Project Initialization and Planning Phase

Date	1 October 2025
Team ID	SWUID20250207636
Project Title	**Global Energy Trends: A Comprehensive Analysis of Key Regions and Generation Modes using Power BI**
Maximum Marks	3 Marks

Project Proposal (Proposed Solution)

This project proposal outlines a solution to address a specific problem. With a clear objective, defined scope, and a concise problem statement, the proposed solution details the approach, key features, and resource requirements, including hardware, software, and personnel.

Project Overview	
Objective	To develop a comprehensive, interactive dashboard and a predictive time-series model to analyze historical global energy consumption and generation, forecast future renewable energy adoption, and provide data-driven insights into the global energy transition.
Scope	The project encompasses the analysis of energy consumption (by country/continent) and power generation (by source, 1990–2017) using the provided datasets. Deliverables include a validated data model, an interactive visualization tool (dashboard), and a 5-to-10-year forecast of renewable energy contribution (TWh).
Problem Statement	
Description	Policy makers, investors, and researchers currently lack a consolidated, easily-interpretable, and predictive tool to assess the progress and trajectory of the global energy transition. Analyzing static data reports makes it difficult to compare regional performance, identify high-impact policy areas, and quickly assess the shift in energy mix
Impact	The proposed solution will allow stakeholders to: (1) Identify high-growth vs. lagging regions in renewable adoption. (2) Quantify the historical impact of generation shifts. (3)Forecast future energy needs and potential supply gaps. (4) Accelerate the transition by highlighting actionable insights and

	investment opportunities.
Proposed Solution	
Approach	1. Data Ingestion & Integration: Load all provided CSV files (Continent_Consumption_TWH.csv, Renewable Total Power Generation.csv, etc.) and structure them into a unified relational data model. 2. Exploratory Data Analysis (EDA): Perform trend analysis on consumption and generation growth rates by region and energy source. 3. Interactive Dashboard Development: Create a visualization layer (using Power BI or Python visualization libraries) for historical analysis.
Key Features	1. Geographic Comparison: Side-by-side analysis of energy mix for top countries and continents. 2. Renewable Penetration Tracker: Dynamic calculation and visualization of renewable energy percentage of total generation. 3. Predictive Scenario Tool: Model output showing likely trajectory of non-renewable reduction and renewable growth (TWh) up to 2030. 4. Drill-Down Capability: Ability to filter and segment data by years, continents, countries, and generation modes.

Resource Requirements

Resource Type	Description	Specification/Allocation
Hardware		
Computing Resources	CPU/GPU specifications, number of cores	Quad-core CPU (2.5 GHz+), suitable for data processing and model training.
Memory	RAM specifications	8 GB RAM (Minimum) for in-memory data operations and running predictive models.
Storage	Disk space for data, models, and logs	1 TB SSD for storing the dataset, model checkpoints, environment, and logs.
Software		

Frameworks	Python frameworks	Python frameworks (e.g., Jupyter Lab/Notebook) for scripting and analysis
Libraries	Additional libraries	pandas, numpy, scikit-learn, matplotlib/seaborn, Prophet, or other specialized time-series libraries.
Development Environment	IDE, version control	Power BI Desktop (for dashboard visualization), Git (for version control)
Data		
Data	Source, size, format	Kaggle: Provided historical energy datasets (CSV files). Size: Small (<10 MB total). Format: CSV.