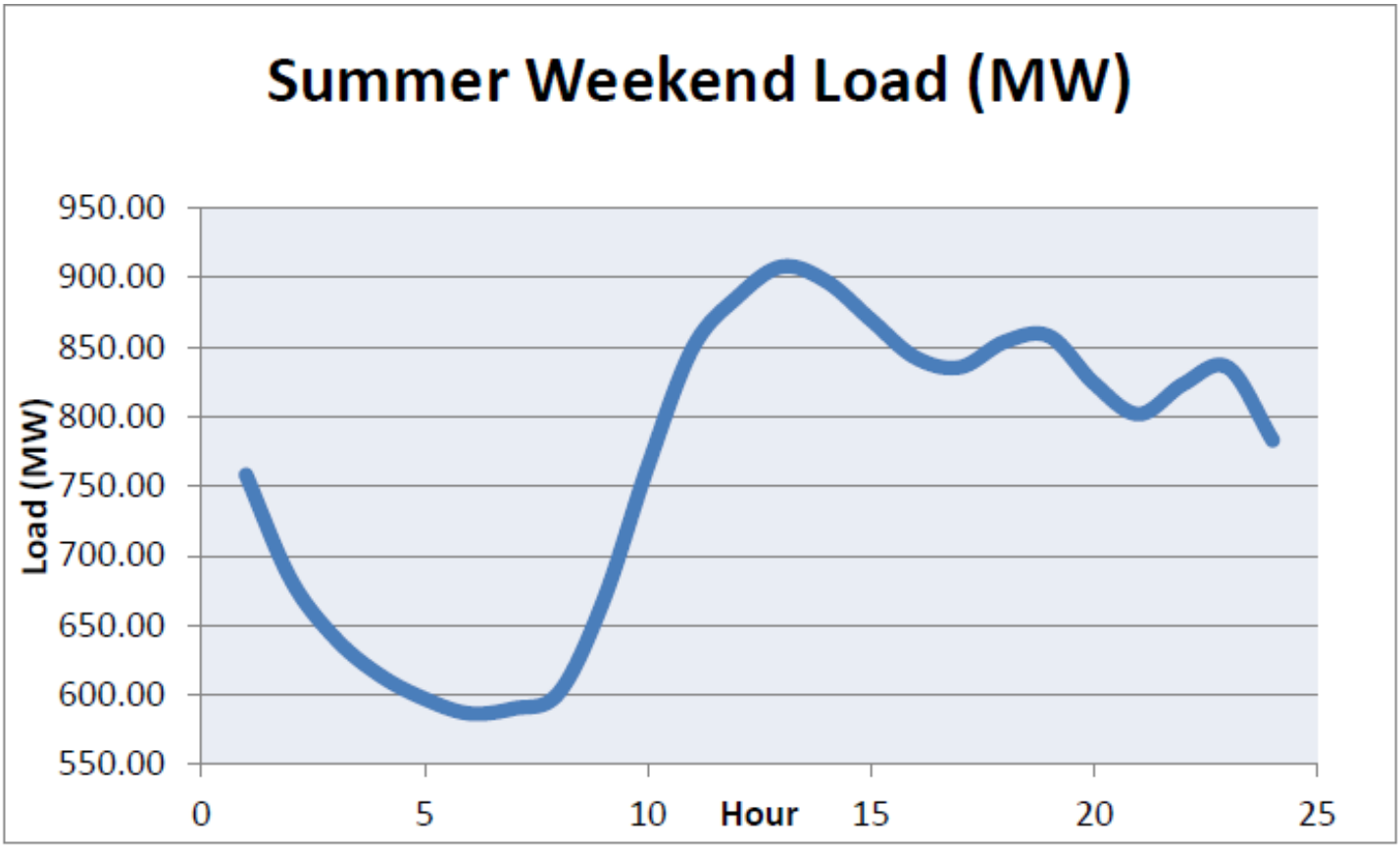
Case Study 4- Utility Usage

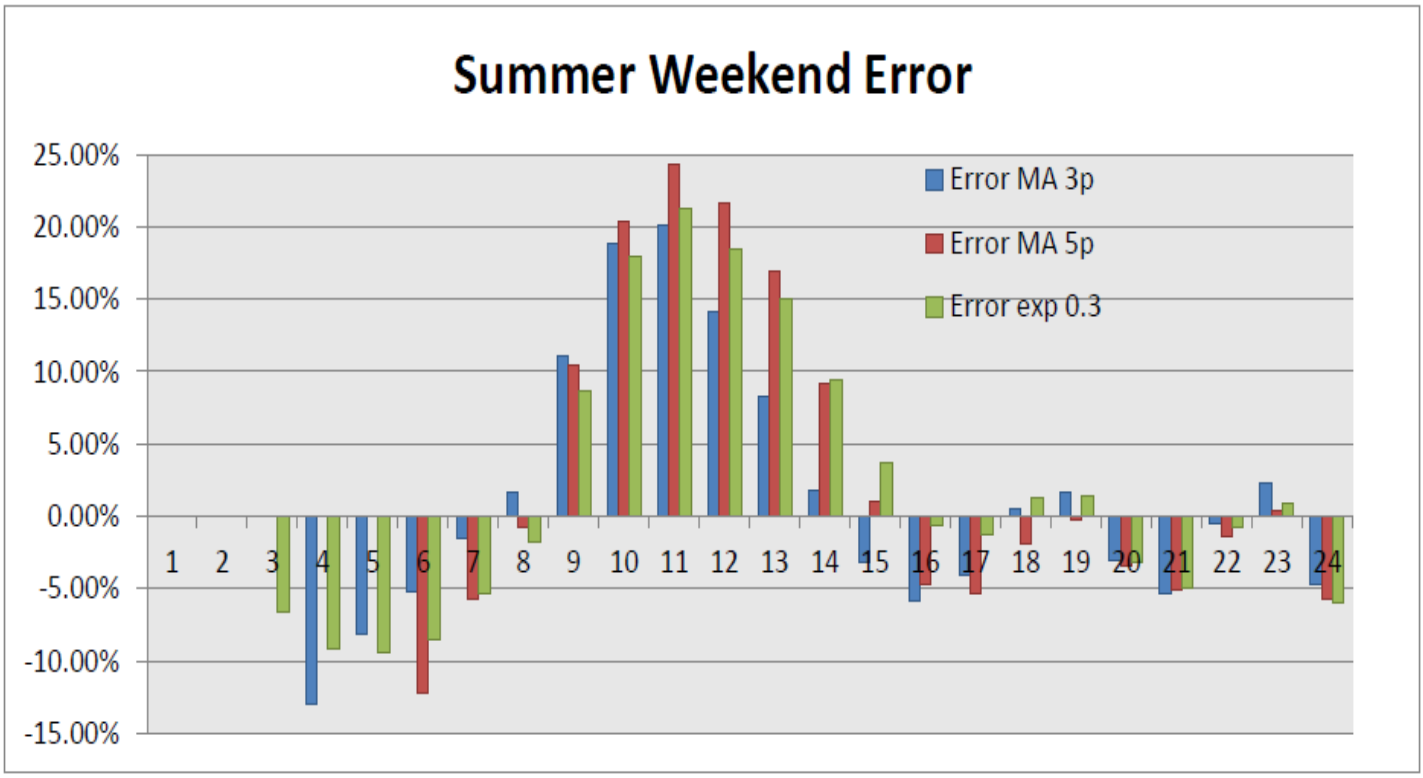
A big utility company would like to forecast power loads to try to understand summer consumption and then differentiate between summer and winter demand by its customers. To achieve that, a 24-hr load actual data was collected at different summer and winter times. The data analyst is trying to decide which forecast model could best reflect the demand in order to submit her recommendations and generate a new cost model that can attract more customers to join the newly developed plan.

