



Executive Summary

U.S. Consumer Opinion Survey

December 2023

EV + Battery
Recycling

New Survey: Americans are Increasingly Concerned About EV Battery Disposal and the Risk of Toxic Landfills...

despite fast growth of the U.S. electric vehicle battery recycling industry.

The second annual **EV + Battery Recycling survey** from Ascend Elements reveals shifting attitudes about electric vehicles and a continued misunderstanding about the recyclability of EV batteries.

While the metals in electric vehicle batteries are infinitely recyclable and the American EV battery recycling industry is booming, nearly 40% of survey respondents believe EV batteries are NOT recyclable.

This fundamental misunderstanding may be connected to increasing concerns about disposal of end-of-life EV batteries.

Meanwhile, the new survey data suggests Americans are learning how to safely recycle other types of lithium-ion batteries.

Ascend Elements commissioned an independent research firm to survey a random sample of 1,004 U.S. consumers. The survey was conducted in October 2023. The margin of error is +/-3% at the 95% confidence level.

EXECUTIVE SUMMARY

Top 3 Observations

1	<p>American adults are increasingly concerned about electric vehicle battery disposal in landfills...possibly due to a fundamental misunderstanding about the recyclability of EV batteries.</p> <p>71% of U.S. adults say they are concerned about disposal of used EV batteries, a 17 point increase compared to 2022 data. About 56% of survey respondents say EV batteries will cause “toxic landfills,” an 8 point increase over 2022. Meanwhile, nearly 40% of survey respondents inaccurately say EV batteries are NOT recyclable.</p>
2	<p>Excitement about electric vehicles may be cooling slightly among American adults.</p> <p>39% of U.S. adults say their attitude towards EVs is more positive than it was 3 years ago, down from 53% in 2022. Similarly, only 33% of US adults think EVs will outsell gas-powered cars in their lifetime, down from 46% in 2022.</p>
3	<p>American adults are learning how to safely use and recycle household lithium-ion batteries.</p> <p>In 2022, 33% of survey respondents said that lithium-ion batteries can be safely recycled in the household recycling bin. In 2023, the percentage fell to only 21% of survey responses.</p> <p>Similarly, in 2022, 27% of survey respondents said that lithium-ion batteries can be safely put in the trash. In 2023, the percentage fell to just 15% of those surveyed.</p>

SURVEY FINDINGS

A survey of 1,004 U.S. adults was conducted in October 2023. The margin of error is +/-3% at the 95% confidence level.

- 40% of U.S. adults think lithium-ion EV batteries cannot be recycled when they reach end of life, down from 47% in 2022.
 - **FACT:** Lithium-ion electric vehicle batteries can be recycled when they reach end of life.
- 31% of U.S. adults think lithium-ion electric vehicle batteries cannot be made with recycled materials, down from 37% in 2022.
 - **FACT:** Lithium-ion electric vehicle batteries can be made with recycled metals and materials.



40% of U.S. consumers think lithium-ion electric vehicle batteries cannot be recycled.

39% of U.S. adults say their attitude towards EVs is more positive than it was 3 years ago, down from 53% in 2022.



- 39% of U.S. adults say their attitude towards EVs is more positive now than it was 3 years ago, down from 53% in 2022.
 - **FACT:** Sales of electric vehicles continue to grow in the United States, although at a slower pace than in previous quarters.
- 29% of U.S. adults think that old laptop and cell phone batteries cannot be recycled and then used to make new electric vehicle batteries, down from 37% in 2022.
 - **FACT:** Companies like Ascend Elements are recycling old consumer electronics batteries and converting the material into new, battery-ready cathode material for new EV batteries.
- Only 24% of U.S. adults understand that the critical materials in lithium-ion EV batteries can be recycled over and over without performance loss, down from 39% in 2022.
 - **FACT:** Battery materials like lithium, nickel and cobalt are infinitely recyclable. Several peer-reviewed studies have shown recycled battery material can perform as well as virgin (newly mined) materials.
- 33% of U.S. adults think that it is more expensive to make new lithium-ion batteries using recycled lithium-ion battery materials, down from 44% in 2022.
 - **FACT:** Ascend Elements can manufacture new lithium-ion battery materials at a competitive cost compared to traditional methods.

