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Lithium Battery Fires Are Threatening Recycling as We Know It



By [Audrey Carleton](#)



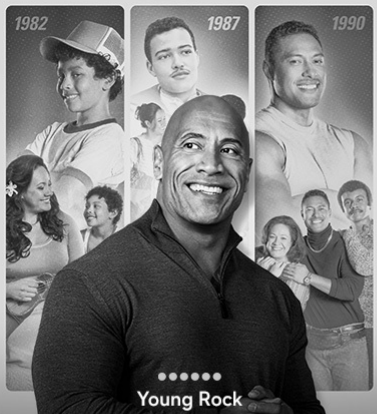
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Around 8 p.m. on a Wednesday in September of 2016, a four-alarm fire broke out at the Shoreway Environmental Center in San Carlos, California, 30 minutes south of San Francisco.

The flames ravaged the public recycling center, ultimately causing \$6.8-million in damages, leading it to shut down for four-and-a-half months and putting 70 employees on furlough.

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Records obtained by Motherboard via a public records request paint a picture of just how volatile the fire was for Shoreway. It erupted spontaneously at 8:22 p.m. that night, just one minute after swing shift staff returned from a meal break. Flames moved quickly throughout the facility

fire with water and fire extinguishers for five minutes, but it only continued to grow. Large portions of the facility burnt down. Around 100 firefighters were called to attend to it over the next few hours.

Shoreway Fire



For months after, cleaning crews dredged soot from the facility.

"Four alarm fire resulted in catastrophic damage to NewScreen 96, Polishing screen 126, and numerous conveyor assemblies and conveyor belts," an incident log of the fire obtained by Motherboard stated. "Fire was first spotted in NewScreen 96 via video captured after the event. Fire began less than one minute after swing shift resumed operations after their meal break ... Within approximately 4.5 minutes of fire fighting effort, the fire was continuing to grow, smoke began to overwhelm the effort, and those fighting the fire evacuated ... MRF personnel safely evacuated. No injuries reported. MRF projected to be down for 4 - 6 months."

What happened in the fire's aftermath proved financially devastating for the center and permanently troublesome for its leadership. But what happened to cause it is emblematic of a broader issue, one that's growing in severity



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Though the cause of the fire was not immediately apparent, according to records Motherboard obtained via Freedom of Information request, the source was eventually identified as an unlikely culprit: An improperly recycled lithium-ion battery.

Composed of particularly volatile compounds that are capable of sparking spontaneously and are difficult to control once they do, lithium-ion batteries pose an “existential threat” to recycling facilities, Joe LaMariana, executive director of RethinkWaste, the California waste collection agency that owns Shoreway, told Motherboard. A presentation done by Shoreway and obtained by Motherboard echoed this in plain terms: “Lithium battery fires = Existential Threat to Recycling.”

That same presentation noted that people are simply tossing electronics and lithium batteries in the blue recycling bins at their homes; more than 26 tons of batteries per year are ending up in those bins in RethinkWaste’s region alone.

Shoreway has experienced at least 47 more of these fires in the years since. An astonishing 45 of them have been attributed to lithium-ion batteries.



obtained by Motherboard. As lithium-ion batteries have proliferated, the fires have gotten more frequent: Just two were recorded in 2013, but since 2017, there have been double-digit fires almost every year.

A spreadsheet of fire incidents is filled with battery-caused fires. Here are some examples:

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- October 10, 2017: "Loader Operator noticed smoke coming from corner of commercial wall/bin. He isolated pile outside and using water, soaked pile. Pile was backdragged to locate source and a Phantom 2 [drone] Lithium Battery was discovered hot."
 - June 6, 2017: "As Loader Operator was back dragging, having just loaded a truck, he inadvertently backed over a plastic encased lithium rechargeable - perhaps a lawn mower battery. As it was crushed, it ignited nearby class A materials."
 - March 16, 2017: "When load was pushed up, something was smoking. What is believed to be a Prius battery was crushed and internal batteries exposed. No fire ensued, but the battery continued to flare, one individual battery at a time. An ABC extinguisher proved unable to stop the process, as each cell continued to flare."
-



the Residential in Fire. The first member went to investigate, but quickly turned around and informed everyone to evacuate as large flames were emanating from the machine and heavy smoke soon overwhelmed the area ... crew determined it to be a Lithium Battery Pack."

- August 31, 2018: "Forklift Operator noticed white smoke coming from front of Residential metering bin after the loader loaded the bin. Water was placed on the smoldering pile and a cell phone was discovered under the pile. Phone was placed in a metal container and covered with water."
- May 29, 2018: "While bale dresser was removing a electronic device from a SMP Bale, item starting to smoke ... What was later discovered to be the remains of a lithium battery were put out with a fire hose."

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The fires at Shoreway are a microcosm of what's happening at municipal and private recycling facilities around the country: The proliferation of gadgets with hard-to-remove lithium-ion batteries is dangerous when an electronic device is disposed of and threatens to make run-of-the-mill household recycling unsustainable.

