

Why electric cars are more trouble than good

Many people believe that technological innovations are the solution to the climate crisis. While certainly important, we need to face the fact that cultural changes are every bit, if not often more, important.

In order to understand how, let's take cars as an example.

A typical car in the US. emits about 4.6 metric tons of CO₂ per year. Given that the average American's total annual emissions of CO₂ is just under 20 metric tons, cars account for around a quarter of our individual carbon footprints. Thus, if we wish to reduce our individual climate footprints, cars are clearly one of the lowest hanging fruits.

For decades now, electric automobiles have been touted as a solution to this enormous problem, as they do not directly emit CO₂ while operating. Each one this promises to reduce those 4.6 metric tons of CO₂ emissions per year to down to zero. Hence, they are often called zero-emission vehicles.

It is hardly surprising, then, that for decades electric cars have been held out as a sort of holy grail. Now that they are finally becoming practical and affordable, it would seem that in one swell foop our problem is solved.

Sadly, it's not.

If we are to limit global temperature rise to 1.5°- 2.0 C, which is the goal of the Paris Accord signed at COP 21, each person on the planet can annually emit no more than about two metric tons of CO₂ or equivalent gases.

Think of this sort of like a dietary guideline. The FDA tells us that, if you want to healthy body, you should consume no more than 2000 or 2500 calories per day. Similarly, if you want to healthy planet, you should emit no more than two metric tons of CO₂ or equivalent gases per year.

With respect to the climate crisis, the problem with cars involves their production.

First, the good news regarding electric cars.

Even though manufacturing an electric car produces 15-68% more greenhouse gas (GHG) emissions than a similar gasoline car, over their lifetimes electric cars generate half of the emissions of their gasoline counterparts, more than compensating for increased emissions during production.

So, if you are going to buy a car, an electric one is arguably the better choice with respect to climate change, all things considered.

But, should we buy one at all? Are there other, external, factors to car's operation that we need to consider?

The manufacture of a typical automobile emits an extraordinary amount of CO₂ or equivalent gases. Manufacturing a typical midrange car (a Toyota Prius, which is a hybrid) releases about 17 metric tons of CO₂ into the atmosphere. A top-of-the-line SUV (a Range Rover) about 35 metric tons.

Let's lean toward the lower end assume that just 22 metric tons of CO₂ or equivalent gasses are emitted during the manufacture of the average car on the road, even though SUVs and crossovers sales are currently dominating the American market and the electric cars now coming online release more greenhouse gases during their manufacture.

The average car has a lifespan of 11 years. This is, incidentally, up from couple of decades ago.

If we spread out the 22 metric tons of CO₂ emitted during the manufacture of a typical car over its 11 year lifespan, we come up with two metric tons per year.

Recall that if you want a healthy planet, you should emit no more than two tons of CO₂ per year – total.

So, if you buy a succession of cars during your adult life, one every 11 years, and leave them in your driveway and never drive them, you will have totally expended your CO₂ allotment for your lifetime. And, of course, this does not leave an emission allotment for anything else, such as for food, clothing, housing, and everything else that we need to live – including actually driving that car!

In case you were wondering, recycling cannot help much more here, as automobiles are already the most recycled of all consumer products.

We could also hope that few people on the planet will own cars. During the 20th century, most cars on the planet were owned by Americans and Europeans. The problem is that we have made them so popular that the rest of the world now wants them.

India is currently the fifth largest car market in the world and growing rapidly. China, now the largest market, is quickly developing an even greater, in fact altogether extraordinary love of cars. In 1985, there were 1.78 million total vehicles in China. In 2017, car ownership alone had soared to 172 million. That's an astonishing increase of more than 10,000 percent in just three decades.

There are currently just over a billion cars on the planet. Because the rest of the world is now also quickly becoming infatuated with them like Americans, that number is expected to double to two billion in by 2040.

The problem is that if we focus just on emissions and see this primarily as a technological challenge we will lose the fight against the climate crisis.

For decades, we have held out hope that technology and industry will produce a car with zero emissions coming out of the tailpipe, when we should instead have been focusing on the car itself.

Instead of trying to produce a truly emissions free automobile – which, if we consider its entire life cycle, is obviously impossible – we instead need to turn our attention to car use.

