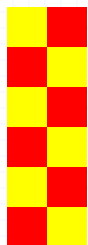




SCDF

The Life Saving Force

... for a safer Singapore



FSM Seminar 2025

Fire Statistics & Case Studies

WO2 Muhammad Shahril Bin Sulaiman

Senior Fire Investigation Specialist

Operations Department

Singapore Civil Defence Force



Scope

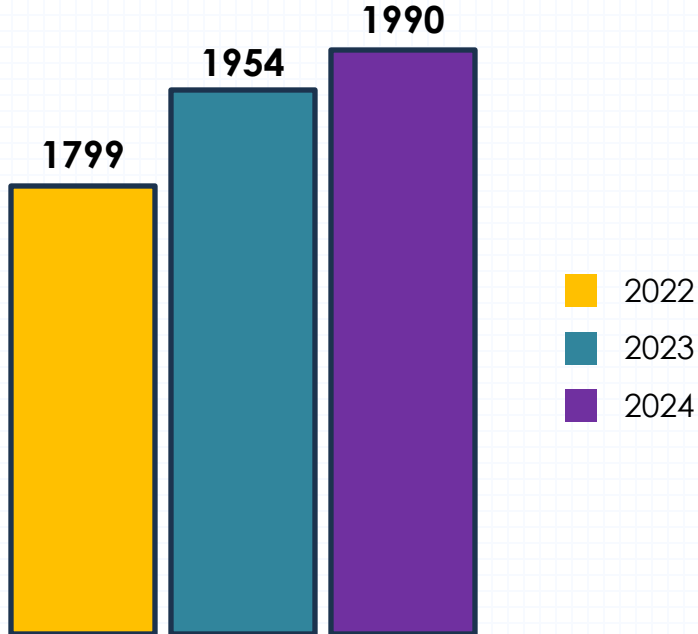
- Annual Fire Statistics 2024
 - ✓ Overview
 - ✓ Areas of concern
- Case Studies
 - ✓ Key takeaways



Photo courtesy of SCDF



Overview



From SCDF Emergency Medical Services,
Fire & Enforcement Statistics 2024

- Overall number of fires increased by **1.8%** from 2023
- In 2024, we attained a **7.5%** reduction in the number of fires at industrial premises.

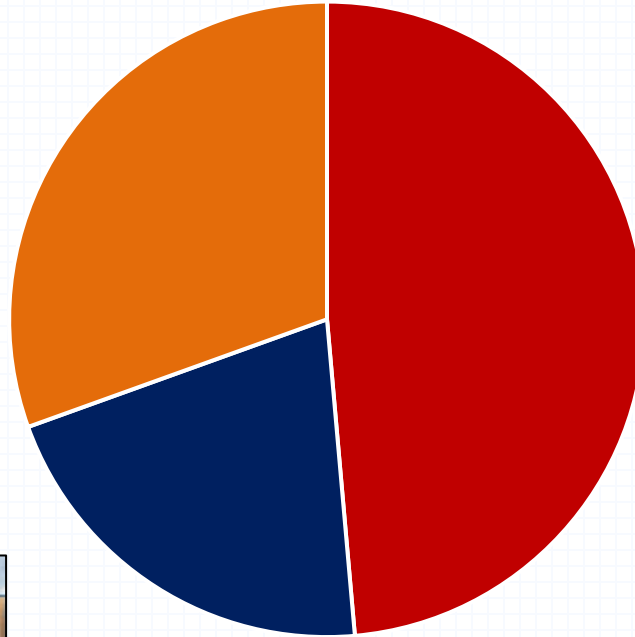


Breakdown of Fire Calls

Non-building Premises (607)



Non-residential Buildings (415)

