

TVSFPE Secretary's Report  
2/1/2024

Sign-In Sheet: Attachment 1  
Meeting Minutes: Attachment 2  
Reference Information: Attachment 3



**2024**  
**TVSFPE Chapter Members**  
**& Local Members of the Chapter**

<b>Date:</b> 2/1/2024	<b>TOPIC:</b> Electric Vehicle Fires	<b>Presented by:</b> Andrew Tinsley
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Member		Chapter Membership	2024 Dues	Signature
Alamri	Fahad	Student	N/A	
Albertsen	Brent	Professional Member		
Alt	Matthew	Local-Only Member		
Altman	Christopher	Student	N/A	
Baity	David	Professional Member	Paid	
Bane	Pamela	Local-Only Member		
Barrack	Sam	Professional Member	Paid	<i>Samuel Barrack</i>
Bartek	Dave	Member		
Beasland	William	Local-Only Member		
Beck	Eric	Professional Member	Paid	
Berkley	Bryan	Local-Only Member		
Biggs	Brian	Local-Only Member	Paid	
Begley	Jim	Fellow		
Borum	Al	Professional Member		
Boyll	David	Local-Only Member	Paid	<i>David A. Boyll</i>
Branka	Matthew	Professional Member		
Brazzell	Dal	Member	Paid	
Brown	Ethan	Member		
Brown	Harrison	Professional Member		
Buckles	Jack	Local-Only Member	Paid	
Caldwell	Andy	Local-Only Member		
Cantu	James	Student	N/A	
Capito	Nick	Local-Only Member		
Christman	Tom	Fellow	PAID	<i>Tom Christman</i> \$40 CASH
Cloyd	Tonya	Member		
Coleman	David	Local-Only Member	Paid POT	



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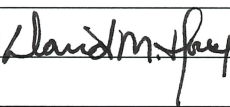



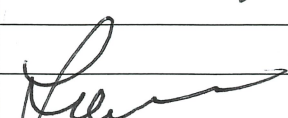
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Member		Chapter Membership	2024 Dues	Signature
Coleman	Jay	Local-Only Member		
Cook	Steve	Professional Member		
Copeland	Tom	Professional Member		
Cross	Jeremy	Local-Only Member		
Daniels	Kaitlyn	Student	N/A	
Dee	Tim	Local-Only Member		
Deschambeault	Rob	Professional Member	Paid	
Devinney	David	Professional Member	Paid	<i>David Devinney</i>
Doliber	Diane	Professional Member		
Douberty	Edward	Professional Member	Paid	
Douglas	Logan	Member		
Douglas	Ryan	Local-Only Member		
Dungan	Ken	Fellow	<i>Paid 4/20</i>	
Durham	Justin	Local-Only Member	Paid	
Eckroth	Jim	Local-Only Member	Paid	
Edwards	Zachary	Local-Only Member	Paid	<i>Zachary Edwards</i>
Felch	Chris	Professional Member		
Fetzer	Jim	Local-Only Member		
Frazer	Scott	Professional Member		<i>Scott Frazer</i>
Freels	Doug	Professional Member	Paid	
Gardner	Justin	Local-only Member	Paid	<i>Justin Gardner</i>
Gilliam	Chris	Local-Only Member		
Gillmann	Colby	Student	N/A	
Goranson	Harvey	Professional Member	Paid	
Greenwell	Jacob	Local-Only Member		
Greer	David	Professional Member	Paid	



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Member		Chapter Membership	2024 Dues	Signature
Gump	Jack	Local-Only Member	Paid	
Hall	Kyle	Local-Only Member	PAID	
Hartford	Clifton	Member		
Higgins	Tommy	Member	PAID	
Henderson	Alan	Member		
Hogan	Scott	Professional Member	Paid	
Houff	CJ	Student	N/A	
House	David	Professional Member		
Hughes	Bradley	Professional Member		
Icove	Dave	Fellow	Paid	
Jenkins	Bobby	Local-Only Member		
Johnson	Dan	Local-Only Member	Paid	
Kasmauskas	Dominick	Professional Member	Paid	
Klima	Steve	Local-Only Member		
Kurr	Amy	Student	Paid	
Landmesser, Jr.	Jimmy	Professional Member	Paid	
Landmesser, Sr.	Jim	Professional Member	Paid	
Larson	Alan	Professional Member	Paid	
Laubach	Eric	Member	Paid	
Livesey	Hannah	Student	N/A	
Massey	Shay	Professional Member	Paid	
Masters	Mike	Local-Only Member	Paid	
McEnergy	John	Local-Only Member		
McNeely	Brett	Local-Only Member		
Migun	Peter	Local-Only Member		
Miller	Leonard	Local-Only Member	Paid	



