

ASEAN PowerPulse Dashboard

In a world increasingly reliant on data to guide governance, tools that transform raw datasets into actionable insights have become inevitably indispensable. The ASEAN PowerPulse is a web-based dashboard built by Group 6 (Apale, Masinda, Rayel, Sanchez) of DATA101 - S12. Designed for Philippine policymakers and energy planners, this dashboard addresses the longstanding gap in accessible regional energy data. With an intuitive interface and dynamic charts, it empowers decision-makers to explore, compare, and forecast energy trends across Southeast Asia.

The following report explores the dashboard’s goals, features, design rationale, and implications for national energy policy.

I. Project Proposal and Objective

The project identifies a clear visualization problem: existing energy dashboards are outdated, static, or lack a Philippine-centric perspective. Most regional platforms—such as ASEPCELLS, Ember, or sipet.org—present incomplete or non-interactive data. Recognizing this, the team built a more comprehensive and responsive solution focused on clarity, interactivity, and comparability. With a primary target audience of policymakers and government officials in the Philippines, the core idea is to combine analytical richness with usability, ensuring that insights are available even to those without deep data science expertise.

II. Datasets and Data Architecture

The app aggregates energy data from reliable and extensive sources:

- A. Our World in Data (OWID) - a large dataset (21,813 rows) covering energy metrics (production, consumption, fuel types, emissions).
- B. Philippine Power Statistics - focusing on regional electrification rates from 2000 to 2023.
- C. GeoJSON files - for interactive maps of both ASEAN and the Philippines

The system integrates national-level and regional-level data, enabling both ASEAN-wide and Philippines-specific perspectives.

III. Prototype and Design Framework

A. Core Visualizations Used

Visualization	Marks	Channels	Purpose
Choropleth Map	Regions	Color (green-purple gradient)	Discover spatial patterns
Scatter Plot	Points	X: GDP, Y: Energy use, Color: Country	Explore relationships and outliers
Bar Chart	Rectangles	Height (value), Color:	Compare metrics across

		Country	nations
Line Chart	Lines/points	Time (X), Value (Y), Color: Sector	Show historical and forecast trends
Radar Chart	Circular axes	Distance from center	Profile strengths/ weaknesses

These idioms were chosen for their strong fit with energy analytics tasks like comparison, discovery, forecasting, and exploration.

B. Interactivity Techniques

To enhance analytical value, several techniques were implemented:

1. Linked Visuals - selection in one chart (e.g., choropleth) updates others (bar, scatter)
2. Dynamic Filtering - tabs allow users to switch between metrics like energy production, investment, renewables
3. Zoom and Hover - important for detailed analysis, especially in scatter plots

These tools were chosen to empower users to perform multi-faceted explorations without getting lost, ideal for policy analysis workflows.

IV. Page-by-Page Analysis and Visualization Insights

A. Dashboard (Main Overview)

This serves as a regional and national energy snapshot.

1. Key Features:
 - a. Metric cards - Bold numbers showing energy production, consumption, and import trends. Using pre-attentive attributes like color and font weight helps users immediately understand if a trend is improving or worsening. Green (+) suggests positive change (e.g., rising renewable share), while red (-) highlights concerns (e.g., growing imports).
 - b. Time-series line graphs - help show direction over time — ideal for understanding whether a policy intervention is having an effect (e.g., how industrial energy consumption is evolving)
 - c. Energy production mix chart - reveals reliance on fossil vs. renewables. These charts show how diversified (or not) a country's energy portfolio is. This can spark discussion about energy security and climate goals.
 - d. Philippines electrification map - a standout feature using choropleth mapping and is perfect for spatial distribution. Darker regions indicate higher electrification, and lighter ones indicate gaps. This is especially useful for Philippine policymakers trying to identify under-electrified regions.

- e. ASEAN energy map - interactive choropleth mapping that visualizes energy production/consumption per country and allows side-by-side comparison of ASEAN neighbors and is helpful for benchmarking

2. Policy Impact

- a. Spotting low-electrification regions helps allocate funds efficiently
- b. Identifying rising import dependence can trigger policy toward energy independence
- c. Renewable mix helps track progress against climate goals

B. Countries Page

1. Key Features

- a. Line charts - historical view of metrics like consumption and renewables
- b. Bar charts - sector-specific consumption (e.g., residential vs. industrial)
- c. Forecast graphs - using dashed lines and shading for confidence intervals. Communicates uncertainty while still giving direction. It is perfect for forward-thinking policymakers who need to anticipate energy demand.

2. Policy Impact

- a. Tracking energy intensity improvements
- b. Observing regional imbalances in consumption/production
- c. Supporting long-term electrification or renewable targets

C. Comparison Page (Benchmarking)

1. Key Features

- a. Bar chart - simple numeric comparison (e.g., total production). Effective for direct numeric comparison. Clear differences in height are easier to decode than numbers alone.
- b. Radar chart - to visually express “balance” or “performance spread” across metrics. One can quickly see if a country has a weakness (e.g., low renewable share) or strength (e.g., low CO2 emissions).
- c. Scatter plot - analyzes relationship (e.g., GDP vs. energy use). In other words, it is a correlation-seeking chart, which is great for hypothesis building (e.g., does richer GDP mean greener energy?)

2. Policy Impact

- a. Helping Philippine agencies benchmark against neighbors
- b. Identifying leaders in renewables, intensity, or emissions
- c. Encouraging regional collaboration and competitive improvement

V. Insights and Conclusion

All in all, the dashboard’s visual approach supports evidence-based policy in several impactful ways for Philippine policymakers. Firstly, the choropleth map of the Philippines highlights regional disparities in electrification, enabling the Department of Energy (DOE) and local government units (LGUs) to identify and prioritize areas that require investment in energy infrastructure. Secondly, the

platform facilitates benchmarking and accountability by allowing agencies such as the National Economic and Development Authority (NEDA) and the Department of Environment and Natural Resources (DENR) to compare the Philippines' performance with its ASEAN neighbors. This comparison helps assess whether national goals—such as renewable energy targets—are on track or falling behind. Thirdly, the inclusion of visual CO2 trend data serves as a vital resource for the Philippine Climate Change Commission, guiding the development of strategies aimed at achieving carbon neutrality. Lastly, the dashboard supports economic planning by providing insights into the relationship between energy intensity and GDP. Lower energy intensity is an indicator of economic efficiency, which is essential for achieving sustainable growth without excessive energy consumption.

The team believes that the ASEANPowerPulse stands out for its blend of accessibility, clarity, and interactivity. It turns complex, multi-country energy data into a readable and responsive interface—a critical tool for the Philippines and the broader ASEAN region. For government officials, not only in Metro Manila but in other areas as well, this dashboard can prioritize electrification efforts, identify trends in renewable energy, compare national progress against regional peers, and build evidence-based energy strategies for 2030 and beyond. Furthermore, ASEAN PowerPulse is more than just a school project; it is a scalable prototype with real-world applications. Indeed, it is a model of how thoughtful design and good data visualization can fuel better governance.