While Shoreway's fire was notably devastating, Doug Kobold, executive director of the California Product Stewardship Council, says their

organization surveyed 26 waste facilities across California and found that 66 percent of respondents had experienced at least one fire in the last two years, two-thirds of them started by batteries. But few facilities are willing to admit it, because they fear publicity could see their insurance premiums skyrocket.

“Every (Materials Recycling Facility) MRF, pretty much, in California is experiencing fires, if not on a daily basis, on a weekly basis,” Kobold said. “We’re on the fringe of losing our recycling infrastructure that we’ve built over several decades to try and recycle this stuff.”



In 2019, the Occupational Safety and Hazards Administration (OSHA) issued a bulletin on the dangers of flammable lithium-ion batteries in the workplace, instructing employers to weave battery safety into their hazard guides. Their bulletin followed a [2018 Consumer Product Safety Commission](#) report that identified more than 25,000 battery-related fires and explosions involving more than 400 types of battery-powered products between 2012 and 2017. These fires also emit toxic chemicals, like [fluoride gas](#), a potent irritant, and [carbon monoxide](#), an asphyxiant.



A July report by the Environmental Protection Agency spotted 245 fires across 64 waste facilities in 28 states, all caused by lithium metal or lithium-ion batteries. (These numbers are almost certainly an undercount, the report notes, because many fires are not publicly reported or covered by the news.) Eruptions occurred across all nodes in the recycling process: In recycling centers, trucks, landfills, and transfer stations. Some caused little damage and were easy to extinguish, others were large and destructive, taking down entire facilities.

Batteries are often incorrectly recycled or thrown out by consumers who don't know what else to do with them. As the battery industry grows to meet surging demand for renewable energy storage, recyclers fear the monetary, environmental and safety threat they pose will only worsen without a course correction from manufacturers, recyclers, and consumers.

The Shoreway Environmental Center sits on 16 acres of land in San Carlos, California, some 25 miles south of San Francisco, on the edge of the peninsula that faces the Bay. It's sandwiched between carefully-plotted waterside suburban homes and the marshes of Bair Island State Marine Park, which sit beside sprawling pink salt flats.

It sends collection trucks all over Northern California, to 92,000 households spanning two-thirds of San Mateo County in the span between Burlingame,



the likes of it and look

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The consequence of Shoreway's proximity to the country's foremost tech hub is not lost on LaMariana, who says he's seen the proliferation of battery-powered devices up close.

"We're right in the heart of Silicon Valley," LaMariana says. "A lot of toys. A lot of tech toys. And those toys all have batteries."





be more easily sorted and melted down to basic materials), lithium-ion

batteries light on fire or explode, which has been a well-known problem at electronics recycling centers for a long time. Turns out it's also a problem at regular recycling centers, too.

Simply being jostled the wrong way, down conveyor belts, through sorters and into piles of rubbish, as is typical in a recycling center, can puncture a battery and cause the lithium and electrolytes within it to interact with particles in the atmosphere, sparking a spontaneous eruption. And once these fires get going, they're hard to put out: Water doesn't deprive a lithium fire of oxygen, it just interacts with it.

Though the average MRF is filled with tons and tons of flammable paper, cardboard and plastic, lithium-ion batteries "are their own best fuel source," Kobold said. "They actually burn themselves to the ground, even if there's nothing else to feed them."

Lithium-ion batteries are core to the electrification of everything—they're good for large-scale electricity storage at solar and wind facilities, but they're also in basically every portable electronic and electric cars, too.

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near-constant fear of spontaneous fires, not just for his own financial losses, but for the wellbeing of his employees.

“400 union workers are based on this site, and their safety is at risk every single day because of this issue,” he said. “Thankfully, nobody got hurt that time. But that may or may not be the case in the future. We have these fires regularly.”

“I don't want to be the one having to call their spouse or their kids,” LaMariana continued, “telling them that mom or dad's not coming home that night because there was a fire. It's just this haunting, awful feeling that we can't get our act together on this.”

For staff and Shoreway neighbors, these fires pose significant safety risk. But the threat of fire makes insuring these facilities logistically complicated, too. The facility was once served by one insurance company, which paid out the damages from its catastrophic fire in 2016, but dumped Shoreway soon after and left the recycling sector entirely shortly after that. The center now relies on seven different insurance policies and has set aside a reserve of funds to cover anything these policies can't. LaMariana says its premiums have jumped from \$180,000 per year to \$1.5-million per year; its deductible from \$5,000 per year to \$1.5-million.

“Every year, we go out into the marketplace to solicit bids,” LaMariana says. “We get fewer and fewer insurance companies that are willing to do this. It's a scary situation.”

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Though Shoreway has issued instructions to consumers on how to properly reuse or dispose of batteries, he doesn't blame the individual mistaken recycler for Shoreway's recurring fires. Rather, he sees this problem as one playing out on a much larger scale: He blames the battery industry.

