MIS/BA 750

Understanding Electricity Prices in Texas

The price of energy (i.e. electricity) in Texas is based on market demand rather than a fixed price determined by a regulatory body. This has implications for managing the cost of electricity consumption. An organization that has a better understanding of price fluctuations and factors that affect electricity prices in Texas can use this information to their advantage by managing consumption and the associated cost. So, a key challenge is to gain a better understanding of the price of electricity in Texas. Are there seasonal variations, does load and generation of electricity have an impact, what about the weather and how it may impact the price? We will take on the challenge of addressing these questions.

Available Data Files:

* 3 Files (2019 – 2021) that contain electricity pricing data
* 3 Files (2019 – 2021) that contain electricity generation data (generation is production of electricity)
* 1 File (2019 – 2021) that contains electricity load data (load is the demand for electricity)
* 1 File (2019 -2021) that contains weather data (temperature, humidity, and windspeed) for various cities in Texas.
* 1 File that contains the data descriptions of the variables in all the files

Important Note: Some of these files have duplicated and/or missing data. We’ll discuss these issues in class.

Objective:

1. To share insights on electricity prices in Texas between 2019 – 2021.
2. To examine the causes of price variation.
3. To provide business recommendations on what to do and not to do.

Outcomes:

1. Insights on electricity prices (descriptive analysis)
2. Dashboard for monitoring key data elements related to electricity pricing
3. Story line that narrates interesting insights from the data to inform an audience interested in learning about electricity prices in a deregulated market such as Texas
4. Ideas on how to extend the work (If you were asked to do further analysis what will be 2 suggestions that you will make? What additional data you think should be available to provide a more in-depth analysis?) Explain this in word document.

**Initial Preparation:**

1. Review the data files
2. Understand the data items and format

**Data Modeling (performed in Tableau Prep)**

1. Explore how to combine / connect the files
2. Explore data manipulation ideas (aggregation, pivot, etc.) needed to structure the data for analysis
3. Outline interesting questions that you think can be addressed by the data
4. This may be an iterative process because you may have to engage in additional data manipulation if the current data structure does not allow for answering the questions you outlined earlier.
5. You are allowed to choose a subset of data to use in this project. If you choose to use only a subset of the data, explain in the word document why.
6. You are allowed to recode the data such as change city to region, or vice versa.
7. There may possibly be duplicate data entry. In case

**Analysis**

The main objective of descriptive analysis is to explore historical trends in the data. In this step, you may explore the followings, but can also explore other questions:

1. Explore if there is a seasonal pattern in electricity prices. Are there variations in the pattern across the regions?
2. How has power generation changed from 2019 to 2021 (or any subset of the data that you choose)?
3. What is the relationship between how power is generated and electricity prices?
4. What is the relationship between weather variables and electricity price? Does the relationship change across the regions?
5. What is the impact of changing the level of detail (one hour vs one day) on the results?

The above questions are only suggestions. We will discuss more ideas in class.   
  
Your project must address three (3) business questions that can produce meaningful and actionable recommendations to the power company.

**Deliverables**

1. One TWBX file with at least 4 visual tools – each addressing different business questions, 1 dashboard, and 1 story. You may add more visual tools but it should not be more than 7. (This task is approximately 30%)
2. One TFLX file
3. Output file(s) from running the flow on Tableau Prep Builder (all in Excel formats after cleaning and data manipulation)
4. One MS Word Document that discusses the items listed in the Final Report Structure (See below). The document has to be at least 3 pages long, times new roman 12-sized font, and double space. All explanations must be completed in bullet format with exception of executive summary. The business questions have to be included in the document.
5. One Video (MP4) files (not more than 7 minutes) that shows how to use your project to reveal hidden knowledge from the data. You may use Zoom to record the video and do the discussion by using Story. (This task is approximately 10%)
6. Another Video (MP4) files (not more than 5 minutes) that discuss how pre-attentive attributes are used in the project. (This task is approximately 10%)
7. **All files about must be put in 1 zipped folder. You must use group number and section (afternoon or evening) as a part of the file names.**

**Final Report Structure (MS Word)**

The written report length should be at least 3 pages. The report should include links to the dashboard and story line.

1. Title (Report Title)
2. Executive Summary (A concise summary (250 words) of the report with key insights)
3. Business questions.
4. Introduction (Outline the key challenge, trends in energy pricing, and variables impacting it)
5. Explain issues in Data Prep and a brief overview how the data was transformed for analysis
6. Explain why you choose a certain subset of data (if any)
7. Analyses (Key insights from the data analyses from visual tools)
8. Story/ Story line that narrates interesting insights from the data to inform an audience interested in learning about electricity prices in a deregulated market such as Texas
9. Ideas on how to extend the work (If you were asked to do further analysis what will be 2 suggestions that you will make)
10. List issues with data cleaning such as missing data, anomalies, recoding, etc.
11. Give examples of what part of your visual tool support the followings;
    1. Descriptive Analytics
    2. Diagnostic Analytics
    3. Predictive Analytics
    4. Prescriptive Analytics

### Create a section on MS Word and name it "Supporting Analytics". Then copy picture(s) from Tableau Desktop project and discuss how they support each type of analytics. (This task is approximately 10%)

1. Create a section on MS Word and name it "Recommendations". Under this section, list 2 actionable and data-driven recommendations for any teams in the competition to perform better in the future competition. In your recommendation, be specific in describing “how you came to the recommendation” and “what part of visual tools that provided the supporting data to you”. (This task is approximately 10%.)

**Grading Criteria**

* The alignment between your project goals and use of Visual Tools, Dashboard, and Story.
* How filtering, animation, set, groups, hierarchies and other tools are used unveil hidden knowledge in your data.
* Variety of Visual Tools used in the project.
* The interactiveness between visual tools on dashboard (s).
* The use of pre-attentive attributes. This is very important because it accounts for 20% of your grade.
* Provide concrete and actionable business recommendations within the scope of the data.
* Polishness of the video.

**Extra Credits**

1. A use of map with proper region coding will earn **30** **extra points**.

Check the following resources to work on Map Visual Tool

<https://help.tableau.com/current/pro/desktop/en-us/maps_custom_territories.htm>

<https://kb.tableau.com/articles/howto/mapping-a-single-state>

<https://help.tableau.com/current/pro/desktop/en-us/maps_options.htm>

1. The 5th and 6th visual tool that you add to the project will earn up to **10 extra points each**. The extra points will depends on the their relevance to the questions that you are trying to explore. Name your visual tools in the right order and put a number in front of their visual tool work sheet (e.g. 1: Pricing history by areas). Without a number in front of the worksheet name, I will not be identify the visual tool that will receive extra points.