



# HIRT Activity Report

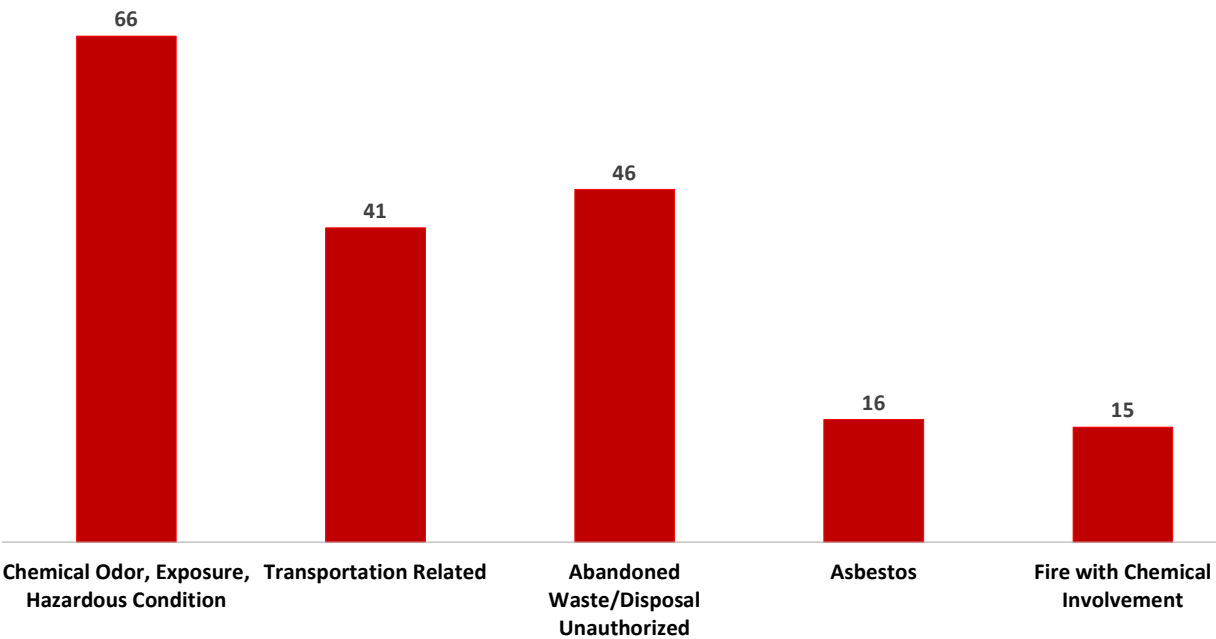
Jan 1 to July 31, 2022



## Incident Type By Jurisdiction

Incident Type By Jurisdiction	Abandoned Waste	Asbestos	Bio-Agent or Bio-Haz / Infectious Waste	Chemical Suicide	Disposal to Unauthorized Point	Drug or Drug Lab Related	Fire with Chemical Involvement	HME or Hazardous Chemical Storage	Pesticide Related	Radiological Related	Reported Chemical Odor or Exposure	Reported Hazardous Condition	Spill Notification Only	Storage or Process Release (non-transportation)	Transportation Accident / Vehicle-Related	Total
City																
Carlsbad		1	1						1	2		1	1	2		9
Chula Vista	1	1				1				5			1			9
Coronado	1															1
Del Mar		1														1
El Cajon	1				1				1	4	4		2	1		14
Encinitas	1				1					1						3
Escondido	2					1	4	1			1	3			1	13
Imperial Beach		1				1										2
La Mesa					1					1					2	4
Lemon Grove													1			1
National City													1			1
Oceanside							1							3		7
Poway	1	1									2				2	6
San Diego	12	8	2	1	7	4	7	2	6	2	11	15	10	10	20	117
San Marcos	1										1	1		2	2	7
Santee			1							1	1	2				5
Solana Beach																0
Vista	1	2			1	1		1				1				7
Unincorporated																
Alpine/Pine Valley	1	1	1											1		4
Bonita	1															1
Bonsall					1										1	2
Borrego Springs							1								1	2
Campo																0
Descanso	1															1
Fallbrook						2		1			1	2			2	8
Jacumba																0
Jamul/Boulavard	1														1	2
Julian/Santa Ysable	1				1									1		3
Lakeside	1				1						1				2	5
Pauma Valley																0
Rainbow																0
Ramona	1													1		2
San Clemente																0
Spring Valley	2						1				2	2			1	8
Potrero/Tecate																0
Valley Center	2				1											3
Warner Springs																0
Camp Pendleton														1		1
2022 YTD Total	32	16	5	1	14	10	15	5	6	5	36	30	11	22	41	249

## Highest Number of Responses by Incident Type



## 2022 HIRT Response Times Summary

% < 1 hr (1 call) or 1.5 hrs (2+ calls)

Month	Monthly Average	YTD Average
January	92%	92%
February	100%	95%
March	100%	97%
April	100%	97%
May	100%	98%
June	92%	97%
July	100%	98%
August		
September		
October		
November		
December		

