



Report

Lithium-ion battery incident data – 2022 to 2024

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Fire Safety Branch
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Executive Summary

Lithium-ion battery (LiB) fires are a growing issue for fire and emergency services around the world. The rise in the number of products and applications utilising battery technology has corresponded to a steady increase in thermal runaway events and fires because of battery failures. The fires present risks and hazards that are challenging for fire and emergency services and may have significant impact to the community.

Examination of the fire incident and investigation data is necessary to capture any trends or insights to better understand the issues. Fire and Rescue NSW (FRNSW) reporting officers capture data at incidents using the electronic Australian Incident Reporting System (eAIRS). This report presents pertinent LiB incident data from the eAIRS database collected between 1st January 2022 to the 31st December 2024 (inclusive). Key findings from the eAIRS data related to LiBs are:

- 1 in 77 incidents were caused by LiBs
- 1 in 20 injuries are at LiB incidents
- LiB incident rates are increasing over time
- LiB incident durations are 20% longer than the average incident
- Narrabri, Sydney and Coonamble LGAs had the highest number of LiB incidents per 100,000 people.
- E-micromobility devices are the most common LiB incidents by device type
- E-micromobility incidents are the most likely LiB incident category to result in an injury
- 63% of LiB structural incidents occur in a private dwelling
- 58% of e-micromobility fires are e-bike fires
- 40% of e-micromobility fires occurred while the device was on charge or soon after it had been charged
- Battery electric vehicles and hybrid electric vehicles have a lower rate of failure resulting in fire than the engine, drivetrain or fuel or gas system of an internal combustion engine vehicle, however, are on average significantly newer than internal combustion engine vehicles
- The average incident duration of a battery/hybrid electric vehicle fire is 10 times that of an internal combustion engine vehicle

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1 Introduction

1.1 Background

Lithium-ion battery (LiB) fires are a growing issue for fire services around the world. The rise in the number of products and applications utilising LiB technology has coincided with a steady increase in battery failures resulting in fires that are challenging for fire and emergency services, and often tragic for victims of fire and emergencies.

To understand risk, it is necessary to examine the incident and investigation data to extract trends or insights that will help to inform research needs, prevention and education activities, fire safety advice and guidance, strategic capability investment, operational practices, and firefighter training.

Data from FRNSW's incident reporting system has been presented in this publication in the interest of public safety and transparency in keeping with the [NSW Government Policy on Open Data](#).

1.2 Context

FRNSW is one of the world's largest urban fire and rescue services and is the busiest in Australia, responding to over 140,000 emergencies per year including approximately 20,000 fire or explosion incidents.

FRNSW has a network of 335 fire stations, with a fleet of over 700 firefighting and support vehicles. These stations are staffed and supported by over, 3,600 permanent firefighters, 3,200 on-call firefighters, 4,700 Community Fire Unit Members and 500 Administrative and Trades Staff. Whilst FRNSW cover less than 1% of NSW by land area, approximately 90% of NSWs approximately 8.5 million inhabitants live within a FRNSW response area. FRNSW respond to all hazardous materials incidents within NSW (FRNSW 2024).

1.3 Data Source

FRNSW utilises an electronic incident reporting system referred to as eAIRS. The eAIRS database is a modified version of the Australian Incident Reporting System (AIRS) coding scheme as defined in the AIRS Manual, developed by the Australasian Fire and Emergency Services Authorities Council (AFAC). While the current eAIRS has some commonalities with the AIRS coding, it is a standalone version unique to FRNSW.

In August 2020, AFAC recommended several changes to AIRS to capture battery fires. FRNSW conducted a review of existing categories and developed a set of 40 new codes to aid reporting of battery-related incidents. The changes were included in the "Material Ignited First", "Ignition Source" and "Cause Determination" fields and were implemented in September 2021.

1.3.1 Data selection

Data was extracted from eAIRS based on the assumption that at least one of the battery-related categories under "Material Ignited First", "Ignition Source" or "Cause Determination" was used. There may be incidents where the reporting officer selected surrounding materials ignited first (e.g. bedding materials or soft furnishings) and could not determine the ignition source or cause with confidence, however a LiB or LiB-powered device was within the area of origin. Such incidents were not included in the analysis. Additionally, fire incidents where the LiB or LiB-

powered device was not involved in the ignition, but became involved and contributed to the severity of the event are not captured in this analysis.

There are many waste fires which are reported as being caused by a LiB. However, these fires haven't been included in this report as the mixed nature of waste makes it difficult to definitively determine what the specific cause of the fire was.

There are many cases of LiB fires which self-extinguish or are extinguished prior to FRNSW arrival (or FRNSW are not called at all). Only the LiB fires where FRNSW undertook extinguishment activities are included in this report, so the total number of LiB fires in NSW are underreported.

The data contained in this report is also only for fires where FRNSW was the lead agency. In some cases, FRNSW will support the RFS, however if the RFS was the lead agency, the incident was not included in the data presented in this report and therefore does not represent data for all of NSW.

1.4 Assumptions and Limitations

Factors of safety should be considered when relying on this data to inform design codes, fire engineering analysis or to inform other key decisions. The data presented herein is accurate to the incident information recorded within the eAIRS system and may not be a true reflection of the consequence and likelihood of all LiB emergencies that occur in NSW. The following assumptions and limitations should be considered when utilising this report.

1.4.1 System constraints

There is a practical limit to the size of the electronic recording form which also constrains the subcategorization of incidents, limiting the level of detail of data that is captured.

