Project Proposal

Impact of COVID-19 on Water Usage in Long Beach

Problem:

In March 2020, a Safer at Home Order was declared in Long Beach in response to the COVID-19 pandemic. This led to the closing of many businesses and a large portion of the population staying at home. Long Beach Water seeks to understand the impacts of the COVID-19 pandemic on water use.

Data Summary:

The Excel file All Account Reads contains water usage data for approximately 80,000 water customers for three consecutive years from July 2017 to July 2020. Records in this data set correspond with water usage for individual customer water accounts that is recorded approximately each month. Each sheet in the Excel file corresponds with 12 "monthly" water usage records of data for each customer account.

Data Column Definitions:

- LOC_ID – Unique customer account number
- WTR_RATE – Identifies the types of customer accounts
    - W-RSFD – Residential Single Family Dwelling
    - W-RDUPLX – Residential Duplex
    - W-RMF – Residential Multi-family
    - W-COM – Commercial
    - W-IND – Industrial
    - W-IRR – Irrigation
- WTR_DWEL_UNIT – Number of dwelling units associated with account. (W-COM "commercial" accounts with non-zero dwelling units are mixed-use properties that have both commercial and residential units using water from the same water account.)
- WTR_USE1 - WTR_USE12 – How much water use was recorded since the last meter read in units of hundred cubic feet (hcf). 1 hcf = 748 gallons.
- WTR_READ_DT1 - WTR_READ_DT12 – Date that water meter was read to record water used since previous read date. (E.g. if WTR_READ_DT1 is 7/19/2018, and WTR_READ_DT2 is 6/19/2018, and that means the value in WTR_USE1 for the record is reflective of how much water was used from 6/20/2018 through 7/19/2020.)
- WTR_READ_DAYS1 - WTR_READ_DAYS12 – Number of days that have elapsed between the associated read date and the previous read date.

Objectives:

1. Join the 3 separate years of data provided in a way that makes it possible to query and produce analysis/reports showing a continuous 3-year trend of water use for each individual account.

2. Develop a solution to assign water use to a particular month. (There is no right or wrong answer to this task, but we ask that you describe the methodology you use for assigning water usage for each month. See the sheet in the Excel file titled 'Sample Reads' for a visual explanation of the data challenges.)
    a. A challenge with this data set is that meter reads do not only occur on the last day of each month and can occur on any day of the month. A meter read can happen during the middle of a month, July 15 for example, and therefore the water usage associated with that read is representative of the water used between the latter half of June and the first half of July.
    b. Similarly, a meter may have a meter read date of July 1. In this case, even though the meter read date is in July, the associated water usage from that read is almost entirely June water use.
    c. Some accounts may have a missing "monthly" read, so therefore the next read may be representative of water use for two "months". An example of this would be an account having a read on July 15, a blank read in August and another read on September 15. In this instance, the water use associated with the September 15 read would be the total water used between July 16 through September 15.
3. Produce a report to present your findings on how water use has changed as a result of COVID-19. Assume March 1, 2020 is the beginning of COVID-19 affects to water use. a. Compare monthly water usage after COVID-19 against water usage in the same month of prior years. b. Identify how COVID-19 has specifically impacted each of the different types of customer accounts (i.e. W-RSFD, W-COM, etc.). c. Present any additional interesting trends you can identify in the data.