# Pool Truck Incidents



















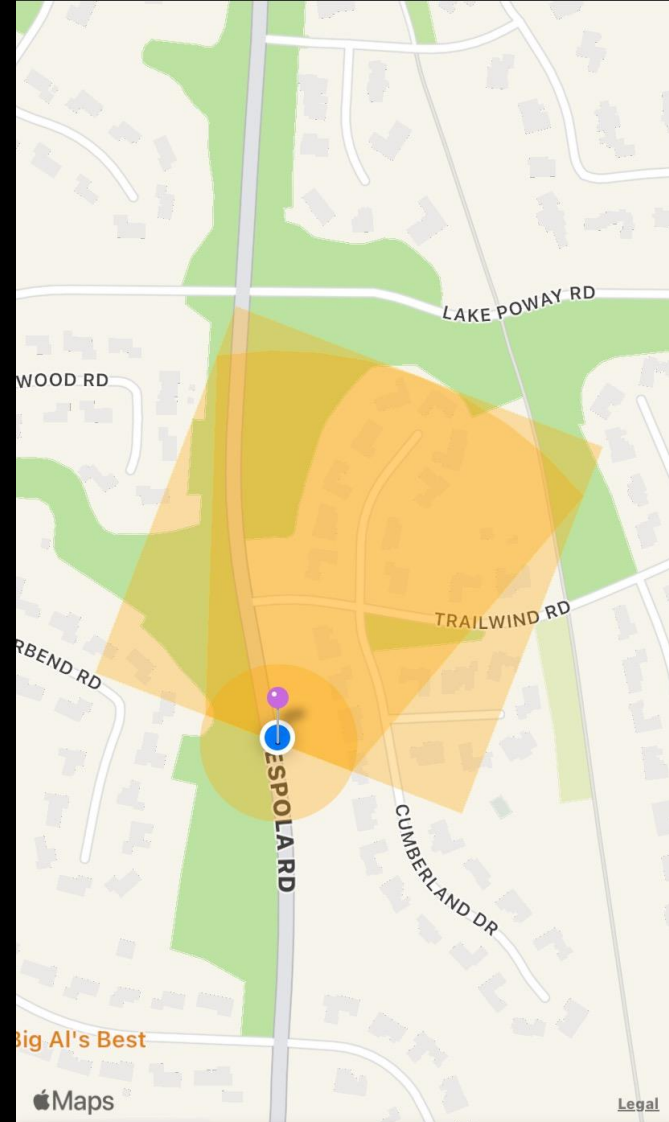
7:01

LTE

&lt; UN 1017

Map

Chlorine



This tool allows you to visualize protective distances on a map. After setting a location, wind direction, and additional details, view the map by selecting the Plot button.











