

Genscape Oil Project

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Problem 1

Prompt:

An oil pipeline uses pump stations to push oil over large distances. Genscape monitors the power consumption of these pump stations in Megawatts and converts this power into the amount of oil flowing through a pipeline in barrels of oil per day. We have provided you with the power consumption at a pump station and the corresponding flow rates in the pipeline (note: The flow rates are considered truth data, while the Megawatts are the actual measurements taken by Genscape). Please attempt to model the flow rate as a function of the pump station power. Discuss whether your model (or models, if you chose to change the model during the time series) is/are a good fit and explain your methodology.

Find the average monthly value for your prediction and the 'Oil Flow' columns. Create a graph comparing the predicted and actual values using the monthly averages. Please make the chart clear as if it were being presented to a customer.

My Work:

To start, I have already read the required data into R. Below is a slight glimpse at what this data looks like:

Date	Oil.Flow..barrels.per.day.	Pump.Station.Power..Megawatts.
2015-01-01	155117	4.969950
2015-01-02	155002	5.228080
2015-01-03	195091	8.769649
2015-01-04	138447	3.624437
2015-01-05	119406	3.021225
2015-01-06	173907	6.359465

Problem 2

Prompt:

Cushing, Oklahoma is a large oil storage field that is critical to understanding oil supply and demand in the U.S. Cushing is connected to many large pipelines. Genscape wants you to research several pipelines to better understand the pipeline's capacity, beginning and ending locations, and the operator/owners of the pipeline. Please create a table or list with this information for each pipeline provided.

Pipelines to research: Seaway (legacy), Dakota Access, Pony Express, White Cliffs, TransCanada Gulf Coast (aka MarketLink)

Genscape has provided sample data for each of the above pipeline's flow rates in barrels per day. We have also provided storage volumes at Cushing in Barrels. Using what you researched above, create a model using the pipeline data provided to predict storage changes at Cushing. Please note that a perfect model is not possible due to noise in the data. Please document the results of your model and explain its strengths and weaknesses.

West Texas Intermediate (WTI) price has a relationship with oil stored at Cushing (Cushing is the delivery point for the WTI NYMEX contract). WTI closing prices have been provided with their corresponding storage volumes. Please discuss any correlation you see, and any economic justification for why that relationship might exist.

My Work: