PHASE ONE COMPETITION

Thank you for participating in BAC@MC 2019. This document contains important background information including the competition's rules, guidelines, and the data description. The data format is described below.

Your team (consisting of between two and four undergraduate students) will review, possibly restructure, explore and analyze the competition data. A poster summarizing your data analysis process and conclusions will need to be prepared and submitted. Poster presentations will be scored by a panel of judges during this first phase of the competition.

If you have any questions, please contact us (see contact information below).

We look forward to receiving your posters and seeing you in May. **Good Luck!**

THE STORY

The phone rang just as Sherlock Ohms was about to drink his first coffee of the workday. He picked up the phone and gave his standard greeting "Ohms and Watts, energy sleuths at your service". He sat and listened intently as the voice on the other end of the phone described the task that required the talents of the famous Ohms and Watts. Once the caller had finished explaining the proposal, Sherlock confidently responded "This sounds like something we can handle. I'll discuss it with my colleague Joan Watts." and then hung-up the phone.

Coincidentally, at that very moment, Joan Watts entered the office. Sherlock greeted her with news of the phone call.

Ohms: I just got off the phone with the editor of the Fence Street Journal. The Journal would like us to do a feasibility study of Governor Cuomo's energy goal of having half of New York State's electricity come from renewable energy sources by the year 2030. This is going to be a full-page article so they want us to provide all analysis details and document how we arrived at our conclusions.

Watts: That type of analysis is right up our alley. First, we need to forecast future demand for electric energy. That will require some historical data on which to base our forecast. We already have data on electrical demand and production from ISO, the operators of the New York power grid.

Ohms: We know that demand for electricity depends on weather conditions. So that should also be part of our analysis.

Watts: Moreover, we can't just take past electricity demand data and use that to forecast future demand. The ways in which electrical energy is being used has been rapidly changing over the past few years.

Ohms: Yes, that is a good point. Energy generation in New York has recently started to decline due to increased energy efficiency in appliances and technology in general. We should try to assess the rate at which that efficiency has been changing and how it might continue.

Watts: Private solar panels and other forms of "behind-the-meter" electrical generation are another aspect we should look at. These technologies can also explain some of the reduction in demand for New York State power grid electricity.

Ohms: On the other hand, the use of electric cars has certainly seen an uptick. Continued growth could generate a substantial demand for electrical power generated by the power grid.

Watts: We may also want to look at the difference between upstate New York and downstate electrical usage.

Ohms: There are also real differences in summer peak demand and winter peak demand. We should add that to our list of things to investigate.

Watts: I've taken note of all the questions we discussed. It looks like it is going to require quite a bit of work to create some forecasts. After that we can investigate where New York stands in terms of renewable energy and how this has changed over time.

Ohms: Sound like a good plan. I have read conflicting reports about the comparative costs of wind and solar power. The economics are going to be a major factor in obtaining New York's goal.

Watts: Speaking of economics, I think we should raise our hourly rates.

Both Watts and Ohms had a good laugh and then began their energy data investigation.

What will all the data tell them? What insights can be gained from the analysis?

THE DATA

The analysis should be based primarily on the following data sets and informational files.

Files include

- **PRICE.csv** contains hourly marginal prices for electric grid
- **WEATHER.csv** contains daily weather information
- **LOAD.csv** contains hourly load data
- **Additional Information.xls** contains other useful information
- **Description.doc** contains description of the data

You are also encouraged to explore relevant data found on the web.

THE POSTER

- The poster should present the team's ideas, methodology, and any insights or conclusions based on the data analysis.
- **Phase one judging will be based on your analysis of the above datasets.** Any additional data sources used to supplement your analysis should be cited on the poster.
- **Posters must be submitted by midnight on May 7, 2019.**
    - All posters should be prepared such that they can be printed on a 36"x48" poster board.

- Additional detailed instructions for poster submission will be made available a few weeks prior to the submission deadline. These instructions will be e-mailed to all participating teams and posted on the competition website.

POSTER EVALUATION CRITERIA

- Research Questions: The research questions are of interest and relevant, and the rational and the objectives are clearly stated.
- Use of Data: The research questions are addressed by using the existing data in a creative way, and the significance and limitations of the data have been explored.
- Methodology/Analysis: The methodology is clearly explained, and the analytical strategy is appropriate to answer relevant research questions.
- Significance of Findings: The conclusions are reasonable for the findings, critical thought is evident, and suggests future research.
- Format and Style: The poster is visually appealing, the figures and tables are easy to understand, and the text is written in clear English with proper grammar.
- Presenters: Presenters are confident, professional, engaging with telling their story, and answered questions appropriately.

CONTACT

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