1.4.2 Quality and accuracy of data

It is assumed that reporting officers have made reasonable and educated determinations as to the origin and cause of the fire based on their training, experience, and the information available to them during their attendance at the incident and have subsequently entered this information accurately into the eAIRS system. As LiBs are a relatively new fire risk and the levels of awareness and experience vary across the workforce, the quality of data also varies widely. The data is audited to identify obvious erroneous entries.

1.4.3 Casualty information

eAIRS captures the consequences of fires as reported by the reporting officer at the completion of each incident. Fatalities may occur after an incident report has been completed and eAIRS is manually updated when a fatality is identified during the fire investigation process. Fatalities that occur after long periods of time may not be captured. Further, data on injured persons is captured when an injury is apparent at the time of the incident. It is therefore more likely to include severe injuries and/or those requiring ambulance attendance and/or transportation. Minor injuries and injuries which are not immediately apparent, or which manifest later, may not be included in the statistics. This analysis is limited to casualty data reported in eAIRS only. Details of injuries or their severity is not captured by FRNSW.

2 General LiB Incident Data

In this section, data is presented which is related to all LiB incident data captured between 2022 to 2024 calendar years, inclusive.

2.1 Incidents and casualties

Table 1 presents the number of incidents (by year) in which the 'material ignited first' was recorded as being a LiB (hereafter referred to as 'LiB incidents'). Injury, fatality, evacuation and rescue totals for these LiB incidents are also presented. Figure 1 presents LiB incident and injuries graphically by month. Table 2 presents the number of LiB incidents and associated injuries relative to the total number of reported fire and explosion incidents (hereafter referred to as 'all fire and explosion incidents').

In 2024, about one in every 62 fires attended by FRNSW, and about one in 20 fire injuries recorded by FRNSW, were reported as LiB incidents.

LiB incidents become more frequent over the reporting period and LiB incidents were more than 3 times as likely to result in an injury than other fire or explosion incidents reported.

Table 1: LiB incidents and casualties by year.

	2022	2023	2024	Total
LiB incidents	165	273	324	762
Injured persons	14	38	34	86
Fatalities	0	0	2	2
Evacuations	814	1315	1190	3316
Rescues	3	3	4	10

Note: Fatality data is not captured in eAIRS however is captured by FRNSW fire investigators

Table 2: Prevalence of LiB incidents and injuries relative to the total number of fire and explosion incidents by year.

	2022	2023	2024	Total
LiB incidents	1 in 100	1 in 80	1 in 62	1 in 77
Injured persons	1 in 35	1 in 16	1 in 20	1 in 20

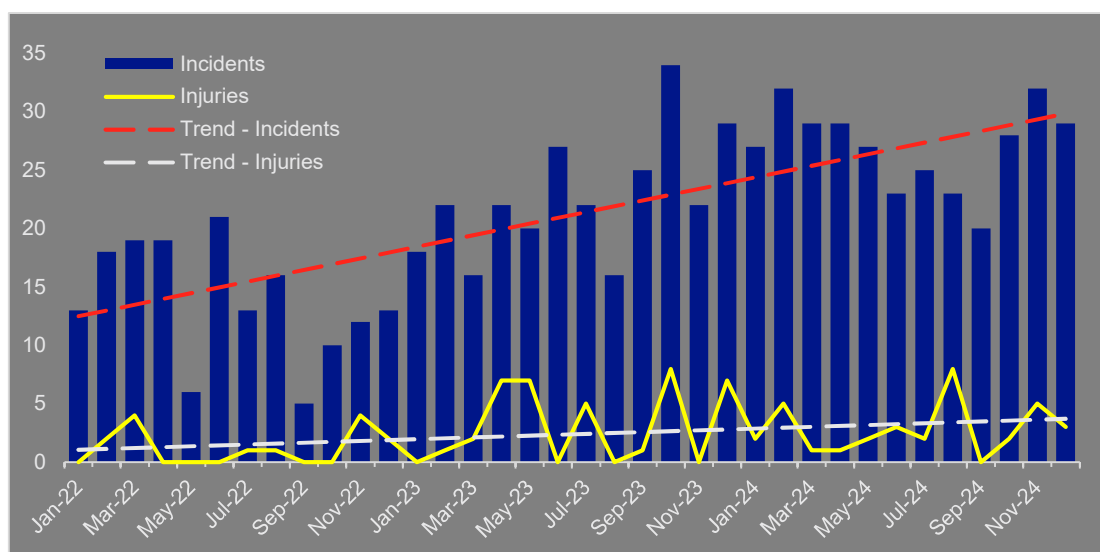


Figure 1: LiB incidents and injuries by month with linear trendlines.

2.2 Average Incident Duration

The duration of an incident is measured from arrival at an incident until FRNSW hands over the incident back to the owner or occupier. Table 3 compares average incident duration between 'LiB incidents' and 'all fire and explosion incidents'.

Table 3: Average incident duration.

		2022	2023	2024	Overall Average
LiB Incidents					
	Average incident duration (min)	74	132	90	101
All fire and explosion incidents					
	Average incident duration (min)	60	112	75	84

Table 3 shows the average duration of a 'LiB incident' is 17 mins (20% longer) than the average duration of 'all fire and explosion incidents'.

2.3 Time of Call

The temporal 'LiB incident' data results are presented in Figures 2 to 5. The data indicates that 'LiB incidents' are more likely to occur between 6am and 2pm in comparison to 'all fire and explosion incidents' and less likely to occur between 6pm and 6am. There is no observable difference between the time of week, month and year of reported 'LiB incidents' and 'all fire and explosion incidents'.