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Member		Chapter Membership	2024 Dues	Signature
Milne	Justin	Professional Member		
Nelson	Steve	Student	N/A	
Oare	Jim	Local-Only Member		
Overton	Monty	Professional Member	Paid	<i>[Signature]</i>
Patterson	Eric	Member		
Payne	Brandon	Local-Only Member		
Phillips	Dennis	Local-Only Member		
Platfoot	Luke	Professional Member	Paid	<i>[Signature]</i>
Platfoot	Mark	Local-Only Member		
Presnell	Joshua	Local-Only Member	Paid *PDT	
Presnell	Stephen	Professional Member	Paid *PDT	
Rippetoe	Blake	Local-Only Member		
Rockwell	Norm	Member		
Rockwell	Scott	Member	Paid	<i>[Signature]</i>
Rogers	Kenny	Member	Paid	
Russell	Kirk	Member		
Russell	Matt	Local-Only Member	Paid *PDT	
Sellers	J.R.	Professional Member	Paid	
Sellers	Eileen	Professional Member	Paid	
Sharp	Gary	Professional Member		
Shehane	Michael	Local-Only Member	Paid	<i>[Signature]</i>
Siem	Mark	Member		
Sinasac	Tim	Local-Only Member	Paid *PDT	
Sipes	Jeff	Professional Member	Paid	
Smith	Patrick	Professional Member		
Smith	William	Member		



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Member		Chapter Membership	2024 Dues	Signature
Solomon	Travis	Local-Only Member		
Spellman	Matthew	Local-Only Member	Paid	<i>Matthew Spellman</i>
Stallions	Will	Student	N/A	
Steneck	Paul	Member		
Sterchi	John	Professional Member		
Summers	Lisa	Local-Only Member		
Tallent	John	Member		
Thornton	Patrick	Professional Member	Paid	
Till	Bernie	Fellow		
Tinsley	Andrew	<del>Local-Only Member</del>	Paid	<i>Andrew Tinsley</i>
Tomecek	Dave	Local-Only Member		
Torbett	Todd	Member		
Tyler	Eric	Member	Paid	
Tulay	Mark	Student	Paid	
VanLandigham	Sara	Member		
Vargas	Leonardo	Student	Paid	
Vuoso	Jerry	Professional Member	Paid	
Waggoner	Wayne	Local-Only Member	Paid	
Walker	Rodney	Local-Only Member		
Walmsley	Channing	Local-Only Member	Paid	<i>Channing Walmsley</i>
Walters	Glenn	Member		
Williams	Jesse	Professional Member	Paid	
Woolard	Geoff	Local-Only Member	Paid	

Garcia Corella Diane      dcorella@bst-solutions.com      *[Signature]*



**2024**  
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Levels of Membership:

- A. Fellow: Fellow is the highest grade of membership in SFPE.
- B. Member (MSFPE): A Member shall be a person who supports the goals and objectives of the Society. Membership starts immediately upon completing the online member application and submission of dues payment.
- C. Professional (PMSFPE): A Professional Member is a graduate of an engineering curriculum of accepted standing and shall have completed not less than four years of practice indicative of growth in engineering competency and achievement, three of which shall have been in responsible charge.
- D. Associate Member:
- E. Affiliate:
- F. Student Member: A Student Member shall be enrolled full-time in an engineering curriculum or an engineering technology curriculum and not have full-time employment.
- G. Honorary Member:
- H. Local-Only Member:



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# TVSFPE GENERAL MEMBERSHIP MEETING

*Meeting Minutes  
February 1<sup>st</sup>, 2024*

Meeting began with introductions at 6:02 p.m.

## REPORTS

Minutes were emailed from previous meeting. Kyle Hall motioned to accept the minutes. Sam Barrack second. Motion carries.

