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The Energy Transition Journey in Ghana. How Ready is the Economic Regulator?

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KEY HIGHLIGHTS

- The National Energy Transition Framework has been developed to provide a roadmap for Ghana's transition pathways to ensure sustainable development.
- There may be insufficient financial and regulatory incentives to promote the investment in and adoption of renewable energy technologies (Sinha, A. et al., 2022).
- Access to financing remains a significant barrier to renewable energy investment in Ghana, particularly for small and medium-sized enterprises (SMEs) and rural communities.
- PURC as the economic regulator of the energy sector has taken some key steps towards facilitating the energy transition, however, much still remains to be done by the regulator and other national actors.

1.0 Introduction

Energy transition has emerged as a significant subject in energy governance research and practice. According to Smil (2010), there is no universally agreed definition for "Energy Transition". However, Verbong & Loorbach (2018) defined energy transition as an inexorable shift away from the commonly affordable, centralized, mostly fossil-based energy systems. In literature, two set of meanings have been assigned for the term. The first category describes energy transition as a structural shift in a country's energy system (Guan et al, 2018). Structural change here refers to a big change that is neither ad hoc nor temporary. This description captures the World Energy Council Deutschland's definition of energy transition as a 'long-term structural transformation in energy systems' (Hauff et al, 2014). The second category describes energy transition as a shift to greener energy (Gibbs & Oneill, 2015). This is demonstrated by IRENA's definition of the word as a 'route towards transformation of the global energy industry from fossil-based to zero-carbon by the second half of the century'[1].

The global energy industry is transitioning from fossil-based energy production and consumption systems such as oil, natural gas, and coal, towards renewable and cleaner energy sources such as wind and solar, as well as lithium-ion batteries. Recent assessments from climate scientists have emphasized the importance of the present energy transition from fossil fuels towards cleaner, low- to no-carbon sources of electricity for the global economy[2].

An energy transition is the movement from one dominating energy resource or group of resources to another. Historically, this included the substitution of paraffin for whale oil in the late nineteenth century and the shift from wood to coal during the Industrial Revolution. The current energy transition however, is characterized by a shift from fossil fuels, particularly coal, oil and gas, etc. to lower-carbon energy sources such as wind, solar, and natural gas (Carley & Konisky, 2020). Regulation and commitment to decarbonization globally have been inconsistent, but the energy transition will become increasingly important as investors prioritize environmental, social, and governance (ESG) considerations[3].

[1] IRENA (2020) Energy Transition. https://www.irena.org/energytransition
[2] IPCC Special Report on Global Warming of 1.5 °C (eds Masson-Delmotte, V. et al.) (WMO, 2018)
[3] https://www.spglobal.com/en/research-insights/articles/what-is-energy-transition

2.0 Goal of the Policy Brief

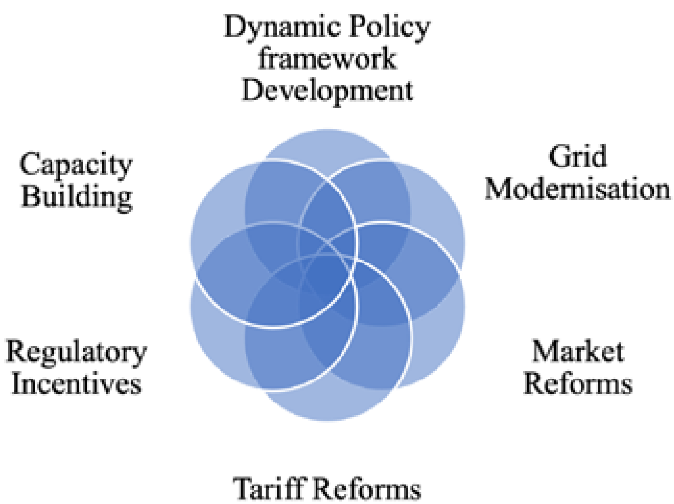
The purpose of this brief is to provide a quick overview of the power sector regulator's evolving role, necessitated by the evolution of the electricity sector. Numerous factors are driving this transformation, such as advances in technology, declining costs of renewable energy, global progress on energy efficiency, demand management, climate change concerns, ongoing pressure on sustainability, and increased access to energy services for the poor. Taking cognisance of these factors, this document attempts to list the many goals of regulators in the electricity industry, emphasising possibilities, difficulties, and interdependencies.