- 50% of U.S. adults think electric vehicles (EVs) are better for the environment than gas-powered cars, down from 59% in 2022.
 - **FACT:** Many studies have shown electric vehicles (EVs) to be better for the environment over the lifetime of the vehicle.
- 40% of U.S. adults think that manufacturing an electric vehicle (EV) uses a lot more energy than manufacturing a similar-size gas-powered vehicle, down from 43% in 2022.
 - **FACT:** Manufacturing an electric vehicle (EV) indeed uses more energy than manufacturing a similar-sized gas-powered vehicle. However, use of recycled materials in new batteries promises to reduce the carbon-footprint of EVs dramatically.

33%

of U.S. adults think EVs will outsell gas-powered cars in their lifetime, down from 46% in 2022.

- 33% of U.S. adults think that electric vehicles will outsell gasoline-powered cars in their lifetime, down from 46% in 2022.
 - **FACT:** Demand for EVs is growing fast and many industry analysts agree EVs will outsell gas-powered vehicles by 2040.
- 45% of U.S. adults think that the batteries in electric vehicles are more dangerous than gas-powered cars, up from 40% in 2022.
 - **FACT:** Both gasoline and lithium-ion batteries are hazardous and must be handled with care.



64% of U.S. adults think EV batteries don't offer as much range as gas-powered vehicles, up from 51% in 2022. %

- 41% of U.S. adults think that lithium-ion electric vehicle batteries are sourced using destructive mining techniques, up from 38% in 2022.
 - **FACT:** Use of recycled battery materials in new EV batteries promises to reduce the need for mining.
- 42% of U.S. adults think that lithium-ion EV batteries don't offer as much power as internal combustion engines, the same as in 2022.
 - **FACT:** Many EV models offer more power and acceleration than traditional internal combustion engine models.
- 64% of U.S. adults think that lithium-ion EV batteries don't offer as much range as internal combustion engines, up from 51% in 2022.
 - **FACT:** Range anxiety is a legitimate concern for many drivers, but installation of a nationwide fast-charge infrastructure will help alleviate concerns.
- 30% of U.S. adults think that lithium-ion electric vehicle batteries are sourced using unjust mining practices, down from 36% in 2022.
 - **FACT:** Use of recycled battery materials in new EV batteries promises to reduce the social justice impacts of mining.

*Source: [U.S. Environmental Protection Agency](#)

- 69% of U.S. adults think that lithium-ion electric vehicle batteries make cars more expensive, up from 59% in 2022.
 - **FACT:** It's true that new EVs are more expensive than new internal combustion engine vehicles, but the costs are slowly declining.
- 48% of U.S. adults think the US isn't competitive when it comes to manufacturing lithium-ion EV batteries, up from 45% in 2022.
 - **FACT:** Asia dominates the world lithium-ion battery market currently, but significant investments in the U.S. lithium-ion battery infrastructure have been made in 2023.
- 45% of U.S. adults think lithium-ion EV batteries are NOT "greener" than internal combustion engines, up from 40% in 2022.
 - **FACT:** Manufacturing an electric vehicle battery actually creates more carbon emissions than manufacturing an internal combustion engine. However, over the lifetime of the vehicle, EVs have a far lower environmental impact. In time, increased use of recycled battery materials will reduce the carbon footprint of new EV batteries.

45%

of US adults think that lithium-ion EV batteries are NOT "greener" than internal combustion engine (ICE) vehicles.

- 46% of U.S. adults think that lithium-ion EV batteries won't save them money compared to gas powered cars, up from 41% in 2022.
 - **FACT:** Charging an EV is approximately 3.5 times cheaper per mile than the cost of fueling a gas-powered car. In the long term, opting for an electric vehicle over a traditional internal combustion engine (ICE) vehicle can save you a huge amount of money.

Source: [Zero Emission Transportation Association \(ZETA\)](#)

37% of U.S. adults think EVs are too small and slow compared to gas-powered cars, down from 41% in 2022.



