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**Project Overview:**

* **Objective 1:** The purpose of this data is to compare how fuel efficiency has improved over time.
* **Objective 2:** To determine the efficiency value of moving to electric vehicles.
* **Data Source 1:** <https://www.fueleconomy.gov/feg/download.shtml>

**Data Collection and Loading:**

* **Initial data:** Data Source 1 was collected in csv format.

About the Data:

**Data Description**

**vehicle**

* [atvtype](https://www.fueleconomy.gov/feg/ws/index.shtml#atvtype) - type of alternative fuel or advanced technology vehicle
* barrels08 - annual petroleum consumption in barrels for [fuelType1](https://www.fueleconomy.gov/feg/ws/index.shtml#fuelType1) [(1)](https://www.fueleconomy.gov/feg/ws/index.shtml#ft1)
* barrelsA08 - annual petroleum consumption in barrels for [fuelType2](https://www.fueleconomy.gov/feg/ws/index.shtml#fuelType2) [(1)](https://www.fueleconomy.gov/feg/ws/index.shtml#ft1)
* charge120 - time to charge an electric vehicle in hours at 120 V
* charge240 - time to charge an electric vehicle in hours at 240 V
* city08 - city MPG for [fuelType1](https://www.fueleconomy.gov/feg/ws/index.shtml#fuelType1) [(2)](https://www.fueleconomy.gov/feg/ws/index.shtml#ft2), [(11)](https://www.fueleconomy.gov/feg/ws/index.shtml#ft11)
* city08U - unrounded city MPG for [fuelType1](https://www.fueleconomy.gov/feg/ws/index.shtml#fuelType1) [(2)](https://www.fueleconomy.gov/feg/ws/index.shtml#ft2), [(3)](https://www.fueleconomy.gov/feg/ws/index.shtml#ft3)
* cityA08 - city MPG for [fuelType2](https://www.fueleconomy.gov/feg/ws/index.shtml#fuelType2) [(2)](https://www.fueleconomy.gov/feg/ws/index.shtml#ft2)
* cityA08U - unrounded city MPG for [fuelType2](https://www.fueleconomy.gov/feg/ws/index.shtml#fuelType2) [(2)](https://www.fueleconomy.gov/feg/ws/index.shtml#ft2), [(3)](https://www.fueleconomy.gov/feg/ws/index.shtml#ft3)
* cityCD - city gasoline consumption (gallons/100 miles) in charge depleting mode [(4)](https://www.fueleconomy.gov/feg/ws/index.shtml#ft4)
* cityE - city electricity consumption in kw-hrs/100 miles
* cityMpk - city miles per Kilogram for Hydrogen
* cityUmpk - unrounded city miles per Kilogram for Hydrogen
* cityUF - EPA city utility factor (share of electricity) for PHEV
* co2 - tailpipe CO2 in grams/mile for [fuelType1](https://www.fueleconomy.gov/feg/ws/index.shtml#fuelType1) [(5)](https://www.fueleconomy.gov/feg/ws/index.shtml#ft5)
* co2A - tailpipe CO2 in grams/mile for [fuelType2](https://www.fueleconomy.gov/feg/ws/index.shtml#fuelType2) [(5)](https://www.fueleconomy.gov/feg/ws/index.shtml#ft5)
* co2TailpipeAGpm - tailpipe CO2 in grams/mile for [fuelType2](https://www.fueleconomy.gov/feg/ws/index.shtml#fuelType2) [(5)](https://www.fueleconomy.gov/feg/ws/index.shtml#ft5)
* co2TailpipeGpm- tailpipe CO2 in grams/mile for [fuelType1](https://www.fueleconomy.gov/feg/ws/index.shtml#fuelType1) [(5)](https://www.fueleconomy.gov/feg/ws/index.shtml#ft5)
* comb08 - combined MPG for [fuelType1](https://www.fueleconomy.gov/feg/ws/index.shtml#fuelType1) [(2)](https://www.fueleconomy.gov/feg/ws/index.shtml#ft2), [(11)](https://www.fueleconomy.gov/feg/ws/index.shtml#ft11)
* comb08U - unrounded combined MPG for [fuelType1](https://www.fueleconomy.gov/feg/ws/index.shtml#fuelType1) [(2)](https://www.fueleconomy.gov/feg/ws/index.shtml#ft2), [(3)](https://www.fueleconomy.gov/feg/ws/index.shtml#ft3)
