AI - Energy Sustainability: A Renewables-First Imperative

By Dr Abdul-razak Saeed, Team Lead, Env't & Climate – UNDP Ghana

January 26, 2026

As the world works to limit global temperature rise to 1.5°C, climate science continues to deliver sobering evidence of how fast the planet is warming. The past 11 years have been the warmest on record globally, with 2024 confirmed as the hottest year and 2025 ranking as the third warmest. **In Ghana**, these trends are not just statistics; they are felt in the shifting rainfall patterns affecting our farmers in the north and the rising sea levels threatening our coastal communities. Clearly, there is a narrowing window for meaningful climate action and the need to align all sectors with low-carbon pathways.

Yet, amid this reality, there is encouraging progress worth highlighting as we mark the **International Day of Clean Energy on 26 January**. Since 2024, global investment in renewable energy has overtaken fossil fuel investment, and in 2025, clean energy technologies attracted roughly twice the capital invested in fossil fuels. This shift signals momentum toward a more just, inclusive, and sustainable energy future—one that is essential not only for climate stability, but for the technologies shaping our economies.

One such defining technology is **digital innovation and artificial intelligence (AI)**. Ghana has positioned itself as a continental leader in this space, hosting Africa's first **Google AI Research Lab in Accra**. AI is now embedded across agriculture, healthcare, governance, climate action, and energy systems. It enables rapid data analysis, strengthens forecasting and planning, and helps interpret complex policies and datasets in seconds.

However, the environmental footprint of AI is often hidden from view. Running AI systems requires extensive data infrastructure, high-performance computing, and a constant electricity supply. Advanced generative AI models typically consume far more energy than traditional digital services, while data centres demand large volumes of electricity and water for

cooling. As AI tools become increasingly accessible to Ghanaians through smartphones and everyday applications, usage scales rapidly. Each interaction carries incremental environmental costs that accumulate quietly in the background.

Recognizing this reality, it becomes important to consider how AI can grow in ways that are consistent with climate goals. The International Day of Clean Energy offers a timely opportunity to reflect on actions that can reduce AI's environmental impact while preserving its benefits.

Educating the Public on Responsible Digital Choices

Digital consumption, like physical consumption, has environmental consequences. Every AI-powered search, prompt, or generated response relies on electricity, water, and physical infrastructure. Raising awareness of these hidden inputs can encourage more intentional and responsible use of digital tools. A culture of mindful engagement, where AI is used efficiently rather than excessively, can help temper unnecessary energy demand without slowing innovation.

Aligning AI Infrastructure with Energy Transition

AI's long-term sustainability depends heavily on how it is powered. Because AI systems operate continuously and at high energy intensity, they cannot scale sustainably on fossil-fuel-based grids without worsening emissions and climate risks. For Ghana, aligning AI infrastructure with our national energy transition is foundational. With the government's **2026 target to reach 10% renewable energy in** the national mix, there is a clear pathway to ensure our "Silicon Accra" dreams don't come at the cost of our environment.

Beyond energy supply, the design of AI technologies themselves matters. AI developers and companies must increasingly prioritize **energy-efficient systems**, including optimized models and hardware that deliver more output with less power, significantly reducing the environmental footprint of AI operations. While renewables alone cannot yet provide constant power at scale, hybrid systems can ensure the reliability needed for a **24-hour digital economy** without locking us into high-emission pathways.

At the system level, renewable energy must form the backbone of AI's power supply. Solar, wind, hydro, and geothermal energy—supported by energy storage, grid upgrades, and flexible demand management—can meet much of AI's future energy demand. Hybrid systems could support storage, and complementary low-carbon sources can ensure reliability.

Financing and Building Energy-Smart, Renewables-Powered AI Systems

With renewable energy investments now surpassing fossil fuels, there is a growing opportunity to anchor AI growth in cleaner electricity systems. However, renewable energy use must expand faster and more equitably to keep pace with AI's rising energy needs, particularly in regions that remain underserved by clean energy finance.

Africa illustrates this imbalance clearly. Despite being home to **20 percent of the global population, it receives only about 2 percent of global clean energy investment**. Without addressing this gap, AI risks deepening inequalities in both energy access and technological opportunity. In response, **UNDP Ghana** is working with the government and stakeholders to finalize its update of the **Renewable Energy Masterplan (REMP)** and develop an **Energy Efficiency Revolving Fund (EERF)** to channel more investment into green infrastructure in the tourism sector.

Innovative funding models can also support sustainability. Approaches similar to the Ecosia search engine—where digital use contributes directly to environmental action—could channel a share of AI usage toward renewable energy deployment, ecosystem restoration, or climate resilience initiatives. Such models build climate responsibility directly into digital ecosystems.

AI holds immense promise to advance Ghana's development, productivity, and climate action. Yet without deliberate attention to how it is powered, AI could inadvertently intensify the climate crisis it is often deployed to address. The challenge ahead is not to slow AI's progress, but to power it differently.

A renewables-first approach to AI, grounded in clean energy, efficiency, and equitable investment, offers a path forward – change to - A renewables-first approach to AI, grounded in energy efficiency, and equitable investment, offers a path forward.

The challenge ahead is not to slow AI's progress, but to power it differently, by aligning digital innovation with clean, renewable energy pathways.