The automobile is just one example of the hope that technology alone will get us out of this problem. There is no need to stop driving cars – so the hope goes – as someone will soon come along and give us a zero-emissions automobile. Elon Musk, of course, likes to cast himself as this savior. But the fact is that no matter how hard we try, making a 5000-pound vehicle to carry one person will never be environmentally sound.

For decades now, we have pinned our hopes on reengineering the automobile. As far as I am concerned, this was a complete and utter waste of time. Unimaginably precious time during a crucial moment when the climate crisis was unfolding.

Effort was not only wasted on this thoroughly misguided project, but attention was drawn away from the real job at hand: We should instead have been focusing our attention on re-engineering the cultural practice of car use.

This is not to say that technology is not needed to help solve this problem along with cultural change.

As it turns out, it's technologically possible to transport a person 350, 500, even an astonishing 750 miles on a single gallon of gasoline or its equivalent. In other words, it is theoretically possible to transport someone from LA to New York on just for gallons of gas. Not only is it possible, the good news is that these transportation technologies are no longer still in the experimental stage.

To the contrary, they have all proven themselves and in fact have been in widespread use for over a century.

What are these wonder technologies? Buses, subways, and trains, respectively. When compared to a 25-mpg car (which is currently the average efficiency of a new automobile in the US.) with a single occupant (three out of four cars on the road have just one person in them), a bus is 14 times more efficient (i.e. one gallon of gasoline can transport a single person 350 miles), a subway 20 times more so (500 mpg per person), and a passenger train 30 times more efficient (750 mpg).

A few years ago, a perceptive student of mine, reflecting on this situation and these numbers, succinctly observed that “what we need is not a 100-mpg car, but rather for taking the bus to become cool and owning a car to be anything but.” I could not agree more.

Incidentally, even 750 mpg can be improved upon—and it's embarrassingly easy to do so. In parts of Manhattan, over a third of commuters walk to work. Bicycling is even more efficient. New Yorkers, incidentally, are eleven times more likely to take mass transit like subways and buses to work than the average American. As Edward Glaeser, David Owen, and many others have thus argued, cities are far more efficient than suburbs and rural locales. This is clearly the case with fossil fuel use and corresponding carbon footprints.

The example of New York (and cities more generally) makes clear that it is quite possible for modern human beings to live rich and diverse lives largely free of the automobile.

Why, then, do so many Americans drive cars? And why do we drive so many of them? The US. has fewer than 4 percent of the planet's population, yet a quarter of its cars. Placed end to end, they would circle the earth – 31 times. As my student realized, in the US. cars are cool, really cool. In fact, in the US, we have more cars than we have licensed drivers. Nonetheless, automobiles are an environmental disaster.

If everything else were equal, switching from car to bus could reduce our individual climate footprints for transportation by a factor of fourteen. Yet, with fewer than 5 percent of Americans taking the bus to work, as opposed to 85 percent using cars to commute, buses are clearly not at all desirable. But why are cars cool and buses not?

This is not a question for the STEM fields, but rather the social sciences and humanities, where we seek to understand just why people do what they do. Science may be able to tell us how human beings are changing our global climate, but not why we are doing it. The sciences may be able to offer us more advanced technology (i.e. more efficient cars), but they offer little insight into why we continue to engage in these practices. Why, for example, we love cars.

If we can understand why cars are desirable and buses not, we can perhaps then take the next step – and it is a big one – of not just studying culture, but actively intervening in it. For example, we might help foster a culture where riding a bus or train is seen as far more appealing than traveling by car. If we could pull this off, the gains could greatly exceed the impact that a 100-mpg car would have on climate change. This is why I suggested that the humanities have as large a role to play as science and technology in limiting anthropogenic climate change.

But, make no mistake, this will be no easy task. Developing and manufacturing the next generation of lithium batteries will certainly be difficult, but no less so than trying to understand why human beings are engaging in perplexing and at times even irrational practices. As the World Health Organization (WHO) notes, over 50 million people are killed or injured in traffic accidents worldwide each year. Globally, traffic accidents are the leading cause of death for young people over the age of 10, surpassing malaria, AIDS, and any and everything else. Consequently, the WHO has declared traffic injuries a worldwide epidemic.