# Pool Truck Accident

Oceanside

















# LITHIUM BATTERY EMERGENCIES:

BATTALION CHIEF MEETING



# Common Lithium Batteries?



## Non-rechargeable Batteries (Lithium Metal)

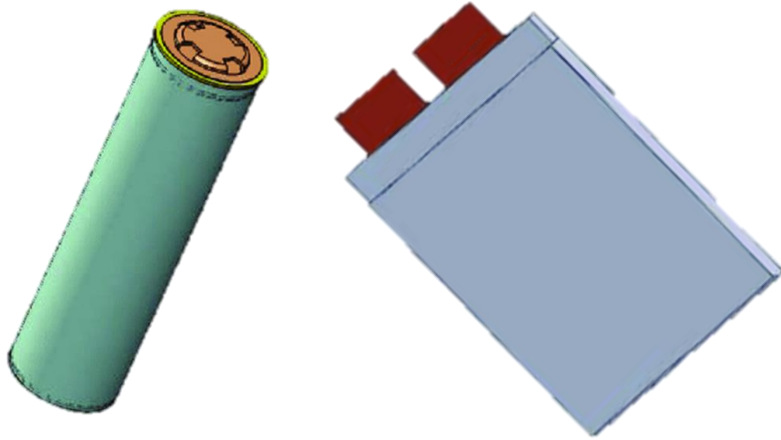
Highest energy density

Very stable medium

Lithium metal found inside  
is extremely water reactive



# Common Lithium-Ion Batteries



## Rechargeable Batteries

Good memory resistance

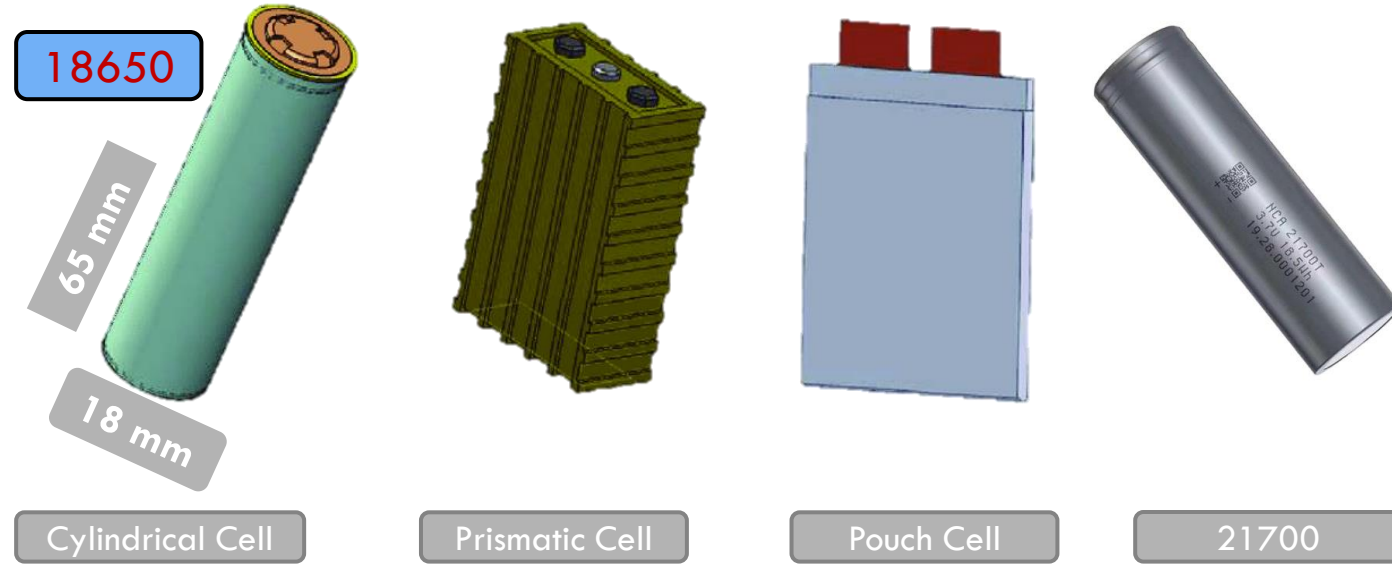
Very stable medium

**Lithium metal is extremely water reactive**





# Lithium-Ion Battery Types



- ❑ Cylindrical Cells (18650) are used almost exclusively by Tesla vehicles – 3K-7K cells per vehicle
- ❑ Cylindrical Cells (18650) are also the most common battery in all other mobile applications (bikes, scooters, etc.)
- ❑ Prismatic and Pouch Cells are found in all other electric vehicles



# Exponential Increase – Infrastructure

## Federal Infrastructure Investment and Jobs Act (11/15/2021)

- ▣ \$6 Billion
  - Battery Storage
- ▣ \$7.5 Billion
  - Rapid charging stations – 500,000 along highways and in communities
- ▣ \$1 Billion
  - School Buses







School Buses?

Rapid smoke and flame production





# Exponential Increase – Electric Vehicles (EV)

% of EVs Global Auto Sales

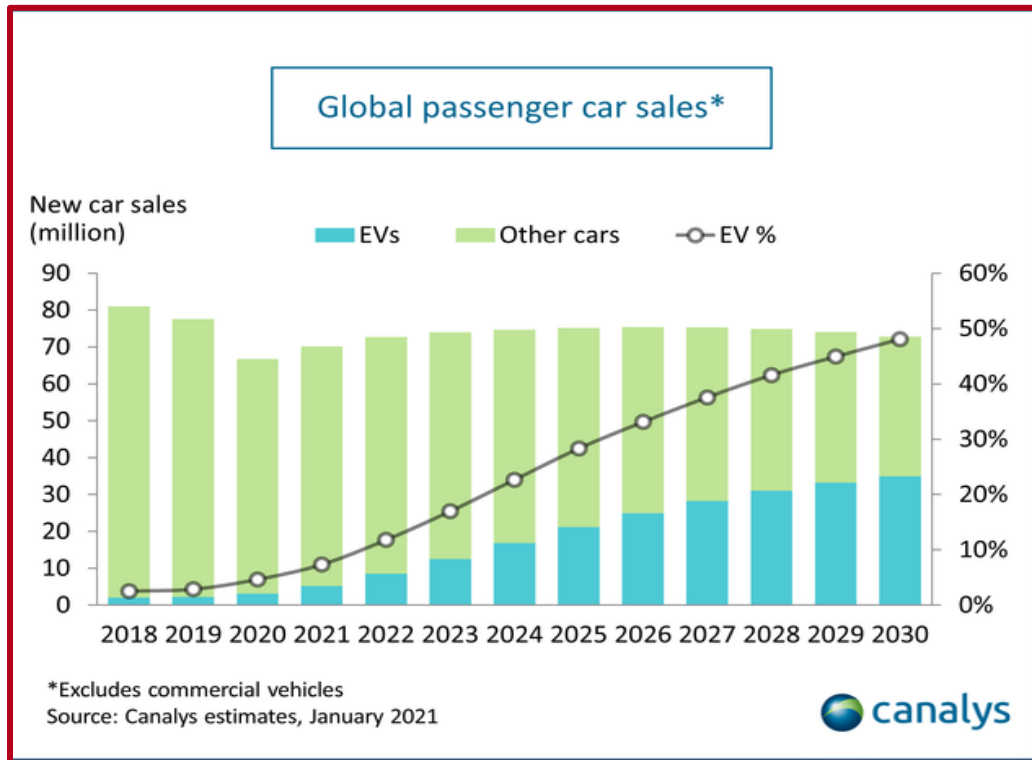
4.7% - 2020

15% - 2025

48% - 2035\*

California forecasted to be much higher.