President Tinsley presented the Treasurer's Report. No further comments.

## OLD BUSINESS

- Accepting 2024 member dues.
- David Devinney motion for TVSFPE to support/endorse Gary Sharp's presentation at Scouts BSA MBC. Scott Frazer second. Motion carries.
- Dan Johnson motion to fund \$2,500 for *Technical Standards in Engineering* research proposal support. David Ilove second. Motion carries.
- David Devinney will chair the 2024 Scholarship Committee.

## NEW BUSINESS

- Scott Frazer motioned to provide \$23,000 in TVSFPE Scholarship assistance in 2024. Michael Shehane second. Motion carries.
- Tom Christmas recommends the 2024 picnic funding be capped at \$1,500.

Business meeting concluded at 6:30 p.m.

Minutes submitted by: Justin Gardner



# SFPE

## TVSFPE Chapter Meeting

February 1, 2024

Speaker – Andrew Tinsley

*Tennessee Valley*

# Welcome

- Introductions
- Minutes from January 2024 Meeting

*Tennessee Valley*

# Treasurer's Report

- ORNL FCU Account balances:
  - Checking: \$6,156.29
  - Savings: \$8,126.76
    - Includes the money designated for burn trailer support
- Fidelity Investment Account
  - Total Value: \$509,783.06
- Paypal Account
  - Total Value: \$250

*Tennessee Valley*

# Old Business

- Pay your 2024 Dues!!!!
- Seminar
  - April 17-18, 2024
  - Bearden Banquet Hall
  - Dr. Icove will be teaching
  - Flyers will come out soon!! Pass them around to your contacts for us.
  - \$250 for code officials/public sector investigators
  - \$500 for engineers/private sector investigators

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# New Business

- Future Meetings
  - Any suggestions/interested topics?? Please email them to [president@tvsfpe.org](mailto:president@tvsfpe.org)
- Next Meeting is 3/7/24
  - Amerex presenting
  - Location: Mimi's Cafe
- Watch your email for survey for ACE completion information. Need input from you all to complete.
- Scholarship Committee Chair/Member Volunteers?
- Other items??

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# SFFPE

## Scholarship Amount Approval

- Per By-Laws, we can fund the scholarship for:
  - Up to a maximum of the accrued interest and investment gains from the Scholarship Fund from the previous calendar year
    - \$23,180.65
  - Up to \$2,000 from the Scholarship Fund
    - \$2,000 max
  - Up to a maximum of 75% of the profits from the seminar for the previous year
    - Profits were \$13,718.25. Allowable amount is \$10,288.69

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# SFFPPE

## Picnic

- Smokies
  - \$35/adult, \$33 per child 4-12, Under 4 are free
  - 5/2 or 5/16
- Main Event
  - ~\$25 per person
- Axe Throwing (again)
  - Have requests in for quotes

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# SFPE

## SFPE Benefits

- Discounts on Virtual Continuing Education (some free offerings) including on demand training
- Access to virtual and print media
  - FPE Magazine
  - Fire Technology Journal
- Knowledge sharing through SFPE Connect Online
- Discounts on SFPE Publications
- Support for the SFPE Foundation

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# Nominations for SFPE Awards

- 5 under 35
- Lund Award for Professional Recognition
- Lucht Award for Contributions to Education
- Fire Protection Person of the Year Award
- Nelson Award for Inspired Service
- Spotlight Award
- Bryan Mentoring Award
- Jensen Award for Committee Service
- SFPE Fellow Nomination

