence which involves an in-depth analysis of energy industry data from a legal, regulatory and policy angle to assist decision makers, investors, and stakeholders in understanding the implications of energy market developments and make well-informed decisions.

The data intelligence highlights considerations for combating water-related climate change risks in Africa.



SOURCE: Electricity Lawyer. *Statistics is derived from the United Nations Office for the Coordination of Humanitarian Affairs (OCHA)*

The graph shows the effect of climate change on water resources in form flooding and its impacts in select African countries of Nigeria, Chad and Democratic Republic of Congo. Flood impacts have become more severe in recent years due to climate change with the above-mentioned countries being the most severely impacted African countries in 2022.^{cccxcvii}

As climate change imposes a new reality, the political, legal and institutional frameworks need to be assessed and adjusted to allow for climate change adaptation, especially to water-related risks such as flooding and water shortage which has led to damage to homes, displacements, and fatalities.^{cccxcviii}

The common causes of flooding throughout the regions are inadequate planning and design of rural-urban communities, an inadequate land use policy framework, an absence of flood data, improperly planned or clogged drainage systems, faulty dams, inadequate river defenses, deforestation and land reclamation along coastal areas.^{cccxcix} Furthermore, it is imperative that proactive flood mitigation strategies take into account the threat posed by climate change in addition to the mentioned challenges.

It is important to prioritize pre-flooding preparations and to invest in early flood warning systems that are accurate and up to date with technology. Real-time flood forecasting and warning systems must be included as a key element of the flood risk management strategy because flood risk is rising as a result of climate change.^{cd} Doing so will ensure impact mitigation by providing accurate warnings and real-time forecasts ahead of impending flooding.

Additionally, flooding risk is directly and indirectly increased by deforestation. Indirectly, cutting down on trees reduces their ability to absorb carbon dioxide from the atmosphere, which raises the risk of

global warming, rising sea levels, overflowing riverbanks, and flooding.^{cdi} Policies that promote reforestation while discouraging deforestation should be developed by national governments. Also, governments should see to the repositioning of their current land use policy framework and ensure strict enforcements to prevent indiscriminate erection of residential buildings, offices, schools, hospitals and other infrastructures in areas prone to flooding.^{cdii}

There is also a need for human capital development by training and equipping personnel with the technical competency and capacity to operate forecast/warning systems; i.e. read, interpret, correctly forecast, review and improve on system operation. Engagement of stakeholder through efficient dissemination of information to citizens encouraging them to abide by regulations pertaining to flood forecasts/warnings, flooding patterns, and domesticating flood risk management measures in their immediate environment will help to reduce consequential impacts on individuals.

Finally, national governments can encourage greater study into water related climate risk management via investment in research and development. This will aid in developing and executing sustainable development strategies that uncover latent causes and produce more modern mitigation techniques.^{cdiii} They can also promote, implement and enforce compulsory flood insurance policy as a non-structural response approach, covering infrastructure and properties such as buildings, vehicles, etc. This will help mitigate the impact of the losses suffered post-disaster.

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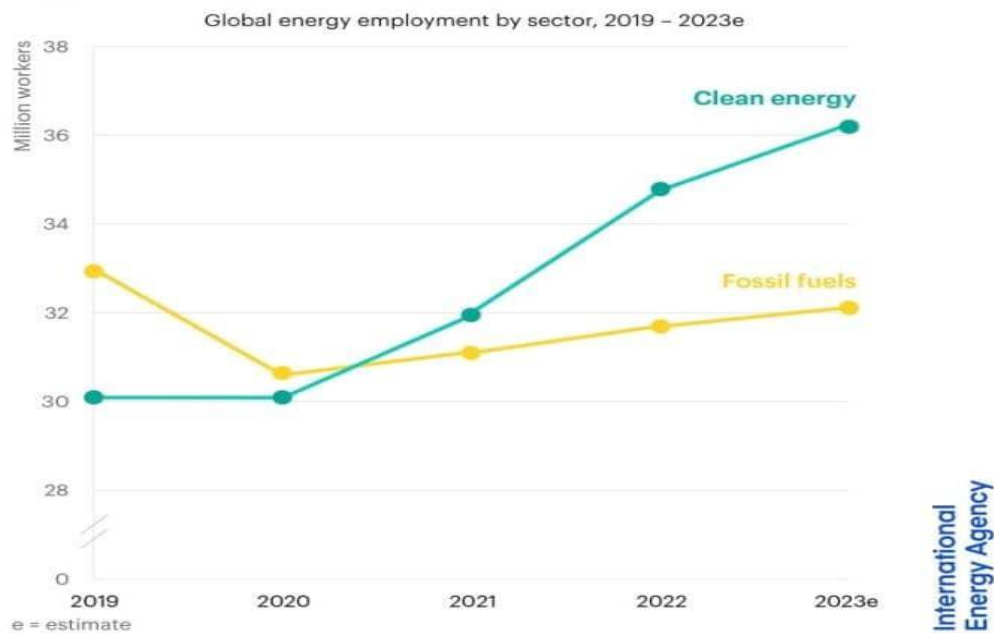
EL: Legal, Regulatory & Policy Data Intelligence

Practical Considerations for Increasing Clean Energy Jobs.

Electricity Lawyer is pleased to introduce its Legal, Regulatory and Policy Data Intelligence which involves an in-depth analysis of energy industry data from a legal, regulatory and policy angle to assist decision makers, investors, and stakeholders in understanding the implications of energy market developments and make well-informed decisions.

The data intelligence highlights considerations for increasing clean energy jobs.