By 2035 100% of all vehicle sales in CA must be battery or hydrogen powered



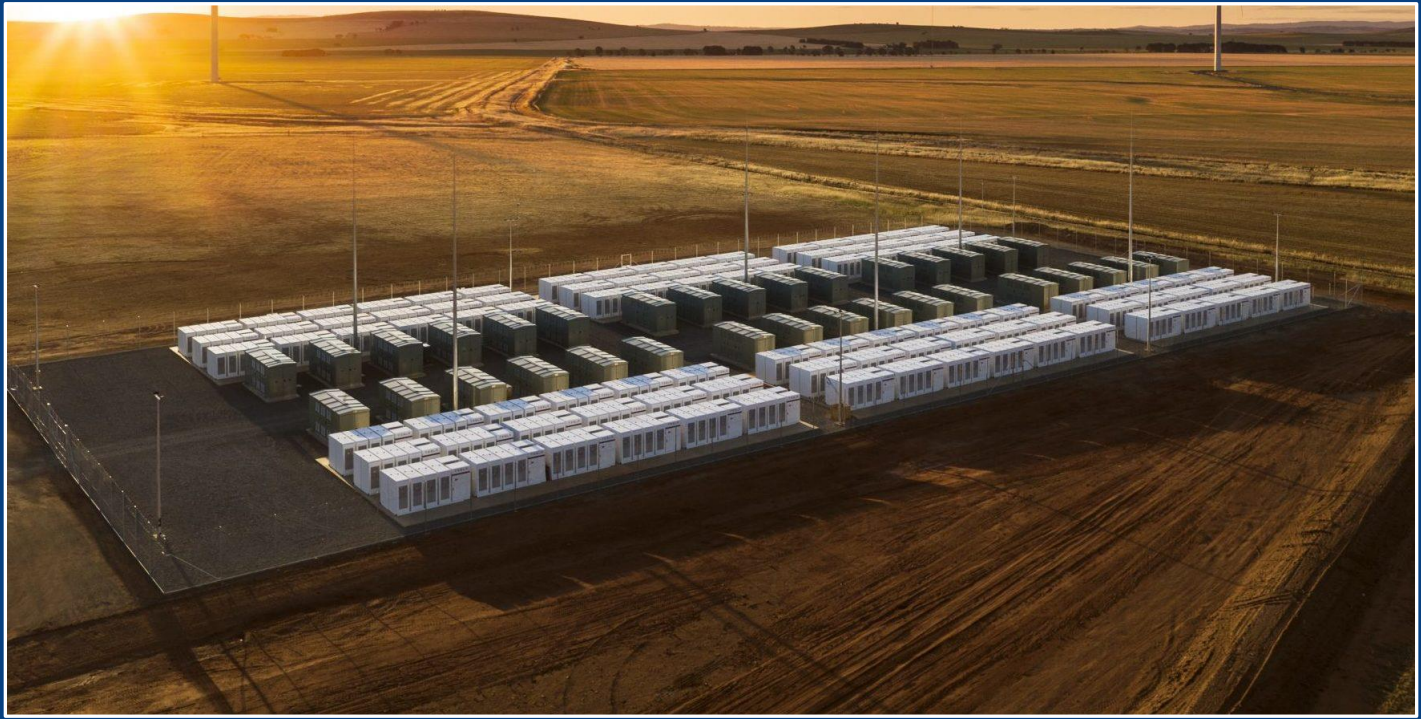


# Differences in Lithium-Ion Battery Fires

- ❑ Very toxic atmospheres
- ❑ Burn temperatures are higher
- ❑ Lithium can burn without Oxygen – can't smother!
- ❑ Explosive potential – Hydrogen Gas
- ❑ Thermal Runaway reaction
  - Chemical reaction – rapid degradation
  - Does not require Oxygen
  - Nearly impossible to stop once it starts
  - Could happen in seconds or days
- ❑ Re-ignition is common – Up to 7 days later!







## Battery Energy Storage System (ESS)

**MOST DANGEROUS. HIGHEST RISK OF FIREFIGHTER INJURY**





# Battery Energy Storage System (ESS)

- ❑ Lithium Titanate (LTO)
- ❑ Large Systems
  - Example Locations: Qualcomm, NBC Studios, San Diego Zoo, and more...
- ❑ Surprise, AZ – APRIL 19, 2019
  - ESS Fire/Explosion
  - Injuries to 8 FF's
    - Chemical Burns
    - Inhalation Injuries
    - Compression Blast Injuries
      - Thrown 75' through fence
- ❑ Full report:

<https://images.firefighternation.com/wp-content/uploads/2020/07/document.pdf>





# Fatality Incident (China)

- On April 16, 2021, an explosion occurred when Beijing firefighters were responding to a fire in a 25 MWh lithium-iron phosphate battery connected to a rooftop solar panel installation. Two firefighters were killed and one injured.