In addition to being incredibly dangerous, automobiles demand a huge portion of family income, making them far less economical than mass transportation. The average cost of owning, insuring, maintaining, and fueling a car in the US. is around \$9000 a year. This is a huge financial burden. Indeed, work about one day a week to afford a car.

It is often suggested, often by car ads, that they represent freedom. Freedom to hop in a car at any time and go for a ride. However, imagine the freedom of every week having a three day weekend as you didn't have to put in the extra work just to afford a car. Also, people have run the numbers and come up with an interesting figure regarding retirement: if, instead of spending \$9000 a year to own a car, you put that money in a retirement account starting when you first enter the workforce in your 20s. If you did this, you would be able to retire not when you were 65 years old, but in your late 40s. Now that strikes me as freedom.

How is it that cars, in spite of being outrageously dangerous, a huge financial burden, and more disastrous for the environment than any other single source, are cool? Like everything else, this has a history. Here's the short version.

The US. came out of the Great Depression economically because it was drawn into a highly industrialized war. Industrial output during World War II was staggering: the US. manufactured nearly 7000 major warships, over 300,000 aircraft, and around 2,500,000 land vehicles in just a few years. When the war came to an end, the challenge was to keep this industrial juggernaut (and accordingly the economy) going strong. The automobile played a huge role in this project.

The growth of the postwar US. automobile industry depended on convincing the public that cars were desirable. Getting us to spend huge chunks of our income to buy them and risk our lives driving them was no easy task. Nonetheless, car manufacturers, working hand in hand with politicians and others, pulled it off. In order to ensure that mass transportation did not successfully compete with the car, it received dramatically less federal funding than did industries devoted to building automobiles and road infrastructure.

Another big part of the solution was to sell the public on the idea of suburbia. In postwar America, if you wanted to get out of the city and into the appealing new suburbs you needed a car to commute. In fact, just to get around in the sprawling suburbs you needed a car. For many families this meant, to the great delight of the auto industry, that you needed two cars.

At its height in the US. a generation ago, one in six Americans were either directly or indirectly employed by this industry. And this did not include the massive, complementary industry of road construction, such as made possible by Eisenhower's Highway Act of 1956, which authorized the creation of 41,000 miles of interstate highways.

Although it may sound a little outlandish on first hearing, for decades the backbone of the US. economy depended on cars being cool. So cool, in fact, that we would knowingly risk our lives and lavish huge portions of our income on their purchase and upkeep. It is difficult to imagine how a broad swath of the American public would go along with this lose-lose proposition. It's even more difficult to imagine how it continues today in an age when we are aware of climate change. Although it is a little mind-boggling, the carbon footprint of cars in the US. exceeds that of our houses (and any other single source, for that matter).

Returning to the big picture, technology alone will not solve the climate crisis. Instead, we need to look hard at rewriting a range of cultural practices, like our love of cars.

Even though the challenges that we face are daunting – and let’s face it, more than a little scary and depressing – approaching this as a human issue can and should be empowering. There is no need to wait for Elon Musk or anyone else to solve this problem (especially as it is clear that these technologists simply cannot come anywhere near doing it on their own), as each of us can simply write cars out of our lives.

As Americans, we can do even more, as a good deal of the world still looks to us to lay down the precepts of what’s cool. In places like Portland, Brooklyn, and a range of other cities, an emerging eco-culture is eschewing cars to instead embrace mass transit and bikes as cool, really cool. Conversely, in these places gas-guzzling cars like SUVs are anything but cool. In terms of climate crisis, this sort of exciting, future-oriented culture may be one of the US.’s most important exports in the 21st century

Yes, even more important – far more important, I would argue – than exporting Teslas.

Although it may seem that we will therefore need to do with less and perhaps even do without (I am, after all, suggesting that we do without cars), we stand to actually benefit by this bargain. Instead of spending huge chunks of our income on deathtraps that are wreaking havoc on our climate and planet, we have the opportunity to imagine new and better ways of getting around.

So, I am curious what you think about the future of cars in the age of the climate crisis – and the larger issue of whether technological innovations will allow us to live our lives without change in this new age or whether will have to change certain aspects of the way that we live in response to the climate crisis.