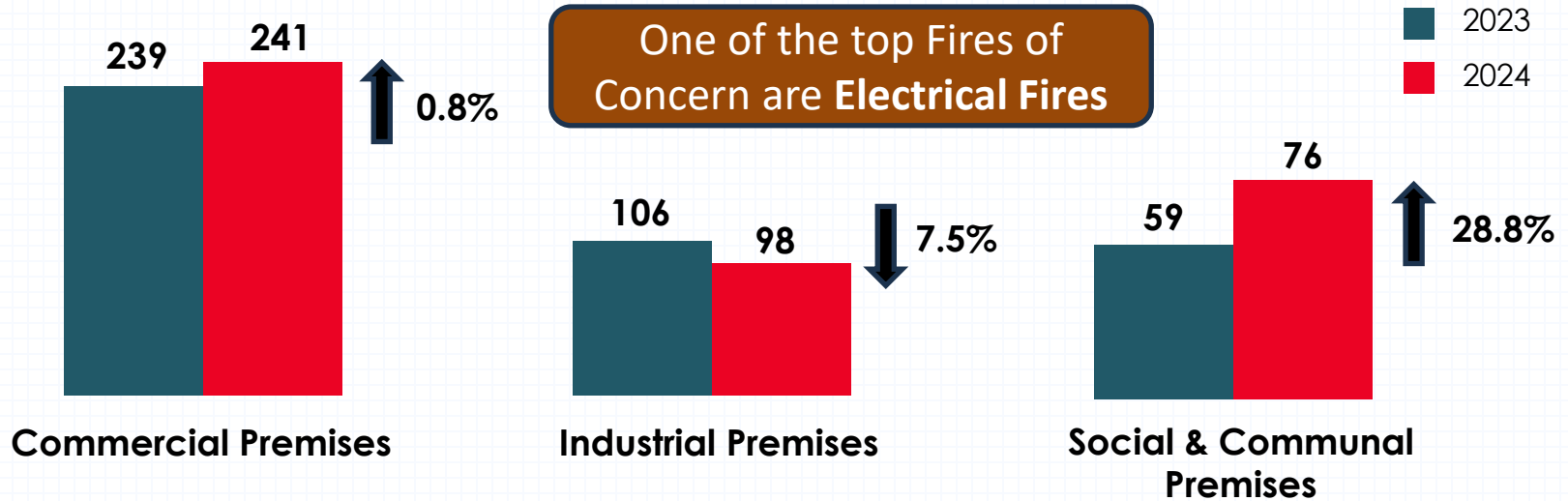


Residential Buildings (968)

(968)



Fires in Non-Residential Buildings



From SCDF Emergency Medical Services, Fire & Enforcement Statistics 2024

SCDF responded to 415 fires in non-residential buildings in 2024, an increase of **2.7%** from 2023.



Electrical Fires



Electrical Fires

- **What happened?**

Electrical fires stem from various factors
(*not just overloading...*)

- Overloaded electrical outlets
- Electrical anomalies
- Faulty appliances
- Damaged wiring / components resulting in short-circuit
- Improper use of electrical devices
- And more...



Electrical Fires

- **What to do?**
 - Do not panic, switch off the main power supply
 - Your safety is important, evacuate!
- **How to prevent?**
 - Do not overload power outlets
 - Do not use faulty electrical equipment
 - Switch off power outlets when not in use
 - Use electrical equipment with official Safety Mark

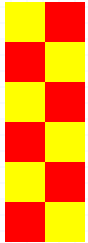




SCDF

The Life Saving Force

... for a safer Singapore



Case Study



Electrical Fires – Electric Vehicles

Singapore's Electrification Vision

4

2025

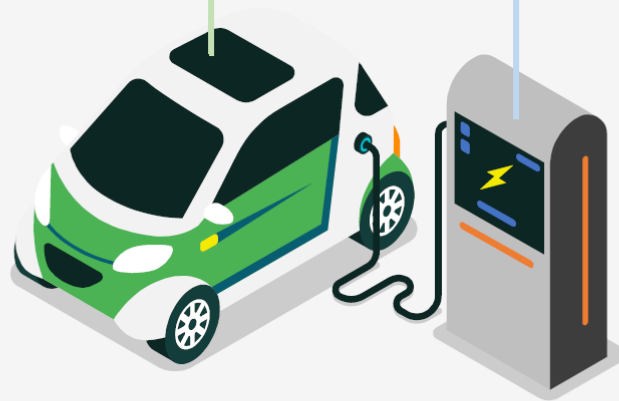
No new diesel car registration.

2030

All new car registrations will be cleaner-energy vehicles.

2040

All vehicles to be cleaner energy vehicles.



2025

Every HDB town is EV ready.

2030

60,000 EV Charging points, in tandem with EV adoption.

2050

Singapore has committed to significantly reduce land transport emissions in absolute terms, in alignment with our net zero target by 2050.

Visit LTA website [Powereverymove.gov.sg](https://www.powereverymove.gov.sg) for more

A). All rights reserved



Electrical Fires – Electric Vehicles

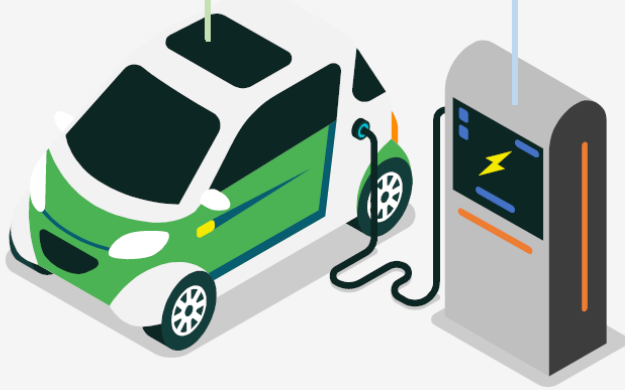
Electrification Progress

> 1/3

of new cars registered in the first half of 2024 were electric.

