**SDG 7: AFFORDABLE AND CLEAN ENERGY**

*"Energy access in rural sub-Saharan Africa: Predicting solar energy generation using weather data to support microgrid planning."*

**Problem Statement**

Access to affordable and reliable electricity is still a major challenge across many African countries, particularly in rural areas. In nations like **Ghana and Kenya**, millions of people live without access to grid power, relying on expensive, polluting alternatives like diesel generators or kerosene lamps. While solar energy presents a clean and abundant alternative, effective planning and deployment are often hindered by the unpredictability of solar power output due to weather variability.

This project aims to support **microgrid planning and solar infrastructure development** by using weather and solar irradiance data to predict solar energy generation in **Ghana and Kenya**. By building data-driven predictive models, we can help governments, NGOs, and energy providers better estimate solar performance, optimize energy storage, and improve energy reliability for off-grid communities in sub-Saharan Africa.

**Justification**

**SDG 7 – Affordable and Clean Energy** is critical to sustainable development and directly affects education, healthcare, and economic growth. In Africa, over **600 million people lack electricity access**, with Ghana and Kenya among the countries actively investing in renewable energy to bridge this gap. Supporting solar microgrid deployment with predictive modeling not only aids these two nations but creates a scalable solution for the broader region.

The project leverages data science to tackle a real-world energy problem, offering practical solutions that contribute to both local development and global sustainability goals.

### Weather Data (2024-2025)

* **Description**: This dataset contains information on weather records for Nairobi city between May 2024 to date.
* **Relevance**: Provides insights into weather trends in Nairobi, which can help contextualize Ghana and Kenya's weather patterns and identify successful strategies from other regions.

Link to dataset: <https://www.kaggle.com/datasets/johnkiriba/nairobi-weather-data>