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SFFPPE



**SPEAKER**

*Tennessee Valley*

# Electric Vehicle Hazards and Code Requirements Overview

February 1, 2024

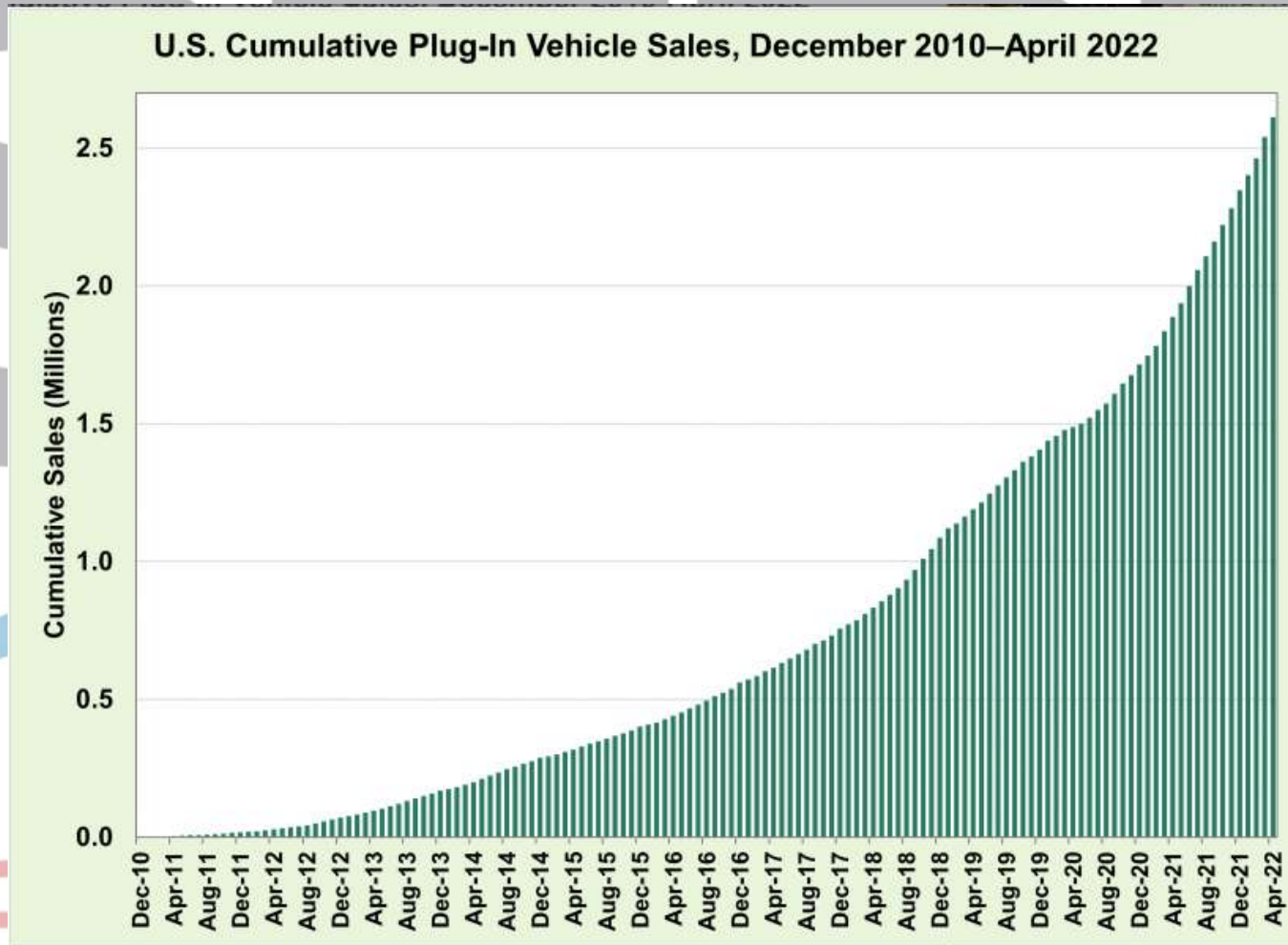
Andrew Tinsley

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Its here... And there's nothing you can do about it...

- US Government stated policy to have 50% market share to electric vehicles by 2030.
- “Build Back Better” initiative to install nationwide charging station network
- GSA heavily pushing electrification of fleet
  - Rumors abound that certain areas of government can carry exemption to these requirements. Have not seen anything substantiated at this point.
- DOE rules exist allowing the installation of charging stations for POVs

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[US: Cumulative Plug-In Electric Car Sales Now At 2.6 Million \(insideevs.com\)](https://insideevs.com)

# Electricity Review

## What is a kWh

Calculate monthly electricity invoice

Item	Power	Time	Energy
Lights	0.24kW (4x 60W)	120 Hrs (4 hr/day x 30days)	28.8kWh (0.24kW x 120 Hrs)
TV	0.05kW (x 50W)	150 Hrs (5 hr/day x 30days)	7.5kWh (0.05kW x 150 Hrs)
Heater	2kW (x 2kW)	90 Hrs (3 hr/day x 30days)	180kWh (2kW x 90 Hrs)

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# How Electric Cars are Powered...