3.0 Scope and Methodology of Study

This study is a desktop analysis of relevant literature from policy documents, laws and regulations across the globe and in-country Ghana on the readiness of electricity regulators for energy transition. The study also reviews empirical literature on published journals and articles to support the various concepts being discussed in the study.

4.0 Evolving Objectives of Regulatory Institutions

The goal of electricity regulation is to accomplish social and policy goals while navigating a number of obstacles. The extremely challenging work of regulating the electricity sector is made more complex by emerging policy objectives, such as combating climate change. Utility business models are also expected to face challenges in several markets, as noted by Kind (2013) and Lehr (2013). Consequently, related concepts such as the business models of utilities and regulatory frameworks will also need to adapt. The idea of current aims and an extra layer of developing objectives can be used to understand evolving regulatory functions.



Source: PURC Construct

The establishment and execution of national legislative and regulatory frameworks to facilitate the pursuit of low-carbon growth in Africa's power sectors is a cross-cutting priority at every stage of the energy transition. This will require institutional monitoring and assistance from trained personnel. Thus, the main difficulty in contemporary power sector regulation is striking a balance between the already challenging work of balancing stakeholders' interests, with the emergent regulatory imperatives of an evolving sector. Notwithstanding this, many nations are implementing renewable energy policies which have significantly diversified their energy mix, and expanded the renewable energy sector with its attendant investment prospects.

5.0 Emerging Roles of Electricity Regulators

5.1 Dynamic Policy Framework Development

Regulators need to establish clear policies that support the transition to renewable energy sources and energy efficiency measures. Policy framework development for energy transition involves the creation of guidelines, regulations, and incentives to steer the energy sector towards sustainability and resilience. Globally, some of the popular and widely accepted policies being implemented by regulators in the face of energy transition include but not limited to the following:

Renewable Energy Targets: Setting specific and achievable targets for renewable energy adoption is a fundamental aspect of policy framework development (Lowitzsch et al, 2019). For instance, a government might establish a target to generate a certain percentage of electricity from renewable sources by a particular year. These targets provide a clear direction for the energy transition and signal the government's commitment to renewable energy deployment.

Feed-in Tariffs (FITs): Feed-in tariffs guarantee a fixed price for renewable energy generated and fed into the grid (Mendonça, M., 2012). This policy mechanism incentivizes investment in renewable energy projects by providing a stable revenue stream for project developers. FITs have been particularly effective in promoting the rapid expansion of renewable energy capacity in countries like Germany and Spain (Mabee et al, 2012). Over the past couple of years, feed-in premiums (FIPs) have been implemented as an alternative and/or development of pre-existing FIT systems in a number of EU member states (European Commission, 2023). Since power from renewable energy sources is usually sold on the electrical spot market, farmers can profit from FIPs in addition to the market price for the electricity they produce. FIP is not paid, therefore, if market prices exceed the level of the reference tariff. In this way, FIPs encourage RES operators to react to price signals in the electricity market, leading to a supply that is somewhat more responsive. Additionally, FIPs are more economically sound than FITs as government support programmes for expanding renewable energy projects. Contracts for difference (CfD) are also endorsed as an appropriate model to encourage further adoption of renewables in the most current EU Guidelines on State Aid for Climate, Environmental Protection and Energy (CEEAG) (European Commission, 2022i).

Net Metering: Net metering policies allow electricity prosumers with renewable energy systems, such as rooftop solar panels, to offset their electricity consumption with the electricity they generate and feed into the grid. Prosumers receive credits or payments for the electricity they provide. Net metering encourages distributed generation and empowers consumers to become prosumers, contributing to the energy transition (Shaw-Williams, D. and Susilawati, C., 2020).

Carbon Pricing: Carbon pricing mechanisms, such as carbon taxes or cap-and-trade systems, internalize the social cost of carbon emissions and provide economic incentives to reduce greenhouse gas emissions. By putting a price on carbon, these policies encourage the transition to low-carbon energy sources and incentivize investments in energy efficiency and clean technologies. An imposition of carbon price on the electricity sector, either through a cap, tax, fee or similar policy, increases the costs of fossil fuels used for generation in proportion to their carbon content (Best, Burke and Jotzo, 2020). For instance, if the generation mix was being held constant, pricing carbon would translate directly into an increase in the electricity price ($/MWh) equal to the carbon price ($/tCO2), and multiplied by the average carbon intensity of generation (tCO2/MWh). Thus, the high cost for fossil-based technologies creates strong incentives to substitute for other technologies including wind, solar, nuclear, etc.