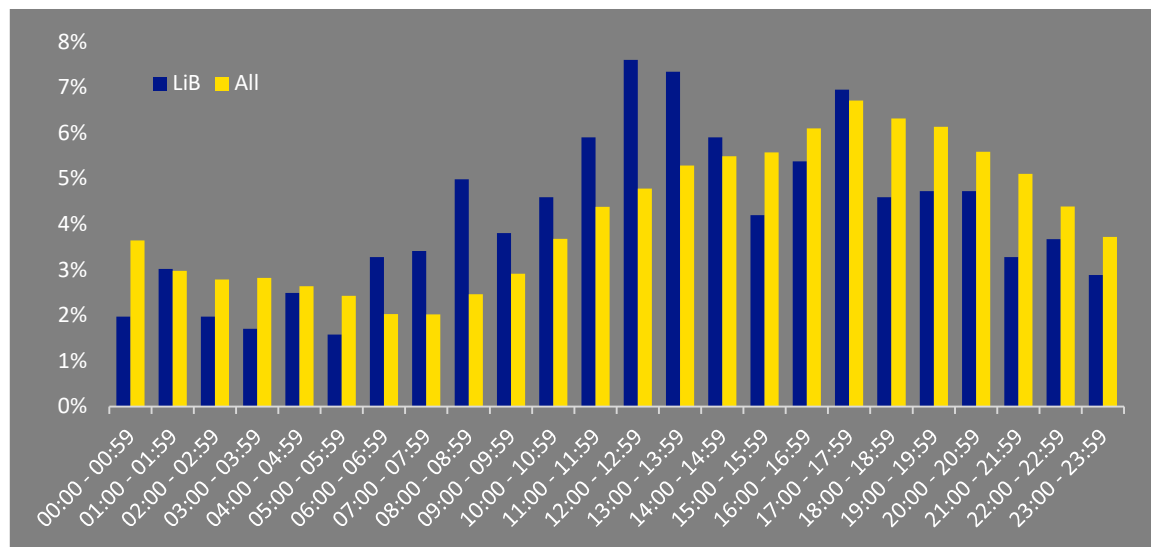


Figure 2: LiB and All incidents by time of call presented as a percentage of total calls