# Victoria, Australia – July 2021

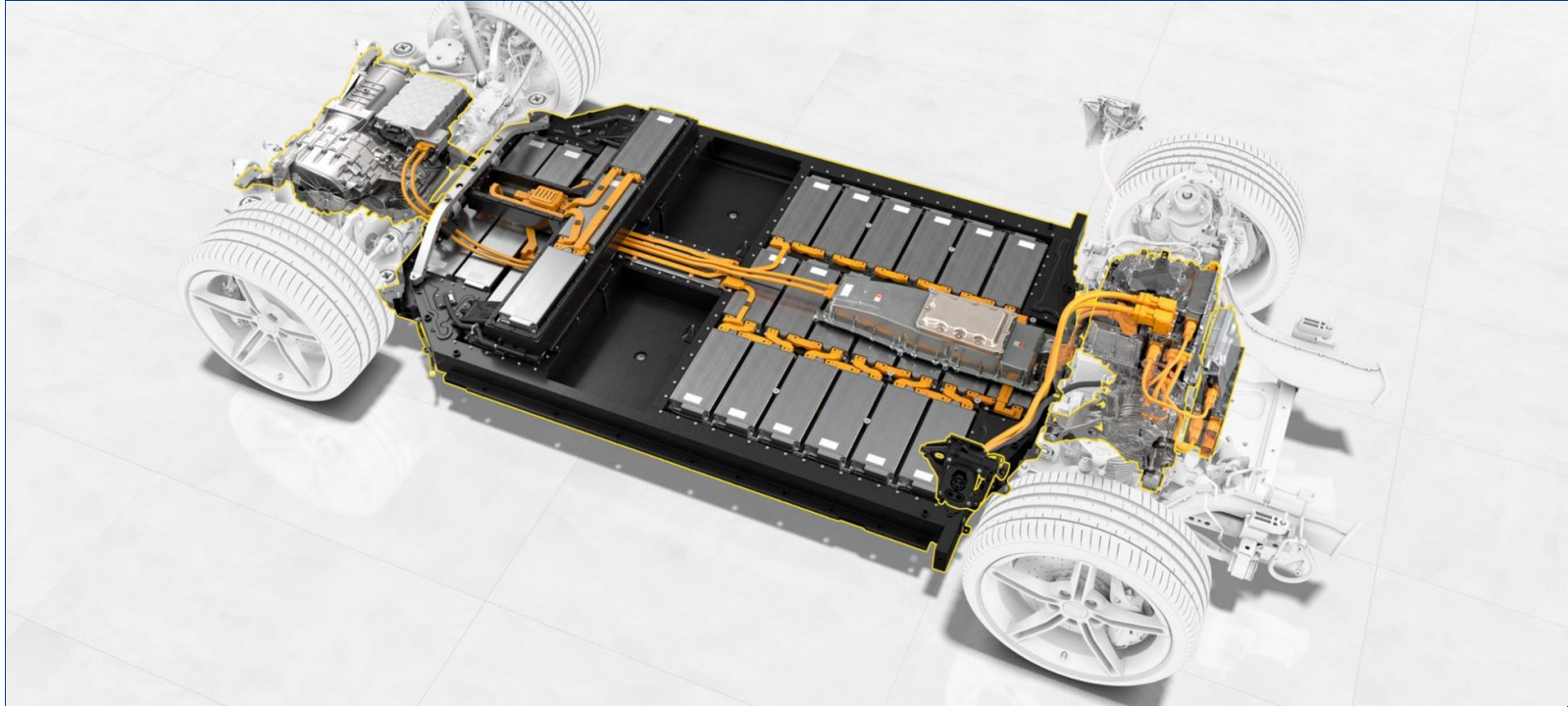




# Netherlands



Two engineers hug on top of a burning wind turbine, moments before their death.



## Electric Vehicles (EV)





# Electric Vehicles (EV)

- ❑ Lithium-Ion Batteries primarily located in underside of vehicle
  - White smoke
  - Battery cell projectiles
  - Hissing/popping sounds
  - Water is considered best cooling agent for suppression
    - Water needs to be applied under the vehicle and up at the batteries.
  - **Rekindle is likely and can occur up to 21 days later!**



**Tesla – Cylindrical Cell Batteries**  
*18650 cell generation*

**LOTS OF WATER**

## 2 Keys to Success

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EV Identification



Secure a Water Supply





## Micro-Mobility Devices

**E-BIKES, SCOOTERS, HOVER BOARDS, ETC.**







# Micro-Mobility Devices

- ❑ Public exposure concerns
- ❑ Stored and charged inside occupied residences and businesses
  - Often near children's bedrooms
  - Can ignite with little-to-no warning
  - **Rekindle is likely. Remove all batteries outside as part of overhaul**



# Micro-Mobility Devices

- ❑ Lithium-Ion batteries do not require Oxygen to burn and are water reactive.







PPE



# PPE

## □ Toxic Gases

- Primary Hazard
- **Respiratory protection is a must throughout including overhaul!**
- Hydrogen Fluoride (HF), Phosphorus Pentafluoride, Phosphoryl Fluoride, Hydrogen Gas, Cobalt
- Some batteries may release their energy and gases long after fire is extinguished

## □ Fire and Explosive Potential

- Full structural firefighting PPE
  - Hydrogen Gas poses explosive potential
  - Fires burn hotter
  - Batteries may release their energy and gases long after fire is extinguished
- ## □ Additional hazards:
- Electrical
  - EVs can move without warning



## SIGNIFICANT INCIDENTS



# February 17, 2021

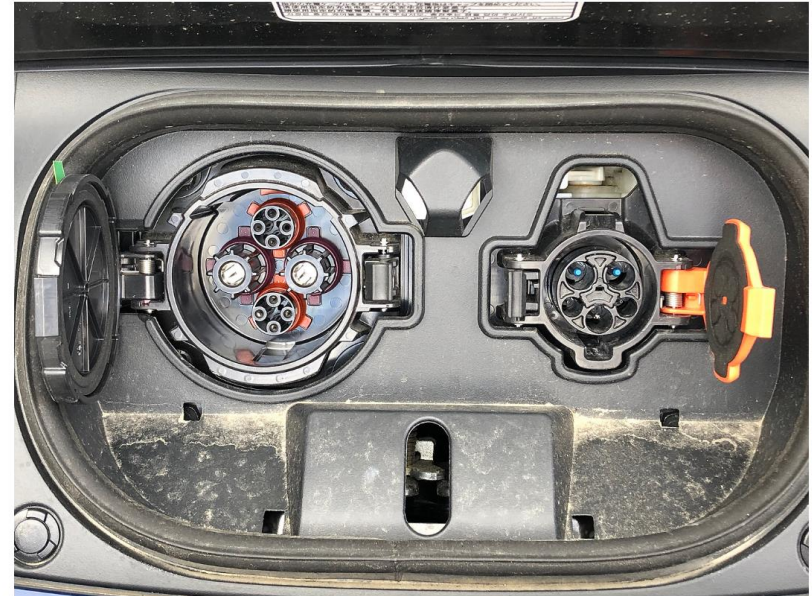
- Germany parking lot bans EVs following EV fire