Energy Efficiency Standards: Implementing energy efficiency standards and labelling programs for appliances, buildings, and industrial equipment can significantly reduce energy consumption and greenhouse gas emissions (Blazejczak, et al, 2014). These standards mandate minimum efficiency requirements for products sold in the market and help drive technological innovation towards more energy-efficient solutions.

Regulatory Sandboxing Guidelines: Regulatory sandboxes provide a controlled environment for testing innovative energy technologies, business models, and regulatory frameworks. By granting exemptions or waivers from certain regulatory requirements, sandboxes grant a time-limited trial waiver to those who sell, supply, generate or transmit electricity, allowing them to trial innovative technologies, approaches, business models, products and services without the fear of regulatory barriers, fostering innovation and accelerating the adoption of emerging technologies (Schneiders, 2021). Energy regulatory sandboxes are already being implemented in Ontario, the Netherlands, Singapore and the United Kingdom. This approach to addressing the stifling lag between technological innovation and regulatory alignment typically involves several common attributes including open communication and collaboration between multiple stakeholders.

Green Procurement Policies: Governments and public institutions can use their purchasing power to support the energy transition by implementing green procurement policies (Kilintzis, et al, 2023). These policies prioritize the procurement of goods and services with low environmental impacts, including energy-efficient appliances, renewable energy technologies, and sustainable building materials

5.2 Grid Modernization

Updating and modernizing the electricity grid is essential for accommodating the integration of renewable energy sources like solar and wind. Grid modernization efforts vary from country to country based on their unique energy landscapes, challenges, and priorities (Aguero et al, 2017). Examples of grid modernization initiatives in different countries may include investments in smart grid technologies, energy storage systems, and grid infrastructure upgrades to enhance flexibility and reliability. Below are some countries grid modernization initiatives:

United States of America

Smart Grid Investments: The U.S. Department of Energy has invested billions of dollars in smart grid projects aimed at modernizing the electricity grid. These projects involve the deployment of advanced metering infrastructure (AMI), distribution automation systems, and grid analytics to improve grid reliability, efficiency, and resilience[4].

Grid Edge Technologies: Utilities across the U.S. are deploying grid-edge technologies such as distributed energy resources (DERs), including rooftop solar, energy storage systems, and demand response programs. These technologies enable greater integration of renewable energy, enhance grid flexibility, and empower consumers to participate in the energy market (WEF, 2017).

Germany

Energiewende: Germany's transition to a low-carbon energy system, known as the Energiewende, includes significant investments in grid modernization. This involves integrating a growing share of renewable energy sources, such as wind and solar, into the grid while maintaining grid stability and reliability[5].

Virtual Power Plants: Germany is exploring the concept of virtual power plants (VPPs), which aggregate distributed energy resources (DERs) like solar PV systems, battery storage, and demand response to provide grid services and support grid stability. VPPs enable the efficient management of decentralized energy assets and facilitate the integration of renewables[6].

Japan

Microgrids: Japan is investing in microgrid technologies as part of its efforts to enhance grid resilience and mitigate the impact of natural disasters like earthquakes and typhoons[7]. Microgrids enable localized generation and distribution of electricity, allowing communities to maintain power during grid outages.

Smart Meter Deployment: Japan has been deploying smart meters as part of its efforts to modernize the electricity grid and promote energy efficiency. Smart meters provide consumers with real-time information on their energy usage, enabling them to make informed decisions about energy consumption and potentially reduce electricity costs (Ling, et al., 2012).

[4] https://energy.gov/sites/prod/files/2016/11/f34/Distribution%20Automation%20Summary%20Report_09-29-16.pdf

[5] https://www.sdg16.plus/policies/energiewende-germanys-planned-transition-to-a-low-carbon-nuclear-free-economy/

[6] https://www.energypartnership.cn/fileadmin/user_upload/china/media_elements/publications/Business_Models_of_Virtual_Power_Plants__VPPs__in_Germany-EN.pdf

[7] https://www.weforum.org/agenda/2022/11/cop27-how-japan-is-using-tech-mitigate-natural-disasters/

South Korea

Smart Grid Roadmap: South Korea has developed a comprehensive smart grid roadmap to guide its grid modernization efforts. The roadmap includes investments in advanced metering infrastructure (AMI), grid automation, energy storage, and demand response technologies to improve grid efficiency and reliability (Mah, 2012).