* combA08 - combined MPG for [fuelType2](https://www.fueleconomy.gov/feg/ws/index.shtml#fuelType2) [(2)](https://www.fueleconomy.gov/feg/ws/index.shtml#ft2)
* combA08U - unrounded combined MPG for [fuelType2](https://www.fueleconomy.gov/feg/ws/index.shtml#fuelType2) [(2)](https://www.fueleconomy.gov/feg/ws/index.shtml#ft2), [(3)](https://www.fueleconomy.gov/feg/ws/index.shtml#ft3)
* combE - combined electricity consumption in kw-hrs/100 miles
* combMpk - combined miles per Kilogram for Hydrogen
* combUmpk - unrounded combined miles per Kilogram for Hydrogen
* combinedCD - combined gasoline consumption (gallons/100 miles) in charge depleting mode [(4)](https://www.fueleconomy.gov/feg/ws/index.shtml#ft4)
* combinedUF - EPA combined utility factor (share of electricity) for PHEV
* cylinders - engine cylinders
* displ - engine displacement in liters
* [drive](https://www.fueleconomy.gov/feg/ws/index.shtml#drive) - drive axle type
* [emissionsList](https://www.fueleconomy.gov/feg/ws/index.shtml#emissions)
* engId - EPA model type index
* eng\_dscr - engine descriptor; see http://www.fueleconomy.gov/feg/findacarhelp.shtml#engine
* evMotor - electric motor (kw-hrs)
* feScore - EPA Fuel Economy Score (-1 = Not available)
* fuelCost08 - annual fuel cost for [fuelType1](https://www.fueleconomy.gov/feg/ws/index.shtml#fuelType1) ($) [(7)](https://www.fueleconomy.gov/feg/ws/index.shtml#ft7)
* fuelCostA08 - annual fuel cost for [fuelType2](https://www.fueleconomy.gov/feg/ws/index.shtml#fuelType2) ($) [(7)](https://www.fueleconomy.gov/feg/ws/index.shtml#ft7)
* fuelType - fuel type with [fuelType1](https://www.fueleconomy.gov/feg/ws/index.shtml#fuelType1) and [fuelType2](https://www.fueleconomy.gov/feg/ws/index.shtml#fuelType2) (if applicable)
* fuelType1 - fuel type 1. For single fuel vehicles, this will be the only fuel. For dual fuel vehicles, this will be the conventional fuel.
* fuelType2 - fuel type 2. For dual fuel vehicles, this will be the alternative fuel (e.g. E85, Electricity, CNG, LPG). For single fuel vehicles, this field is not used
* ghgScore - EPA GHG score (-1 = Not available)
* ghgScoreA - EPA GHG score for dual fuel vehicle running on the alternative fuel (-1 = Not available)
* guzzler- if G or T, this vehicle is subject to the gas guzzler tax
* highway08 - highway MPG for [fuelType1](https://www.fueleconomy.gov/feg/ws/index.shtml#fuelType1) [(2)](https://www.fueleconomy.gov/feg/ws/index.shtml#ft2), [(11)](https://www.fueleconomy.gov/feg/ws/index.shtml#ft11)
* highway08U - unrounded highway MPG for [fuelType1](https://www.fueleconomy.gov/feg/ws/index.shtml#fuelType1) [(2)](https://www.fueleconomy.gov/feg/ws/index.shtml#ft2), [(3)](https://www.fueleconomy.gov/feg/ws/index.shtml#ft3)
* highwayA08 - highway MPG for [fuelType2](https://www.fueleconomy.gov/feg/ws/index.shtml#fuelType2) [(2)](https://www.fueleconomy.gov/feg/ws/index.shtml#ft2)
* highwayA08U - unrounded highway MPG for [fuelType2](https://www.fueleconomy.gov/feg/ws/index.shtml#fuelType2) [(2)](https://www.fueleconomy.gov/feg/ws/index.shtml#ft2),[(3)](https://www.fueleconomy.gov/feg/ws/index.shtml#ft3)
* highwayCD - highway gasoline consumption (gallons/100miles) in charge depleting mode [(4)](https://www.fueleconomy.gov/feg/ws/index.shtml#ft4)
* highwayE - highway electricity consumption in kw-hrs/100 miles
* highwayMpk - highway miles per Kilogram for Hydrogen
* highwayUmpk - unrounded highway miles per Kilogram for Hydrogen
* highwayUF - EPA highway utility factor (share of electricity) for PHEV
