Key Factors Driving Load Growth in PJM and ERCOT

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Github Repository

https://github.com/jazpritch/KarneiKogaWargoPritchett_ENV872_EDA_FinalProject

1. Rationale and Research Questions

Written Section (Bold questions!)

2. Dataset Information and Wrangling

Written Section

2.1 PJM Load Data

Written Section

Table : Dataset Information for PJM

Detail	Description
Data Source:	JM Website - Metered Hourly Load
Retrieved From:	https://dataminer2.pjm.com/feed/hrl_load_metered/definition
Variables Used:	datetime_beginning_ept(Date), mw (Load_MW)
Date Range:	1/1/2010 - 12/31/2022

Table : Real-Time Dataset Information for PJM

Detail	Description
Data Source:	PJM website - Regulation Zone Preliminary Billing Data
Retrieved From:	https://dataminer2.pjm.com/feed/reg_zone_prelim_bill/definition
Variables Used:	datetime_beginning_ept(Date), mw (Load_MW), rmpcp (Price)
Date Range:	1/1/2013 - 12/31/2022

Table : Day-Ahead Dataset Information for PJM

Detail	Description
Data Source:	PJM website - Day-Ahead Scheduling Reserve
Retrieved From:	https://dataminer2.pjm.com/feed/dasr_results/definition
Variables Used:	datetime_beginning_ept (Date), mw (Load_MW), dasrmcp (Price)
Date Range:	1/1/2010 - 12/31/2022

2.2 ERCOT Load Data

Written Section

Table : Dataset Information for ERCOT

Detail	Description
Data Source:	ERCOT Hourly Load Data Archives
Retrieved From:	https://www.ercot.com/gridinfo/load/load_hist
Variables Used:	Hour_Ending, ERCOT
Date Range:	1/1/2010 - 12/31/2022

2.3 Demographic Data

Written Section

Table : ERCOT Linear Model Demographic Data

Detail	**Description**
Year:	2010 - 2022
Electricity Price:	Average prices of electricity to ultimate customers (https://www.eia.gov/totalenergy/data/monthly/pdf/sec9_11.pdf)
Median Income:	Income level at which half of the households in Texas earn more and half earn less (https://fred.stlouisfed.org/series/MEHOINUSTXA672N#)
Percent Renewable:	
Percent Minority:	Subtraction of white only percentages after dividing white popultion from totals (U.S. Census 2010-2022)
Population:	Total Population each year for Texas (https://www.census.gov/programs-surveys/popest/data/data-sets.html)
Mean Load:	Average load for ERCOT

3. Exploratory Analysis of Data

Written Section

3.1 Exploration of ERCOT

3.2 Exploration of PJM

4. Analysis

4.1 Time Series Analysis

HYPOTHESIS

4.2 Growth Analysis

4.3 Simple Linear Regression of PJM

HYPOTHESIS

Written Section

Table

Written Section

Table

Written Section

4.4 Multiple Linear Regression of ERCOT

HYPOTHESIS

To begin this analysis, we used Akaike's Information Criterion (AIC) to determine which explanatory variables should be used to prevent over fitting of the data. Table X outlines the results of this test. The lowest AIC value achieved was 173.58 with the average bill price and percent renewables as the chosen variables. This result can be confirmed by observing the correlation plot for the explanatory variables (Figure ___).

Variables	AIC Value
Mean_Load + population + percent_renew + med_income + percent_minority	178
average_price_tot + population + percent_renew + med_income	176.04
average_price_tot + percent_renew + med_income	174.26
average_price_tot + percent_renew	173.58

Written Section

P-Value Table

Written Section

5. Summary and Conclusions

6. References

Image Source: https://pv-magazine-usa.com/2022/06/29/faster-lower-cost-interconnection-by-combining-ercot-miso-pjm-approaches/