Renewable Energy Integration: South Korea is working to integrate a greater share of renewable energy, including solar and wind power, into its electricity grid. This involves upgrading grid infrastructure to accommodate variable renewable energy sources and implementing grid management strategies to maintain grid stability.

5.3. Market Reform

In the face of rising interest in clean energy sources, regulators ought to evaluate and update market structures to ensure they are conducive to the integration of renewable energy and the participation of diverse energy stakeholders, including consumers, generators, and grid operators. Market reforms are essential for facilitating the transition to a more sustainable and efficient energy system by creating market structures that incentivise investment in renewable energy, promote competition, and enable the integration of clean energy technologies (Grubb et al, 2018). Here are some examples of market reforms for energy transition.

Capacity Markets: Capacity markets provide payments to generators for maintaining sufficient capacity to meet electricity demand during peak periods (Petitet et al, 2016). These markets complement energy markets by ensuring grid reliability and incentivising investments in flexible resources such as energy storage, demand response, and peaking power plants. Capacity markets can facilitate the integration of renewable energy by providing revenue streams for backup capacity needed to address intermittency.

Wholesale Electricity Market Design: Reforming wholesale electricity markets to accommodate renewable energy integration and promote competition is critical for the energy transition. Market designs such as day-ahead and real-time energy markets, as well as ancillary services markets, enable efficient dispatch of generation resources, including renewable energy sources, while ensuring grid stability and reliability (Milligan et al, 2016).

Market Access for Renewable Energy: Ensuring fair and non-discriminatory market access for renewable energy generators is essential for promoting competition and encouraging investment in clean energy technologies (Nicolli and Vona, 2019). Market reforms may include establishing transparent rules for grid access, simplifying interconnection procedures, and providing renewable energy generators with fair access to transmission and distribution networks.

Demand Response Programs: Introducing demand response programs in electricity markets allows consumers to adjust their electricity consumption in response to price signals or grid conditions. By incentivizing consumers to reduce or shift their electricity usage during periods of high demand or supply constraints, demand response programs can help balance supply and demand, reduce peak load, and support the integration of renewable energy resources (Vahid-Ghavidel et al, 2020).

Energy Market Flexibility: Enhancing market flexibility through market design reforms can facilitate the integration of variable renewable energy sources such as solar and wind power. Market reforms may include introducing flexible market products, relaxing bidding and scheduling rules, and implementing market mechanisms that reward flexibility and responsiveness.

Prosumer Participation: Encouraging prosumer participation in electricity markets allows consumers with distributed energy resources (DERs) such as rooftop solar panels, energy storage systems, and electric vehicles to actively participate in energy markets as producers, consumers, or both. Market reforms may include introducing net metering programs, feed-in tariffs, or peer-to-peer energy trading platforms that enable prosumers to monetize their surplus energy and contribute to grid stability (Kühnbach, M., Bekk, A. and Weidlich, A., 2022).

Market Transparency and Information Sharing: Improving market transparency and information sharing among market participants, regulators, and system operators can enhance market efficiency, reduce market power, and facilitate the integration of renewable energy. Market reforms may include implementing transparent price discovery mechanisms, enhancing data exchange protocols, and fostering collaboration among stakeholders to improve market oversight and decision-making.

5.4. Tariff Reform

Revising electricity tariff structures can help incentivise efficient energy use and encourage investment in renewable energy technologies. Tariff reforms are crucial for facilitating the transition to a more sustainable and efficient energy system by aligning economic incentives with environmental and energy policy objectives, encouraging investment in renewable energy and energy efficiency, and promoting more efficient use of electricity resources (Grubb et al, 2014).

Time-of-Use (TOU) Pricing: TOU pricing involves charging different electricity rates based on the time of day, typically with higher rates during peak demand periods and lower rates during off-peak hours (Siepermann, et al, 2021). This encourages consumers to shift their electricity usage away from peak times, reducing strain on the grid and incentivizing energy conservation. TOU pricing can also reflect the actual cost of electricity generation, including the varying costs associated with renewable energy generation.

Demand Charges: Demand charges are fees based on the highest level of electricity usage during a specified period, typically measured in kilowatts (kW). By imposing charges based on peak demand, utilities can encourage customers to manage their electricity usage more efficiently and reduce overall demand on the grid. Demand charges can also provide price signals that incentivize investment in energy efficiency measures and distributed generation technologies (Chantzis et al, 2023).