* hlv - hatchback luggage volume (cubic feet) [(8)](https://www.fueleconomy.gov/feg/ws/index.shtml#ft8)
* hpv - hatchback passenger volume (cubic feet) [(8)](https://www.fueleconomy.gov/feg/ws/index.shtml#ft8)
* id - vehicle record id
* lv2 - 2 door luggage volume (cubic feet) [(8)](https://www.fueleconomy.gov/feg/ws/index.shtml#ft8)
* lv4 - 4 door luggage volume (cubic feet) [(8)](https://www.fueleconomy.gov/feg/ws/index.shtml#ft8)
* make - manufacturer (division)
* mfrCode - 3-character manufacturer code
* model - model name (carline)
* mpgData - has My MPG data; see [yourMpgVehicle](https://www.fueleconomy.gov/feg/ws/index.shtml#ympgVehicle) and [yourMpgDriverVehicle](https://www.fueleconomy.gov/feg/ws/index.shtml#ympgDriverVehicle)
* phevBlended - if true, this vehicle operates on a blend of gasoline and electricity in charge depleting mode
* pv2 - 2-door passenger volume (cubic feet) [(8)](https://www.fueleconomy.gov/feg/ws/index.shtml#ft8)
* pv4 - 4-door passenger volume (cubic feet) [(8)](https://www.fueleconomy.gov/feg/ws/index.shtml#ft8)
* rangeA - EPA range for [fuelType2](https://www.fueleconomy.gov/feg/ws/index.shtml#fuelType2)
* rangeCityA - EPA city range for [fuelType2](https://www.fueleconomy.gov/feg/ws/index.shtml#fuelType2)
* rangeHwyA - EPA highway range for [fuelType2](https://www.fueleconomy.gov/feg/ws/index.shtml#fuelType2)
* trans\_dscr - transmission descriptor; see http://www.fueleconomy.gov/feg/findacarhelp.shtml#trany
* trany - transmission
* UCity - unadjusted city MPG for [fuelType1](https://www.fueleconomy.gov/feg/ws/index.shtml#fuelType1); see the description of the [EPA test procedures](https://www.fueleconomy.gov/feg/fe_test_schedules.shtml)
* UCityA - unadjusted city MPG for [fuelType2](https://www.fueleconomy.gov/feg/ws/index.shtml#fuelType2); see the description of the [EPA test procedures](https://www.fueleconomy.gov/feg/fe_test_schedules.shtml)
* UHighway - unadjusted highway MPG for [fuelType1](https://www.fueleconomy.gov/feg/ws/index.shtml#fuelType1); see the description of the [EPA test procedures](https://www.fueleconomy.gov/feg/fe_test_schedules.shtml)
* UHighwayA - unadjusted highway MPG for [fuelType2](https://www.fueleconomy.gov/feg/ws/index.shtml#fuelType2); see the description of the [EPA test procedures](https://www.fueleconomy.gov/feg/fe_test_schedules.shtml)
* [VClass](https://www.fueleconomy.gov/feg/ws/index.shtml#VClass) - EPA vehicle size class
* year - model year
* youSaveSpend - you save/spend over 5 years compared to an average car ($). Savings are positive; a greater amount spent yields a negative number. For dual fuel vehicles, this is the cost savings for gasoline
* sCharger - if S, this vehicle is supercharged
* tCharger - if T, this vehicle is turbocharged
* c240Dscr - electric vehicle charger description
* charge240b - time to charge an electric vehicle in hours at 240 V using the alternate charger
* c240bDscr - electric vehicle alternate charger description
* createdOn - date the vehicle record was created
* modifiedOn - date the vehicle record was last modified
* startStop - vehicle has stop-start technology (Y, N, or blank for older vehicles)
* phevCity - EPA composite gasoline-electricity city MPGe for plug-in hybrid vehicles
* phevHwy - EPA composite gasoline-electricity highway MPGe for plug-in hybrid vehicles
* phevComb - EPA composite gasoline-electricity combined city-highway MPGe for plug-in hybrid vehicles
* basemodel - base model name

