



ELECTRIC VEHICLE(EV) AND ION-LITHIUM BATTERIES MANAGEMENT

### BACKGROUND

- History of EVs
- Definition of an EV battery
- Sources of EV batteries

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• EV infrastructure

### AGENDA

#### **CHALLENGES**

 Challenges associated with EV batteries from a recycling and safety perspective



#### **Best Practices**

- Community outreach
- Vendors in area
- Cost of recycling / Disposal



## WHAT IS AN ELECTRIC VEHICLE?

An automobile that is powered by one or more electric motors, using energy stored in batteries







Smart Watches



Cell Phones and Laptops

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Singing Cards

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Electric Lawn Mowers

## LITHIUM-ION BATTERIES IN ACTION

**Electric Vehicles** 

**17** states weigh adopting California's electric car mandate

## **HISTORY OF ELECTRIC VEHICLES**





### 1890

The first operable electric vehicle invented by William Morrison<sup>2</sup>

**113 years later** 



#### 2003

Co-Founders of Tesla, Inc. Marc Tarpenning (left) and Mark Eberhard (right)<sup>3</sup>



## **CURRENT EV INFRASTRUCTURE**



Charging stations increased by

an astounding **8,970%** in 2021. In the year 2000 there

were only **558** stations.<sup>4</sup>

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![](_page_6_Picture_7.jpeg)

New Mexico have access to **132** public charging stations according to New Mexico Tourism Department.

The expansion of battery charging infrastructure in North America since 2010 is an influencing factor in the increase of EV battery-powered vehicles.

## **EV CURRENT MARKET TRENDS**

In the U.S. EVs are expected to constitute **8%** of the total estimated vehicles to be on the road by **2030** (now less than 1%).

350,000,000 300MM 300,000,000 280MM 250,000,000 200,000,000 150,000,000 100,000,000 50,000,000 25MM 1,7MM 2020 2021 2022 2023 2024 2025 2026 2027 2028 2029 2030 Cumulative EVs in Operation ICE Vehicles in Operation

Historical Data: GoodCarBadCar.net, InsideEVs, IHS Markit | Auto Manufacturers Alliance, Advanced Technology Sales Dashboard | \* BEV and PHEV | Research, Forecast & Chart: Loren McDonald / EVAdoption

Fig 4. Projected EVs to be on U.S roads in 2030

#### US ICE & Electric\* Vehicles In Operation: 2020-2030

![](_page_8_Picture_0.jpeg)

## **CHALLENGES** Recycling and Safety

## **RECYCLING CHALLENGES**

![](_page_9_Picture_1.jpeg)

![](_page_9_Picture_2.jpeg)

of lithium-ion batteries are currently being recycled globally<sup>7</sup>

![](_page_9_Figure_4.jpeg)

Fig 11. Circular recycling process for lithium-ion batteries

### **SAFETY CHALLENGES**

![](_page_10_Picture_1.jpeg)

![](_page_10_Picture_2.jpeg)

![](_page_10_Picture_3.jpeg)

![](_page_10_Picture_4.jpeg)

## **SAFETY CHALLENGES**

### FIRES BETWEEN 2016-2021 IN THE U.S and Canada

### WASTE & RECYCLING FACILITY FIRES US & CANADA 2016-2021\* VS. AVERAGE

Publically Reported Fire Incidents ---- Ave '16-'20 450 \*2021 Est. Trend 398' 400 365 345 350 317 18 290 300 272 250 200 150 100 50 2017 2016 2018 2019 2020 2021\* Source: Ryan Fogelman, rfogelman@firerover.com

**S10** is the average amount of fires that were caused by, or likely caused by, lithium-ion batteries in United States and Canada <sup>8</sup>

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As you can see these trends are just getting worse. <sup>8</sup>

Fig 13. Waste facility fire

![](_page_12_Picture_0.jpeg)

### SAFETY CHALLENGES

![](_page_12_Picture_2.jpeg)

Fig 13. Waste facility fire

![](_page_12_Picture_4.jpeg)

Fig 14 Fire Rover

![](_page_12_Picture_6.jpeg)

![](_page_13_Picture_0.jpeg)

## **BEST PRACTICES**

![](_page_14_Picture_1.jpeg)

\* Community Outreach

\* Vendors in your area to partner with

## **Community Outreach**

![](_page_15_Picture_1.jpeg)

![](_page_15_Picture_2.jpeg)

![](_page_15_Picture_3.jpeg)

![](_page_15_Picture_4.jpeg)

Traditional Bilingual Newpapers

![](_page_15_Picture_6.jpeg)

# facebook

![](_page_16_Picture_0.jpeg)

Li-Cycle®

![](_page_16_Picture_2.jpeg)

### VENDORS IN YOUR AREA

- \* Call2 recycle
- \* Batteries recyclersofamerica

![](_page_17_Picture_0.jpeg)

![](_page_18_Picture_0.jpeg)

![](_page_18_Picture_1.jpeg)

![](_page_18_Picture_2.jpeg)

**QUESTIONS?** 

SCSWA

South Central Solid Waste Authority

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