

# NATIONAL PETROLEUM COUNCIL

**DRAFT**

Future Transportation Fuels Study

## Vehicle Attribute Model User's Guide

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This Vehicle Attribute Model was created in 2011 in support of the Future Transportation Fuels Study (FTF Study) of the National Petroleum Council. Its purpose is to generate vehicle price and fuel economy outputs over a range of technology and fuel price cases for the years 2015, 2020, ..., 2050. Detail on the methodology used in creating the model can be found in the appendix to the report. The purpose of this guide is to provide information on the structure of the model and guidance on how to use it.

The model is a self-contained Excel workbook titled Inputs.xls with no external links. There are eight operational worksheets, one for each propulsion technology pathway included in the FTF Study. These worksheets are labeled Diesel, Conv, CNGV, HEV, PHEV10, PHEV40, BEV100, and FCEV. A description of each pathway can be found in the FTF Study report appendix.

Within each operational worksheet is a link to the macro that generates the output tables. This is in a graphic labeled “Run macro to compute tables.” The macro cycles through all of the options represented by the selection boxes in row 5 and writes the results for each “case” into the output tables. The macro for each worksheet will run independently of the macros in the other sheets. However, the PHEV10 worksheet pulls results from the HEV worksheet, so the PHEV10 macro should always be run after HEV changes are made and the HEV macro is run. The macros also write a copy of the output table data to the AllData worksheet. This worksheet consolidates the results from all worksheets.

Within each operational worksheet, key inputs are shaded in green, and inputs from other sheets are shaded in blue. Most of the key inputs were drawn from the AEO2010 baseline cases or the individual pathway chapters work of the FTF Study. These input values can be changed and the macros rerun for alternative sets of results. The effect of changes can also be explored by changing the parameter values and then selecting case parameters manually in row 5. The key outputs of vehicle price and fuel economy are in red toward the bottom of each worksheet (before the output tables). Making manual changes to the parameters in row 5 will not affect the macros. The macros loop through the full range of parameters and return all parameters to the default setting when finished.

The Swimlanes worksheet compares the output values on a case-by-case basis. Case parameters are selected using the drop-down boxes under the graphs. The key for the coding of case lookup values is documented below the parameter selection boxes. All of the graphed values are read off of the AllData worksheet.

The Vehicle Choice Model queries this Vehicle Attribute Model for its inputs. Values are written into the output box at the bottom of each operational worksheet to select a specific case. These values are written by the macro in the matrixCollection.xlsm Excel workbook. The Vehicle Choice Model links then read the selected case values from the output box. The Vehicle Attribute Model is passive in this exchange – it is simply being queried for results.

Points to keep in mind when using the model:

1. All fuel economy values are in “test” fuel economy, and on-road fuel economy is assumed to be 80% of test fuel economy per the convention adopted by the VISION tool. For example, the BEV100 is defined as having a 100-mile on road range, and it is thus modeled with a range requirement of 125 miles based on test fuel economy.
2. Electric “gallon gasoline equivalent” is defined in the model as 33.7 kWh (based on gasoline lower heating value). This differs from the VISION tool definition of 36.6 kWh (based on gasoline higher heating value). Electric fuel economy values must be converted for use in VISION.
3. Some of the macros will require several minutes to run. Screen updating has been turned off, so there will be no update of output values until the macro has finished running.
4. Adding rows to the operational worksheets below row 5 will not affect the macros. The macros use the row references in rows 3 and 5 to locate their proper input and output rows. However, adding columns can cause the macros to miss inputs or write outputs into the wrong location unless the macro code is modified.
5. The macros write directly into worksheet cells, and therefore have the potential to overwrite parts of the model. Best practice is to always save the file before running the macros.
6. When the model is being used as part of the FTF Study Integrated Model Set it interacts with the matrixCollection.xlsm, VCM.xlsm, and CaseResults.xls Excel workbooks. To work correctly as part of this model set, the file name must be Inputs.xls.