News → An Underground Parking Lot In Germany Bans Electrified Cars

## An Underground Parking Lot In Germany Bans Electrified Cars

Matt St-Pierre

NEWS February 17, 2021



2019 Nissan LEAF SL+ | Photo: Matt St-Pierre

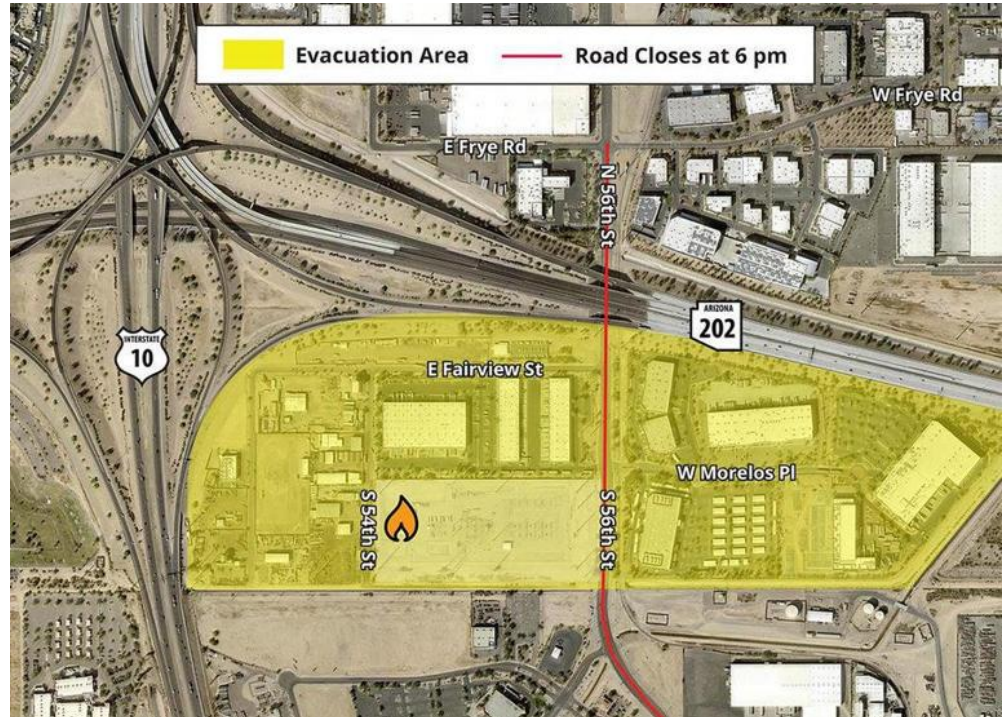
Banning electrified cars from parking in underground or stacked lots could be an issue in major urban areas





# April 18, 2022

- ❑ Chandler, AZ
- ❑ 6,000 sqft ESS – 9 MW
- ❑ 15-day operation
- ❑ All businesses in the area were evacuated due to toxic gases prior to robots opening the facility doors to allow toxic/explosive gases to vent
- ❑ EMF in the area prevented wireless robot utilization. Hardline robot utilized to open doors and take atmospheric reading prior to fire personnel ensuring the fire was extinguished



# April 25, 2022

- FDNY issues warning to public after 4 fires erupted in 2 days
  - 3 in Manhattan
  - 1 in Brooklyn
- E-bike
- FDNY issues PSA message

HOME » INDUSTRY NEWS

## FDNY issues warning following spate of lithium-ion battery fires

Published April 25, 2022

NEW YORK (BRAIN) — Four fires sparked by lithium-ion batteries on lightweight electric vehicles Thursday prompted the FDNY to issue a statement afterward on its Twitter account about the dangers of improper charging and storing.

The tweet came after the FDNY extinguished the fires — three in Manhattan and one in Brooklyn — that injured a dozen people. FDNY said lithium-ion fires were the cause of four deaths last year.

"If using a lithium-ion battery, follow the manufacturer's instructions for charging and storage. Always use the manufacturer's cord and power adapter made specifically for the device. If a battery overheats, discontinue use immediately. See more at <http://fdnysmart.org>," the tweet read.

According to the *Daily News*, the three-alarm Brooklyn fire at a Kensington section home was reported about 4 a.m. It took more than 100 firefighters two hours to control the blaze. Seven people were treated for injuries.

<https://www.fdnysmart.org/be-fdnysmart-when-using-any-devices-powered-by-lithium-ion-batteries/>



# April 29, 2022

- ▣ Paris, France
- ▣ Second electric bus fire in less than 1 month
- ▣ All 149 electric buses from Parisian transit service are taken offline until further notice



# May 2, 2022

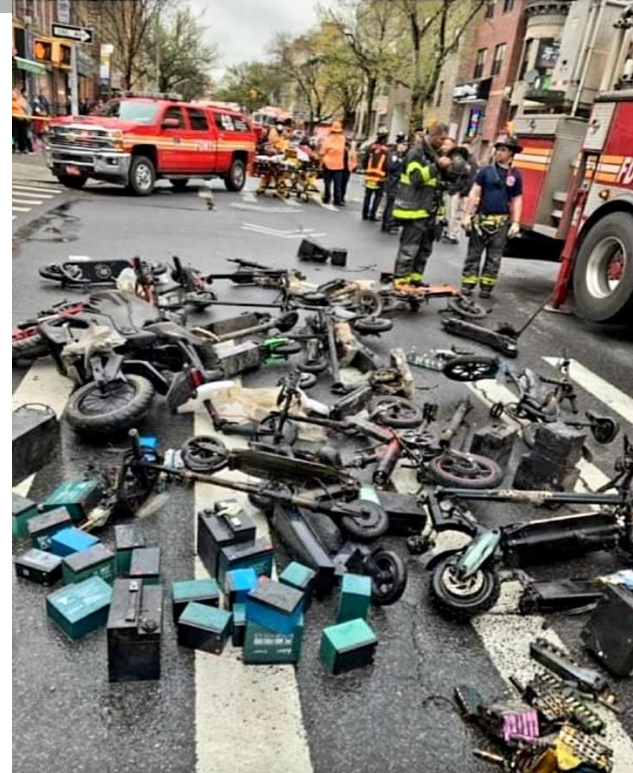
- E-Bike Battery Fire
- "Farmer" apartment
  - Charging multiple e-bikes



NYC Fire Wire

3m · 🌐

Removed from the 3rd Alarm this morning in Sunset Park.



