Team Mini Project: Alternative Fueling Locations
DS450-01
Data Science Senior Capstone

Project Goal: To create a set of dashboards to display information about alternative fuels and alternative fueling locations in the United States.

Scenario: Your team works for an environmental think tank named 21st Century Environmental Policy (21CEP). The group works on various analysis projects across the spectrum of environmental policy including alternative fuels such as compressed natural gas (CNG), ethanol (E85), propane/liquefied petroleum gas (LPG), biodiesel (B20 and above), electric vehicle charging, hydrogen, and liquefied natural gas (LNG). Your team has been approached by one of the policy analysts to develop a set of dashboards that provides users with a quick graphical view of alternative fuel locations (AFL) data across the United States. They want to be able to view data in a variety of ways at both the federal, regional, and state levels.

Instructions: Using the latest data from the U.S. Department of Energy on Alternative Fuel Locations (https://catalog.data.gov/dataset/alternative-fueling-station-locations-422f2). You will generate a set of dashboards according to the following specifications:

You must use either PowerBI or Tableau for this project. Either is fine, your organization has access to both. However, do not mix them; use or the other. You will create several files to group visualizations together (**see below**). If you use Tableau they will be .twb files. If you used PowerBI, they will be .pbix files.

United States

You will create one dashboard file that includes visualization for the entire United States. The file should be named **US_AFL.xxx** where **xxx** is the file extension used by Tableau or PowerBI as appropriate. The file should contain the following visualizations.

- A map of the continental United States that displays a dot for each AFL, colored coded by the Fuel Type Code.
- A map of Alaska that displays a dot for each AFL, colored coded by the Fuel Type Code.
- A map of Hawaii that displays a dot for each AFL, colored coded by the Fuel Type Code.
- A map of the continental United States for each Fuel Type Code by itself (e.g. BD, CNG, E85, etc.) You should have seven versions – one for each type of AF.
- A map of Alaska for each Fuel Type Code by itself (e.g. BD, CNG, E85, etc.) that displays a dot for each AFL.
- A map of Hawaii for each Fuel Type Code by itself (e.g. BD, CNG, E85, etc.) that displays a dot for each AFL.

Regions

You will create five (5) dashboard files, one for each of the five generally accepted regions of the United States which include West, Midwest, Southwest, Southeast, and Northeast. The PDF attached to this assignment shows what states are in each of these regions. You can put Washington DC with the Northeast and Puerto Rico with the Southeast. The files should be named **WEST_AFL.xxx**,

MIDWEST.xxx, **SOUTHWEST.xxx**, **SOUTHEAST.xxx**, and **NORTHEAST.xxx** where **xxx** is the file extension used by Tableau or PowerBI as appropriate. The files should contain the following visualizations.

- A map for the region that displays a dot for each AFL location, colored coded by the Fuel Type Code.
- A map for the region and each type of alternative fuel (CNG, E85, LPG, B20, EVC, hydrogen, and LNG) that displays a dot for each AFL. You should have seven versions – one for each type of AF.
- Several part-to-a-whole graphs for the region for Fuel Type Code. There should be approximately seven (7) of these graphs per region. The goal is to see the breakdown of AFLs by each type of alternative fuel (count). You can use bar graphs, bubble charts, or tree maps. **No donut charts or pie charts.** You do not have to use the same graph type in every file. Some might work better than others depending on data density.

Electric Vehicles

21CEP is particularly interested in electric vehicles. You will create one dashboard file that includes visualization just for this data. The file should be named **EV_AFL.xxx** where **xxx** is the file extension used by Tableau or PowerBI as appropriate. The file should contain the following visualizations.

- Maps for the continental United States, Alaska, Hawaii, and each region that displays a dot for each EV Network location color-coded by EV Network. There should be seven (7) different maps.
- Part-to-a-whole graphs for the EV Network information counts, one graph for the continental United States, Alaska, Hawaii, and each region.

Specific State Data

21CEP is also interested in viewing the data for the ten (10) most populous US States. You will create one dashboard file that includes visualization just for this data. The file should be named **TOP10_AFL.xxx** where **xxx** is the file extension used by Tableau or PowerBI as appropriate. *You will need to find the states yourself. Ensure you cite your source.* The file should contain the following visualizations.

- Maps for each state that display a dot for each AFL, colored coded by the Fuel Type Code.
- Part-to-a-whole graphs of AFL counts for each state.

Note Every visualization in all files should have titles, properly labeled axes, readable labels, appropriate color combinations, etc. They should be as easy to read and understand as possible.

The output for this project should be:

- A two (2) to three (3) page paper that explains why you chose the toolset you used for this project, describes the process you used to generate your visualizations, why chose the specific part-to-a-whole graphs you generated, and any problems you encountered generating any of the visualizations. That discussion should also include problems with cleaning or preparing the data.

  The paper should have 1" margins, use 10-pt Times New Roman font, be double-spaced and have the following heading at the top:

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- A three (3) to five (5)-minute video presentation of your dashboard(s) that incorporates elements of your paper. You do not have to present every map and graph. All members of your team should be in the video. Use a narrated PowerPoint to generate the video and upload it on video.bellarmine.edu. Include a link to the video in your README.md file under the heading ***Alternative Fuel Locations***.
- All .twb or .pbix files.
- Any Python or R scripts you used to clean/prepare the data.

Submission: Create a new directory in your git repository of this project and put all your project files in that directory. Upload a link to your GitHub repository in the area provided on Moodle by the deadline specified.