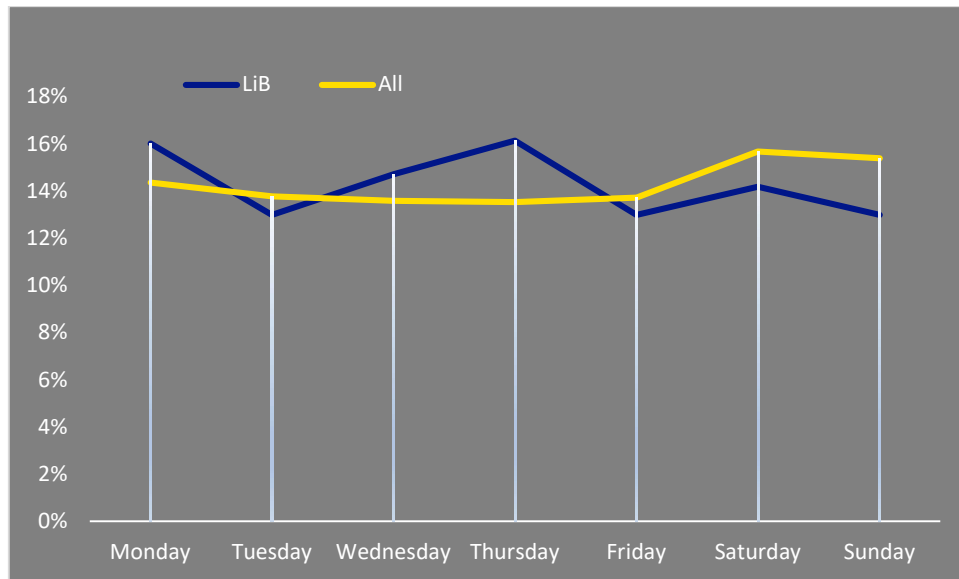


Figure 3: LiB and All incidents by day of call

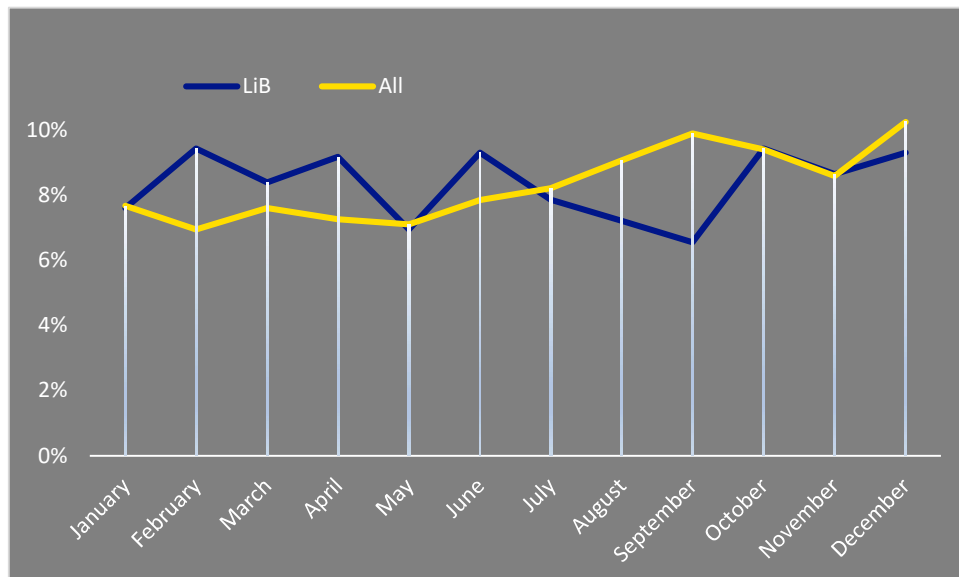
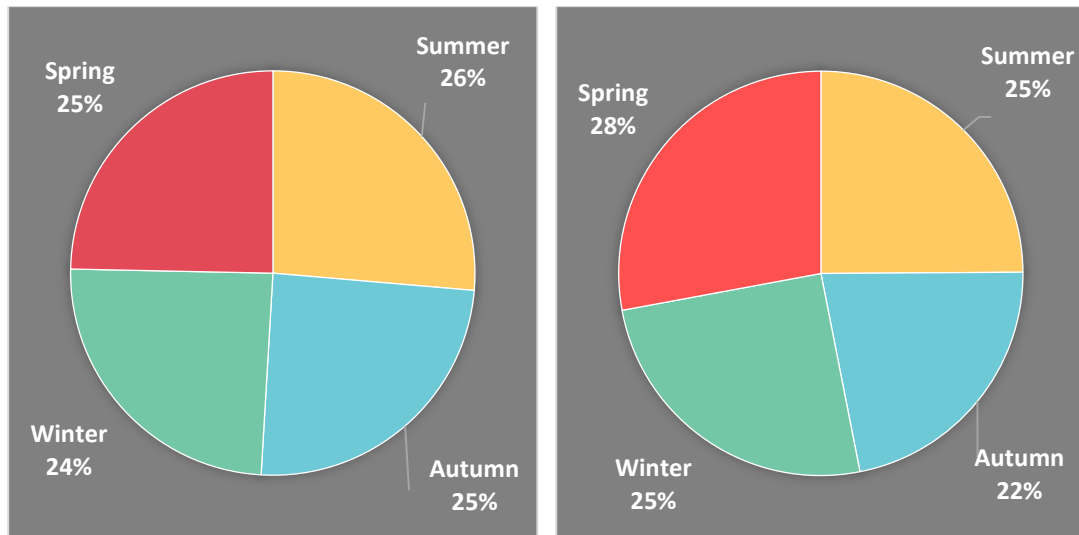


Figure 4: LiB incidents by month of call



LiB fire and explosion incidents
Figure 5: LiB incidents by season of call

All fire and explosion incidents

2.4 Incidents by Local Government Area

Table 4 lists the 50 local government areas (LGAs) with the most 'LiB incidents' per 100,000 registered residents (ABS 2021a). The total number of 'LiB incidents' in each of the listed LGAs and the ratio of LiB to all incidents is also presented. The geographical location is shown in Figure 6.

Narrabri, Sydney, Coonamble, Leeton and Forbes were the top five LGAs for LiB incidents per capita. Mosman (1 in 18), Sutherland (1 in 26), Hunters Hill (1 in 27), Willoughby (1 in 19) and Sydney (1 in 31) had the highest ratio of LiB incidents to All incidents. Moree Plains (1 in 1359), Kempsey (1 in 1255), Tamworth regional (1 in 535), Dubbo regional (1 in 425) and Walgett (1 in 291) had the lowest ratio of LiB to All incidents.

Table 4: LiB Incidents by Local Government Area.

LGA	LiB Incidents					Ratio of LiB incidents to all incidents
	2022	2023	2024	Total	Incidents per 100,000 people (Total)	
NARRABRI	3		1	4	31	1 in 43
SYDNEY	15	26	25	66	31	1 in 31
COONAMBLE		1		1	27	1 in 164
LEETON	1	1	1	3	26	1 in 40
FORBES	1		1	2	21	1 in 55
CLARENCE VALLEY	6	3	2	11	20	1 in 55
NAMBUCCA VALLEY		4		4	20	1 in 76
WALGETT			1	1	19	1 in 291
MUSWELLBROOK	1	1	1	3	18	1 in 121
BLAND			1	1	18	1 in 59
MOSMAN		3	2	5	18	1 in 18
BROKEN HILL	2	1		3	17	1 in 104
RICHMOND VALLEY	2	1	1	4	17	1 in 94
BYRON	1	3	2	6	17	1 in 44
TEMORA		1		1	17	1 in 63
PORT STEPHENS	2	4	6	12	16	1 in 45
COWRA		1	1	2	16	1 in 76
JUNEE			1	1	16	1 in 73
FEDERATION		2		2	16	1 in 46
BURWOOD	1	4	1	6	15	1 in 38
CUMBERLAND	6	16	13	35	15	1 in 41
HUNTERS HILL	1		1	2	15	1 in 27
INNER WEST	3	11	13	27	15	1 in 33
NEWCASTLE	4	7	12	23	14	1 in 71
BAYSIDE	6	12	5	23	13	1 in 39
KIAMA	1	1	1	3	13	1 in 34
CESSNOCK	2		6	8	13	1 in 149
SINGLETON	1		2	3	12	1 in 77
BATHURST REGIONAL	1	3	1	5	11	1 in 84
SUTHERLAND SHIRE	7	11	8	26	11	1 in 26
LISMORE	1	2	2	5	11	1 in 74
LAKE MACQUARIE	6	7	11	24	11	1 in 79
WOOLLAHRA		3	3	6	11	1 in 34
GLEN INNES SEVERN		1		1	11	1 in 146
FAIRFIELD	8	7	8	23	11	1 in 51
WARRUMBUNGLE SHIRE	1			1	11	1 in 126
KYOGLE			1	1	11	1 in 42
WILLOUGHBY	2	1	5	8	11	1 in 29
PORT MACQUARIE-HASTINGS		5	4	9	10	1 in 61
ARMIDALE		1	2	3	10	1 in 182
CANTERBURY-BANKSTOWN	3	13	22	38	10	1 in 52
NORTH SYDNEY	1	1	5	7	10	1 in 34
PARRAMATTA	7	6	13	26	10	1 in 48
CENTRAL COAST (NSW)	9	11	15	35	10	1 in 71
NORTHERN BEACHES	6	9	11	26	10	1 in 40
GOULBURN MULWAREE	2		1	3	9	1 in 91
WOLLONGONG	3	7	10	20	9	1 in 106
MID-COAST	2	4	3	9	9	1 in 80
SHOALHAVEN	2	4	4	10	9	1 in 73
ORANGE	1	2	1	4	9	1 in 119