- 48% of U.S. adults think that across all product types, recycled products are not as good as new ones.
 - **FACT:** Recycled EV batteries have been shown to perform just as well as batteries made with virgin materials.
- 37% of U.S. adults think that electric vehicles are too small and slow compared to gas powered cars, down from 41% in 2022.
 - **FACT:** While many consumers may have visions of the first-generation EVs in mind, today's battery electric vehicles can be *fast* (Tesla Model S Plaid) or *large* (Ford F-150 Lightning).
- 38% of U.S. adults think that EV batteries made with recycled materials are just as good as EV batteries made with newly mined metals, down from 46% in 2022.
 - **FACT:** Independent studies have shown EV battery cells made with recycled materials perform just as well as battery cells made with new materials.
- 71% of U.S. adults are concerned about what we will do with all these lithium-ion EV batteries after they reach end of life, up from 54% in 2022.
 - **FACT:** Lithium-ion EV batteries are recyclable and highly valuable. The EV battery recycling industry is growing fast in the U.S. There is currently enough capacity to recycle 150,000 metric tons of EV batteries per year in the U.S.

- 56% of U.S. adults think that EVs will cause toxic landfills full of old lithium-ion batteries, up from 48% in 2022.
 - **FACT:** Lithium-ion EV batteries are recyclable and highly valuable. With demand for new EV battery materials growing, it's highly unlikely that used EV batteries will be sent to landfill.
- 50% of U.S. adults think that owning an EV means they'll need to wait in long lines for charging stations, the same as in 2022.
 - **FACT:** Unlike gas stations, electric vehicle charging can be dispersed over larger areas and incorporated into parking lots and cityscapes, giving EV drivers many options for charging.
- 52% of U.S. adults think that too many EVs will overwhelm the power grid, up from 47% in 2022.
 - **FACT:** EVs are most likely to be charged overnight at home, which is the time of day with the lowest demand for electricity.

52%

of U.S. adults think too many EVs will overwhelm the power grid.

- 58% of U.S. adults think that EVs are more expensive to repair, up from 53% in 2022.
 - **FACT:** EV motors are virtually maintenance free compared to internal combustion engines. With fewer moving parts, the cost of ownership is generally lower with electric vehicles.
- 60% of U.S. adults are concerned because China makes most of the world's EV batteries, up from 51% in 2022.
 - **FACT:** This is a legitimate concern, but the United States and other countries are investing in lithium-ion battery materials and manufacturing infrastructure.

- 21% of U.S. adults think that lithium-ion batteries can be recycled in the household recycling bin, down from 33% in 2022.
 - **FACT:** Lithium-ion batteries contain hazardous materials and should never be placed in the household recycling bin.
- 15% of U.S. adults think that lithium-ion batteries can be put in the trash, down from 27% in 2022.
 - **FACT:** Lithium-ion batteries contain hazardous materials and should never be placed in the trash.



Only 21% of U.S. adults think lithium-ion batteries can be recycled in the household recycling bin, down from 33% in 2022.

- 42% of U.S. adults understand they should “always cover the battery terminals with electrical tape or place battery in a plastic bag” before recycling.*
 - **FACT:** Covering the terminals greatly reduces the risk of fire.
- 30% of U.S. adults know they should not recycle damaged or recalled lithium-ion batteries in the same way they recycle other lithium-ion batteries.*
 - **FACT:** Damaged battery cells must be recycled using special precautions.

- 40% of U.S. adults understand that they should not charge an e-bike or electric scooter unattended or overnight.*
- 60% correctly understand that you should never leave a lithium-ion battery plugged in when it is not charging.*

**New questions in 2023 survey.*



Only 40% of U.S. adults understand they should not charge an e-bike or electric scooter unattended or overnight.

Ascend Elements commissioned an independent research firm to survey a random sample of 1,004 U.S. adults about their beliefs and attitudes regarding battery technology and electric vehicles.

The survey was conducted in October 2023.

The margin of error for this study is +/-3% at the 95% confidence level.

Leaders from Ascend Elements are available to discuss the survey results.

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