Public Perception of Renewable Energy Policies in the U.S: A Twitter-Based Analysis

Priscila Stisman

Problem Statement

The transition to renewable energy is essential for combating climate change and achieving sustainability goals. However, public perception—particularly among policymakers—plays a pivotal role in shaping energy policies, influencing investment decisions, and determining the adoption of renewable technologies. Understanding how members of the U.S. Congress discuss renewable energy can provide valuable insights into the political discourse surrounding this critical issue.

This project aims to analyze congressional sentiment toward various renewable energy sources—such as solar, wind, and hydro—using Twitter data from U.S. Congress members. By employing sentiment analysis, topic modeling, and supervised classification, this study will uncover key themes in renewable energy discourse and assess how political leaders frame discussions on different energy sources. Additionally, this project will examine how sentiment trends evolve over time and whether major events—such as legislative debates, energy crises, or natural disasters—coincide with shifts in discourse.

Data Sources

The primary data source for this project will be tweets from U.S. Congress members. A subset of tweets will be extracted from a broader corpus using relevant keywords, including:

- "renewable energy", "solar energy", "wind power", "hydropower", "clean energy", "fossil fuels", "nuclear energy", "coal", "natural gas"

After filtering the corpus with these keywords, approximately 8,000 tweets remain for analysis. Additional data cleaning will include the removal of retweets, duplicate tweets, and spam-like content. The dataset spans from 2009 to 2022, enabling a long-term examination of congressional discourse on renewable energy.

Methods

Sentiment Analysis: Utilize pre-trained models such as VADER to classify tweets as positive, neutral, or negative.

Topic Modeling: Apply Latent Dirichlet Allocation (LDA) to extract key topics from tweets, identifying recurring themes in congressional discussions on renewable energy.

Supervised Classification: Explore the potential for incorporating a case study analyzing newspaper headlines following a major event, such as a natural disaster, to assess how public discourse aligns with congressional sentiment.

Analysis

1. Temporal Analysis

- Track changes in sentiment and topic trends over time.
- Identify correlations between major political, economic, or environmental events and shifts in discourse.

2. Political Affiliation Analysis

- Since the dataset includes tweets from members of Congress with known party affiliations (Democrat or Republican), analyze differences in sentiment and topics based on political ideology.

3. Issue Framing and Narrative Analysis

- Examine how members of Congress frame renewable energy discussions (e.g., economic benefits, climate change, energy security).
- Assess whether different political parties emphasize distinct narratives when discussing renewable energy.
- Identify recurring keywords and themes associated with positive and negative sentiments.

4. Event-Driven Analysis

- Investigate whether major events (e.g., energy policy changes, extreme weather events, political bills) trigger shifts in sentiment or topics.

Data Visualization

To enhance the interpretability of results, the project will generate:

- Word clouds to highlight frequently used terms in renewable energy discussions.
- Bar plots illustrating sentiment trends over time.
- Topic distributions to visualize key themes in congressional discourse.

Definition of Success

The success of this project will be measured by the following outcomes:

- **Sentiment Insights:** Determine whether congressional sentiment toward renewable energy is predominantly positive, negative, or neutral.
- **Key Topics:** Identify the main topics driving renewable energy discussions (e.g., policy, investment, climate concerns).
- **Trend Analysis:** Assess how sentiment evolves over time and whether major events coincide with shifts in discourse.
- **Political Insights:** Compare sentiment and topic differences between political parties.

By providing a comprehensive analysis of renewable energy discourse in the U.S. Congress, this study will contribute to a deeper understanding of political attitudes and concerns that may influence the transition to a sustainable energy future.