Figure 6: Location of LiB incidents.

2.5 Incident by Device Type

Table 5 presents the number of incidents to which FRNSW responded by the type of device containing a LiB which was reported as the “Ignition Source”. Based on requests to FRNSW for device disposal information and guidance it is likely that there have been many more LiB fires than FRNSW has responded to, particularly small portable device fires.

From Table 5, e-micromobility fires (electric bike, mobility scooter, ride-on toy) were the most prevalent ‘LiB incidents’ to which FRNSW responded between 2022 and 2024.

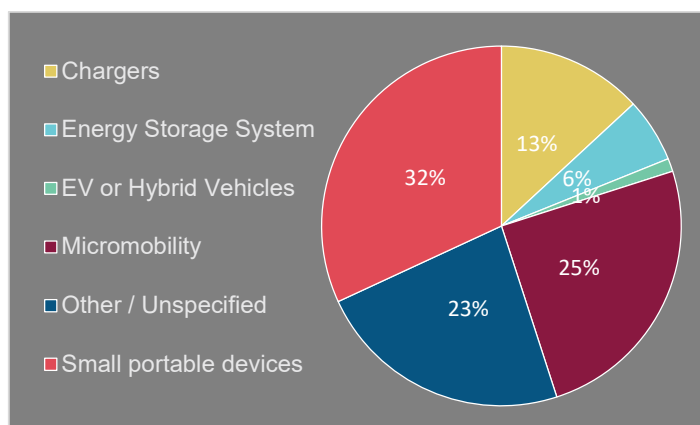
Table 5: LiB incidents by device type.

Device category	2022	2023	2024	Total
Audio devices, speakers, earphones, headphones (battery powered)	3	4	2	9
Automated / robotic equipment (battery powered)	2	1		3
Battery cell or pack - rechargeable, secondary			9	9
Battery cell or pack - single use, disposable, primary			1	1
Battery pack, battery system (hybrid vehicle, electric vehicle)	4	3	2	9
Camera, camcorder, photographic equipment (battery powered)	2		1	3
E-cigarettes, vape pens	3	12	8	23
Electric bike, mobility scooter, ride-on toy	23	67	99	173
Electric forklift			1	1
Gaming devices (battery powered)	1			1
Hand tool, power tool (battery powered)	15	9	24	48
Lamps, lights, torches (battery powered)	5	7	10	22
Laptop / Tablet	7	6	14	27
Mobile phone	9	14	20	43
Other (battery powered equipment)	36	74	56	160
Outlet charger, battery charger, power adapter (e.g. for portable devices and equipment)	19	27	10	56
Personal care device - toothbrush, shaver, epilator (battery powered)		4	5	9
Personal device - watch, tracker, medical aid	1			1
Phone handset, two-way radio, microphone (battery powered)	1	2	1	4
Power tool, hand tool - cordless, (battery powered)			7	7
Powerbank, powerpack, portable charger, jump starter	8	9	27	44
Remote control toy / craft - cars, drones, robots, watercraft	4	7	8	19
Sensor / control device (battery powered)	2	1	1	4
Solar battery, energy storage system, UPS system	16	21	7	44
Vacuum cleaners - handheld, robotic (battery powered)	4	5	11	20
Total	165	273	324	762

2.6 Incidents and Injuries by device category

The device types presented in Table 5 have been grouped into 6 categories (Figure 7). Small portable devices were the most prevalent 'LiB incident' category to which FRNSW responds, with EV or hybrid vehicle fires being the least.

The percentage of injuries incurred at incidents from each LiB category is represented in Figure 8. Comparing Figures 7 and 8, e-micromobility incidents correlated in an increased injury percentile.

**Figure 7: Incidents by device category**

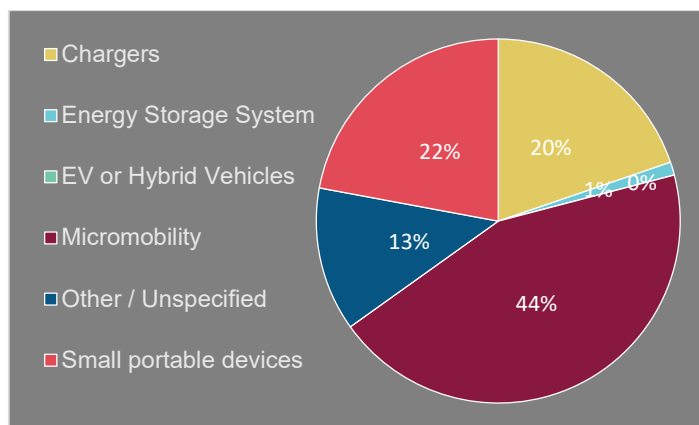


Figure 8: Injuries by device category

3 Structural Fires

As shown in Table 6, most LiB incidents occurred within a structure. Fires within a structure may increase the risk to life and the risk of fire spread.

