HARNESS POWER, LTD.

WIND POWER COMPANY LOOKING AT MARKET ENTRY

BRIEF

Harness Power, Ltd. is an established firm in wind power generation. They've had success in their home state of Massachusetts and are considering taking advantage of existing tax breaks, advancing technology, and in-house expertise to expand their business westward. While they know their home state well, they know less about power generation in the United States more broadly, including the prevalence of existence wind-based power generation.

Harness Power has collected data from the Department of Energy and from the Tornado History Project and would like an analysis that provides an overview of power generation in general, wind generation throughout the U.S., and the likelihood of a potential loss of capital or interruption of construction due to tornadoes. In addition, they would like for you to provide an analysis of potential competitor activity and some background on claims their CEO has made.

1. Descriptive Stats – data visualization – What is the state of power generation currently?
- Bar chart
    - By source
- Frequency table and histogram
    - Percent of all production coming from wind
- Percent cross-tabulations
    - Generation by source and census region (2 tables, 1 generation × source, 1 gen. × census region)
    - Capacity by source and census region (same as previous)

2. Descriptive statistics – numerical measures – What is the state of wind generation?
- Average state level of wind power production
- Average state level of wind power capacity
- Standard deviation of both power production and capacity
- Correlation between wind production and wind capacity
- Correlation between wind production as percent of total and natural gas as percent of total

3. Probability distributions
- Probability of a tornado in each census region in the next 1, 5, and 10 years.

4. Interval estimation

- One of our competitors will be choosing a state to place new natural gas power plants—imagine we have no information and so our best guess is to treat the 50 states (plus DC) as a random sample. What is the point estimate of the average existing capacity in the state they choose? What is the 95% confidence interval?
- Another competitor is doing the same with wind—what is the interval estimate for existing capacity in the state they choose?

5. Hypothesis testing

- Before we collected the enclosed data, our CEO made a claim that the average state-level wind capacity was less than 1250 gigawatts. Treating the 50 states and the district as a random sample, can we draw this conclusion? He made the claim that coal had a capacity of more than 6000 gigawatts. Can we draw that conclusion as well?