**emissions**

* emissionsList
  + emissionsInfo
    - efid - engine family ID
    - id - vehicle record ID (links emission data to the vehicle record)
    - [salesArea](https://www.fueleconomy.gov/feg/ws/index.shtml#salesArea) - EPA sales area code
    - score - EPA 1-10 smog rating for [fuelType1](https://www.fueleconomy.gov/feg/ws/index.shtml#fuelType1)
    - scoreAlt - EPA 1-10 smog rating for [fuelType2](https://www.fueleconomy.gov/feg/ws/index.shtml#fuelType2)
    - [smartwayScore](https://www.fueleconomy.gov/feg/ws/index.shtml#smartwayScore) - SmartWay Code
    - [standard](https://www.fueleconomy.gov/feg/ws/index.shtml#standard) - Vehicle Emission Standard Code
    - [stdText](https://www.fueleconomy.gov/feg/ws/index.shtml#standard2) - Vehicle Emission Standard

**fuel prices**

* fuelPrices
  + midgrade - $ per gallon of midgrade gasoline[(9)](https://www.fueleconomy.gov/feg/ws/index.shtml#ft9)
  + premium - $ per gallon of premium gasoline[(9)](https://www.fueleconomy.gov/feg/ws/index.shtml#ft9)
  + regular - $ per gallon of regular gasoline[(9)](https://www.fueleconomy.gov/feg/ws/index.shtml#ft9)
  + cng - $ per gallon of gasoline equivalent (GGE) of compressed natural gas[(10)](https://www.fueleconomy.gov/feg/ws/index.shtml#ft10)
  + diesel - $ per gallon of diesel[(9)](https://www.fueleconomy.gov/feg/ws/index.shtml#ft9)
  + e85 - $ per gallon of E85[(10)](https://www.fueleconomy.gov/feg/ws/index.shtml#ft10)
  + electric - $ per kw-hr of electricity[(10)](https://www.fueleconomy.gov/feg/ws/index.shtml#ft10)
  + lpg - $ per gallon of propane[(10)](https://www.fueleconomy.gov/feg/ws/index.shtml#ft10)

**yourMpgVehicle - summary of all My MPG data for this vehicle**

* avgMpg - harmonic mean of average MPG shared by fueleconomy.gov users
* cityPercent - average % city miles
* highwayPercent - average % highway miles
* maxMpg - maximum user average MPG
* minMpg - minimum user average MPG
* recordCount - number of records for this vehicle
* vehicleId - vehicle record id (links My MPG data to the vehicle record)

**yourMpgDriverVehicle - summary of driver data reported for this vehicle**

* cityPercent - user average % city miles
* highwayPercent - user average % highway miles
* lastDate - date records were last updated (yyyy-mm-dd)
* mpg - average MPG
* state - state of residence
* vehicleId - vehicle record ID (links My MPG data to the vehicle record)

About Data Foot Notes:

**Footnotes:**

(1) 1 barrel = 42 gallons. Petroleum consumption is estimated using the Department of Energy's GREET model and includes petroleum consumed from production and refining to distribution and final use. Vehicle manufacture is excluded.

(2) The MPG estimates for all 1985–2007 model year vehicles and some 2011–2016 model year vehicles have been updated. [[](https://www.fueleconomy.gov/feg/ratings.shtml)Learn More](https://www.fueleconomy.gov/feg/ratings.shtml)

(3) Unrounded MPG values are not available for some vehicles.

(4) This field is only used for blended PHEV vehicles.

(5) For model year 2013 and beyond, tailpipe CO2 is based on EPA tests. For previous model years, CO2 is estimated using an EPA emission factor. -1 = Not Available.

(6) For PHEVs this is the charge depleting range.

(7) Annual fuel cost is based on 15,000 miles, 55% city driving, and the price of fuel used by the vehicle.

(8) Interior volume dimensions are not required for two-seater passenger cars or any vehicle classified as truck which includes vans, pickups, special purpose vehicles, minivan and sport utility vehicles.

(9) Fuel prices for gasoline and diesel fuel are from the Energy Information Administration and are usually updated weekly.

(10) Fuel prices for E85, LPG, and CNG are from the Office of Energy Efficiency and Renewable Energy's Alternative Fuel Price Report and are updated quarterly.

(11) For electric and CNG vehicles this number is MPGe (gasoline equivalent miles per gallon).