

Real-Time German Energy System Balance and Generation Dashboard

Germany's energy transition (Energiewende) has introduced high levels of variable renewable generation, creating significant volatility for Transmission System Operators (TSOs). Grid operators require immediate, system-wide situational awareness, but monitoring tools are often fragmented, forcing operators to manually correlate data from disparate systems for generation, load, and system balance. This fragmented approach delays the ability to get a simple, holistic view of the grid's state. A simplified, unified dashboard is needed to ingest key data streams and provide an overview visualisation of the national generation mix and the real-time balance between electricity supply and demand.

This project will develop a real-time data pipeline focused on displaying the national load-generation balance. The system will ingest key data streams from the ENTSO-E API using a periodic Python script. This script will process the data, calculate the System Balance Indicator (SBI), and write the results to a local database. A Streamlit will then visualize this data, with the objective of providing a single source of truth for high level system status, including the continuous display of system-wide load vs generation with a data latency of under 30 minutes.

The objective is to provide a high level system status, enabling faster, more informed operational awareness. The expected outcome is an operational dashboard interface that clearly visualizes the SBI and the Generation Mix. Success will be measured by the dashboard's ability to maintain a data latency of under 30 minutes and achieve 99% system availability during testing, providing operators with a tool to manage volatility and enhance overall grid stability.

System Boundary

- Data Ingestion
- Data Processing
- Data Persistence
- Visualization
- Latency Targeting

Github: https://github.com/ezra-iu/Akankwasa-Ezra-Mark_4250079_CS_Project