**SDG 7: Affordable and Clean Energy**

**Problem Definition Document**

**Introduction**

Sustainable Development Goal 7 (SDG 7) focuses on ensuring access to affordable, reliable, sustainable, and modern energy for all. Energy is a cornerstone of human development and economic progress, influencing various aspects of life such as health, education, and industry. Despite its importance, access to clean and affordable energy remains a significant challenge in many regions, particularly in developing countries. This problem definition document outlines the specific challenges related to energy access and sustainability within the context of SDG 7 and proposes a data-driven approach to monitor and enhance energy consumption and availability across different regions.

**The Energy Access Challenge**

Energy access is unevenly distributed across the globe, with millions of people still lacking basic access to electricity. In many parts of Africa, particularly in East Africa, South Africa, and Nigeria, the situation is dire. These regions experience frequent energy shortages, high energy costs, and reliance on non-renewable energy sources that contribute to environmental degradation and climate change. The lack of access to clean and affordable energy not only hampers economic growth but also exacerbates poverty, limits access to education and healthcare, and hinders overall quality of life.

The problem is further compounded by the lack of accurate data on energy consumption and availability. Without proper data, it is challenging for governments, energy providers, and policymakers to make informed decisions about energy distribution, infrastructure investments, and policy reforms. This gap in data also makes it difficult to track progress towards achieving SDG 7 and to identify areas that require urgent intervention.

**Problem Statement**

The core problem addressed in this document is the lack of a comprehensive, data-driven approach to monitor and enhance energy access and sustainability in African countries, South Africa, and Nigeria. Specifically, the problem revolves around:

Insufficient Data on Energy Consumption and Production: Many regions lack accurate and timely data on energy consumption and production, making it difficult to assess energy needs, optimize energy distribution, and implement energy efficiency measures.

Energy Access Disparities: There are significant disparities in energy access between urban and rural areas, as well as between different socio-economic groups. These disparities contribute to inequality and limit opportunities for social and economic development.

Reliance on Non-Renewable Energy Sources: Despite the potential for renewable energy in many regions, there is still a heavy reliance on non-renewable energy sources such as fossil fuels. This reliance not only contributes to greenhouse gas emissions but also exposes regions to energy price volatility and supply disruptions.

Lack of Monitoring and Evaluation Tools: There is a lack of tools and systems to monitor energy consumption and production in real-time, making it difficult to identify inefficiencies, detect energy losses, and track progress towards energy sustainability goals.

**Proposed Solution**

To address the aforementioned challenges, this project proposes the design and implementation of a database system to track energy usage and availability across different regions in East Africa, South Africa, and Nigeria. The database will serve as the foundation for data analysis and visualization, enabling stakeholders to gain insights into energy consumption patterns, identify disparities in energy access, and develop targeted interventions to enhance energy sustainability.

**Key Components of the Solution:**

Database Design: A relational database will be designed to store data on energy consumption, production, and availability. The database will include tables for energy sources, regions, consumption records, and production records. The data will be sourced from government agencies, energy providers, and other relevant stakeholders.

Data Analysis: SQL queries will be used to retrieve and analyze data from the database. The analysis will focus on identifying trends in energy consumption, comparing energy access across different regions, and assessing the contribution of renewable energy sources to the overall energy mix.

Data Visualization: Microsoft Excel will be used to create interactive dashboards that visualize key insights from the data analysis. The dashboards will include charts, graphs, and maps that highlight energy access disparities, track progress towards energy sustainability goals, and provide actionable insights for decision-makers.

Monitoring and Evaluation: The database system will include features for monitoring and evaluating energy consumption and production in real-time. This will enable stakeholders to detect inefficiencies, optimize energy distribution, and implement energy-saving measures.  
  
**Pitch Deck presentation**  
<https://gamma.app/docs/Empowering-Sustainable-Energy-Access-in-Africa-A-Data-Driven-Appr-atl92hlfb3lo7k2?mode=doc>

**Conclusion**

Achieving SDG 7 requires a concerted effort to ensure that everyone has access to affordable, reliable, and sustainable energy. By leveraging data and technology, this project aims to address the challenges of energy access and sustainability in East Africa, South Africa, and Nigeria. The proposed database system will provide the tools needed to monitor energy consumption, identify disparities, and drive progress towards a more equitable and sustainable energy future. Through this data-driven approach, we can empower communities, reduce inequalities, and contribute to the global effort to achieve SDG 7 by 2030.

**Reference**  
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