- Input to Battery
  - Level 1 and 2 chargers – AC in
  - Level 3 (Fast Charge) – DC in
- Storage – DC
- Motors – Generally AC (AC Induction)

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# Recognized Hazards (NFPA 855, Annex B)

- Normal Conditions:
  - Fire and Explosion Hazards
    - Combustibles in contact with heated surface (e.g. insulation, combustible fluids)
  - Chemical Hazards – What you would expect...
  - Electrical Hazards – Commercial stations operate at 240 or 480 Volts
  - Stranded/Stored Energy Hazards – Power where/when we don't expect it
  - Physical Hazards – Impact, burns, etc.

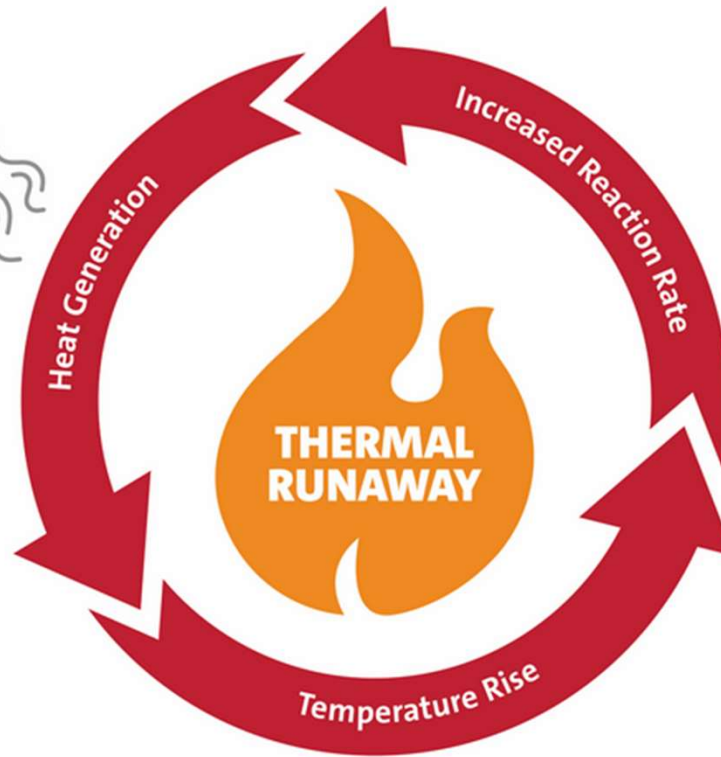
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# Recognized Hazards (NFPA 855, Annex B)

- Emergency/Abnormal Conditions:
  - Fire and Explosion Hazards
    - Venting of flammable gases near sources of ignition
    - Explosions typically uncommon as overpressure venting is typically integrated (at least that's what they claim... See YouTube videos galore)
  - Chemical Hazards – See NFPA 855, Annex B.4.2
  - Electrical Hazards – See NFPA 855, Annex B.4.3
  - Stranded/Stored Energy Hazards – See NFPA 855, Annex B.4.3
  - Physical Hazards – See NFPA 855, Annex B.4.4

