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## **RESISTANCE**

by Steve Huntoon

# Electric Cars – Three Ugly Facts Edit (<https://www.rtoinsider.com/wp-admin/post.php?post=38448&action=edit>)

February 13, 2017

*By Steve Huntoon*

One would have to live under a rock to not know about the Second Coming of electric cars.[1](The First Coming 100 years ago is pictured.)

Virtually every auto maker has announced plans, and the media have anointed their inevitability. As *The Wall Street Journal* proclaimed (<https://www.wsj.com/articles/mind-the-shock-as-auto-investing-turns-electric-1481626699>) recently, “The car of the future will be electric ...”

But to paraphrase Thomas Huxley, the great tragedy of reality is the slaying of a beautiful hypothesis by an ugly fact.

In the case of electric cars there are not one but three ugly facts. First is that they cost a lot more than gasoline cars and that’s not going to change for a long time. Maybe never.



1922 Detroit Model 90 | *Detroit Electric*

Second is that they tend to contribute to global warming more than gasoline cars.

Third is that they cause more death and disability than gasoline cars.

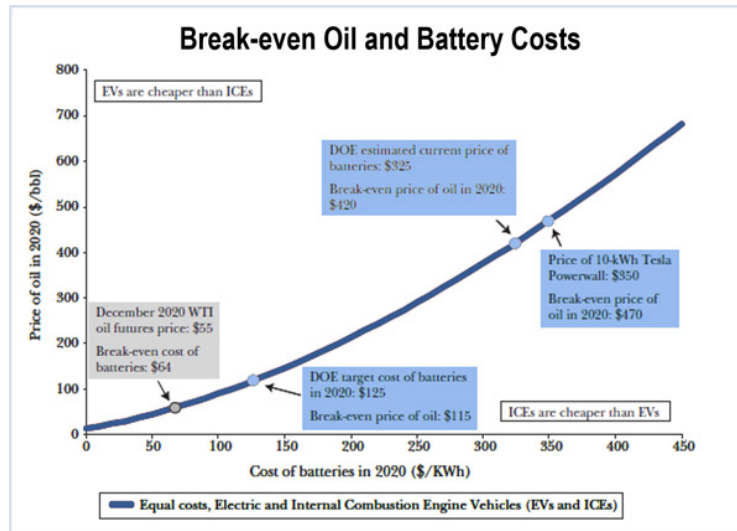
Let me walk you through this great tragedy of reality.

*First ugly fact:* Electric cars are and will be much more expensive – indefinitely. Ignore the media hype and consider peer-reviewed academic articles, like one by researchers from the University of Chicago and the Massachusetts Institute of Technology in the *Journal of Economic Perspectives* last year, showing that electric cars are far out of the money for customers on a total cost of ownership basis.[2] Basically, the high cost of batteries trumps (sorry, couldn’t resist) the lower cost of electricity relative to gasoline.

And here's the killer — it ain't going to get much better for the next 10 years — if ever. Even if battery costs drop precipitously from the current \$325/kWh to \$125/kWh (an Energy Department "target" (<https://www.energy.gov/eere/vehicles/vehicle-technologies-office-batteries>)), oil prices would still need to rise to \$115/barrel for electric cars to make sense. There is a fascinating chart in the Chicago/MIT paper (pictured) showing the break-even relationship between battery costs and oil prices.

Neither battery costs nor oil prices are likely to align for electric cars. Battery costs seem to be plateauing above \$300/kWh. Tesla's Powerwall 2 has debuted at \$321/kWh even if one generously gives its inverter a \$1,000 value.[3]

As for oil, the futures price (<http://www.cmegroup.com/trading/energy/crude-oil/light-sweet-crude.html>) is below \$60/barrel through 2025, about half of what oil would need to cost in order for a battery cost of \$125/kWh to break even.



| Journal of Economic Perspectives

To summarize, the electric car propulsion system is 400% out of the money, with little prospect of making that up any time soon, if ever. And the recharging time and location problems still need to be solved.

So, yes, Tesla and others will sell their electric cars as Veblen goods — commodities for which demand is high because of their high prices and perceived status — in the hundreds of thousands. But tens of millions of cars sold every year will continue to run on gasoline.

*Second ugly fact:* Electric cars exacerbate global warming. Surprised? It's important to remember a couple things. One, converting raw fuels to electricity is inefficient. Two, the fuels generating electricity when an electric car is charging tend to be the worst from an environmental perspective.

There is only one study I can find that was sufficiently "granular" to do carbon emission analysis on this hard reality basis. It is a paper published in another obscure periodical, the *Journal of Economic Behavior & Organization*, with the engrossing title: "Spatial and Temporal Heterogeneity of Marginal Emissions." [4]

Buried in excruciating detail is the hard reality. The average rates of carbon dioxide emissions on an apples-to-apples kilowatt-hour basis are:

- Electric car: 2.10 lbs/kWh.
- Comparable gasoline car: 1.79 lbs/kWh.
- Comparable hybrid: 1.13 lbs/kWh.

So if you buy an electric car instead of a comparably sized gasoline car, you will most likely make global warming worse. And an electric car instead of a hybrid would be twice as bad.

*Third ugly fact:* Electric cars cause much more death and disability (euphemistically, "human toxicity potential") from the mining of heavy minerals and graphite. This has received anecdotal attention in *The Washington Post* (<https://www.washingtonpost.com/graphics/business/batteries/congo-cobalt-mining-for-lithium-ion-battery/>) and other media, but there is an empirical study by Arthur D. Little showing that the aggregate "days of life impact" in terms of death and disability are 30 for an electric car (with a 50-kWh battery in 2025) versus six for an equivalent gasoline car. [5]

So to sum up, electric cars cost more, contribute to global warming more and hurt more people than gasoline cars.

May I make a modest proposal if you care about the environment and don't want to hurt people? Take the money you would have overspent on an electric car and spend it on (1) a renewable energy supply option from your utility or other electric supplier, (2) a hybrid car and/or (3) high efficiency appliances and lighting such as LED bulbs.

You may not have the coolest toy in the neighborhood, but the planet and your fellow humans should thank you.

Steve Huntoon is a former president of the Energy Bar Association, with 30 years of experience advising and representing energy companies and institutions. He received a B.A. in economics and a J.D. from the University of Virginia. He is the principal in Energy Counsel LLP (<http://www.energy-counsel.com>).

[1] Here we mean battery-powered electric cars, not driverless cars or hybrid cars.

[2] <http://pubs.aeaweb.org/doi/pdfplus/10.1257/jep.30.1.117> (<http://pubs.aeaweb.org/doi/pdfplus/10.1257/jep.30.1.117>).

[3] \$5,500 minus \$1,000 divided by 14 kWh is about \$321/kWh. The inverter value may be high; Tesla isn't charging anything less if you get the DC version without the inverter.

[4] <http://environment.yale.edu/kotchen/pubs/cars.pdf> (<http://environment.yale.edu/kotchen/pubs/cars.pdf>).

[5] [http://www.adlittle.us/uploads/tx\\_extthoughtleadership/ADL\\_BEVs\\_vs\\_ICEVs\\_FINAL\\_November\\_292016.pdf](http://www.adlittle.us/uploads/tx_extthoughtleadership/ADL_BEVs_vs_ICEVs_FINAL_November_292016.pdf) ([http://www.adlittle.us/uploads/tx\\_extthoughtleadership/ADL\\_BEVs\\_vs\\_ICEVs\\_FINAL\\_November\\_292016.pdf](http://www.adlittle.us/uploads/tx_extthoughtleadership/ADL_BEVs_vs_ICEVs_FINAL_November_292016.pdf)).

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