# FDNY

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- ▣ 60 residential fires due to lithium-ion batteries – Jan 1 to May 3, 2022
- ▣ 233% increase from the same period in 2021



# May 15, 2022

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- ▣ EV Hybrid Fire (Chevy Volt) – Escondido, CA
- ▣ 5,000 gallons used
- ▣ Respiratory exposure to gases by crew member

# May 15, 2022

- ▣ Seattle, WA
- ▣ 1 of 2 Micromobility fires in the city that day trapped 2 in their bedroom on the 5<sup>th</sup> floor
- ▣ Rescued by ladder company



# May 19, 2022

- San Diego, CA
- 2 Lithium Batteries – 77 cells, 12 lbs
- General Atomics battery testing facility
- Crews followed recommended procedures
- Damage batteries turned over to General Atomics staff

21:40

Done FILE\_6433

In case of contact with skin wash off immediately with plenty of water. Consult a physician.

**After contact with eyes**  
Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Seek medical treatment by eye specialist.

**After ingestion**  
Drink plenty of water.  
Call a physician immediately.

**5. Fire Fighting Measures**

**Suitable extinguishing media**  
Cold water and dry powder in large amount are applicable.  
Use metal fire extinction powder or dry sand if only few cells are involved.

**Special hazards arising from the chemical**  
May form hydrofluoric acid if electrolyte comes into contact with water.  
In case of fire, the formation of the following flue gases cannot be excluded:  
Hydrogen fluoride (HF), Carbon monoxide and carbon dioxide.

**Protective equipment and precautions for firefighters**  
Wear self-contained breathing apparatus and protective suit.  
Additional information  
If possible, remove cell(s) from fire fighting area. If heated above 125°C, cell(s) not flammable but internal organic material will burn if the cell is incinerated.

**6. Accidental Release Measures**

**Personal precautions**  
Use personal protective clothing.  
Avoid contact with skin, eyes and clothing.  
Avoid breathing fume and gas.

**Environmental precautions**  
Do not discharge into the drains/surface waters/groundwater.  
Methods for cleaning up/taking up  
Take up mechanically and send for disposal.

**7. Handling and Storage**

20:27

Search

Structure Fire - Comm / Apt

Inc #FS22084206 04:13:47

16530 Via Esprillo, # BLDG G92, SAN DIEGO CA

XST: VIA FRONTERA/VIA DEL CAMPO  
TAC: 9A / 9B

RSP Sdge  
ONS M33, B7, E33, E42, T40  
OTHER RSF 262

All Priority (0) CAD

CAD 05/19 17:39:43

[B7] [34] NICKEL COBALT ALUMINUM INLITHIUM BATTERIES 77 CELLS 12 POUND BATTERIES

CAD 05/19 17:32:28

[JTP] [33] IC- EXTENDED RICK, RELEASING 3713 3773 BACK TO JURISDICTION, UNITS ATS ADD'L 90 MINS, CONTACTING SPRINKLER CO., WORKING ON REL'ING RSFE262

CAD 05/19 17:23:30

[JTP] [32] IC- COUNTY HAZMA ATS CONFIRMED KO ON FIRE

Activity Map Units



# June 12, 2022

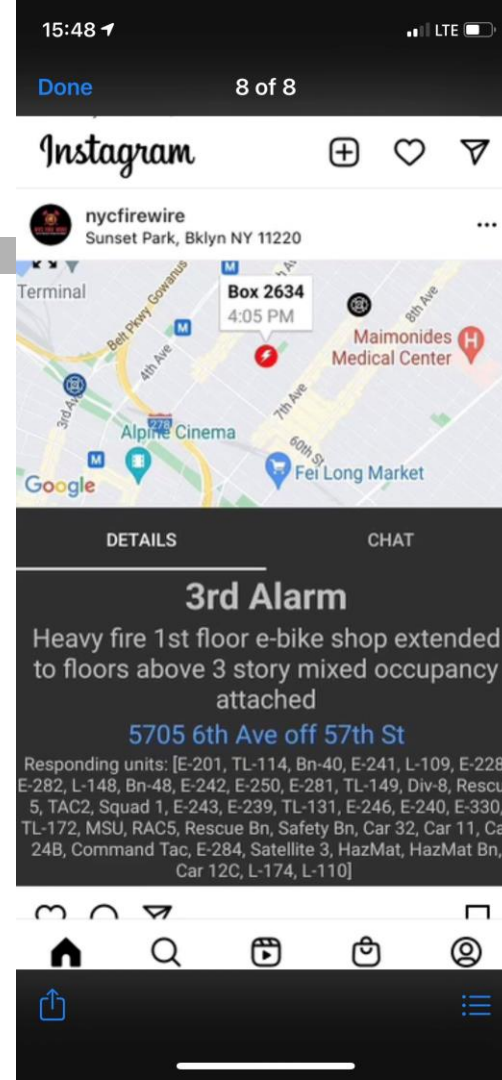
- ❑ Sacramento, CA
- ❑ Tesla Fire in a Wrecking Yard
- ❑ Damaged and reignited in yard after 3 weeks!!





# June 26, 2022

- Brooklyn, NY
- 3<sup>rd</sup> Alarm e-bike shop, residential over commercial





# July 23, 2022

- ❑ Hamden, CT
- ❑ Electric city bus
- ❑ FD let bus burn





Other Hazards?



