A look at the ERCOT renewable power generation market

Trying to answer two questions:

- Is wind better than solar, or vice versa?
- Is there a way to minimize risk at financial settlement?

A quick analysis and visualization of the ERCOT data with the R language

Background of the analysis

Goal: Glean insights from analysis of historical market data

Measures:

- Collect and process historical pricing and settlement data from the ERCOT market website
- Utilize R for the processing and statistical analysis of the large data sets: ~3 million rows of data

Conclusions:

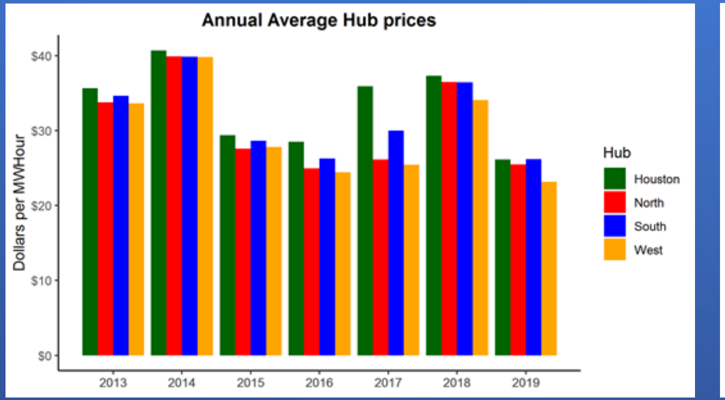
- Statistical analysis of large data sets paired with domain & technology knowledge minimize risk in making financial bets on renewable power plants
- R is a very capable tool for conducting these analyses efficiently and gives the ability to scale quickly

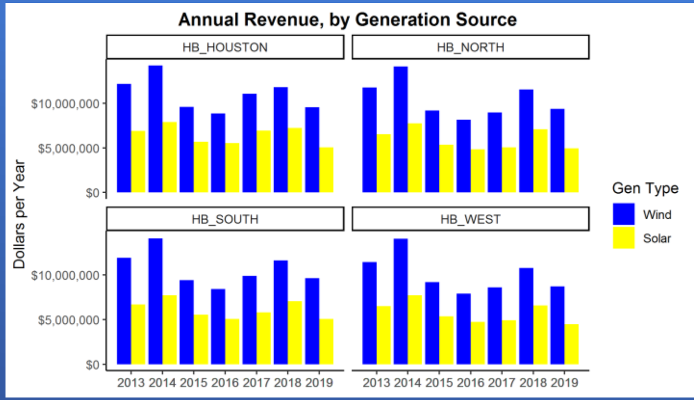
Physical considerations - where to locate, what type of generation?

Where to locate:

- Average annual hub prices are typically within 6%, high to low, between the main hubs – same trend for the annual revenue for a consistent resource profile
- Houston hub consistently has the highest average price and the West is typically the lowest

- Other considerations for where to locate – congestion, distance from gen to load, etc

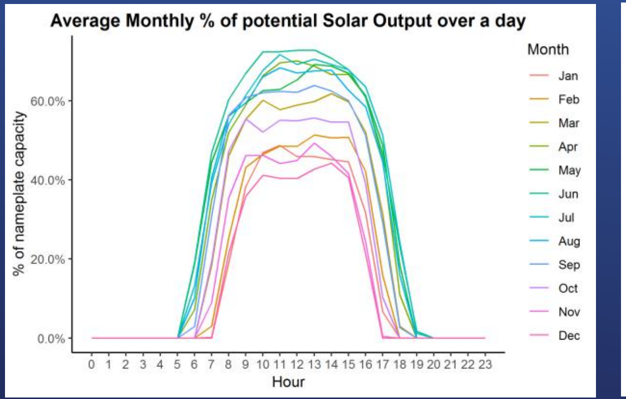


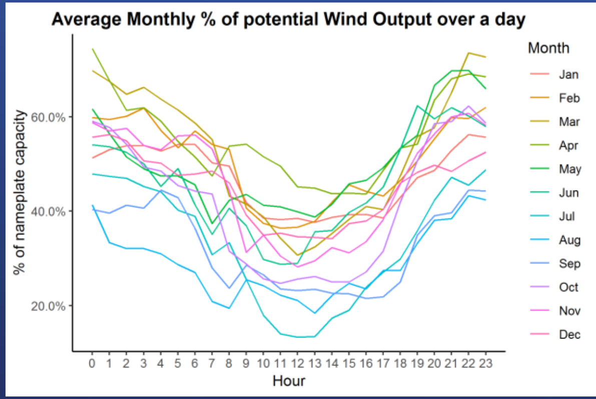


What type of generation:

- Max generation potential from wind typically occurs at night (off peak pricing), while solar is at its max during peak pricing

- Other considerations for what generation to select – proximity to people, integration of storage to capture peak pricing, CapEx and O&M costs





Financial considerations – if I have a choice with my off-taker, where to settle?

If I am deriving my PPA fixed price for negotiation, where should I propose to settle:

- Regions of price volatility are inherently higher risk
- Visually and statistically the LZ West settlement point has the highest volatility and can be perceived as the highest risk
- The Houston Hub and LZ have the closest relationship in annual average price and have the lowest price volatility

- Other considerations for selecting a settlement point – what is the historical price (LMP) volatility at the source node compared to the Hub/LZ, can I settle there?