Table 6: Percentage of LiB incidents which occurred within a structure.

Location	2022	2023	2024	Total
Structure	74%	68%	68%	69%
Non-structure	26%	32%	32%	31%

3.1 Incidents by NCC Building Type

Table 7 presents LiB incidents by the classification of the structure in which the incident occurred, or by a location description for non-structural fires. Of the 'LiB incidents' that occurred within a structure, 63% occurred within private dwellings, with 225 incidents (38%) occurring within detached houses, 87 (15%) occurring within semi-detached housing, and 56 (10%) occurring within apartments. In NSW, detached houses represent 65.6% of dwellings, semi-detached houses represent 11.7% and apartments represent 21.7% (ABS 2021b). Taking into consideration the percentage of each private dwelling type, semi-detached housing experienced twice as many 'LiB incidents' 'per dwelling' than the other private dwelling types.

Of non-structural LiB incidents, 64% were recorded on a roadway.

Table 7: LiB Incidents by NCC Building Classification or Property use

Building classification / Property location use	2022	2023	2024	Total
Class 1a (detached) Residential detached house	42	86	97	225
Class 1a (attached) Residential attached dwelling (e.g. unit, terrace house, town house or villa unit)	19	28	40	87
Class 1b	2	3	3	8
4 or more single dwellings located on one allotment for short-term holiday accommodation	1	2		3
Boarding house, guest house, hostel or the like, not exceeding 300 m ²	1	1	3	5
Class 2	11	17	28	56
Building containing 2 or more sole-occupancy units each being a separate dwelling	8	14	23	45
Mixed Commercial/Residential	2	1	3	6
Secondary dwelling (e.g. granny flat, garage or shed being used as residence)	1	2	2	5
Class 3	5	6	7	18
Assisted care accommodation		1		1

Building classification / Property location use	2022	2023	2024	Total
<i>Boarding house, guest house, hostel, lodging house or backpackers accommodation greater than 200 m2</i>	2	3	1	6
<i>Detention Centre</i>	1		2	3
<i>Hospital Residence</i>	1			1
<i>Hotel or motel residence</i>	1	2	1	4
<i>School Residence</i>			3	3
Class 5 Office building used for professional or commercial purposes	3	6	4	13
Class 6	12	14	24	50
<i>Business/Commercial - Other</i>	8	7	15	30
<i>Service Station</i>	1		1	2
<i>Shopping complex</i>	3	7	8	18
Class 7a Vehicle storage, carpark (not open or uncovered) including carstacking	2		1	3
Class 7b	4	10	12	26
<i>Carpark (open or uncovered)</i>	2	4	7	13
<i>General storage facility</i>	2	1	2	5
<i>Metal or electrical related storage</i>		1	1	2
<i>Storage property: Unclassified</i>		4	2	6
Class 8	4	3	9	16
<i>Electrical network substation</i>		1		1
<i>Factory</i>	3	2	9	14
<i>Laboratory other than a health care or hospital facility</i>	1			1
Class 9a Health care or hospital facility	5	6	6	17
Class 9b	5	4	6	15
<i>Cinema, Theatre or Studios</i>	1			1
<i>Educational related building (e.g. school, early childhood centre, preschool)</i>	1	1	2	4
<i>Public gathering related building (e.g. library, theatre, place of worship)</i>		1	1	2
<i>Sports stadium, sporting or other club</i>	3		1	4
<i>Transit related building (e.g. bus, railway, rail, airport or ferry terminal)</i>		1	2	3
<i>University</i>		1		1
Class 9c Aged care related facility	1	5	5	11
Class 10a	13	10	18	41
<i>Garage, carport or shed</i>	13	10	18	41
<i>Boat used as residence</i>	1			1
Non-structural	37	75	64	176
<i>Boat used as residence</i>	1	1		2
<i>Caravan used as residence</i>		1		1
<i>Cemetery</i>	1			1
<i>Coastline</i>		1		1
<i>Contractor's shed</i>	1			1
<i>Electric transmission, distribution system (excluding substations)</i>	2	1		3
<i>Forest, hunting or fishing related area</i>		1		1
<i>Industrial plant yard area</i>	2	3	1	6
<i>Managed hazardous materials waste disposal site</i>		1	1	2
<i>Managed non-hazardous rubbish disposal site</i>	1		2	3

Building classification / Property location use	2022	2023	2024	Total
Open land	2	2	3	7
Playground, Park or Parklands		1	4	5
Port, channel or anchorage	1			1
Public utility infrastructure (public mailbox, outdoor telephone booth, etc)	1		2	3
Railway property, excluding buildings		2		2
Road, Street, Highway or Motorway (Public or Private)	22	50	41	113
Sanitary service. Garbage and sewerage disposal.		1	2	3
Uncovered parking area		2	1	3
Vacant allotment	2			2
Yards, non-residential (not primarily for storage)	1	3		4
Yards, non-residential (primarily for storage)		1		1
Yards, residential		4	7	11
Total	165	273	324	762

3.2 Smoke Alarm/Detector Function

Functional smoke detection and warning systems (including smoke alarms) significantly reduce the risk of fire fatalities, particularly in dwellings structures where people sleep (Hall & Evarts 2022). Table 9 presents the percentage of structural 'LiB incidents' to which FRNSW responded where a smoke alarm/detector was installed (Alarm/detector present).