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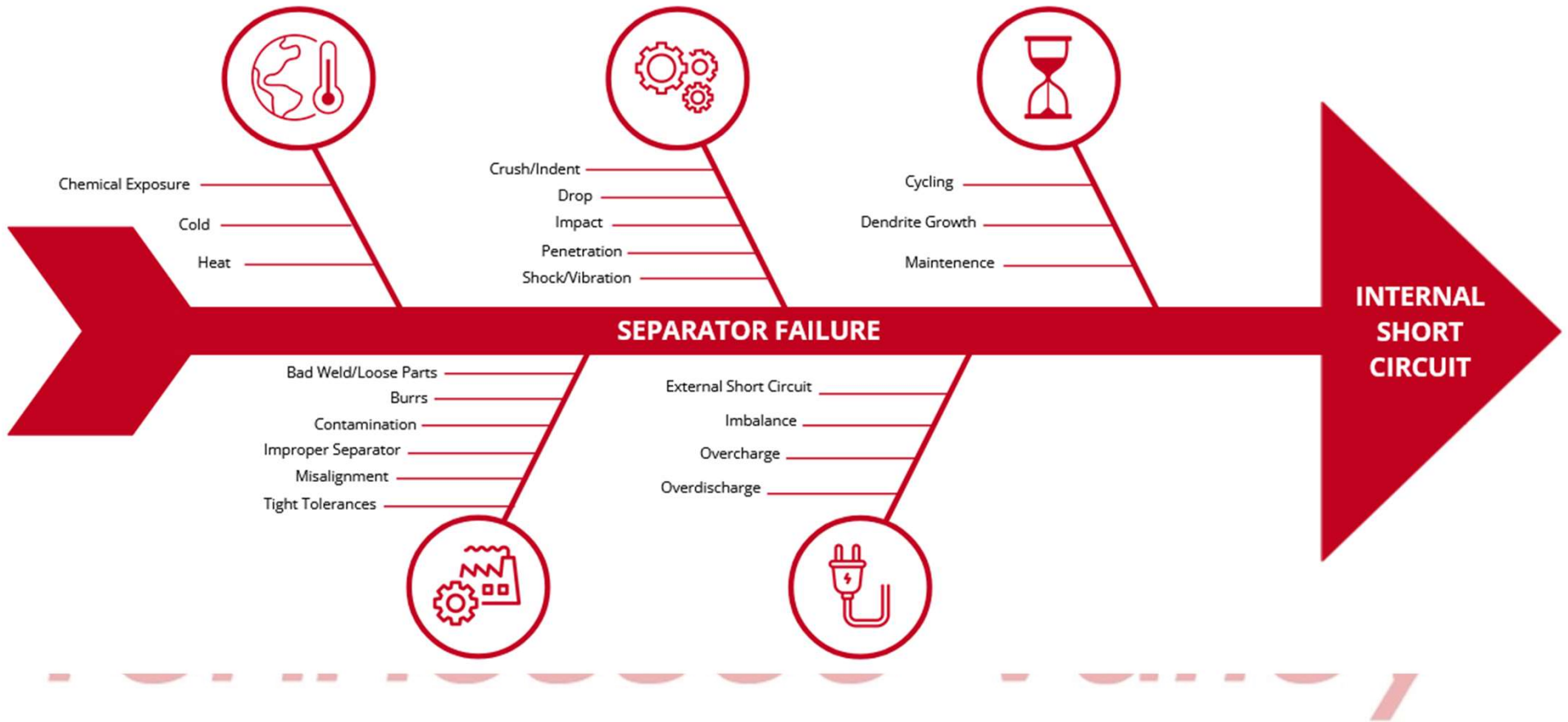
[What Causes Thermal Runaway? \(youtube.com\)](#)

[What is thermal runaway? Electric vehicle fires explained! \(youtube.com\)](#)

[The Science of Fire and Explosion Hazards from Lithium-Ion Batteries | FSRI Safety Academy](#)

*Terrence Valley*

# Thermal Runaway



# Thermal Runaway

- Stage 1 Failure
  - A battery cell becomes compromised through mechanical damage, an internal or external thermal event, or through an electrical fault.
- Stage 2 Failure
  - Small amounts of gas—typically hydrogen—are generated and released from the cell with an accompanying release of heat; this is known as “off-gassing.”
- Stage 3 Failure
  - With increasing heat levels, smoke begins to emit from the cell. The presence of smoke is indicative of an impending catastrophic event in which ignition and thermal runaway are the likely outcomes.
- Stage 4 Failure
  - Fire ensues and a chain reaction failure of adjoining cells is probably along with the possibility of an explosion.