Since the pandemic, **job growth in clean energy** has outpaced **fossil fuels**



SOURCE: International Energy Agency (IEA)

The graph portrays the growth of energy jobs globally since 2019 to 2023 in both fossil fuel and clean energy sectors. As governments and businesses continue to prioritise clean energy as a means to achieve sustainability and economic growth, the demand for clean energy jobs is expected to further increase, creating a positive cycle of job creation and environmental progress.^{cdiv}

According to a report by the International Renewable Energy Agency (IRENA), the renewable energy sector employed 11.5 million people worldwide in 2019, with the potential to reach 42 million jobs by 2050.

Furthermore, the clean energy industry offers a wide range of job opportunities across various skill levels and sectors. From manufacturing and installation to research and development, clean energy jobs span a diverse range of professions, providing employment opportunities for individuals with different backgrounds and expertise.^{cdv}

Several key factors will however propel an increased demand for clean energy jobs. Increased government actions targeted at lowering carbon emissions and boosting renewable energy will have a substantial impact on increasing demand for clean energy employment. For example, more subsidies, tax breaks, and regulatory measures will encourage investment in renewable energy projects, resulting in an increased demand for trained people in the clean energy sector.^{cdvi}

Furthermore, there should be an increase in public awareness of global energy transition. As the public awareness of environmental issues grows, there will be an increasing demand for sustainable and eco-friendly practices across industries. This heightened awareness will lead to a shift in consumer behavior and corporate responsibility, driving the need for skilled professionals who can contribute to the development and implementation of clean energy solutions.^{cdvii} Consequently, there will be an increased need for professionals who can design and manufacture electric vehicles, install charging infrastructure, and develop energy-efficient building designs.

Governments should also explicitly integrate industrial and climate policy to encourage innovation and job development in emerging industries like energy services, renewables, and smart technology.^{cdviii} This will make companies recognise the importance of sustainability in their operations and adopt clean energy practices/technologies to reduce their environmental impact. Hence, create job opportunities in areas such as energy management, sustainability consulting, and renewable energy project development.

Establishing clear and transparent long-term energy transition policies would assist promote and de-risk private investment in clean energy industries, hence promoting job development. For instance, part of Denmark's decision to phase out oil and gas production in the North Sea by 2050, the government is planning an aid package to ensure local jobs for the existing skillset of oil and gas workers through carbon capture, utilisation and storage (CCUS) and electrification projects while Canada plans to leverage its existing strengths in the oil and gas sector to develop its hydrogen sector, creating up to 350 000 quality, green jobs over the next three decades.^{cdix}

Finally, when analysing the clean energy job market, it becomes evident that there is a diverse array of job opportunities available, each requiring specific skills and expertise. Thus, modernizing and emphasizing energy related curricula should be a priority at all levels of education are an essential way to allow more students and/or youths to become engaged in clean energy careers.^{cdix} For instance,

Lane Community College in Oregon has developed a two-year online degree in energy management focused on large-building energy efficiency solutions.

The clean energy sector offers a wide range of career opportunities across various disciplines. From engineering and project management roles in renewable energy projects to research and development positions focused on sustainable technologies, the job market is diverse and dynamic. Governmental policies and mechanisms will be an integral tool in developing these opportunities.

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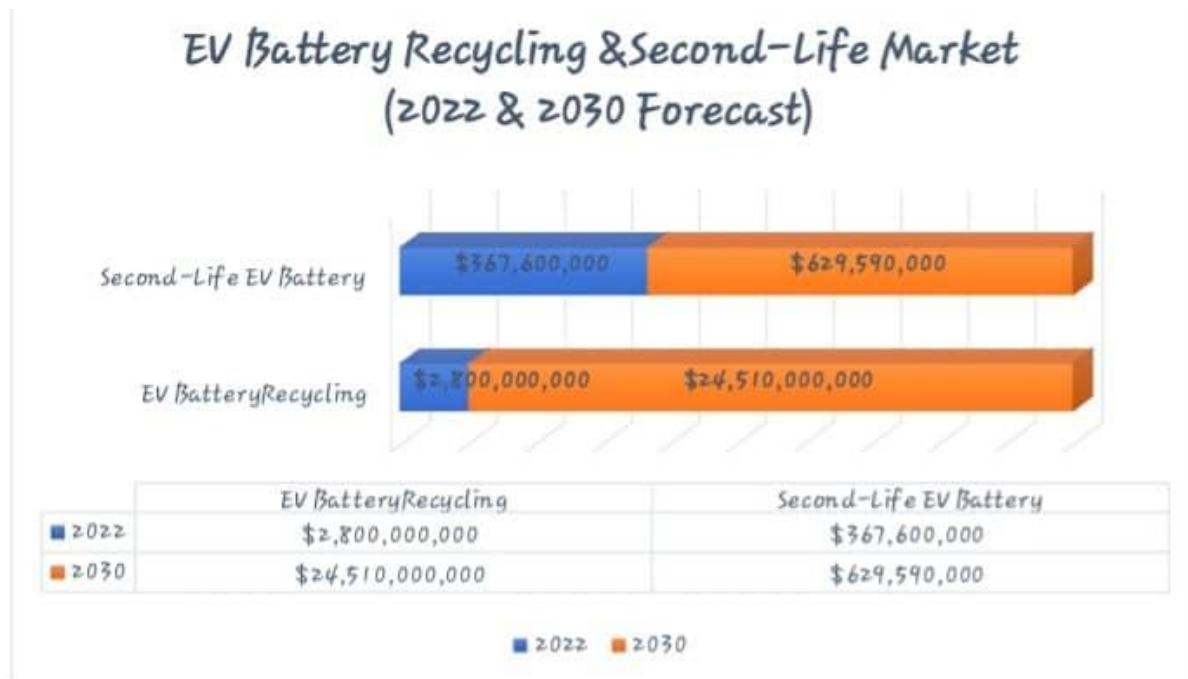
EL: Legal, Regulatory & Policy Data Intelligence

Practical Considerations For Encouraging End-Of-Life Strategies For Electric Vehicle Batteries.

