New cars, rental cars, Amtrak and EMF radiation exposure
My experience renting a car

• I rented a Toyota Corolla in Mt. Kisco NY and had to return the rental car because my entire right side started burning up. I actually own an older Toyota Corolla

• The Toyota car rental was a Connected Car with an active wireless monitoring system plus center console USB ports

• I went to investigate about what was so different about the new rental cars and why for hours later I had a reaction to electrical outlets
My investigation...

• Most modern cars have several communication systems like Bluetooth, radar and Wi-Fi hotspots. Newer cars may have elevated levels of all the main fields – electric, magnetic, radio frequency, and dirty electricity.
Newer tech/electrosmog in recent models and rental cars

- Multiple EMF sources
- Internet of Things (IoT) systems, e.g., passive keyless entry (PKE), device-to-device (D2D), intra-vehicle (InV), vehicle-to-vehicle (V2V), vehicle-to-infrastructure (V2I), vehicle-to-everything (V2X) communications or vehicular ad-hoc network (VANET, wireless fidelity (Wi-Fi), mobile communication, long-term evolution (LTE), Bluetooth, worldwide interoperability for microwave access (WiMAX), wireless access in vehicular environments (WAVE), dedicated short-range communications (DSRC), radio frequency identification (RFID), near-field communication (NFC), ZigBee, etc.

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8914635/
And you thought your house had a lot of ‘hot spots’! Sources of EMF in Vehicles

an increasingly standard feature.

Diagram from a 2017 EMF presentation by Dr. Theodore P. Metsis, Ph.D, showing the vast number of EMF sources inside a single car. [Source]
Small limited space with wireless not just a problem for EVs

• The application of wireless communication technologies and engines and supply equipment in EVs is related to the use of multiple EMF sources in a relatively small, limited space....consideration of the following issues: (1) potential environmental health hazards to humans from short-term (exposure for durations less than the corresponding averaging time) and chronic, long-term (during a major part of the lifetime) EMF exposure

• [https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8914635/](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8914635/)
Electric Cars & EMF Radiation: Could Your Tesla Be Bad for You?
: DefenderShield
USB-C ports next to driver’s seat a few inches from the body in new models

- Most cars now have USB ports, some in the center console and one on the front dash under the stereo. According to CareExpert article Unlike the rectangular USB-A we’re all used to, USB-C is a new kind of port, USB-C is capable of transmitting high amounts of data and power in one cable.
- **USB-C Power Delivery (PD)** can deliver a whopping 100 watts of maximum power, and distribute it evenly to devices.
- For context, the legacy USB-A can only deliver up to 7.5 watts of charging power.
The Toyota Corolla Car rental did come with Connected Services

• While driving in Bedford Hills NY on a rural route, not near any cars my Safe and Sound meter registered green to suddenly "red" every ten or so seconds. It made no sense until I noticed the Connected Services sticker on the car.

• [https://www.toyota.com/rental/faq.html](https://www.toyota.com/rental/faq.html)
Connected Services

Safety Connect Includes:

- Enhanced Roadside Assistance
- Emergency Assistance Button
- Collision Assistance
- Automatic Collision Notification
- Stolen Vehicle Locator
Is your rental car spying on you?

- In a nutshell, a “connected car” is a telematics-enabled vehicle that allows the company to locate it on demand. The company can also collect vehicle data, and access the vehicle for on-demand rentals. Connected features can help a customer who gets locked out of a vehicle.

https://blog.autoslash.com/is-your-rental-car-spying-on-you-the-story-of-connected-rental-cars/
Is your rental car spying on you?

- Microphones are fairly ubiquitous in new rental cars. We don’t recommend syncing your personal phone to a rental car’s entertainment system, but be aware that services like OnStar that operate through a car’s speakers mean that microphones are in cars.

https://blog.autoslash.com/is-your-rental-car-spying-on-you-the-story-of-connected-rental-cars/
Information Rental Car Companies are Collecting

- **GPS:** Used to report the location of vehicles with mechanical problems, recalls, accidents, and also to help when vehicles are stolen or suspected as stolen.

- **Remote Shutoff:** If the car still running after an accident or stolen, remote shutoff precludes the vehicle from moving.

Information Rental Car Companies are Collecting

• **Operating Statistics:** Rental car companies extensively document the service history of cars. Therefore, operating statistics help plan maintenance and alert the rental car company of problems.

• **Fuel Levels:** It’s not expressly listed in Hertz’s policy, but the company was the innovator on fuel metering. Fuel levels are usually only checked at the time of pickup and return.