Manufacturers continue to pump out growing volumes of batteries to meet surging demand, without much by way of end-of-life accountability. LaMariana says this leaves recyclers on the hook, bearing the brunt of consequences of a problem they did not ask for.

Waste advocates and recyclers alike are throwing their weight behind momentum for end producer responsibility (EPR): A policy framework that



throughout the entirety of its life cycle.

It's gained traction across materials industries like glass, plastic and tires. And it's become particularly salient in the battery world in California, where environmental advocates have spent the last two of the last three legislative sessions pushing for 'take back' bills that establish battery drop-off programs and dedicated processes for handling recycled batteries, all funded by the producers that create them.

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The first of these bills, Assembly Bill (AB) 1509, was introduced in 2019 and proposed requiring every battery retailer to establish a free collection system for rechargeable batteries, establishing a state-wide lithium-ion battery recycling program in the Department of Resources Recycling and Recovery that would be funded by fees that manufacturers (or retailers or importers, should a manufacturer be impossible to identify) paid. It built on an existing law, passed in 2006, that banned household batteries from waste landfill disposal, requiring retailers to take batteries back from consumers at no cost. Crucially, advocates say, it lacked enforcement and funding mechanisms, and to their view, did not work.

AB 1509 died in a senate committee in November of 2020. So, Kobold and other advocates drafted another iteration, this time introduced in the state senate: [Senate Bill \(SB\) 289](#). This version of the bill included the same table stakes as the first, requiring that battery manufacturers create their own take-back programs that are subject to annual audits with a few additional provisions. It scrapped a state-wide recycling program in lieu of a fund to cover regulatory costs; manufacturers would be audited annually, required to submit reports and budgets to the state, and would face fines of up to \$50,000 per day should they violate the law.

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The legislation was supported by 36 environmental, health and waste reduction advocacy groups and, according to LaMariana, a number of state legislators who govern RethinkWaste. Given its broad support, LaMariana says he was surprised to see the second version of the bill die once again in May of 2021.

“You never know why,” he said of the cause of the bill’s death. “We were starting to get active opposition from industry lobbyists.”

Indeed, opposition letters filed to the state Senate Judiciary Committee by lobbying groups that represent the lithium-ion manufacturing industry, shared with Motherboard, show a fervent attempt to squash the legislation by battery industry representatives.

“[SB 289] also inevitably will result in the regressive imposition of increased prices to consumers for products ranging from the vital – like medical devices, cell phones, power tools and watches – to the merely enjoyable – like toys, portable game devices, and even shoes that light up,” a letter from the Rechargeable Battery Association (PRBA), filed on April 14, 2021, reads. (PRBA is a 30-year-old non-profit trade association that represents the likes of Energizer, Panasonic, Sanyo, Apple, Google, LG, and Samsung, among other battery and device companies. Despite lobbying against the California take-back bill, the association still advertises itself as a key player in the passage of federal battery recycling legislation passed in the ‘90s.)

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State lobbying records also show that PRBA spent \$123,000 lobbying against AB 1509 exclusively in 2019-2020. Other trade groups that filed opposition letters against SB 289 include the Consumer Technology Association (which represents the likes of Toshiba and Dell), the National Electronic Manufacturers Association (which represents the likes of Duracell and Philips), and the Toy Association (which represents the likes of Hasbro and Mattel). Per state lobbying records, the Consumer Technology Association spent \$71,000 in the first half of 2021-2022 lobbying on SB 289, among other bills; the Toy Association spent \$68,250 in the same time period doing the same thing.

Retailers, too, are hesitant to adopt any kind of role in the take-back process, LaMariana and Kobold say. Though the bills Shoreway has



stores, which would have to adopt collection programs, fear being a middleman could become overly laborious and complex.

But Kobold, LaMariana and other EPR advocates are not backing down: They're currently drafting another version of these bills to introduce in state assembly next month, marking the start of the 2022-2023 legislative session. They're mum about what it will include, for fear of giving away their political strategy as they gear up to take on a booming industry once again.

For now, Kobold says he and fellow recycling advocates plan to work collaboratively with political opponents from the battery industry to clarify sticking points and reach a middle ground on legislation that could reasonably pass.

The alternative, he says, is to let another year go by without meaningful checks on the output of a booming industry. For LaMariana, that means another year of improperly discarded batteries reaching his facility, daily fire anxiety, and haphazardly assembled insurance policies. It's not a matter of whether another battery fire will erupt at Shoreway, but when, and how large.

"We deal with seven [insurance companies]," he said. "Can you imagine what it's gonna be like the next time this happens?"

It means Shoreway would continue to operate with the possibility that another catastrophic fire forces it to tap into its emergency reserve fund without seeing a dime paid by the manufacturers he believes are responsible. It could be worse: It could see Shoreway sustain such damage that it is forced to close.

LaMariana does not want this to happen, for his own sake, but also for the sake of the renewable energy industry. He sees tremendous value in the very products that have caused him such duress over the years — but he wants a game plan.

“Clearly, the technology is here to stay. It has incredible benefits to our society, and to our environment,” he said. “We just have to handle it.”

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