

EVALUATING GHANA'S NEARLY-ZERO ENERGY BUILDING PROJECT AND THE REGIONAL SIGNIFICANCE FOR AFRICA





Introduction

Ghana's commissioning of West Africa's first Nearly-Zero Energy Building (NZEB) represents a groundbreaking milestone in the continent's pursuit of sustainable development and energy efficiency. The project, located at the Energy Commission's headquarters in Accra, embodies Ghana's broader vision of aligning national development with global climate goals. More than just a building, the NZEB is a tangible demonstration of how Africa can adopt green design principles, renewable energy technologies, and local materials to cut down on energy use and emissions; while promoting domestic industry.

The facility was developed through collaboration with the German Government and the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), with an investment of about €1 million. Its inauguration signals a practical shift from policy ambitions to implementation, highlighting Ghana's leadership role in driving Africa's transition to low-carbon infrastructure.

Ghana's Net-Zero Building



The Nearly-Zero Energy Building is both a technical and architectural landmark. Designed by S. Tetteh + Associates and constructed by Berock Construction Ltd, the 920-square-metre structure is purposely built to minimize energy consumption, while maximizing efficiency. It houses two conference halls, a meeting room, washrooms, staff kitchenettes, a central courtyard, and a rooftop terrace functions that make it both practical and symbolic as a national energy hub.

Central to its energy performance is a 50 kW-peak solar photovoltaic system that supplies roughly 88% of the building's annual energy demand, estimated at 63 MWh. With net metering expected to come online, the facility is designed to not only meet its own needs, but also contribute excess electricity to Ghana's national grid, enhancing its sustainability profile.

The architectural approach integrates passive design strategies and local materials to ensure climate responsiveness. Earth bricks, denya hardwood, double-glazed low-emissivity glass, and cavity walls enhance thermal comfort, reduce dependence on imported materials, and cut costs. The cooling system is equally advanced, employing R290 refrigerant with zero greenhouse gas emissions, alongside an automated energy management system that monitors usage for optimal efficiency.

Beyond energy and materials, lifecycle assessments project that the

building will reduce environmental impact by about 50% compared to conventional facilities over its 50-year lifespan. This underscores its role not only as a functional office space, but also as a proof-of-concept for replicable sustainable construction across the region.

The building also serves a strategic educational role through its ÒEnergy Academy,Ó an in-house training and engagement center. This initiative is designed to build capacity for energy professionals, fostering knowledge-sharing and advancing the next generation of expertise in renewable energy and sustainable building practices across Ghana and the wider region.



Regional Significance for Africa

1. **Benchmark for Sustainable Public Infrastructure:**

The NZEB establishes a reference point for governments and institutions across Africa to pursue green buildings that are energy efficient, environmentally conscious, and cost-effective over the long term.

2. **Scaling Renewable Energy Integration:**

By successfully integrating solar PV and efficiency measures into a functioning government facility, Ghana provides a practical model for wider adoption in other African countries with abundant solar potential.

3. **Boosting Local Industry and Skills:**

The use of local materials and expertise strengthens domestic construction industries and builds technical capacity, setting the stage for job creation and knowledge transfer in sustainable building practices.

4. **Catalyst for Policy and Regulatory Frameworks:**

The NZEB demonstrates the importance of strong building codes, energy efficiency standards, and net metering policies, encouraging other African nations to create or reinforce similar frameworks.

5. **Cultural and Design Inspiration:**

By blending modern sustainability principles with indigenous materials and craftsmanship, the project showcases how African countries can create green infrastructure that reflects both environmental responsibility and cultural identity.

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