

Project Initialization and Planning Phase

Date	1 October 2025
Team ID	SWUID20250206509
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) template

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 an interactive Power BI dashboard that provides comprehensive analysis and visualization of global energy generation trends across key regions, comparing traditional fossil fuel generation with renewable and alternative energy sources to support data-driven decision-making for energy stakeholders
Scope	The project encompasses data collection from major global energy databases, creation of a unified data model, and development of interactive visualizations covering multiple regions (North America, Europe, Asia-Pacific, Middle East, Africa, South America) and energy generation modes (coal, natural gas, oil, nuclear, hydro, solar, wind, and other renewables) over a 20-year period (2005-2025)
Problem Statement	
Description	Energy analysts, policy makers, and business leaders currently lack a centralized, interactive platform to analyze and visualize global energy generation trends. Existing data sources are fragmented across multiple databases and reports, making it difficult to identify patterns, compare regions, track the transition to renewable energy, and make informed strategic decisions. The absence of real-time, interactive visualizations hampers the ability to quickly respond to market changes and policy opportunities

Impact	By solving this problem, stakeholders will gain immediate access to comprehensive energy insights through interactive dashboards, enabling faster decision-making, better resource allocation, improved policy development, and enhanced ability to identify investment opportunities in the renewable energy sector. This will accelerate the global transition to sustainable energy sources and improve energy security planning
Proposed Solution	
Approach	The project will utilize Power BI's data visualization and business intelligence capabilities to create an interactive dashboard. The methodology includes, 1. Data extraction from authoritative sources (IEA, EIA, regional databases),2. ETL processes using Power Query for data cleaning and transformation,3. Development of a star schema data model with fact tables for energy generation and dimension tables for regions, time, and generation modes ,4. Creation of DAX measures for advanced calculations and KPIs,5. Design of interactive visualizations including maps, time-series charts, comparative bar charts, and trend analyses,6. Implementation of drill-down capabilities and dynamic filtering , 7. Iterative testing and refinement based on user feedback
Key Features	Interactive World Map: Geographic visualization with drill-down from continent to country level <ul style="list-style-type: none"> • Time-Series Analysis: Track energy generation trends over 20 years with play animation features • Generation Mode Comparison: Side-by-side comparison of fossil fuels vs. renewables • Regional Benchmarking: Compare energy mix across different regions • KPI Dashboard: Real-time metrics including total generation, renewable percentage, growth rates, and carbon intensity • Predictive Analytics: Trend forecasting using Power BI's built-in AI capabilities • Custom Filters: Dynamic slicers for year range, region, country, and generation type • Export Capabilities: Allow users to export insights and reports • Mobile Responsive: Optimized layouts for mobile and tablet viewing

Resource Requirements

Resource Type	Description	Specification/Allocation
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Hardware		
Computing Resources	CPU/GPU specifications, number of cores	e.g., 2 x NVIDIA V100 GPUs
Memory	RAM specifications	e.g., 8 GB
Storage	Disk space for data, models, and logs	e.g., 1 TB SSD
Software		
Frameworks	Python frameworks	e.g., Flask
Libraries	Additional libraries	e.g., scikit-learn, pandas, numpy
Development Environment	IDE, version control	e.g., Jupyter Notebook, Git
Data		
Data	Source, size, format	e.g., Kaggle dataset, 10,000 images