

Electric Cars – Everything You Wanted to Know in Ten Minutes or Less

Presentation to the Sierra Club Rappahanock Group
during [National Electric Drive Week](#)

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Electric Cars – Is the Future Now?

- Each year, American passenger cars and trucks burn 121 billion gallons of gasoline and spew upwards of 3 trillion pounds of carbon pollution into the air.
- Electric vehicles (EVs) are cleaner, greener, and more fun to drive.
- 43% of Northeastern U. S. drivers could use current EVs
- Federal tax credit (nothing in Virginia!)
- Typically less air pollution
- Typically less operating expense
- But...limited range and few away from home charging options locally



Emissions depends on utilization

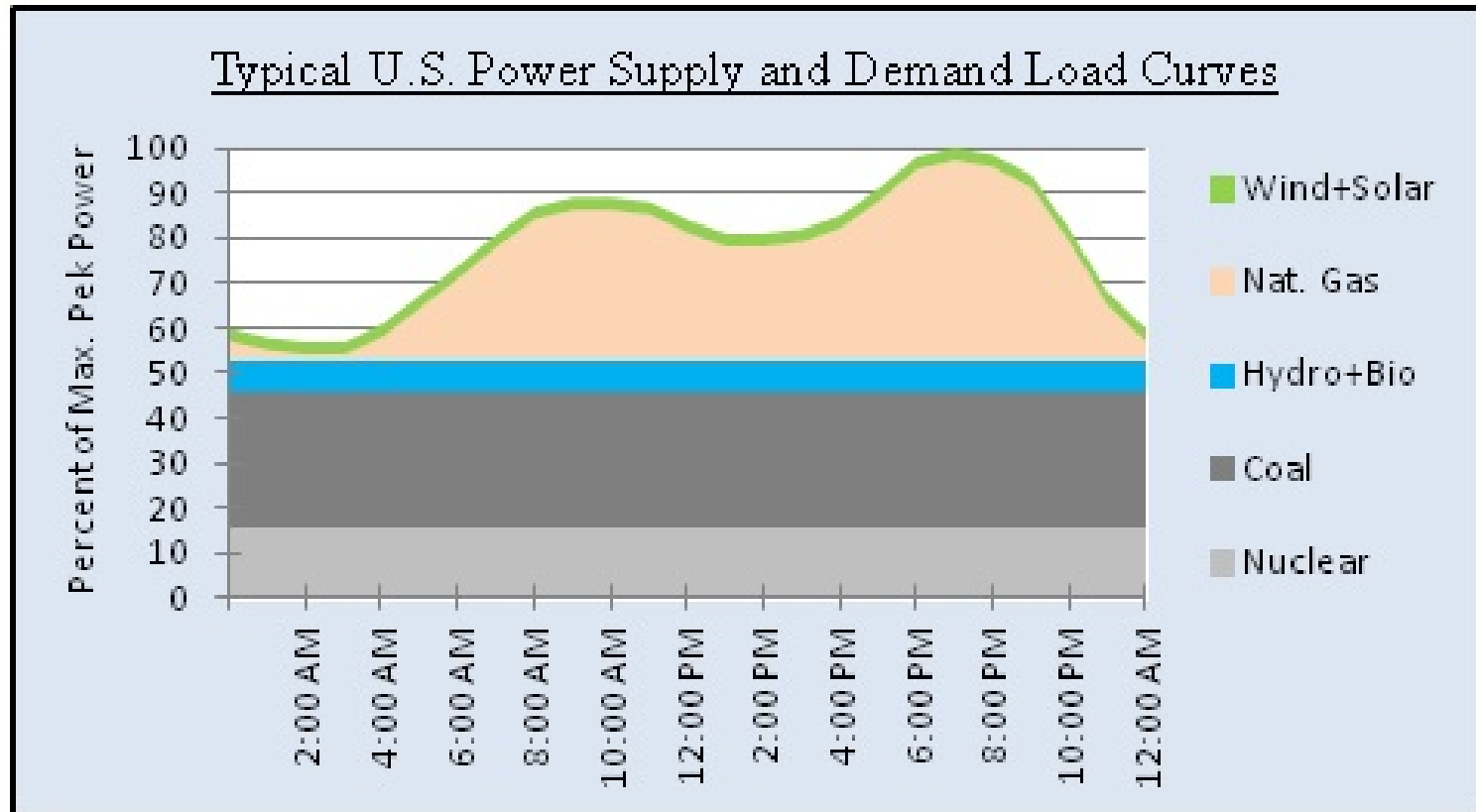
Emissions and Fuel Cost for a 100-Mile Trip		
Vehicle (compact sedans)	Greenhouse Gas Emissions (pounds of CO2 equivalent)	Total Fuel Cost (U.S. Dollars)
Conventional	87 lb CO2	\$13.36
Hybrid	57 lb CO2	\$8.78
All-Electric	54 lb CO2	\$3.74

SOURCE: [U.S. DEPARTMENT OF ENERGY](#)

Depends on the electricity source !!!



