**SDG Problem Definition Document**

**Sustainable Development Goal (SDG):Affordable and Clean Energy**

**Problem Definition:**

**Energy Consumption vs. Sustainability**

Energy consumption is a crucial factor in economic growth and development. However, excessive reliance on non-renewable energy sources such as coal and gas contributes to high carbon emissions, environmental degradation, and increased costs.

**Key Challenges:**

* **High Carbon Emissions:** Industries and households heavily depend on fossil fuels, increasing CO2 emissions.
* **Inefficient Energy Usage:** Many consumers do not monitor or optimize their energy consumption.
* **Lack of Awareness:** People are unaware of how energy-saving practices can lead to cost savings and environmental benefits.
* **Limited Data-Driven Decision Making:** Without data insights, businesses and households struggle to adopt sustainable energy solutions.

**Proposed Solution:**

A **data-driven approach** to monitoring and analyzing energy consumption patterns, identifying peak usage periods, promoting renewable energy sources, and suggesting sustainability strategies.

**How Data Helps Solve the Problem:**

* **Energy Consumption Monitoring:** Track energy usage by consumers across sectors (residential, commercial, industrial).
* **Trend Analysis:** Identify seasonal and peak-hour energy consumption trends.
* **Impact Assessment:** Measure energy savings and CO2 reductions from sustainable practices.
* **Decision Support:** Provide data-driven recommendations for cost-effective, sustainable energy usage.

**Database Design Overview:**

A relational database will be developed to store and analyze energy usage data. Key tables include:

* **Consumers:** Information about energy consumers (name, location, sector).
* **EnergyUsage:** Daily energy consumption details per consumer.
* **EnergySources:** Various energy types and their carbon emissions.
* **SustainabilityMetrics:** Energy saved, CO2 reduced, and cost savings metrics.

**Expected Outcomes:**

* **Data-backed insights** to encourage efficient energy consumption.
* **Improved sustainability practices** through reduced carbon footprint.
* **Economic benefits** via lower energy costs and optimized resource use.
* **Enhanced awareness and decision-making** for energy conservation.

This project integrates database-driven analysis and Excel-based data visualization to facilitate real-time decision-making and promote affordable, clean energy practices.