

Michaels Engineering LEED® Brief

ELECTRIC VEHICLES: CLEAN & EFFICIENT

SUGGESTIONS...

Do you have certain LEED® topics you'd like to know more about? Send an email with your suggestion to the author listed below and your topic might become a future LEED® Brief!

DID YOU KNOW...

...One benefit of EVs is that they release almost no pollution on roadways, and in urban and residential areas.

...Lower operating costs for EVs reflect both the low cost of coal and greater EV efficiency.

...If you commute to a workplace less than 16 miles away (the national average) a single charge of an EV would easily carry you there and home.

MEET THE AUTHOR



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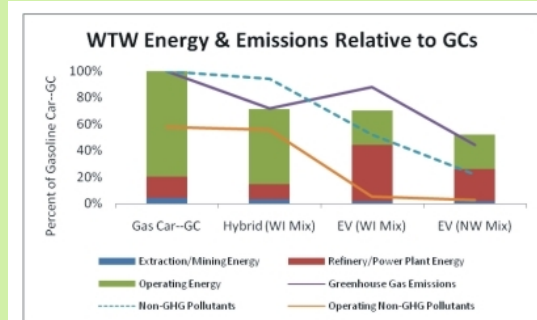
Chris Paine's upcoming film *Revenge of the Electric Car* forecasts a much brighter future for electric vehicles (EVs) than his 2006 documentary *Who Killed the Electric Car?* Next year, both GM's Volt and Nissan's Leaf will join EVs offered by thirty or more smaller manufacturers. This development surely would have pleased Thomas Edison, who once told his employee Henry Ford to "give up [his] gas engine and devote [him]self to something really useful." Should the coming availability of EVs also please Americans today as "something really useful?" While EVs are not emission-free nor wildly fuel efficient nor a magical solution to global warming, for those concerned about fuel economy, gasoline costs, and the environment, there are clear reasons to consider owning one.

One benefit of EVs is that they release almost no pollution on roadways, and in urban and residential areas. This, however, does not make them zero emissions vehicles, as some might claim. Emissions do occur at power plants where the electricity EVs run on is produced.

Also requiring clarification are recent efficiency claims: 230 mpg (city) for Volt and 367 mpg (city) for Leaf, which seem to imply they are 10 to 20 times more efficient than the cars we now own! Yes, they can go many miles on a gallon of gas, but that is only because they run primarily or exclusively on electricity. According to GM, the Volt will use 25 kWh of electricity per 100 miles in city driving.

This figure offers a better measure of its economy. With an electric recharging cost of \$0.12/kWh, operating the EV would cost \$0.03/mi, while a 20 mpg gasoline car (GC) in city driving (with \$2.50/gal fuel costs) would cost \$0.12/mile. Lower operating costs for EVs reflect both the low cost of coal and greater EV efficiency.

A well-to-wheels (WTW) accounting of automobile energy from oil well (or coal seam) to car wheels shows that EVs are both clean and energy efficient compared to GCs. An EV's environmental impact, however, will vary regionally depending on the method of electricity generation. The chart below compares WTW energy and emissions for four fuel/vehicle pathways including (1) a baseline GC, (2) a hybrid electric car, (3) an EV with a Wisconsin (70% coal) generation mix, and (4) an EV with a Northwest (significant hydroelectricity) generation mix. [i]



WTW energy (bar totals) for the EV in the Northwest, due to hydroelectricity, is 30% lower than in Wisconsin. Non-greenhouse gas pollutants for EVs are about 40% lower in Wisconsin and 70% lower in the Northwest than for GCs. Wisconsin EVs' greenhouse gas emissions are comparable to GCs due to the carbon-intensive coal generation pathway. EVs in the Northwest fare much better.

LEED® projects can earn credit by providing preferred parking for EVs and low-emitting vehicles with a green score of 40 or better (5% of parking spaces), providing alternate vehicle re-fueling stations (3% of parking spaces), or providing 3% of employees access to low-emitting vehicles. For shared company vehicles, such as a fleet vehicle, LEED requires one vehicle for up to 267 full-time employees.

If you commute to a workplace less than 16 miles away (the national average) a single charge of an EV would easily carry you there and home. While they are not emission-free, and their recent economy ratings seem inflated, their operating costs, emissions, and energy use should be significantly less than those of conventional gasoline cars.

[i] Data modeled using GREET1.8c, a WTW tool from Argonne National Laboratory, which informed California's "State Plan to Increase the Use of Non-Petroleum Transportation Fuels."