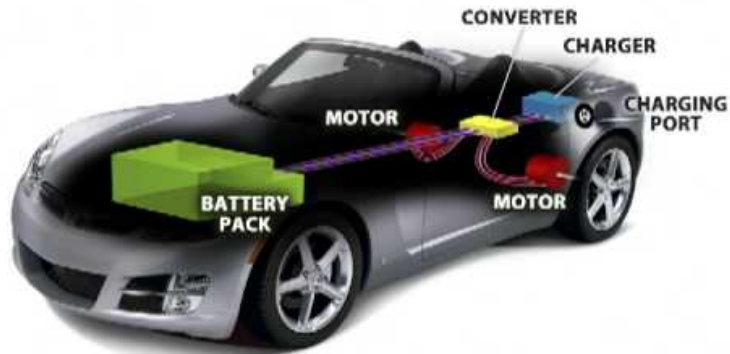
Emissions depends on electricity source



EVs are typically charged during off-peak hours

Operating Cost

Vehicle	Cost of Fuel	Fuel Cost per Mile
30 miles per gallon	\$3.00 per gallon	\$0.100
40 miles per gallon	\$2.20 per gallon	\$0.055
50 miles per gallon	\$1.95 per gallon	\$0.039
All-Electric (4.3 miles per kWh – about 120 mpge)	\$0.12 per kWh	\$0.028



Electric cars have fewer moving parts so overall maintenance costs are much less!

Current Electric Cars Are Best If You...

- Have off-street parking with access to an electrical outlet or plug-in electric vehicle charger at home.
- Do not currently need a vehicle with hauling or towing capacity
- Do not need to carry more than four passengers (five total occupants)
- Can live with limited range



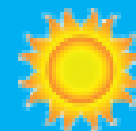
Who's selling What



The Electric Vehicle Association
of Greater Washington DC
evadc.org



2016
Electric Vehicle
Information Sheet



Zero S



Smart



Fiat 500e



LEAF



Bolt



Model S

	Base Price (USD) ¹	Net Price (USD) ²	Range (mi) ³	Batt. (kWh)	Speed (mph)	MPG equiv ⁴	Fuel / Mo. ⁴	QC ⁵
Zero S ZF9.8	\$10,995	\$9,895	91 ⁺	9.8 ⁺	95	475 ⁺	---	Y
Victory Empulse TT	\$19,999	\$17,999	94 ⁺	10.4	105 ⁺	---	\$19 ⁺	
Mitsubishi i (i-MiEV)	\$22,995	\$15,495	62	16	80	112	\$50	Y
Smart electric	\$23,000	\$17,500	68	17.6	78	107	\$50	
Chevy Spark EV	\$23,120	\$17,620	82	21.3	90	119	\$50	Y
VW e-Golf	\$28,995	\$21,495	83	24.2	87	116	\$46	Y
Ford Focus Electric	\$29,170	\$21,670	76	23	84	105	\$50	
Fiat 500e	\$31,800	\$24,300	84	24	85	112	\$50	
Kia Soul EV	\$31,950	\$24,450	93	27	90	105	\$50	Y
Nissan LEAF SV	\$34,200	\$26,700	107	30 ⁺	95	112	\$50	Y
Chevy Bolt (2017)	\$37,500	\$30,000	200 ⁺	60 ⁺	91	---	---	
Mercedes B250e	\$41,450	\$33,950	87	28	101	84	\$67	
BMW i3 (+ gas opt.)	\$42,400	\$34,900	81	22	93	124	\$46	Y
Tesla Model S	\$80,000	\$72,500	265	85 ⁺	140	89	\$62	Y

Electric



Empulse



Spark EV



i-MiEV



Sonata



Pacifica minivan



Power Steering

EVs are still few and far between



AUTOMAKER (some sell multiple EV models/brands)	TOTAL EV sales Jan- June, 2016	TOTAL Overall U.S. Car Model Sales	PERCENT EV sales of all U.S. Auto Sales
TESLA	19,030	19,030	100%
GENERAL MOTORS (Chevy, Cadillac)	12,803	1,438,915	0.84%
FORD	10,906	1,345,170	0.81%
BMW	6,214	153,436	4.05%
NISSAN	5,793	798,114	0.73%
VW AG (Audi, Volkswagen)	3,397	247,135	1.38%
FCA (Fiat, Chrysler)	2,220	1,152,259	0.19%
HYUNDAI	1,360	374,060	0.36%
PORSCHE	1,322	26,708	4.95%
VOLVO	1,006	36,653	2.75%
DAIMLER AG (Mercedes, Smart)	740	181,132	0.41%
KIA	613	328,327	0.19%
TOYOTA	42	1,197,800	0.00%
MITSUBISHI	20	51,934	0.04%

Which is better?











- Hybrids
 - Flexible usage and more range
- Electrics
 - With higher usage comes greater benefits
- More info:
 - <http://earthtechling.com/2013/08/are-hybrids-or-electric-cars-better-for-the-environment/>
 - <http://science.howstuffworks.com/science-vs-myth/everyday-myths/does-hybrid-car-production-waste-offset-hybrid-benefits.htm>

Car Shopping

- Myths and Reality
 - <http://content.sierraclub.org/evguide/myths-vs-reality>
- More info:
 - <http://content.sierraclub.org/evguide/>
 - <http://www.sierraclub.org/compass/2016/08/auto-industry-needs-make-it-easier-shop-for-electric-cars-heres-how>
 - <http://www.ucsusa.org/sites/default/files/attach/2016/05/Electric-Vehicle-Survey-Methodology.pdf>

Summary

Electric vs. Gasoline

No Tailpipe Emissions 	 Greenhouse Gases/Pollution
Utility Company 	 OPEC
100+/- Mile Range 	 300+ Mile Range
Hours to Recharge 	 Minutes to Refuel
2 cents per mile 	 12 cents+ per mile