# September 12, 2019

- ▣ Conception Dive Boat
- ▣ 34 dead
- ▣ Photography Lithium-Ion batteries “involved”





# February 16, 2022

- ❑ Coast of Portugal
- ❑ 1000s of EVs involved
- ❑ Ship sank



# Other

## ■ Electric Tugboats



### Vessel Specifications

#### Overall Dimensions

Molded Length	82'
Length at Waterline	78' 4"
Depth	17' 9"
Design Draft	16' 5"
Beam	40'
Bollard Pull	70 short-tons (estimated)
Speed	12 knots
Gross Tonnage (US Regulatory)	<200 GRT
Bow and Stern Winch	Markay Model DEPC-48-50HP Electric Reel/Recover Winch
Generators for long transit	2 x 300 kW
Fuel	9800 gal @95%

#### Electrical Integrator (ABB) Providing the Following:

Main Propulsion Battery	Corvus 6.2 MWh
Thrusters	Schottel Azimuthing Thruster
Electric Motors	2 x 2100 kW RAMME Motors
Switchboards	ABB Onboard DC Grid™ and AC Switchboard
Intelligent Maneuvering	ABB Marine Pilot Control
Autonomous Operations	ABB Marine Pilot Vision

Fresh Water	750 gal
Battery Room Fixed Fire Suppression	Water Mist
Berths	4



WHERE DO WE GO FROM HERE?





# MULTI FACETED APPROACH

## FIRE SERVICE



■ PREVENTION

■ INVESTIGATION

■ HAZMAT

■ TRAINING

■ OPERATIONS

■ TECHNICAL RESCUE

# RECOMMENDATIONS

- ❑ EV FIRE RECOMMENDATIONS (summary):
  - ❑ Early identification of EV fire
  - ❑ Request TRT
  - ❑ Ensure Water Supply / Consider Water Tender
  - ❑ Add Hazmat if batteries are out of vehicle
  - ❑ Prepare for a prolonged operation
  - ❑ \*\* See EV SOG Draft \*\*

# RECOMMENDATIONS

## □ MICROMOBILITY FIRES

- Early identification of battery involvement
- Ensure all personnel wearing SCBA
- Assume all batteries have stored energy and could off-gas and ignite
- Request Hazmat to respond, advise of LI Batteries present:
  - To remove batteries from area
  - Render them safe
  - Proper disposal
- Do not allow any personnel to enter without SCBA (i.e. investigators) until batteries are removed



# STILL TO-DO

- Standardize an Emergency Response Plan for BESS facilities
- Mandatory through Fire Prevention/Code

Emergency Response Plan*				TB-1228-J2		CAPSTONE	
Name: Top Gun BESS		Type: Utility - Electric		Top Gun-Batt 30 MG			
Address: 6875 "B" Consolidated Way		City: San Diego		Watt/120MG watt Hr.= 4hrs			
SDGE EMERGENCY 888-320-1906		SDGE Fire Coordinator 858-503-5152		SDGE Fire Brigade Engine 619-929-4357			
Operator Contact: *****							
<b>FIRST IN OFFICER</b>							
1 Fire Dept....Remain <b>OUTSIDE</b> of fence...!!! <b>DO NOT ENTER</b> ...(Consider ALL lines Energized...!!!)							
2 Contact SDGE....Identify the ONSITE Qualified Electrical Worker (QEW)							
3 Be <b>PATIENT</b> ....equipment is required to be de-energized and grounded by a QEW							
4 Identify Exterior Exposures and protect... Identify Off-site runoff potential and dike...							
5 Apparatus Approach and Spotting..."Uphill", "Upwind", "Look up"(overhead lines), "Look down", "Look all around"							
6 Locate Water Source and Supply							
<b>Safety Check Off</b>							
<input type="checkbox"/> <b>QEW</b> (Qualified Electrical Worker <b>ON SITE</b> )							
<input type="checkbox"/> <b>De-Energized Equipment has been "Locked-Out &amp; Tagged-Out"</b>							
<input type="checkbox"/> <b>De-Energized Equipment has "Personal Grounding" in place</b>							
<input type="checkbox"/> <b>Equipment has been "De-Energized within 50' of fire and Energized Equipment has been "Flagged"</b>							
<input type="checkbox"/> <b>Equipment on fire.....ALL electrical sources de-energized:</b>							
<input type="checkbox"/> PRIMARY voltage disconnected (high voltage, >>> 4kv)							
<input type="checkbox"/> Secondary voltage disconnected (low voltage, 120v - 440v)							
<input type="checkbox"/> Tertiary voltage disconnected (DC / batteries)							
<input type="checkbox"/> Back feed circuits disconnected							
<b>**CAUTION**</b> If you choose to attempt to extinguish a containment pit fire, work the <b>TACTICAL FIRE SUPPRESSION</b> formula below to ensure you have enough class "B" foam and a adequate water supply prior to any fire attack & All <b>Safety Check Off</b> boxes have been addressed.							
<b>Tactical Fire Suppression</b>						<b>Total Foam Required</b> (Total Gals x Foam %)	
Class "B" Foam Application Formula	Containment Pit Size	Foam Application Rate		Foam Application Time		(1% = 0.01)	
	Area (A = L x W) A = sq. Ft.	(A x 0.2) GPM		(GPM x 20 mins) Total Gallons		(3% = 0.03) Gallons	
<b>Warning - Do Not Proceed Without Sufficient Class "B" FOAM</b>							
*The Emergency Response Plan was designed solely for the facility listed in the address section of the plan. The plan is designed for qualified electrical workers and professional fire-fighters. It should not be used by persons without those qualifications. Each facility is unique. The emergency response plan, for a facility, is specifically tailored to address the particular features within the facility. It is not appropriate to copy the plan for one facility and use it for another.							
<b>*Stay Back 85 ft. From Involved Equipment*</b>							
Prepared by: S. Pullen		Rank: Captain		Last revision: 11/1/2021			

# THANK YOU!

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Contact Battalion Chief Rob Rezende with any questions:  
[rrezende@san Diego.gov](mailto:rrezende@san Diego.gov)