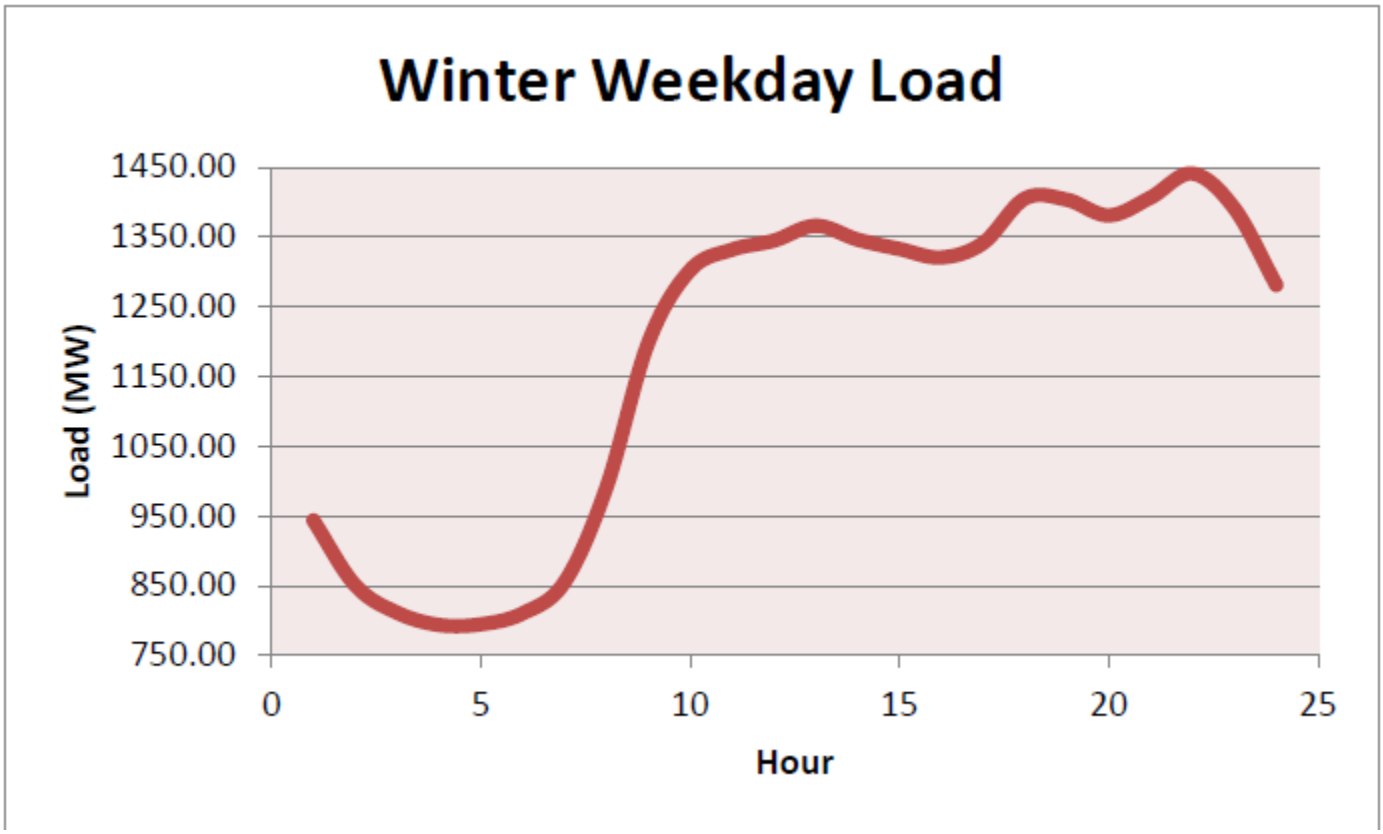
The **summer weekday** data can be found on BB (Case 4-Summer Weekday.xls).

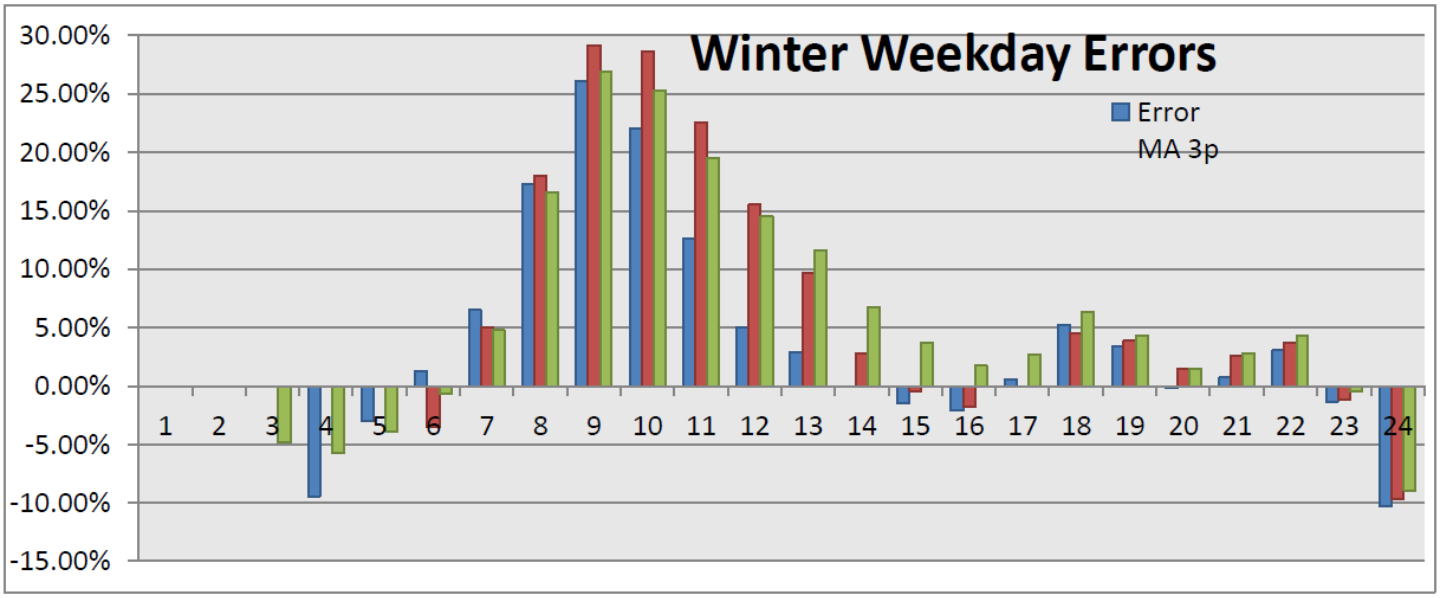
1. Forecast the load demand using a 3-hour moving average
2. Forecast the load demand using a 5-hour moving average
3. Forecast the load demand using exponential smoothing with a smoothing constant of 0.3
4. Calculate the MAD for each of the techniques above and determine which model does a better job.
5. For each technique, calculate the % error for each period.