Electricity Lawyer is pleased to introduce its Legal, Regulatory and Policy Data Intelligence which involves an in-depth analysis of energy industry data from a legal, regulatory and policy angle to assist

decision makers, investors, and stakeholders in understanding the implications of energy market developments and make well-informed decisions.

The data intelligence highlights considerations for encouraging end-of-life strategies for electric vehicle batteries.



SOURCE: Electricity Lawyer (Statistics are sourced from the U.S Market Report and Precedence Research)

The graph portrays the market for Electric Vehicles batteries based on their end of life strategies, which includes recycling and repurposing (second life use) in 2022 and a 2030 forecast. The increased adoption of EVs raises important questions about the availability and sustainability of the raw materials used for the batteries, mostly lithium-ion batteries that will be powering them. Without a standardized system, the materials used in these batteries will quickly end up in landfills. Irregular disposal of spent batteries can also lead to fire hazards and the leaching of toxic substances into the environment.^{cdxi} These materials are not only hazardous, but they are also valuable. If they are lost due to improper disposal, manufacturers will be forced to keep extracting new materials from the ground.^{cdxii} Hence, there is a need for governments to adopt policy measures that can encourage manufacturers and end users take cognizance of end -of-life strategies for electric vehicle batteries.

When electric vehicle (EV) batteries are no longer suitable for use in EVs, they can be repurposed or recycled. The batteries can be repurposed for second-life applications, which involve using the batteries for energy storage applications such as stationary storage for renewable energy, backup power for buildings, or charging stations for EVs.^{cdxiii} The recycling process involves disassembling the

battery, separating the components, and recovering the valuable materials. These materials can then be used to manufacture new batteries or other products.^{cdxiv}

To incorporate these end-of-life strategies, governments can give incentives for vehicles and battery manufacturers to recycle their batteries. This might include tax advantages or subsidies for recycling plants, as well as stipulate legal, regulatory and technical standards for automakers to employ recycled materials in battery manufacture.^{cdxv} An extended producer responsibility can also be incorporated for manufacturers to ensuring the adoption of an end-of-life strategy for the batteries produced.

Many worldwide initiatives have been made to establish a circular economy for the end-of-life of lithium-ion batteries derived from electric vehicles. The Global Battery Alliance (GBA), for example, has helped to design a Battery Passport.^{cdxvi} The Battery Passport is a system that improves battery traceability. It is a digital representation of each battery that includes a digital ID. It comprises information on the battery's health and manufacture to help determine if it is appropriate for reuse. The Battery Passport data is useful for deciding if a battery should be repurposed or discarded after its initial usage, and it gives trustworthy and complete information regarding battery health before purchase and testing.^{cdxvii} Governments can incorporate such measures to encourage more investment and adoption of these end-of-life strategy.

Furthermore, governments should invest in research and development efforts to enhance the recycling process and lower the cost of battery recycling. This may involve creating new recycling methods, refining the recycling process, or discovering new applications for recovered battery components.^{cdxviii}

There will also be a need to educate consumers about the importance of EV battery recycling and how they can dispose of their batteries properly, this will encourage consumers to recycle their batteries instead of throwing them away.^{cdxix}

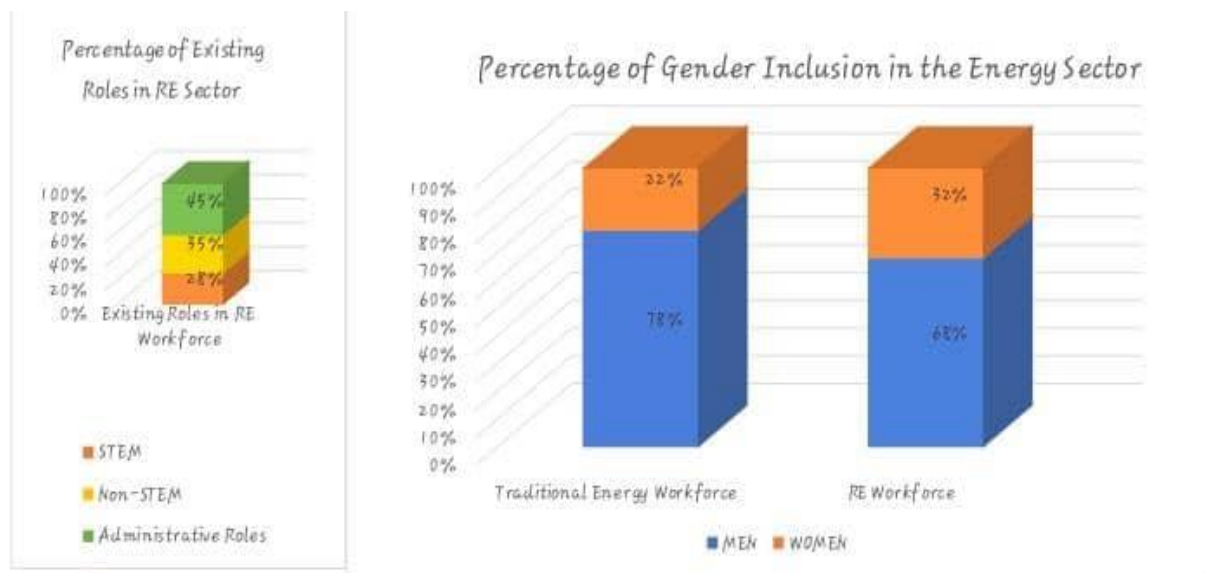
Overall, encouraging EV battery end-of-life strategy is critical to the electric vehicle industry's long-term viability. By promoting appropriate battery disposal, educating customers, providing incentives, supporting research and development, governments can assist to lessen the environmental effect of EV battery disposal.

