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| To: | Students buying either gas or electric vehicles |
| From: | Odiscious Dozier |
| Subject: | Deciding between electric and gas engine vehicles |
| Date: | April 10, 2014 |
| cc: | Dr. Laurie Anderson |

**Introduction**

Gasoline, electric, hybrid (gasoline and electric), and hydrogen are fuel types that are currently available for vehicles. This memo is to help you, as a student, decide which type of vehicle would best fit your needs. It uses the following criteria: manufacturer’s suggested retail price, annual maintenance costs, driving ranges, and types of power required.

**Gasoline**

The manufacturers suggest retail price for conventional vehicles range from $14,770 to $120,000. This range does not include extravagant vehicles or vehicles obtained by any other means than at a local dealership. This price range does not include taxes and licenses; as, they will vary on the state in which you reside.[8]

Annual Maintenance costs for these vehicles range from $200 - $1000 per year. Because the vehicle’s engine has an internal combustion system, its basic services require that of: air filter changes, oil changes, transmission fluid, valve adjustments, timing belt, tuning, and visual inspections. [9][10]

The driving range for the conventional vehicle depends on these factors: the individual driver, location, time of day, and climate. In standard driving conditions, these vehicles will travel 29 miles per gallon, in the city, and 40 miles per gallon on the highway. The distance traveled before refueling ranges from 381 miles to 424 miles. [11]

The three different types of fuels used to power these vehicles are: regular unleaded, unleaded plus, and unleaded supreme. All of which, are common to the market place and found within the vehicle’s refueling range. Whether in city or driving across country, the same is true. [12]

**Electric**

The manufacturers suggest retail price for electric vehicles range from $27,750 to $91,070. This range does not include extravagant vehicles or vehicles obtained by any other means than at a local dealership. This price range does not include taxes and licenses; as, they will vary on the state in which you reside. [1]

Annual Maintenance costs for electric cars range from $0 - $250 per year. Because the vehicle’s engine has no internal combustion, its services require that of: air filter changes, battery lead cleaning, and visual inspections. [2]

The driving range of an electric vehicle depends on quite a few factors; such as: the individual driver, location, and climate. In standard driving conditions, the vehicles will travel 126 miles per gallon electric, in the city, and 101 per gallon electric on the highway. The distance traveled before recharging ranges from 68 miles to 82 miles. [3]

There are three different types of power ratings used to charge electric vehicles. Charging with a 110 volt charge takes 18 to 20 hours. With a 220 volt power source, charging times range from 3 – 4 hours. A 440 volt power source takes a range of 20 to 30 minutes to charge the batteries up to 80 percent. [13]

The lesser, 110 volt charge, is provided with the residential charging unit. This unit is sold separately from the vehicle and requires little to now maintenance. The two larger power sources are provided at commercial charging stations and variants are continuously being brought to market. [13]

**Hybrid**

The manufacturers suggest retail price for hybrid vehicles range from $18,600 to $119,910. This range does not include extravagant vehicles or vehicles obtained by any other means than at a local dealership. Also, this price range does not include taxes and licenses; as, they will vary depending upon the state in which you reside. [4]

Annual Maintenance costs for hybrid vehicles range from $128 - $496 per year and as of 2006, have a unique maintenance schedule. Because the vehicle’s internal combustion engine is combined with an electric motor, its services require that of the traditional fuel injected vehicle and additional: electric motor air filter changes, battery lead cleaning, and visual inspections. [5]

The driving range of a hybrid vehicle depends on quite a few factors; such as: the individual driver, location, and climate. In standard driving conditions, the vehicles will travel 44 miles per gallon, in the city, and 47 miles per gallon on the highway. The distance traveled before refueling ranges from 580 miles to 620 miles. [6]

The three different types of fuels used to power these vehicles are: regular unleaded, unleaded plus, and unleaded supreme. All of which, are common to the market place and found within the vehicle’s refueling range. Whether in city or driving across country, the same is true. [7]

**Hydrogen**

The manufacturers suggest retail price for hydrogen vehicles start from $19,995. This range does not include specifics because, it is new to market and currently only available in the Los Angeles area. The price does not include taxes and licenses; as, they will vary on the state in which you reside. [14]

