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Evaluation of Sustainable Business Model Innovation in Increasing the Penetration of Renewable Energy in the Ghana Power Sector

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Abstract : Ghana's primary energy supply is heavily reliant on petroleum, biomass, and hydropower. Currently, Ghana gets its energy from hydropower (Akosombo and Bui), thermal power plants powered by crude oil, natural gas, and diesel, solar power, and imports from La Cote d'Ivoire. Until the early 2000s, large hydroelectric dams dominated Ghana's electricity generation. Due to unreliable weather patterns, Ghana increased its reliance on thermal power. However, thermal power contributes the highest percentage in terms of electricity generation in Ghana and is predominantly supplied by Independent Power Producers (IPPs). Ghana's electricity industry operates the corporate utility model as its business model. This model is typically' vertically integrated,' with a single corporation selling the majority of power generated by its generation assets to its retail business, which then sells the electricity to retail market consumers. The corporate utility model has a straightforward value proposition that is based on increasing the number of energy units sold. The unit volume business model drives the entire energy value chain to increase throughput, locking system users into unsustainable practices. This report uses the qualitative research approach to explore the electricity industry in Ghana. There is a need for increasing renewable energy, such as wind and solar, in electricity generation. The research recommends two critical business models for the penetration of renewable energy in Ghana's power sector. The first model is the peer-to-peer electricity trading model, which relies on a software platform to connect consumers and generators in order for them to trade energy directly with one another. The second model is about encouraging local energy generation, incentivizing optimal time-of-use behaviour, and allowing any financial gains to be shared among the community members.

Keywords : business model innovation, electricity generation, renewable energy, solar energy, sustainability, wind energy
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