EL: Legal, Regulatory & Policy Data Intelligence

Practical Considerations For Encouraging Gender Inclusion in the Renewable Energy Sector.

Electricity Lawyer is pleased to introduce its Legal, Regulatory and Policy Data Intelligence which involves an in-depth analysis of energy industry data from a legal, regulatory and policy angle to assist decision makers, investors, and stakeholders in understanding the implications of energy market developments and make well-informed decisions.

The data intelligence highlights considerations for encouraging gender inclusion in the renewable energy sector.



SOURCE: Electricity Lawyer (Statistics are derived from the Global Women’s Network for Energy Transition)

The chart illustrates the level of gender inclusivity within the energy sector, indicating a minimal participation of women despite relatively higher representation in the renewable energy (RE) sector. Nonetheless, this remains constrained by the prevailing roles within the RE sector, which often lack sufficient training opportunities for women.

There is substantial evidence that women and children are disproportionately affected by a lack of access to energy, and modern energy infrastructure typically reaches women last.^{cdxx} To increase women’s participation in the energy sector, it is necessary to not only understand the evidence for it, but also the barriers women face in joining and remaining.^{cdxxi}

Governments can mainstream gender in energy sector frameworks by integrating women's experiences, capacities, expertise, and preferences into energy policies and programs. This can be achieved through gender audits and by ensuring the integration of women along the off-grid renewable energy value chain.^{cdxxii}

Also, vocational training programs by organisations can help with recognizing the role that women can play as renewable energy technicians. One such example is the Vocational Training and Education for Clean Energy (VOCTEC) Program, an initiative implemented by Arizona State University with the support of USAID and IRENA.^{cdxxiii} The training curriculum is designed to take into account cultural aspects of trainees and increase social awareness and gender inclusion in order to achieve maximum impact and participation among women. Governments can further tailor training and skills development programmes, including raising awareness of career opportunities, adapting curricula, making technical training programmes more versatile, and strengthening mentoring and outreach within the public sector.^{cdxxiv}

Human resource policies can cultivate a supportive environment that allows for women to better balance their professional and family lives.^{cdxxv} Examples of interventions include establishing flexible working hours, allowing for parental/family leave to take care of sick or unwell family members and/or providing caregiving support or paying wages sufficient for employees to find the caregiving support they need. This will help to attract and retain talent for opportunities in professional advancement in the energy sector in diverse roles.

Finally, national governments and energy companies can pursue promoting networking face-to-face and electronically among women in sustainable energy and support organisations that facilitate such networking; featuring achievements of women in energy in mainstream and specialised media; supporting and designing workshops or conference events specifically targeted at women in sustainable energy; or insisting on inclusiveness in panels at conferences and seminars, in selection committees for industry awards and the like^{cdxxvi}.

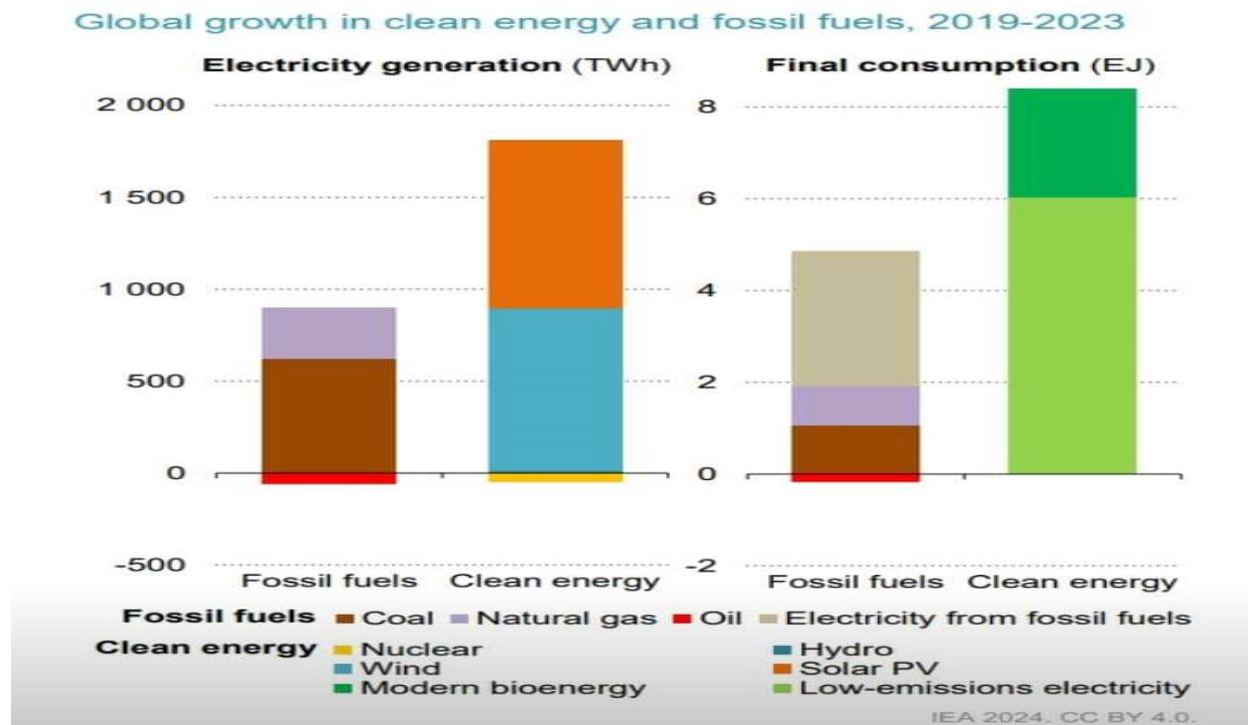
From legal standards set by governments, to recruitment and human resources policies, to opportunities through training and supportive associations, these are measures all stakeholders can engage to recognize the value of women in the energy sector and working to actively recruit and retain them in line with the energy transition agenda.