Table 10 presents a comparison of 'LiB incidents' and 'All fire and explosion incidents' where detectors/alarms were operating when FRNSW arrived. In total, alarms/detectors were operating at time of FRNSW arrival for 79% of 'LiB fire and explosion incidents' where smoke alarms/detectors were present, which was comparable to 'All fire and explosion incidents'.

Table 8: Percentage of LiB incidents with a smoke alarm/detector present by building type

NCC Classification	Smoke alarm/detector present	Smoke alarm/detector not present	Not reported
Class 1a (attached)	80%	7%	13%
Class 1a (detached)	62%	20%	19%
Class 1b	63%	13%	25%
Class 2	75%	13%	13%
Class 3	56%	11%	33%
Class 5	77%	0%	23%
Class 6	28%	24%	48%
Class 7a	0%	33%	67%
Class 7b	4%	27%	69%
Class 8	31%	19%	50%
Class 9a	65%	0%	35%
Class 9b	67%	7%	27%
Class 9c	64%	0%	36%
Class 10a	17%	73%	10%
Total	44%	17%	39%

Table 9: Comparison of operating smoke alarms for LiB and All incidents

NCC Classification	Smoke alarm/detector operating (where present)	
	LiB incidents	All incidents
Class 1a (detached)	81%	63%
Class 1a (attached)	71%	50%
Class 1b	100%	79%
Class 2	90%	63%
Class 3	100%	81%
Class 5	90%	82%
Class 6	86%	87%
Class 7a	NP	78%
Class 7b	0%	88%
Class 8	80%	76%
Class 9a	100%	50%
Class 9b	70%	75%
Class 9c	86%	85%
Class 10a	57%	88%
Total	79%	76%

*NP – No smoke detection was present for LiB incidents for this building type

4 E-micromobility Incidents

E-micromobility devices pose a risk to the community as they are relatively portable (i.e. can be brought inside a dwelling, carried on public transport, and other public spaces for example) and have sufficient stored energy to potentially cause a significant incident in the event of a failure. The Fair Trading Regulation NSW (2025) defines an e-micromobility vehicle as an e-bike, e-scooter, self-balancing scooter or electric skateboard. eAIRS reporting descriptions include all light electric vehicles within the e-micromobility classification (FRNSW 2025).

4.1 Device Type

The most common e-micromobility 'LiB incident' types FRNSW responded to were e-bike (58%) and e-scooter (24%) vehicles (Table 11).

Table 10: E-micromobility incidents by vehicle type

Type	2022	2023	2024	Total
E-bike	11	41	59	111
E-scooter	7	17	21	45
Hoverboard	1	2	1	4
Toy car	1	1	1	3
Mobility scooter		1	2	3
E-motorscooter		1	2	3
E-skateboard	1		4	5
E-wheelchair	1			1
E-surfboard		1		1
Electric forklift			1	1
Golf buggy			1	1
Unspecified	1	3	8	12
Total	23	67	100	190

4.2 Charging Status

Table 12 presents the charging status of e-micromobility devices, based on the reporting officers' observations and statements from those at the scene, when the LiB battery incident was reported. 40% of devices were reported to be charging or recently off charge at the time of ignition. The state of charging of the device at the time of FRNSW arrival may be difficult to determine, resulting in the high percentage of unconfirmed cases.

Table 11: Charging status at time of ignition of e-micromobility devices

Status	2022	2023	2024	Total
Actively charging	8 (34.8%)	30 (44.8%)	29 (29.0%)	67 (35.3%)
Recently off-charger	1 (4.3%)	1 (1.5%)	7 (7.0%)	9 (4.7%)
Not charging	2 (8.7%)	13 (19.4%)	19 (19.0%)	34 (17.9%)
Unconfirmed	12 (52.2%)	23 (34.3%)	45 (45.0%)	80 (42.1%)
Total	23 (100.0%)	67 (100.0%)	100 (100.0%)	190 (100.0%)

4.3 Incident Location

The most likely locations for e-micromobility incidents were private dwellings or roads, where 57 (30%) incidents occurred in detached houses, 35 (18%) in semi-detached houses, 27 (14%) in apartments and 24 (13%) on roads.

Table 12: Location of e-micromobility incidents

Location Category	2022	2023	2024	Total
4 or more single dwellings located on one allotment for short-term holiday accommodation		1		1
Aged care related facility	1	1		2
Boarding house, guest house, hostel or the like, not exceeding 300 m2			2	2
Boarding house, guest house, hostel, lodging house or backpackers accommodation greater than 200 m2	1	1		2
Building containing 2 or more sole-occupancy units each being a separate dwelling	3	9	15	27
Business/Commercial - Other	1	3	5	9
Carpark (open or uncovered)			1	1
Coastline		1		1
Factory			2	2
Garage, carport or shed	1	2	4	7
General storage facility			1	1
Hotel or motel residence		1		1
Mixed Commercial/Residential			3	3
Open land	1	1		2
Playground, Park or Parklands			3	3
Railway property, excluding buildings		1		1
Residential attached dwelling (e.g. unit, terrace house, town house or villa unit)	8	14	13	35
Residential detached house	6	23	28	57
Road, Street, Highway or Motorway (Public or Private)		8	16	24
Secondary dwelling (e.g. granny flat, garage or shed being used as residence)	1		1	2
Shopping complex			3	3
Storage property: Unclassified		1		1
Vehicle storage, carpark (not open or uncovered) including carstacking			1	1
Yards, residential			2	2
Total	23	67	100	190

5 Energy Storage Systems

FRNSW has a single field in eAIRS to capture all battery, power supply or Uninterrupted Power Supply (UPS) incidents. In this category residential battery energy storage systems are captured along with other stand-alone or stationary batteries (i.e. a battery not integrated with a device) such as UPS systems. There are currently no fields in the eAIRS report to further distinguish between the incidents by battery type. Batteries in this category represent 6% of total 'LiB incidents'.