Grid Access Charges: Grid access charges reflect the costs associated with maintaining and operating the electricity grid and are typically based on a customer's level of grid connection and usage. These charges can be structured to recover the fixed costs of grid infrastructure while providing incentives for customers to reduce their grid reliance through energy efficiency measures, onsite generation, or demand response programs (Hanny et al, 2022).

5.5. Regulatory Incentives

Regulators, in the era of energy transition, are expected to develop frameworks that provide incentives for utilities and energy companies to invest in renewable energy infrastructure and adopt energy-efficient practices. This may include offering performance-based incentives tied to achieving renewable energy targets or implementing energy efficiency programs (Pato et al, 2019). Some of the nascent incentives used by key regulators include;

Renewable Energy Targets: Regulatory agencies can establish renewable energy targets or renewable portfolio standards (RPS) that require utilities to procure a certain percentage of their electricity from renewable sources. Meeting these targets may be incentivized through regulatory mechanisms such as renewable energy credits (RECs) or compliance payments.

Performance-Based Regulation (PBR): PBR frameworks incentivise utilities to achieve specific performance targets related to renewable energy adoption, energy efficiency, grid reliability, or customer service. Utilities that exceed performance targets may be eligible for financial rewards or other incentives, while those that fall short may face penalties or reduced returns on investment (Pato et al, 2019).

Decoupling Mechanisms: Decoupling mechanisms separate utility revenues from electricity sales volume, allowing utilities to recover fixed costs associated with grid infrastructure investments regardless of electricity consumption levels. Decoupling removes the financial disincentive for utilities to promote energy efficiency measures and encourages investments in grid modernization and demand-side management programs.

Performance-Based Rate Making (PBRM): PBRM frameworks link utility revenues to performance metrics such as energy efficiency savings, renewable energy deployment, or grid reliability improvements (Arbelaez et al, 2011). Utilities that achieve or exceed performance targets may be eligible for financial rewards or rate adjustments, while those that underperform may face penalties or reduced revenue opportunities.

Regulatory Asset Base (RAB) Financing: RAB financing allows utilities to recover the costs of approved infrastructure investments through regulated rates of return over the asset's useful life. This incentivizes utilities to make long-term investments in renewable energy projects, grid modernization initiatives, and other capital-intensive projects that support the energy transition (Jamasb et al., 2020).

Grid Modernization Incentives: Regulators can provide incentives or cost recovery mechanisms for investments in grid modernization technologies such as advanced metering infrastructure (AMI), distribution automation systems, energy storage, and smart grid solutions. These incentives encourage utilities to deploy innovative grid technologies that enhance grid reliability, flexibility, and integration of renewable energy resources.

5.6. Capacity Building

There is the need for regulators to build their capacities to oversee and regulate the evolving energy landscape. This may involve training staff on emerging technologies, regulatory best practices, and the latest developments in energy policy and market design. The regulatory climate keeps evolving and for regulators to keep pace with this changing landscape, their capacity ought to be upgraded.

6.0. Major Steps Undertaken at Country Level (Ghana)

Ghana has demonstrated commitment to the exploitation of its renewable energy resources through the enactment of the Renewable Energy Act, 2011 (Act 832), which was amended in 2020 with the Renewable Energy (Amendment) Act, 2020 (Act 1045). A procurement plan is established under the amended Act to provide energy produced from renewable sources at a competitive market rate. The Renewable Energy Master Plan provides incentives from the Ghanaian Government in the form of significant tax savings. The plan, recommends getting rid of import duties and Value Added Tax (VAT) on materials, machinery, and other items utilized in the creation or assembly of renewable energy sources. Ghana has been implementing various policies and regulations to promote the transition to a more sustainable and diversified energy sector. Specifically, Ghana has implemented the following policies and regulations to help in the expansion of renewable energy sources;

Renewable Energy Act (Act 832) of 2011, Amended in 2020 (Act 1045): Enacted in 2011, this legislation provides the legal framework for the promotion, development, and management of renewable energy resources in Ghana. The act establishes the Renewable Energy Authority, which is responsible for overseeing the implementation of renewable energy projects and sets targets for renewable energy deployment in the country.