EL: Legal, Regulatory & Policy Data Intelligence

Practical Considerations For Encouraging Modern Bioenergy in the Energy Mix of Countries.

Electricity Lawyer is pleased to introduce its Legal, Regulatory and Policy Data Intelligence which involves an in-depth analysis of energy industry data from a legal, regulatory and policy angle to assist decision makers, investors, and stakeholders in understanding the implications of energy market developments and make well-informed decisions.

The data intelligence highlights considerations for encouraging modern bioenergy in the energy mix of countries.



SOURCE: International Energy Agency

The chart shows the global growth in clean energy and fossil fuels from 2019-2023. Low emissions electricity and modern bioenergy emerges higher than fossil fuel in the final energy consumption. The consumption of modern bioenergy, is a novel development in the energy mix of countries which needs couple of efforts to yield more energy solutions.

Bioenergy is a term used to describe renewable energy that comes from biological sources like organic matter or biomass that may be transformed into useful energy forms. It is a type of energy that uses plant life, agricultural waste, and other organic materials to generate heat, electricity, and liquid fuels.^{cdxxvii} Modern bioenergy is an important source of renewable energy - its contribution to final energy demand across all sectors is currently five times higher than wind and solar PV combined, even when the traditional use of biomass is excluded.^{cdxxviii} Modern bioenergy is the largest source of renewable energy globally today, accounting for 55% of renewable energy and over 6% of global energy supply.^{cdxxix} More efforts are needed to accelerate modern bioenergy deployment to get on track with the energy transition goal.

Bioenergy power generation has significant supply chain and infrastructural challenges, particularly when using bulk biomass sources like residues and garbage. Agricultural and forestry residue-based feedstock are seasonal, therefore the feedstock market price might change widely. Also, financing bioenergy generation can be challenging due to potential technology and contractual risks coupled with market uncertainties.^{cdxxx} Investors may be concerned about the long-term economic supply of sustainable biomass feedstock, making financing difficult for biomass generation. Despite the introduction of Bioenergy with Carbon Capture and Storage (BECCS), infrastructural upgrades and operational expenditures are necessary for the BECCS plants in order to capture, move, and store

CO₂ - and even with very high investment, projects' profitability is unclear, hence BECCS is unlikely to be financially feasible without supporting policies.^{cdxxxii}

A legislative framework supporting bioenergy generation should be carefully constructed to avoid conflicting with climate change aims or putting sustainability at risk. Because of the scarcity of feedstock, governments should not encourage the use of biomass for electricity generation alone. Policies should focus on maximizing the synergies and co-benefits of bioenergy generation, including waste management.^{cdxxxiii}

Bioenergy power production is often included within renewable generation support schemes and could benefit from widespread supporting policies, including (feed in tariffs) FITs, renewable portfolio standards and power purchase agreements.^{cdxxxiiii} FITs can tackle the high cost of bioenergy generation and possibly provide an assured electricity income. They offer a long-term agreement that guarantees a price per unit of output and feed-in-premiums, which offer a premium tariff and wholesale electricity prices. Such mechanisms have been widely used to promote bioenergy generation in Germany, Japan and the United Kingdom. In Germany, the FIT scheme provides a higher rate for bioenergy plants.

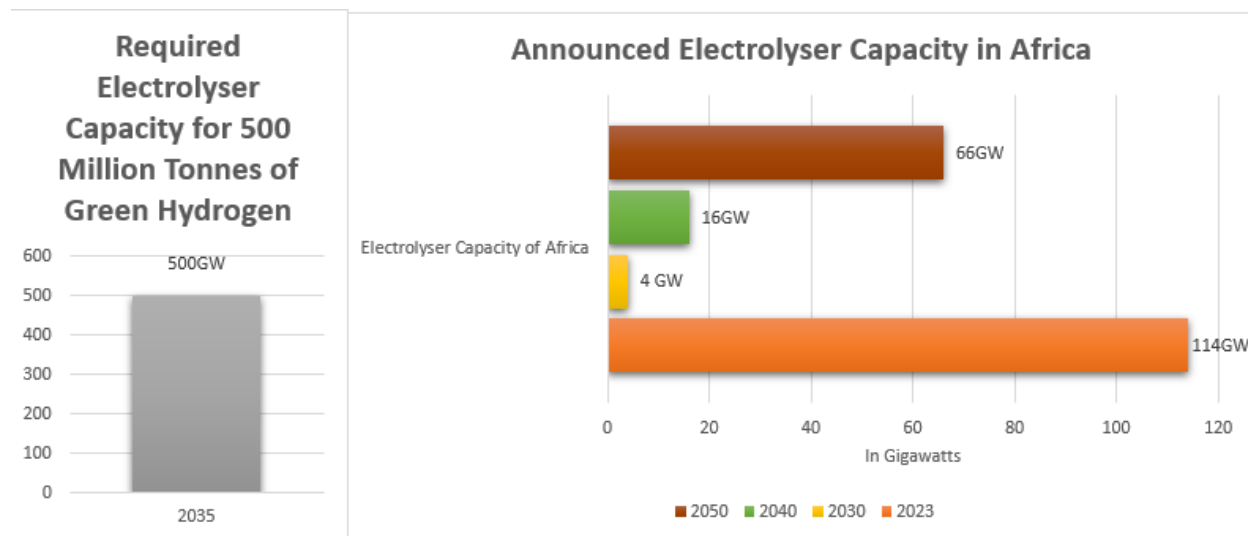
Finally, national governments can ensure enabling conditions for investments in research and development. According to International Energy Agency studies, advanced biofuels can provide infrastructure-compatible, low-carbon fuels, with higher land use efficiency and a better greenhouse gas balance than some first-generation biofuels. Analyses also show that biomass, including wood, will play an increasingly important role in heat and power production.^{cdxxxv} Investments in more research on bioenergy can unlock better innovations to mitigate the challenges of adopting bioenergy.