> 18,000

cars, or 2.7% of our total population, are electric.



> 1 in 2

HDB carparks are now equipped with EV chargers.

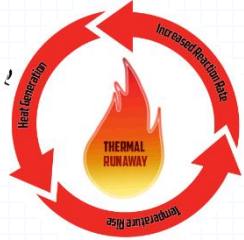
> 13,800

charging points islandwide.

Visit LTA website [Powereverymove.gov.sg](https://www.powereverymove.gov.sg) for more



Assessment of Risk



Thermal Runaway

Phenomenon in which lithium-ion cell is in state of uncontrolled self-heating



Hazardous Gas Release

EV batteries undergoing thermal runaway will release toxic/flammable gases due to combustion of electrolytes



Risk of Reignition

EVs may reignite even after fire is extinguished due to undischarged energy within the battery



Organic Compound	PAHs
Asphyxiant Gases	CO, HCN
Irritant Gases	HF, HCl, SO ₂ , NO ₂



Electrical Fires – Electric Vehicles



For more information, please visit SCDF's Facebook page.

Electrical Fires – Electric Vehicles

■ What happened?

- A car fire happened on 17 February 2025
- The burning car was an electric vehicle
- 1 person sustained minor burns injury
- The case is still under investigation

■ What did SCDF do?

- Cover the car with a vehicle fire blanket
- Used water jets to cool the car
- Used special tools to inject water into the car's battery for direct cooling
- Damping down of car even after the fire was put out, prior to handover to vehicle recovery operator for transport to quarantine site




Electrical Fires – Electric Vehicles

- **How to prevent / minimize effects?**
 - Be aware if the affected burning / accident vehicle is an EV (look out for make, model, labels)
 - Minor fires involving EV (e.g. upholstery) can be put out by fire extinguishers
 - Look out for respiratory hazards from toxic gas release
 - If the EV fire is beyond control / shows signs of off-gassing, jet-like flames, evacuate to safe distance (15m and more)
 - Even if fire had been put out, assume that the EV is still a danger due to possibility of reignition (due to remnant state of charge)



Public Materials

In collaboration with LTA and NFEC – Vehicle safety checklist uploaded in SCDF Website to educate the public on preventive tips, how to recognise tell-tale signs of EV battery fire, etc



Vehicle Safety Checklist

Preventive Tips

Learn how to prevent your vehicle from catching fire by following these tips:

- 1 Service Regularly**
Service your vehicle regularly. Do not attempt to modify/tamper the vehicle.
- 2 Check for defects**
During servicing, ensure that the vehicle's electrical, engine and fuel systems are checked for any defects.
- 3 Self-inspection**
Outside of the scheduled servicing period, conduct visual checks for any signs of leakages.

Tips on preventing & handling vehicle fires

Primary Causes of Vehicle Fire

Most vehicle fires in Singapore occur while the vehicles are travelling on the road.

The primary causes of these fires are due to ignition sources such as overheating and electrical faults within the engine compartment.

Vehicle owners are advised against any unauthorised additions or modifications to their vehicles.

Equip Your Vehicle With a Fire Extinguisher

Most vehicle fires start small but develop rapidly due to the presence of flammables such as petrol, diesel and lubricants.

It is advisable for every vehicle to be equipped with a dry powder fire extinguisher to extinguish a small fire before it spreads or grows any larger.

P.A.S.S. Method

- PULL** out the safety pin as instructed on the label
- AIM** the nozzle at the base of the fire
- SQUEEZE** the lever
- SWEEP** the fire using the extinguisher's discharge

Further Information

For a step-by-step guide on how to operate a fire extinguisher, please visit the SCDF website link at: www.scdf.gov.sg/community-volunteers/publications

Download the myResponder app for various in-app e-learning modules!

Measures to minimise injuries

While travelling, if a vehicle owner spots any sign of smoke emitting from the vehicle:

- 1 Pull over**
Pull over safely to the road shoulder where possible and turn off the engine.
- 2 Evacuate**
Evacuate and move more than 15m away from the vehicle.
- 3 Call 995**
Do not attempt to fight the fire. Call 995 for assistance, and provide details on the make, model and vehicle registration number.