National Energy Policy (NEP) (2010): Ghana's National Energy Policy aims to ensure a sustainable, reliable, and affordable energy supply to support economic development while minimizing environmental impacts. The policy emphasizes diversification of the energy mix, promotion of renewable energy sources, and energy efficiency measures to enhance energy security and sustainability.

Feed-in Tariff (FiT)/Net metering Program: Ghana has implemented a feed-in tariff program to incentivize investment in renewable energy projects, particularly solar photovoltaic (PV) and wind power. The program guarantees fixed prices for electricity generated from renewable sources and fed into the grid, providing investors with financial certainty and promoting renewable energy development.

Renewable Energy Master Plan (REMP) (2019): The Renewable Energy Master Plan provides a roadmap for the sustainable development of renewable energy resources in Ghana. The plan outlines strategies and targets for increasing the share of renewable energy in the country's energy mix, including specific plans for solar, wind, hydro, and biomass energy development.

Energy Efficiency Regulations: Ghana has introduced the Energy Efficiency Standards and Labelling (Public lighting) Regulations, 2022 (LI 2453) regulations aimed at reducing energy consumption and promoting energy-efficient technologies and practices. These regulations cover various sectors, including buildings, appliances, transportation, and industry, and include standards for energy-efficient lighting, appliances, and building design.

Off-grid Renewable Energy Programs: Ghana has launched off-grid renewable energy programs to increase access to electricity in rural and remote areas where grid extension is not feasible. These programs promote the deployment of decentralized renewable energy solutions such as solar home systems, mini-grids, and solar lanterns to improve energy access and livelihoods in off-grid communities.

Renewable Energy Investment Tax Incentives: The Government of Ghana offers tax incentives and other financial incentives to attract investment in renewable energy projects. These incentives may include tax holidays, import duty exemptions for renewable energy equipment, and accelerated depreciation allowances to reduce the cost of renewable energy investments.

Public-Private Partnerships (PPPs): Ghana has encouraged public-private partnerships to leverage private sector expertise and investment in renewable energy development. PPPs facilitate collaboration between government agencies, private companies, and development partners to finance, develop, and operate renewable energy projects, driving innovation and scaling up renewable energy deployment.

National Energy Transition Framework (2022 – 2070): The Ministry of Energy in collaboration with other sector Ministries – Transport, Environment, Science and Innovation, Finance, Lands and Forestry, Water and Sanitation; has developed this Framework to provide a roadmap on Ghana's transition pathways to ensure sustainable development. The Framework lays out a pathway for decarbonizing the energy sector and reaching net zero emissions by 2070 while ensuring socioeconomic growth and the use of Ghana's natural resources.

These policies, regulations and frameworks demonstrate Ghana's commitment to promoting renewable energy, improving energy efficiency, and achieving a more sustainable and resilient energy sector. Through continued implementation and enforcement, Ghana aims to accelerate the energy transition and achieve its energy access and climate goals.

7.0. Regulatory and Policy Gaps Identified in Ghana's Energy Transition Journey

While significant efforts have been made to promote the energy transition in the country, there are still several key gaps in policies and regulations that need to be addressed to accelerate progress towards a more sustainable and resilient energy sector. Gaps in the policy framework for energy transition in Ghana can be shaped by a variety of factors including political, social, and economic considerations. While the specifics of this brief targets the regulatory functions, the energy policy gaps as detailed in this section go beyond the jurisdiction of the regulatory institutions:

Inadequate Incentives for Renewable Energy: There may be insufficient financial and regulatory incentives to promote the investment in and adoption of renewable energy technologies (Sinha, A. et al., 2022).

Social and Economic Barriers: Inequitable socio-economic conditions can prevent a fair distribution of the benefits of renewable energy and can lead to social imbalance (Sinha, A. et al., 2022).

Technical and Infrastructural Challenges: The transition to renewable energy can be slowed by outdated infrastructure and the need for significant investments in new technologies and grid updates (Akom, et al, 2016).

Financial Constraints: Emerging economies like Ghana may face financial limitations which may impede the necessary investments needed in renewable energy infrastructure (Obeng-Darko, 2019).

Fragmented Institutional Framework: Ghana's energy sector is characterized by fragmentation and overlapping mandates among different government agencies, leading to coordination challenges and inefficiencies. Strengthening institutional coordination and collaboration, as well as establishing clear roles and responsibilities, can improve policy coherence and facilitate the effective implementation of energy transition initiatives.