EL: Legal, Regulatory & Policy Data Intelligence

Practical Considerations For Encouraging Investment of Green Hydrogen Electrolysers in Africa.

Electricity Lawyer is pleased to introduce its Legal, Regulatory and Policy Data Intelligence which involves an in-depth analysis of energy industry data from a legal, regulatory and policy angle to assist decision makers, investors, and stakeholders in understanding the implications of energy market developments and make well-informed decisions.

The data intelligence highlights considerations for encouraging investments of green hydrogen electrolysers in Africa.



SOURCE: Electricity Lawyer (Statistics from DNV Hydrogen Forecast to 2050)

The graph depicts the capacity of electrolyzers announced in Africa from 2023 - 2050 for the production of green hydrogen. Africa has a goal of producing 50 million tonnes of hydrogen by 2035 by the capacity of electrolyzers announced cannot produce the amount of green hydrogen targeted.^{cdxxxv} Achieving this capacity will require about 500GW of electrolyser capacity as 4-5 GW of electrolyser capacity is needed to produce a target of 0.5 million tonnes.^{cdxxxvi} However, as at 2023, Africa's total announced electrolyser pipeline capacity reached 114 gigawatts (GW). There is need for Africa to engage in more productive efforts towards investing in green hydrogen and its infrastructure to meet up with the 2035 target.

The upfront capital costs of establishing green hydrogen electrolyser facilities can be prohibitive, particularly for countries with limited financial resources and infrastructure like African countries. This includes the costs of electrolyser equipment, renewable energy installations, and associated infrastructure such as storage and distribution systems. Also, developing a local supply chain for electrolyser components and materials may be challenging in Africa due to limited manufacturing capacity and reliance on imports.^{cdxxxvii}

Encouraging investment in green hydrogen electrolyzers in Africa requires a multifaceted approach that addresses various challenges and leverages opportunities.

Governments should develop policies and regulations that incentivize the production of green hydrogen electrolyzers. This can include offering tax incentives, subsidies, and grants for companies involved in electrolyser manufacturing.^{cdxxxviii} Additionally, clear and transparent regulatory frameworks can provide certainty for investors and encourage long-term commitments.

Also, allocating funding for research and development initiatives focused on improving electrolyser technology, increasing efficiency, and reducing production costs can yield more positive investments in Africa.^{cdxxxix} Collaboration between governments, research institutions, and private companies can accelerate innovation in this area.

It is equally important that Africa countries develop industrial zones or clusters dedicated to green hydrogen electrolyser production to attract manufacturers and streamline supply chains. They can also invest in infrastructure such as transportation networks and utilities to support the growth of the manufacturing sector in the continent.^{cdxli} Governments can invest in vocational training programs and education initiatives to develop a skilled workforce capable of manufacturing and maintaining electrolyser systems.^{cdxlii} This can help create job opportunities and contribute to the growth of the local manufacturing industry.

Finally, demand for green hydrogen electrolysers should be created by promoting their use in various sectors such as transportation, industry, and energy storage.^{cdxliii} Government procurement programs, incentives for renewable hydrogen adoption, and public awareness campaigns can stimulate this market growth.

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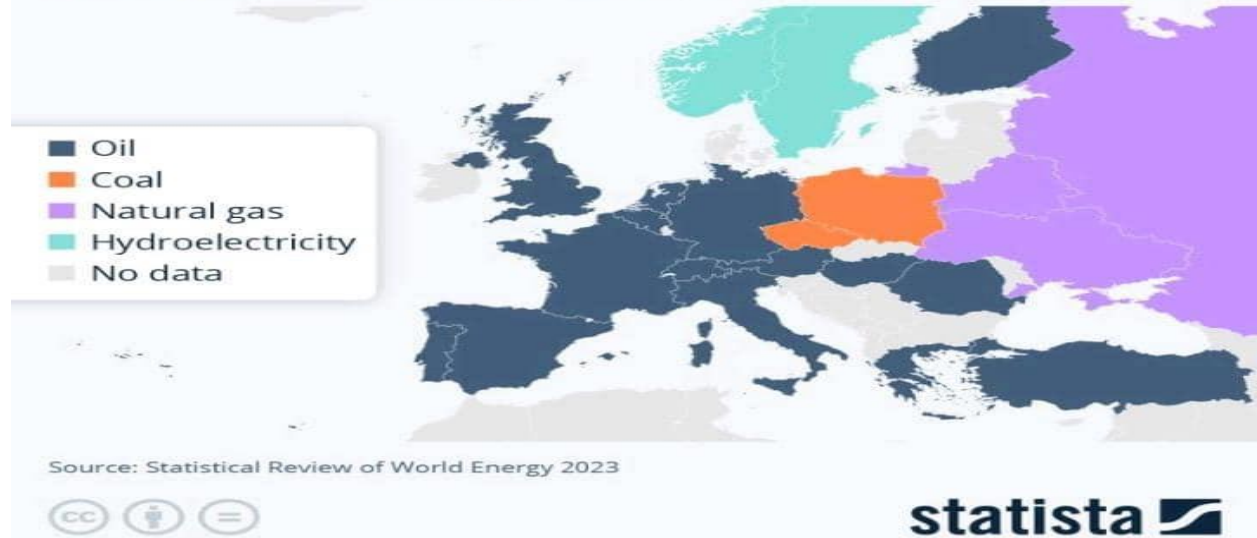
Practical Considerations for Encouraging Investments in Oil & Gas Exports from Africa to Europe as a Step Towards Energy Transition.