6. Using a bar chart, present the % errors in one graph and analyze the results.

The analyst repeated the forecasting process using the same techniques to analyze the **summer weekend** as well as **winter weekday's** data. The loads as well as the results of the errors % per period for each of the techniques are shown below. Interpret the results below and propose a path forward to the analyst.






Winter Weekday Load
1450.00
1350.00
1250.00
1150.00
1050.00
950.00
850.00
750.00
Load (MW)
0
5
10
15
20
25
Hour


Winter Weekday Errors
Error
MA 3p
30.00%
25.00%
20.00%
15.00%
10.00%
5.00%
0.00%
-5.00%
-10.00%
-15.00%
1
2
3
4
5
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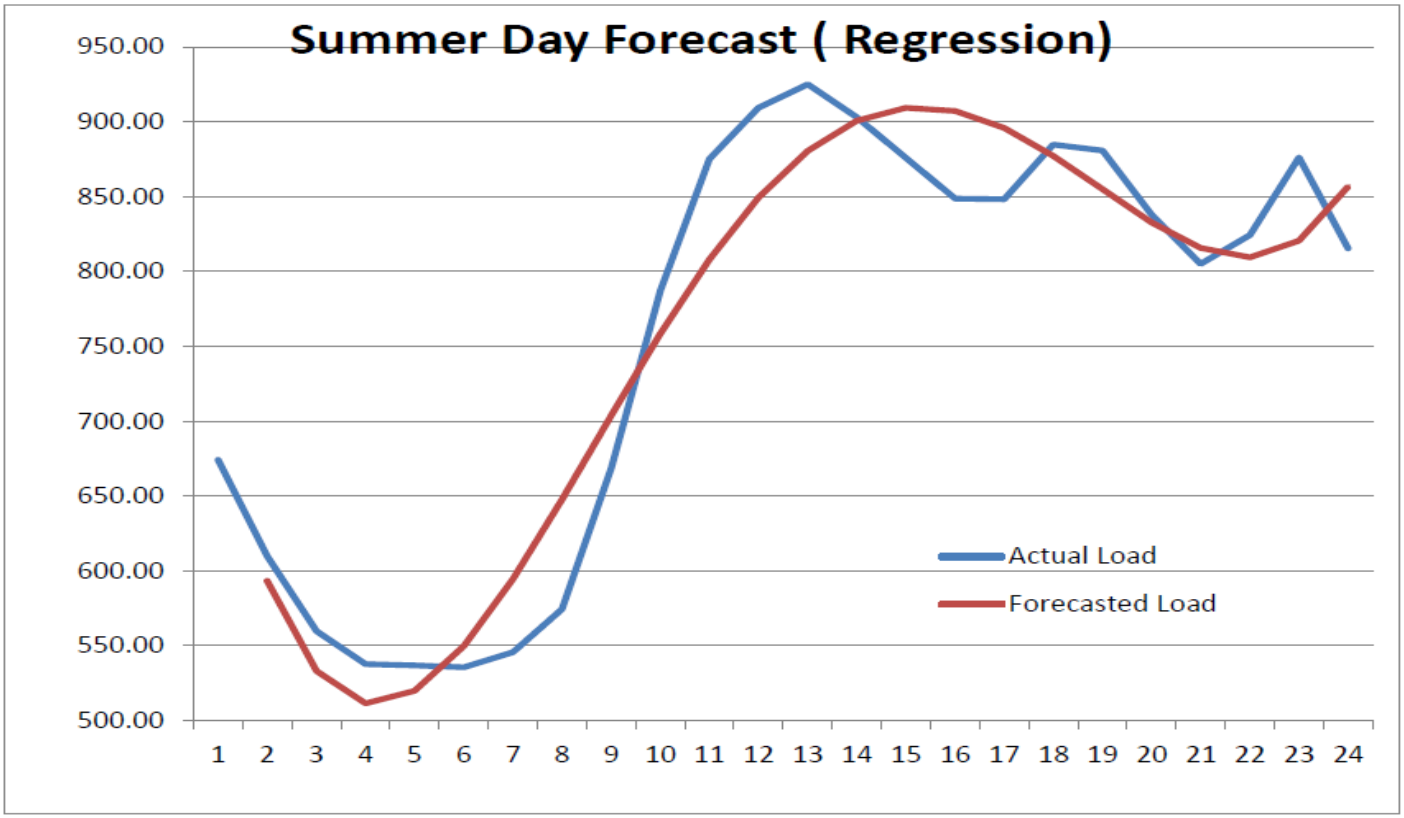
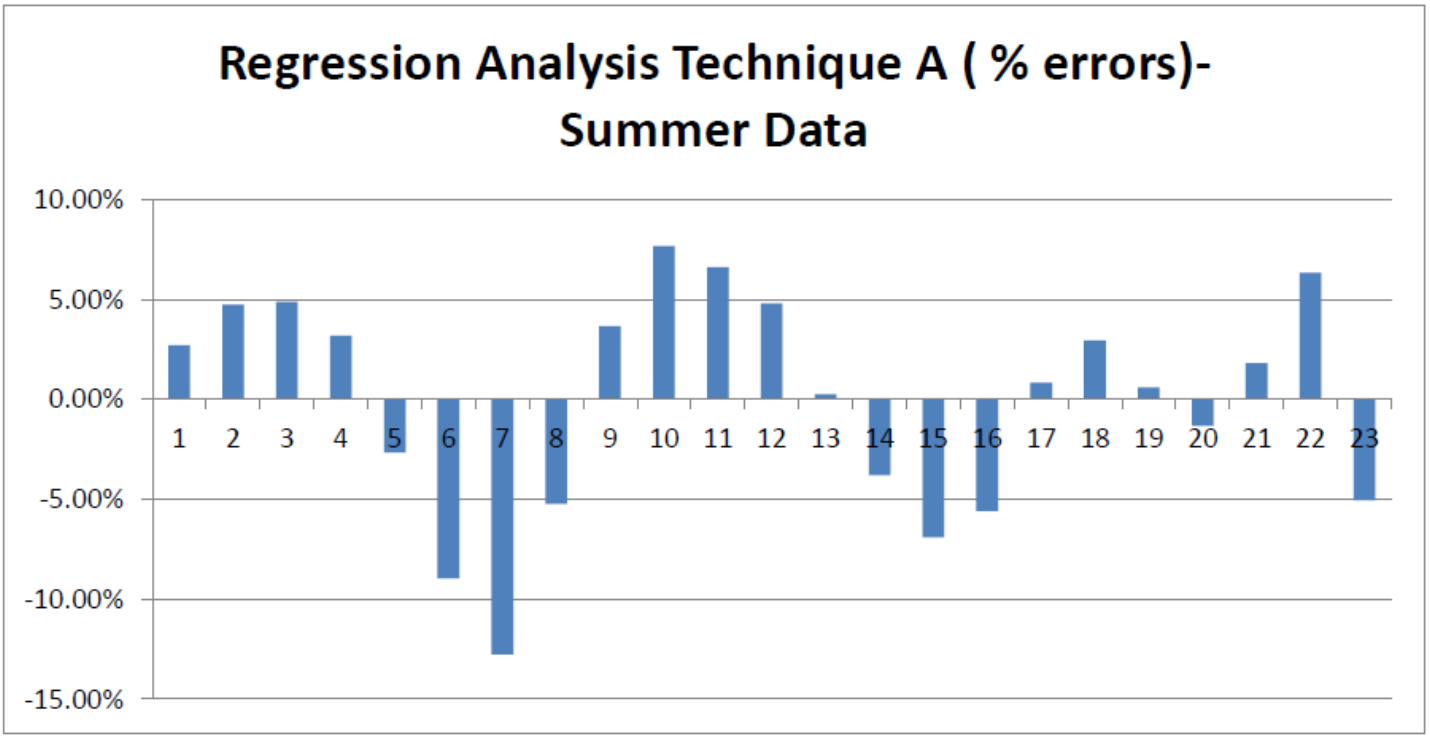
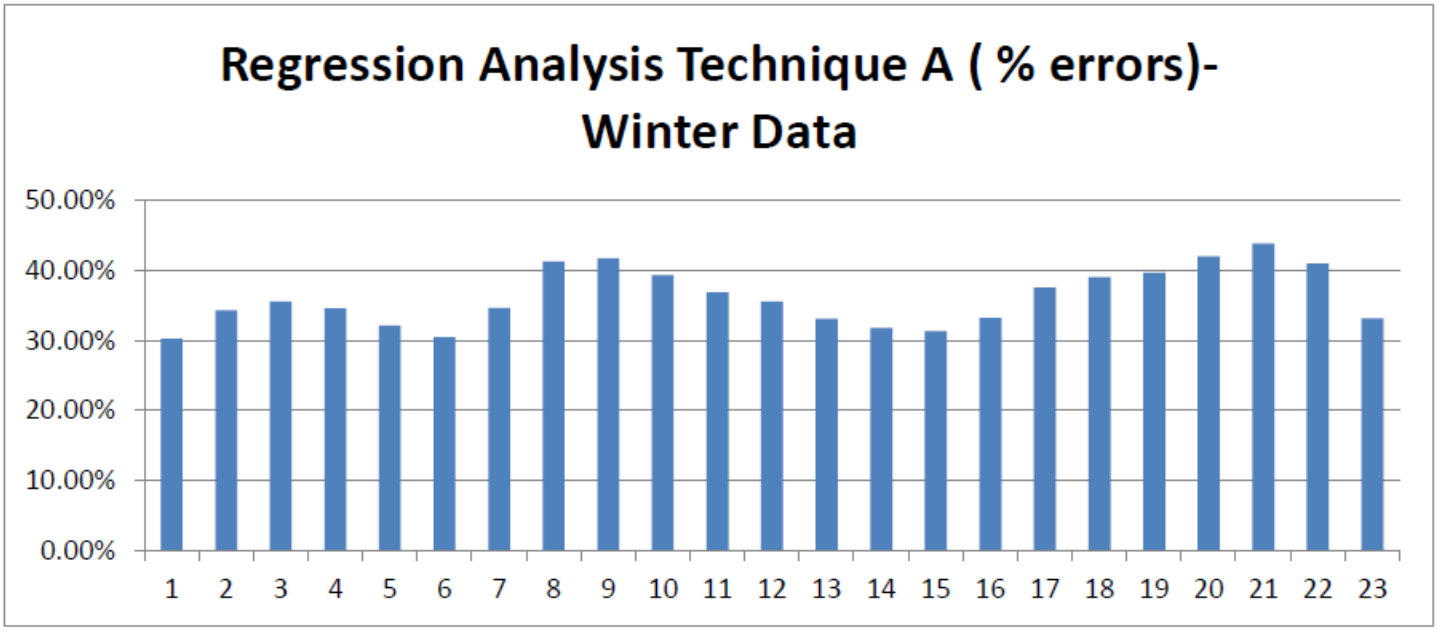
The manager wished to know if there are better ways to predict future demand using regression analysis. The data analyst came back with the following model proposal. What do you recommend?

Develop a simple linear regression model and analyze the output.





Finally, the manager decided to use the same regression technique to predict the demand during wintertime. After applying the same model used for summer data, the % errors came as following. What do you advise?



Using the winter data (Case 4- Winter Data.xls), develop a multiple linear regression model and perform a complete analysis.

- MULTIPLE R:
- R SQUARE:
- STANDARD ERROR OF ESTIMATES:
- t TEST:
- F STATISTIC
- p VALUE