Table 13: Number of energy storage incidents

Energy storage - battery, power supply, UPS	2022	2023	2024	Total
Total	16	21	7	44

6 Vehicle fires

This section presents two types of vehicle fires, incidents started by the battery of a battery electric vehicle (BEV) or hybrid electric vehicle (HEV) and fires involving LiB devices within vehicles.

Table 15 presents a comparison of incidents originating from batteries used for the propulsion of a vehicle (as opposed to a starter battery) and incidents originating from the engine, driveline, fuel or gas system component of an internal combustion engine vehicle (ICEV). In this context, vehicle refers to a motorbike, car, truck or bus. Incidents where a vehicle battery wasn't in the vehicle at the time of the incident have been included (e.g. battery being replaced by mechanic). This data excludes incendiary incidents, i.e. fires that were deliberately lit.

As can be seen from Table 15, for every incident caused by a battery failure there were 92 incidents caused by a component of an ICEVs fuel/engine system. In December 2024, a total of 7,394,520 vehicles were registered in NSW, with 76,796 being BEVs and 211,130 being HEVs. One in every 26 registered vehicles was a BEV or HEV in December 2024. As such, an incident caused by the failure of an ICEVs engine, drivetrain or fuel or gas system component was reported 3 times more often than an incident caused by the failure of a battery used for vehicle propulsion.

It should be noted that BEVs and HEVs are typically much newer than ICEVs which may impact the prevalence of failures. In December 2024, 21% of NSW registered ICEVs were manufactured post 2020, 47% were manufactured from 2011-2020, 23% were manufactured from 2001-2010 and the remaining 9% were manufactured pre-2001. In comparison, 75% of the B/HEVs registered in December 2024 were manufactured post 2020, 22% were manufactured from 2011-2020, 2% were manufactured from 2001-2010 and 10 vehicles were manufactured pre-2001 (Transport for NSW 2025).

Table 14: Comparison of BEV/HEV incidents and ICEV incidents

Fire energy source	2022	2023	2024	Total
Battery of hybrid or electric vehicle	3	3	2	8
Engine, driveline, fuel or gas system component	196	270	272	738

Fires involving lithium-ion batteries behave differently to other fuel types. One difference is the risk of battery reignition after extinguishment. Table 16 presents the average incident duration for both BEV/HEV battery incidents and all vehicle incidents. From Table 16, on average BEV/HEV battery incidents were 10 times longer in duration than the average vehicle incident over the reporting period.

Table 15: Incident duration of EV fire relative to all vehicle fires

Vehicle type	2022	2023	2024	Total
Average BEV/HEV battery incident duration (min)	55	111	2188	609
Average All vehicle incident duration (min)	64	50	50	54

Table 17 presents vehicle incidents caused by LiBs not used for the propulsion of the vehicle. These fires have been highlighted as the location within a vehicle impacts FRNSW intervention strategies.

Table 16: LiB incidents by device type which occurred within a vehicle

Device Category	2022	2023	2024	Total
Audio devices, speakers, earphones, headphones (battery powered)	1	1		2
Battery cell or pack - rechargeable, secondary			2	2
Battery pack, battery system (hybrid vehicle, electric vehicle)	4	3		7
Battery powered equipment, portable, mobile (e.g. Lithium-ion)	2			2
E-cigarettes, vape pens		1	2	3
Electric bike, e-bike				0
Electric bike, mobility scooter, ride-on toy		1	2	3
Hand tool, power tool (battery powered)	2	1	1	4
Lamps, lights, torches (battery powered)			2	2
Laptop / Tablet		1	2	3
Mobile phone	1		2	3
Other (battery powered equipment)	8	18	13	39
Outlet charger, battery charger, power adapter (e.g. for portable devices and equipment)	1	3	2	6
Phone handset, two-way radio, microphone (battery powered)		1		1
Power tool, hand tool - cordless, battery powered			2	2
Powerbank, powerpack, portable charger, jump starter	2	2	3	7
Sensor / control device (battery powered)	1			1
Solar battery, energy storage system, UPS system	2	2		4
Total	24	34	33	91

7 Summary

This report has presented LiB incident data recorded by FRNSW reporting officers in eAIRS. Key LiB incident statistics include:

- 1 in 77 incidents were caused by LiBs
- 1 in 20 injuries are at LiB incidents
- LiB incident rates are increasing over time
- LiB incident durations are 20% longer than the average incident
- Narrabri, Sydney and Coonamble LGAs had the highest number of LiB incidents per 100,000 people.
- E-micromobility devices are the most common LiB incidents by device type
- E-micromobility incidents are the most likely LiB incident category to result in an injury
- 63% of LiB structural incidents occur in a private dwelling
- 58% of e-micromobility fires are e-bike fires
- 40% of e-micromobility fires occurred while the device was on charge or soon after it had been charged
- Battery electric vehicles and hybrid electric vehicles have a lower rate of failure resulting in fire than the engine, drivetrain or fuel or gas system of an internal combustion engine vehicle, however, are on average significantly newer than internal combustion engine vehicles
- The average incident duration of a battery/hybrid electric vehicle fire is 10 times that of an internal combustion engine vehicle

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