Electricity Lawyer is pleased to introduce its Legal, Regulatory and Policy Data Intelligence which involves an in-depth analysis of energy industry data from a legal, regulatory and policy angle to assist decision makers, investors, and stakeholders in understanding the implications of energy market developments and make well-informed decisions.

The data intelligence highlights considerations for encouraging investments in oil & gas exports from Africa to Europe as a step towards energy transition.

The Most Used Energy Sources in Europe

Most consumed energy source per country in Europe in 2022



SOURCE: Statista

The map shows the most used energy sources in Europe, which is predominantly oil and natural gas, which African countries have in surplus. African countries can leverage on this demand to generate profits for the continent to fully transit into cleaner energy, especially when African countries simultaneously utilize natural gas as a major energy source in the next few years. This also aligns with the European declaration of adopting natural gas as cleaner energy source.^{cdxliii}

African oil and gas producing countries stand to potentially benefit from Europe's search for new markets, however, this will require increased investment in the oil and gas sector.^{cdxliv}

However, for these Africa countries to be able to meet their domestic needs and export surplus gas products to Europe, many policy considerations and possible collaboration will need to be in place. For instance, Increased investment in natural gas infrastructure is necessary. Good governance and political stability are equally necessary for African countries to attract the significant investments required to improve their energy infrastructure. Without these key reforms and investments, African countries will be unable to capitalize on the opportunity presented by Europe's demand of natural gas.^{cdxlv} If African oil and gas producers can create an enabling environment, they will be able to reap a financial windfall from increased gas exports to Europe, which should result in more revenues to also transition to cleaner fuels, create local jobs, reduce poverty rates, and support other domestic development goals. Thus, potential partnerships between European and African nations towards energy transition must prioritize guaranteeing energy access through a combination of varied sources and methodologies accessible on the continent.^{cdxlvi}

First, African countries must be clear to pursue good governance and transparency in the use of the windfall reaped from gas export deals with Europe and decarbonization projects to promote sustainable development, and easily transit into cleaner fuels.^{cdxlvii}

Also, to avoid fossil fuel lock-in, European countries must collaborate with gas-exporting African countries and pursue policies such as a carbon takeback obligation - agreements placing the responsibility of safe CO2 storage on the producers and importers of fossil fuels while African countries develop the infrastructure needed to increase gas exports to Europe.^{cdxlviii} This is in recognition of the risk where African countries continue to invest in and develop fossil fuels, and European countries shift away from them.

In addition, the regular maintenance of oil and gas pipelines is essential for their smooth and functional operations. A lack of maintenance can result in social and environmental issues including the destruction of vegetation, harm to local wildlife, and increase water and air pollution levels in Africa.^{cdxlx} There should be an adoption of regulations and standards that mandate regular inspection and maintenance of oil and gas pipelines to ensure compliance with safety and environmental requirements. Failing to meet these regulatory obligations can result in penalties, fines, or legal liabilities for pipeline operators.

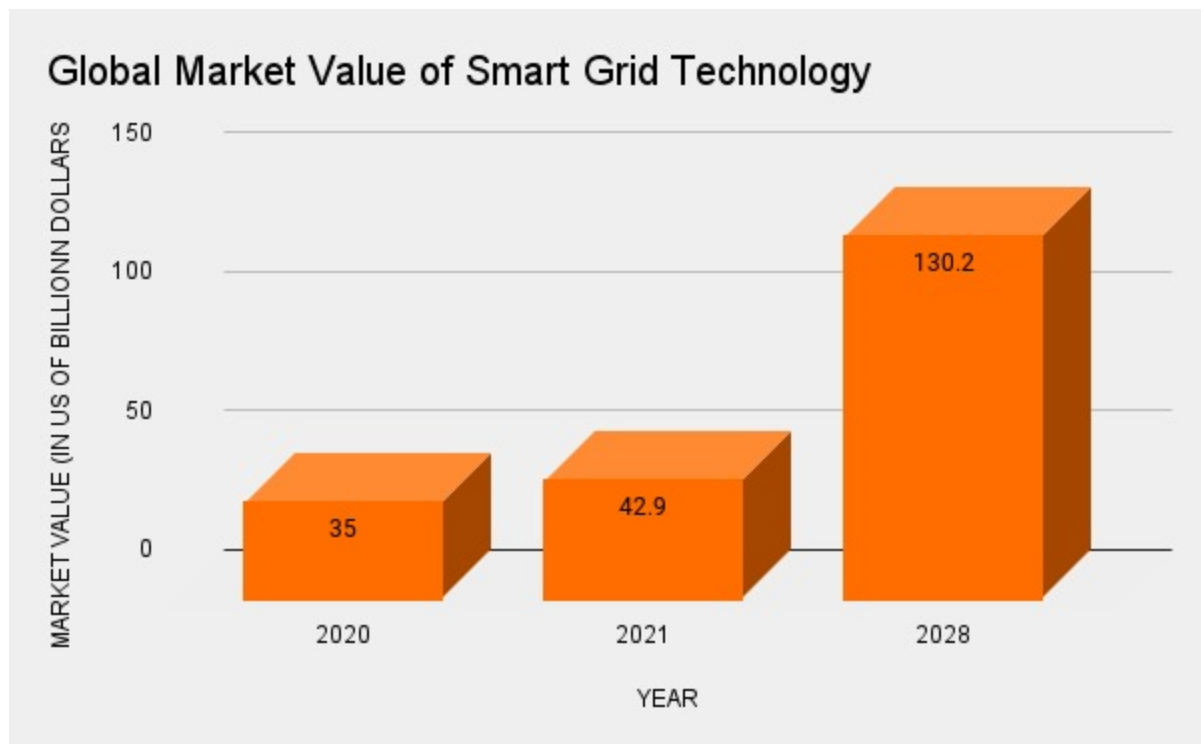
Finally, oil and gas pipeline infrastructure require significant investment and takes time to build, develop and operate. Algeria is currently struggling to meet the increased demand for gas from Europe, due to a longstanding lack of investment in its gas infrastructure.^{cdl} Thus, the continent must focus on having a stable regulatory environment, as well as investment incentives to mitigate risks and improve financial viability of projects.