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# SFFPPE

## Behavior of an EV Fire

- Actually not that bad... Testing performed by NFPA to develop recommendations for PPE and tactics

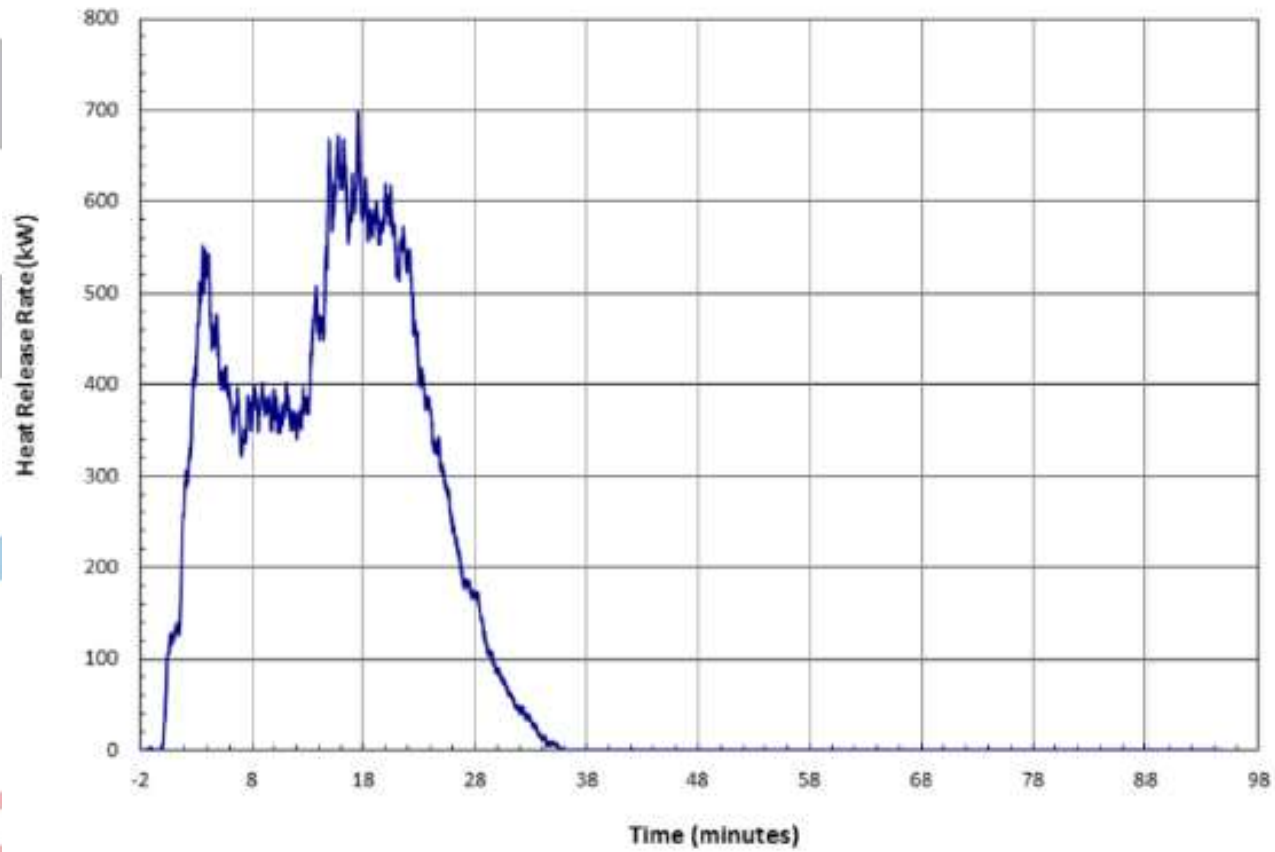


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### HEAT RELEASE RATE



Terminology






TC	Maximum Temperature (°F)	Time	TC	Maximum Temperature (°F)	Time
1	1600.5	0:18:19	11	1490.7	0:17:09
2	1342.4	0:18:19	12	1264.1	0:23:26
3	2111.9	0:18:19	13	2233.8	0:20:54
4	1472	0:17:04	14	1311.4	0:47:04
5	2040.1	0:20:58	15	1262.7	0:18:13
6	1977.4	0:20:54	16	1975.5	0:05:20
7	1533.4	0:19:57	17	201.7	0:24:09
8	1713.9	0:16:57	18	127	0:24:27
9	1609.9	0:06:45	19	230	0:18:14
10	1419.8	0:05:58	20	106.7	0:22:35