What Rental Car Companies Do With the Information

• If you violate a rental car contract, expect to pay hefty fees. For example, each rental car company has “geographic restrictions” that limit where the rental car can go. If these restrictions forbid border crossings and ferry rides, a user who takes a rental car to Tijuana, Mexico instead of returning the car at the Cross Border Xpress will land on the rental car company’s “Do Not Rent” list.

https://blog.autoslash.com/is-your-rental-car-spying-on-you-the-story-of-connected-rental-cars/
Connected Car Platform
Launched in 2016


- https://global.toyota/en/detail/14097157
Connected Rental Cars have this sticker

• Your rental vehicle may wirelessly transmit location, driving, and vehicle health data to provide Connected Services and for internal research and data analysis. Connected Services include the use of this vehicle data to respond to emergencies, navigation assistance, and/or to activate remote services.

• We also collect and use your personal information to facilitate your usage of Connected Services, fulfill your requests, and to manage our relationship with you. [www.toyota.com/privacyvts](http://www.toyota.com/privacyvts).
Enjoy convenience and peace of mind with Connected Services.

Enjoy convenience and peace of mind with Connected Services in your Toyota - Passport Toyota Blog
Car rental staff could not turn off the connected car

- The Enterprise staff said they did not know how to turn off the wireless monitoring system. Is this the future of car rentals? Was the car an activated mobile hot spot? A quick search shows that Mobile Hotspots and Connected Data Car Plans are now bundled with internet packages, not just for Toyota but other vehicles make and models.

https://www.verizon.com/support/connected-car-faqs/#vehicles
Toyota to make "Connected Vehicles" its new standard in Japan

Corporate | Global Newsroom | Toyota Motor Corporation...
Service Connect

• I never heard of Service Connect before. I was not having peace of mind with up to date information of the vehicle health status of my rental, which I had no choice but to return. But here's the promo:

• [https://www.toyota.com/connected-services/](https://www.toyota.com/connected-services/)

• Receive personalized maintenance updates and vehicle health reports. Service Connect includes Vehicle Health Reports, Vehicle Maintenance Alerts, and Maintenance Reminders. Get peace of mind with up-to-date information on the health and status of your vehicle.
The new connected cars "may" be one big smartphone.

Connected new cars may have a "(cellular or WiFi) modem, and a recording capability mated to its sensors.

"it is assumed that the car will be one big smartphone, and that the consumer will gladly let someone -- the automaker, your government, someone else's government -- control the car's software via wireless access."

Cars one big smartphone? What if the consumer doesn’t want it?

• Volvo is now opening up a new **frontier in this privacy battle**. Yes, it is going to be installing cameras in its cars, so as to -- how can I say this politely -- monitor its drivers. Yes, the purpose is -- as always -- "noble" because it's meant to catch people who have been drinking and are distracted.

Volkswagen Automotive Cloud
AI and IoT

How Volkswagen Automotive Cloud will help shape the connected car of tomorrow

Volkswagen/Microsoft – plans to become a software-driven mobility provider

- Volkswagen and Microsoft automatic cloud and Volkswagen's plans to become a software-driven mobility provider (2019).

- In the very near future, vehicles will be fully connected software platforms, Diess explains. A development to which the entire automotive industry must adapt. "At Volkswagen, we need skills for this that we don't really have today".

- “Digital technology is rapidly changing every aspect of the auto industry – from the manufacturing process to the car itself. Our partnership will enable Volkswagen to deliver new Azure-based connected vehicle services that accelerate the company’s transformation into a software-driven mobility provider and define the future of mobility for people everywhere.”

Volkswagen and connected car partner Microsoft

• ....had better figure out a fallback plan if the consumer demands three things from their cars going forward: Don't record/collect any data. Don't transmit any data. Don't receive any data.

• If Volkswagen -- and other automakers -- don't offer an option for the consumer to buy a non-connected car, what happens if the consumer doesn't want it?
Amtrak train Stamford CT to Springfield MA

- Amtrak measured 1 million on my Safe and Sound II meter next to a passenger, 10,000 next to the luggage rack
Amtrak train...need 2023 studies
Hybrid/Electric Car EMFs vs Regular Car EMFs

- Hybrid cars do expose passengers to higher levels of EMFs that conventional cars.
- Increase of RF in any newer vehicle.
- EMF levels in Hybrids tend to concentrate around the foot of the driver as well as the waist.
- Rear seat passengers are exposed to the rear battery emissions. In many instances, rear seat passengers are children.
Electric/Hybrid concerns

• 1. Large AC batteries
• 2. In hybrid and electric cars, the batteries are often placed much closer to where people sit, and in the case of the Tesla, directly underneath the cabin floor (ie, right under the feet).
• 3. These batteries convert DC-AC via a power converter and require more electronic wiring throughout the entire vehicle.
• 4. Charging the car creates substantial amounts of dirty electricity (DE). When you charge your car in the garage, you are putting extremely high levels of DE onto the wires of your entire home. This is especially problematic as most people charge the car overnight the time of day when we want our EMF exposure to be as low as possible.

