

Electric vehicle fires are rare, but when they occur, they can be a nightmare

By [Dharna Noor](#) Globe Staff, Updated February 2, 2023, 7:48 a.m.



The Orange County Fire Authority battled flames on a burning vehicle inside a garage in Orange County, Calif. When firefighters removed the SUV from the garage to assess the fire, they identified the fuel source as the SUV's high-voltage battery pack. ORANGE COUNTY SHERIFF'S DEPARTMENT/ASSOCIATED PRESS

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When a 38-year-old man crashed his Tesla on I-95 in Wakefield late one night last month, the car burst into a fire that took hours and [20,000 gallons](#) of water to put out.

As Massachusetts and the United States push to get more electric vehicles on the road to meet climate goals, how worried should we be about incidents like this? Not too worried, experts say — as long as we get prepared.

Though they often grab headlines, electric vehicle fires are less common than gas-powered car fires, said Andrew Klock, senior manager of education and development at the National Fire Protection Association, a nonprofit that offers free EV training for firefighters across the country.

“There’s a gasoline fire in this country every three minutes in a gas vehicle,” he said.

Overall, EVs are about 0.3 percent likely to ignite, versus a 1.05 percent likelihood for gas cars, according to the Bureau of Transportation Statistics and the National Transportation Safety Board compiled by [Auto Insurance EZ](#) last year.

“It’s not like electric vehicles are more dangerous,” said Klock. “They’re just different.”

But the differences are important, he said, and they can make the fires hard for firefighters who are unfamiliar with EVs to manage.

The risk of EV fires comes from their lithium-ion batteries. Similar batteries power many household devices, but in cars, the batteries are far larger.

“The bigger the battery, the bigger the fire caused is going to be,” said K.M. Abraham, a pioneer of the lithium-ion battery and a retired professor at Northeastern University.

When these batteries get damaged, it can kick off a chemical reaction leading to a state of “thermal runaway,” or uncontrollable self-heating. In the case of last month’s Wakefield fire, the damage occurred when the battery got [punctured by a guardrail](#) as first responders tried to pull it off the road. In some other cases the cause is less clear. Near Sacramento last week, a Tesla Model S burst into flames, seemingly spontaneously.

When a battery fire starts, it can quickly spread between battery cells, keeping the fire ablaze. So, when EV fires do occur, they burn hotter than gas fires and are more prone to re-igniting. And unlike gas fires, lithium-ion battery fires don't require outside oxygen to burn, making them harder to extinguish.

Rich MacKinnon, president of the Professional Fire Fighters of Massachusetts, which represents some 12,000 firefighters and EMTs, said workers statewide are currently ill-prepared to manage EV fires. The MBTA provides workers with training to extinguish electric bus and train fires, but he said he hasn't seen Tesla or other electric car manufacturers provide anything comparable through the state's Department of Fire Services, though some makers offer [guides](#) and private [classes](#).

"I don't think we're getting enough information from the industry and carmakers that make and manufacture these cars, and that's the big issue," he said. "It's absolutely concerning."

Also missing from most fire departments: EV-specific fire suppressants. Powders made of graphite or sodium chloride can more effectively quell lithium-ion battery fires than water, said Abraham, but right now, firehouses generally don't have those materials on hand.

In the absence of appropriate training and materials, fighting EV fires is a highly resource- and labor-intensive process. Extinguishing the fire in Wakefield last month required an amount of water used by [an average four-person household](#) in two months. Wakefield firefighters were forced to call upon fire departments in Melrose, Stoneham, Reading, Lynnfield, and Middleton.

"This is the kind of thing we've never seen before now," said MacKinnon.

A gas car fire, by contrast, said MacKinnon, can often be quelled by just a few workers using one-20th that amount of water, or even less. If EVs catch fire more frequently as

more people begin to drive them, he said, relying on workers and resources from other jurisdictions could impede fire departments' abilities to respond to fires elsewhere.

Trends in the EV market could pose new dangers to drivers and exacerbate fire risk, said Paris Marx, author of the 2022 book "Road to Nowhere: What Silicon Valley Gets Wrong About the Future of Transportation" and advocate for reducing dependency on cars.

The adoption of electronically activated doors, for instance, could trap people in cars that are on fire. In 2021, a man briefly got stuck in his blazing Tesla, because his doors would not open from the outside, his attorneys [told the Washington Post](#). After a man [died](#) in a Tesla fire in Florida in 2019, his family filed a suit saying police officers couldn't open a door to rescue him.

Another concern: EVs — and their [batteries](#) — are getting larger.

"Trucks and SUVs keep getting larger with every redesign," Marx said.

It's a [trend](#) that's expected to continue, and that could increase fire risk.

MacKinnon said he "absolutely" supports moves to decarbonize transportation, but that if we don't address fire concerns, workers and drivers alike will be put in danger.

"Typically, industry comes out with a great idea and then we're forced to deal with the negatives of it without any type of funding, training, or specialized equipment we may need," he said. "That's really the issue."

Dharna Noor can be reached at dharna.noor@globe.com. Follow her on Twitter [@dharnanoor](#).

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