Annual Maintenance costs for these vehicles have no current data. Because the vehicle’s engine has no internal combustion, its services will be similar to that of the electric vehicle. Since the vehicle is, currently, being introduced to the market, there is little to no data available for maintenance. [14]

The driving range for the hybrid vehicle depends on these factors: the individual driver, location, time of day, and climate. In standard driving conditions, these vehicles will travel 60 miles per gallon, in the city, and 60 miles per gallon on the highway. The distance traveled before refueling is 240 miles. [14]

Compressed hydrogen fuel is the only fuel source available for this vehicle. This fuel type is not common in the market place, at this time. Depending on the area in which you reside, travel may be limited by the lack of refueling stations equipped with hydrogen fuel. [14]

Table 1 illustrates the criterion for each of the vehicle types.

Table 1

| **Criteria** | **Electric** | **Hybrid - Electric/Gas** | **Gas** | **Hydrogen** (New to market – limited supply; limited data) |
| --- | --- | --- | --- | --- |
| **Cost Range** (New) | $25,750 - $91,070 | $18,600 - $119,910 | $14,770 - $120,000 | $19,995 – no data |
| **Annual Maintenance Costs** | $0 - $250 | $128 - $490.76 | $200 - $1000 | No data |
| **Driving Range** (miles) | 101/126  City/Hwy  *68 – 82 miles before recharge* | 50/47  City/Hwy  *580 –743 miles before refueling* | 36/40  City/Hwy  *381 - 424 miles before refueling* | 60/60  City/Hwy  *240 miles before refueling* |
| **Power Source** | Electricity options:  110v source:  18 – 20 hours to charge  220v source:  3-4 hours to charge  440v source:  20 – 30 minutes from empty to about 80% | 5 – 10 minutes  Unleaded:  87 Octane rating  Unleaded Plus:  89 Octane Rating  Unleaded Premium:  91 Octane rating | 5 – 10 minutes  Unleaded:  87 Octane rating  Unleaded Plus:  89 Octane Rating  Unleaded Premium:  91 Octane rating | 5 – 10 minutes  Compressed Hydrogen Gas |

**Citations**

[1] "Electric Car Price Guide: Every 2013-2014 Plug-In Car, With Specs." *Green Car Reports*. N.p., n.d. Web. 29 Apr. 2014.

[2] "Electric Car Maintenance A Third Cheaper Than Combustion Vehicles?" *Green Car Reports*. N.p., n.d. Web. 29 Apr. 2014.

[3] "2014 Nissan LEAFÂ® Electric Car Specs." *Nissan USA*. N.p., n.d. Web. 29 Apr. 2014. [4] "New [4]”New Cars." *Motor Trend*. N.p., n.d. Web. 22 Apr. 2014.

[5] "Hybrid Cars Pros and Cons – Benefits & Problems." *Money Crashers*. N.p., n.d. Web. 29 Apr. 2014

[6] Honda Civic. *2013 Civic*. N.p.: Honda Civic, n.d. Web. 22 Apr. 2014.

[7] "Gasoline." *Chevron*. N.p., n.d. Web. 29 Apr. 2014.

[8] "Vehicles Found." *Car Finder*. N.p., n.d. Web. 29 Apr. 2014.

[9] "How Stuff Works - How Much Does Auto Maintenance Cost over Time?" *HowStuffWorks*. N.p., n.d. Web. 29 Apr. 2014.

[10] "Electric Car Maintenance A Third Cheaper Than Combustion Vehicles?" *Green Car Reports*. N.p., n.d. Web. 29 Apr. 2014.

[11] "2014 Nissan LEAFÂ® Electric Car Specs." *Nissan USA*. N.p., n.d. Web. 29 Apr. 2014.

[12]N.p., n.d. Web. 29 Apr. 2014. <]http://www.chevronwithtechron.com/products/gasoline.aspx>.

[13] "The REView." *The REView*. N.p., n.d. Web. 29 Apr. 2014. <http://thereview.chargepoint.com/>.

[14]Royce, John. “Hydrogen vehicle data collection” Telephone interview. 04 Apr. 2014.