Limited Access to Financing for Renewable Energy Projects: Access to financing remains a significant barrier to renewable energy investment in Ghana, particularly for small and medium-sized enterprises (SMEs) and rural communities. Developing innovative financing mechanisms, such as green bonds, venture capital funds, and microfinance schemes, can unlock investment opportunities and expand access to renewable energy technologies.

8.0. Conclusion and Recommendation

The brief highlights some of the major policies which are facilitating the smooth and sustainable transition of energy. In order to achieve the desired transition from heavily relying on fossil fuels, countries are adopting a number of policies and regulations such as market reforms, grid modernization, etc, which are fast promoting the adoption of more sustainable energies in their economies.

There is an overwhelming call to action in contemporary conversations surrounding the much-needed growth of clean energy sources, such that regulatory institutions and governments must give up or use their position and power to clear all impediments and stimulate critical sectors development for clean energy solutions in order to achieve success. It is becoming more and more clear that economic regulators in particular, ought to consciously depart from conventional environmental paradigms and embrace the unrivalled effect of innovation to propel advancement as well as the dynamism such as market reforms, tariff policies, regulatory incentives, etc.

From the six thematic emerging roles of regulatory institutions highlighted, it is obvious that, there are a lot of programs or interventions that energy sector regulators in Ghana are expected to undertake to be sync with global the movement towards the promotion of renewable energy and the energy transition journey. As noted in the brief, some of these interventions have been implemented already, however, the global whirlwind of energy transition will require more robust and tough decisions, such as more private sector participation, grid modernization incentives, and performance-based regulation.

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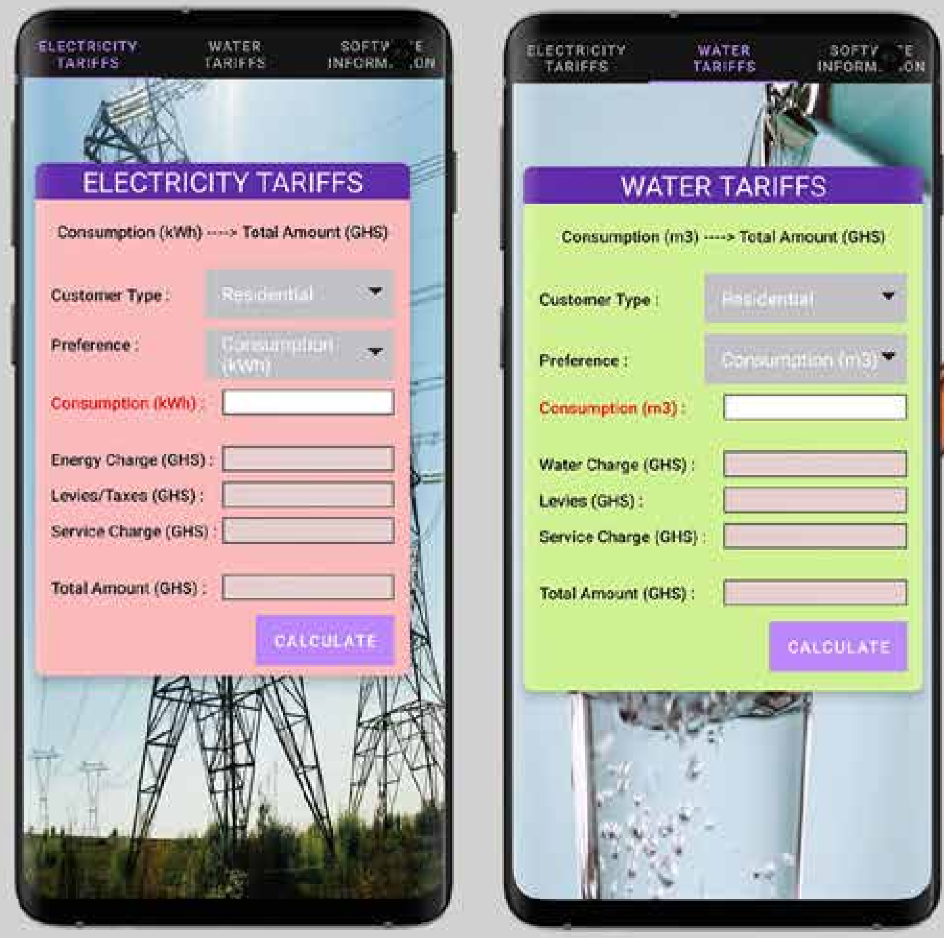

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