# SEDFE

Measurement	Value	Time
HFG1 (5 feet)	17.1 kW/m <sup>2</sup>	0:23:05
HFG2 (10 feet)	4.7 kW/m <sup>2</sup>	0:15:52
HFG3 (5 feet)	18.0 kW/m <sup>2</sup>	0:14:54
HFG4 (10 feet)	3.7 kW/m <sup>2</sup>	0:14:54

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# EV Charging Station Nomenclature

KNOW YOUR EV CHARGING STATIONS		
 <p><b>AC Level One</b></p>	 <p><b>AC Level Two</b></p>	 <p><b>DC Fast Charge</b></p>
<b>VOLTAGE</b> 120V 1-Phase AC	<b>VOLTAGE</b> 208V or 240V 1-Phase AC	<b>VOLTAGE</b> 208V or 480V 3-Phase AC
<b>AMPS</b> 12–16 Amps	<b>AMPS</b> 12–80 Amps (Typ. 32 Amps)	<b>AMPS</b> >100 Amps
<b>CHARGING LOAD</b> 1.4–1.9 kW	<b>CHARGING LOAD</b> 2.5–19.2 kW (Typ. 6.6 kW)	<b>CHARGING LOAD</b> 50–350 kW
<b>CHARGING TIME</b> 3–5 Miles per Hour	<b>CHARGING TIME</b> 12–60 Miles per Hour	<b>CHARGING TIME</b> 60–80 Miles in 20 Minutes

# Mitigation...

- **Charger**

- Appropriate listing (UL/FM) and installation (NFPA 70)
- In-Cable Control Box (ICCB) – Protects against over/under current
- Ground Monitoring – GFCI style protection
- Temperature Control – Monitors for excess temperature

- **Vehicle**

- Appropriate Battery Listing
- Battery Monitoring System
- Automatic Impoundment of Damaged Cells

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# SFFPE

## Codes/Standards???

- Code search on requirements has been nonproductive to say the least.
- Codes do not seem to be taking any immediate action regarding EV charging stations...



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IBC/IFC/IRC

- No requirements regarding fire protection.
- Lots of requirements on when capability has to be provided...

[EVs and Building Codes](#)

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# NFPA 30A

- TIA No. 1621 for NFPA 30A failed on Technical Merit as well as Emergency Nature
  - 2024 Version of NFPA 30A issued with no additional guidance
- Review of this document indicates the following:
  - Committee did not feel the need was emergent as the hazards are adequately addressed in other codes (e.g. separation from classified equipment, etc.)
  - Limits on spacing from building are wholly unvetted and difficult to enforce based on charging cable reach distances
  - The relative infrequency of the events the code language is meant to protect from

[30A 2021 AUV AAA Log1621 tiaballot final.xlsx \(nfpa.org\)](#)

# NFPA 30A

- TIA Failed Proposal

- New Chapter 15 specifically addressing charging stations
- Location restrictions
  - 10 ft from property lines, etc.
  - Cannot allow charging on separate lots (charging station cable cannot cross lot lines)
  - Separation from classified areas (e.g. fuel pump areas)
- Requires sloping such that flammable liquids cannot collect under EV
- Collision protection (requirements basically copied from NFPA 855)
- Signage similar to fuel pumps (e-stop location, etc.)
- Lighting, extinguishers, ITM, etc.

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## FM 7-15, Garages

- Amended to include statement that standard is equally applicable to garages with EVs and EV charging stations
- Assume this means FM sees no increase in hazard to the facility based on the inclusion of EVs

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# Listing Standards

- *UL 2202, DC Charging Equipment for Electric Vehicles*
  - EV Charging Systems
- *UL 2594, Electric Vehicle Supply Equipment*
  - Batteries and integrated chargers
- *UL 2750, Outline of Investigation for Wireless Power Transfer for Electric Vehicles*
  - Wireless charging of EVs (new-ish)
- *UL 2580, Batteries for Use in Electric Vehicles*

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## Related Codes/Standards

- UL 2202 – DC Charging Equipment for Electric Vehicles
- NFPA 855 – Energy Storage Systems
- IBC/IFC – Mostly, Section 1207 of IFC (2024)
- UL 9540 – Energy Storage Systems and Equipment
- FM Datasheet 5-33 – Lithium-Ion Battery Energy Storage Systems

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SF

Questions???



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