

SSIE 516 PROJECT PROPOSAL

Topic: *California's 2045 Carbon Neutrality Goal: Assessing Market Reforms for Renewable Energy Integration*

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Introduction:

The Western Interconnect's transmission planning regions comprises of California Independent System Operator (CAISO), NorthernGrid, and WestConnect (Reference 1). Each region operates independently with unique planning priorities. This research aims to focus on CAISO and its current policies and goals. California has a target to achieve carbon neutrality by 2045, aligned with Senate Bill 100 (Reference 2). Hence, California's energy sector faces the need for significant transformations.

Research Question:

What are the engineering and economic implications of achieving California's 2045 carbon neutrality goal, and how can market reforms and transmission planning be designed to address these challenges?

Objectives:

The main objective of this project is to assess California's current energy landscape and decarbonization goals. The specific goals are:

1. Electricity usage and demand trends
2. Generation mix changes with optimal renewable energy integration solutions
3. Actionable policy recommendations for market reforms
4. Reliable transition to carbon-neutral energy system by 2045

Data Sources

1. Electricity consumption by county from California Energy Commission (CEC): <https://www.energy.ca.gov/files/energy-consumption-data-files>
2. California Electricity Data from California Energy Commission (CEC): <https://www.energy.ca.gov/data-reports/energy-almanac/california-electricity-data>
3. Greenhouse gas emissions and renewable energy integration data from California Air Resources Board (CARB): <https://ww2.arb.ca.gov/ghg-inventory-data>

References:

1. <https://feature.wecc.org/soti/topic-sections/transmission/index.html>
2. <https://www.energy.ca.gov/news/2021-03/california-releases-report-charting-path-100-percent-clean-electricity>
3. https://www.energy.gov/sites/default/files/2023-12/National%20Transmission%20Needs%20Study%20-%20Final_2023.12.1.pdf