Dirty electricity while charging Chevy Volt

Those thin lines going up and down are from 3 dimmer switches that were turned on inside the house; with those off, the sine wave looked pretty good. Here is what it looked like after their Chevy Volt was plugged in:

![Image of an oscilloscope showing a distorted sine wave]

That is a LOT of dirty electricity! If you want to see this in action, check out this video of my colleague Damon Coyne as he tests a home with two electric vehicles.

## Testing Shows

In 2010, **Consumer Reports tested** 13 vehicles using an ELF/Magnetic Field meter to see which ones emitted the most EMF. And here are the results.

<table>
<thead>
<tr>
<th>Vehicle tested</th>
<th>Peak EMF reading at driver’s feet (milligauss)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008 Chevrolet Cobalt</td>
<td>30 mG</td>
</tr>
<tr>
<td>2008 Chevrolet Tahoe Hybrid</td>
<td>14 mG</td>
</tr>
<tr>
<td>2008 Subaru Impreza</td>
<td>6 mG</td>
</tr>
<tr>
<td>2006 Toyota Prius (hybrid)</td>
<td>4 mG</td>
</tr>
<tr>
<td>2008 Subaru Legacy</td>
<td>4 mG</td>
</tr>
<tr>
<td>2008 Toyota Prius (hybrid)</td>
<td>4 mG</td>
</tr>
<tr>
<td>2008 Mini Cooper Clubman</td>
<td>3 mG</td>
</tr>
<tr>
<td>2008 Nissan Altima Hybrid</td>
<td>3 mG</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Model</th>
<th>EMF Emissions (mG)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008 Nissan Altima Hybrid</td>
<td>3 mG</td>
</tr>
<tr>
<td>2008 Toyota Highlander Hybrid</td>
<td>2 mG</td>
</tr>
<tr>
<td>2008 Nissan Murano</td>
<td>1.3 mG</td>
</tr>
<tr>
<td>2008 Toyota Sequoia</td>
<td>1 mG</td>
</tr>
<tr>
<td>2007 Chevrolet Suburban</td>
<td>0.8 mG</td>
</tr>
<tr>
<td>2008 Toyota Highlander</td>
<td>0.5 mG</td>
</tr>
</tbody>
</table>

While most vehicles showed relatively low EMF emissions, the 2008 Chevy Cobalt stood out in this test. As you can see, its EMF emissions reached 30mG. And that's a lot—capable of seriously damaging your health.

What's even more interesting is that all of these cars are from before 2010. They were neither as sophisticated nor had the kind of wireless features we have in cars today. And this only means one thing: the EMF emissions from vehicles have increased significantly.

2023 Consumer Reports does not include magnetic fields?

The appeal is clear, with reduced energy costs, lower emissions, convenient home charging, and the promise of reduced maintenance costs. More than a third of Americans would “definitely” or “seriously” consider buying or leasing an electric-only vehicle if they were to buy a vehicle today, according to the largest-ever nationally representative survey of 8,027 U.S. adults from Consumer Reports. Among their reasons: More than 3 in 10 U.S. adults say that it costs less to charge an EV than to refuel a gas car (33 percent), overall lifetime costs are lower (31 percent), and maintenance costs are lower (28 percent).

But there remain barriers for many consumers, according to the survey, including where to charge an EV; how far a charge will take the car; and the overall cost of ownership. A clear takeaway from that research is that many consumers have questions about EV ownership.

So, we rounded up our resident EV experts to provide answers.

This guide is a basic primer that can help determine whether going electric is right for you.

Download our Electric Vehicle Checklist (PDF) to help with the decision.

https://www.consumerreports.org/cars/hybrids-evs/electric-cars-101-the-answers-to-all-your-ev-questions-a7130554728/
People also ask:

- Do cars emit magnetic fields?
- Is there no danger from magnetic fields in electric cars?
- Does a Tesla car have a magnetic field?
- Are electric cars safe electromagnetic fields?

Institute of Electrical and Electronics Engineers
https://spectrum.ieee.org › magnetic-fields-in-electric-car...

**Magnetic Fields in Electric Cars Won't Kill You**

A report finds that magnetic fields in electric cars pose no danger to drivers or passengers.

Wolf Track Energy
https://wolftrackenergy.com › is-it-worth-buying-an-el...

**Electric vehicles are all the rage. Is owning one worth it?**

Jun 10, 2021 — For our purposes, there's one important concept to know: electrical current moving through wire creates a magnetic field.