Telltale signs of Electric Vehicle(s) (EV) Battery Fire

- 1 Audible and distinguishable popping/hissing sounds from the battery compartment.**
- 2 Visible sparks.**
- 3 Sudden thick amount of greyish/whitish smoke spewing out in high volume.**
- 4 'Jet-like' directional flames.**

Logos: SCDF, Land Transport Authority, NFEC



Public Materials

If you detect a fire and have a fire extinguisher with you, you may attempt to extinguish the vehicle fire while it is still small or safe to do so. Otherwise, call 995 for SCDF's assistance.

995

If you notice signs of a battery fire involving electric vehicle(s) (EV), do not attempt to extinguish the fire and instead call 995 for SCDF's assistance.



If the fire is too large or involves signs of battery fire* involving EV, they should not attempt to fight such fires

Instead, they should retreat to a safe distance away, call 995 and inform details on the make, model and license plate no. where possible

* Such signs could include audible and distinguishable popping/hissing sounds from the battery compartment, visible sparks, sudden thick amount of greyish/whitish smoke spewing out in high volume and jet-like directional flames.



Public Guidelines






- Refer to CD Emergency Handbook 9th Edition, Page 42 (available for download on SCDF Website) on guidelines to EV incidents

Electrical Vehicle (EV) Fire

As EVs (both pure EVs and hybrid EVs) run on electricity from High Voltage (HV) batteries, this poses a different kind of challenge as compared to fires involving Internal Combustion Engine (ICE) vehicles (e.g. risk of electrocution and extreme heat from the affected HV battery if it undergoes thermal runaway¹).

You should not attempt to extinguish a fire that has already fully engulfed the EV as thermal runaway may be in progress. Instead, you should retreat to a safe distance of at least 15 metres away from the vehicle and call 995 for assistance.

When calling 995, you should provide the license plate of the vehicle or the model of the EV and a brief description of the area on fire (e.g. front bonnet, middle section of EV, undercarriage of EV).

	Identifying pure EVs and Hybrid EVs	The EV High Voltage (HV) Battery is commonly located at:	
Hybrid EVs	 Label insignia – "Hybrid"	 Trunk or Under/Behind Rear Seat	
Pure EVs	 Lack of exhaust pipe	 Undercarriage	 Transmission Hump



EV firefighting procedure

Initial Containment and Public Protective Actions

1. If premises has Tier 1 certified Company Emergency Response Team (CERT), they are to don full PPE with self-contained breathing apparatus and perform the following tasks:
 - a. Call 995 to activate SCDF
 - b. Evacuate people from surrounding areas
 - c. Establish cordon of at least 15 m around EV on fire
 - d. Fight fire by setting up water jets to conduct cooling of burning vehicle/batteries and surrounding structures/vehicles
2. If facility's CERT is not Tier 1 certified, they shall perform the following tasks:
 - a. Call 995 to activate SCDF
 - b. Do not attempt to fight the fire. Instead, focus on evacuating people from surrounding areas
 - c. Establish cordon of at least 15 m around EV on fire
3. CERT to ensure that ventilation systems are activated (if any).

* Firewatch to be conducted on a 6-hourly interval for the first 48 hours post-incident, followed by a 12-hourly interval thereafter over a period of 5 days or the period recommended by a specialist representative from the owner/distributor of the affected vehicle, whichever is longer

Post-Incident Support

How FSMs can assist SCDF in Fire Investigation

- Key personnel who can provide firsthand accounts
- Critical documentation like maintenance records and floor plans
- Important technical information such as electrical diagrams
- Surveillance footage that can help determine cause and spread
- Specialized equipment logs, particularly important for EV-related incidents where battery monitoring systems are involved



FSM's Key Responsibilities

- **Peacetime**
 - ✓ Maintenance of all fire safety measures
 - ✓ Conduct daily checks and remove any fire hazard
 - ✓ Train, co-ordinate and supervise the CERT exercises annually
 - ✓ Fire warden familiar with the evacuation procedure specified in the ERP
 - ✓ SMC, FSM and CERT should be familiar with roles/responsibilities specified in the ERP
- **During incidents**
 - ✓ Notify SCDF immediately upon the occurrence of any fire incident in the premises
- **Post-incident**
 - ✓ Providing additional info – floor plans



Beyond Firefighting: Your Critical Role



Photo courtesy of SCDF

- The role of the FSM goes beyond firefighting – they are crucial colleagues of SCDF in preventing and minimizing danger/ damages
- Knowledge & proficiency is key to keep yourself and others safe



Thank You