EL: Legal, Regulatory & Policy Data Intelligence

Practical Considerations for Harnessing Smart Grid Technology in Africa

Electricity Lawyer is pleased to introduce its Legal, Regulatory and Policy Data Intelligence which involves an in-depth analysis of energy industry data from a legal, regulatory and policy angle to assist decision makers, investors, and stakeholders in understanding the implications of energy market developments and make well-informed decisions.

The data intelligence highlights considerations for harnessing smart grid technology in Africa.



SOURCE: Electricity Lawyer (Statistics from North East Evidence Hub)

The Sustainable Development Goal 7 cannot be achieved in Africa with the traditional technologies in use for the design of electricity networks. A radical needed approach will be needed such as the use of smart grids. Smart grid is a term used to embrace the application of modern electricity supply alternatives with ICT infrastructure to help achieve universal access to energy via modern and flexible electricity supply systems.^{cdli} The global smart grids market was estimated to be US\$ 35 billion in 2020, with expected growth for the period 2020-2023 being 21% owing to global demand.^{cdlii}

At a global level, it is widely acknowledged that United States and Europe, for example have made progress towards grid modernizing electricity networks in the last decade specifically to address 21st century industry challenges.^{cdliii} In Africa, existing electricity grids are ageing, outdated, and under huge capacity constraints. Africa is well positioned to learn from the developments in the rest of the world. The aim should be to have an economically evolved, technology enabled, electricity system that is intelligent, interactive, flexible and efficient and will enable Africa's energy use to be sustainable for future generations. While constraints such as a lack of good governance, limited investment capital, largely inadequate infrastructure and a gap in well-trained power sector personnel are stifling innovative infrastructure such as smart grids, it will be essential to prioritise specific smart solutions based on clearly defined functionalities that help reduce costs, promote economic growth and improve long-term sustainability.^{cdliv} These will include Advanced Metering Infrastructure (AMI), Demand Response (DR), Customer Side System (CSS), Advanced Distribution Automation (ADA), Transmission Enhancement Applications (TEA), Asset / Process Optimisation (AO), Distributed Energy Resources (DER), Information and Communication Integration (ICI), and Wide Area Monitoring and Control (WMC), among others.^{cdlv}

The distinct gap in the technical know-how of smart grid technology could impede the deployment of a smart grid. To support smart grid engineering, there has to be a significant restructuring and training of engineers and technicians in integrated skills of the developing and emerging technology area of the smart grid in Africa.^{cdlvi}

Also, cyber-attacks are global phenomena that impact nations, companies, organisations, security services, and infrastructures. They can damage hardware and software facilities that control the smart grid. Globally, an estimated US\$ 445 billion is spent annually in the war against cybercrimes, with many developing nations like Nigeria budgeting little to nothing to counter cybercrimes. Therefore, smart grid deployment in Africa must be accompanied by well-structured cybersecurity for a secure and resilient system.^{cdlvii}

Furthermore, poor regulatory policies and implementation in most African nations serve as a barrier to smart grid deployment since consistency and a well-driven strategy are essential for the sustainable execution of projects. Excellent and consistent regulatory policies will be helpful in the implementation of smart grids, such as agreements on the technical standards required, as well as the regulation for the effective use of systems for assessment of compliance to the agreed standards.^{cdlviii}

Finally, given the specific needs of Africa, it is obvious that a smart grid approach for the continent cannot simply be a copy of practices in industrialised countries — the starting point, challenges and opportunities are too different. Thus, low interruption areas such as smart metering, distributed generation, and ICT can start to implement smart technology while tending towards a gradual overhaul in avoiding a total breakdown of the power sector.^{cdlix}

In conclusion, smart grid integration may enable African countries to leapfrog elements of traditional power systems in terms of both technology and regulation. This could accelerate national and regional electrification timeframes, improve service delivery, minimize costs and reduce environmental impact.

ⁱ Clean Cooking in Nigeria. Available at https://energypedia.info/wiki/Clean_Cooking_in_Nigeria

ⁱⁱ Ibid

ⁱⁱⁱ Ibid

^{iv} EV Sales Collapses as subsidies & tax credits come to an abrupt end. Available at <https://www.rystadenergy.com/news/ev-sales-collapse-as-subsidies-and-tax-credits-come-to-an-abrupt-halt>

^v Ibid

^{vi} Africa's push for Electric Vehicles. Available at <https://www.howwemadeitinafrica.com/africas-push-for-electric-vehicles/150459/>

^{vii} Critical Raw Materials in Africa. Available at <https://storymaps.arcgis.com/stories/79b2db81b98a42e69ef2a9390b2aab42>

^{viii} Ibid

^{ix} Will Zimbabwe's ban on unprocessed lithium advantage China? Available at <https://african.business/2023/01/resources/will-zimbabwes-ban-on-unprocessed-lithium-exports-advantage-china/#:~:text=In%20a%20circular%20issued%20on,from%20Zimbabwe%20to%20another%20country.%E2%80%9D>

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