Australian Government
Clean Energy Regulator

Inspections update No. 22

1 Introduction

This inspections update provides a summary (as of 30 June 2023) of the Small-scale Renewable Energy Scheme (SRES) inspections program. It provides results for the 2022-23 financial year inspections program, which covers small-scale photovoltaic (PV) systems installed in 2021.

This update is a continuation of a series of published inspections updates[1], available from the CER website.

The SRES inspections program is administered by the Clean Energy Regulator (CER) under Section 23AAA of the *Renewable Energy (Electricity) Act 2000* and Part 7 of the Renewable Energy (Electricity) Regulations 2001.

2 SRES Inspections program

Each year, the CER inspects a statistically significant selection of PV installations that had small-scale technology certificates (STCs) created against them under the SRES. The inspection program is required by law. The CER randomly selects PV installations from across Australia to inspect "for conformance with Australian standards and any other standards or requirements relevant to the creation of certificates". Participation in the program is voluntary.

The CER may also inspect PV installations at any time when it is appropriate or necessary to do so.

The CER provides the results from the inspections program to state and territory regulators, along with the installer accreditation body. This is the Clean Energy Council (CEC) at the time of publishing this update. The results are also used to identify areas of concern which are then addressed through industry education, stakeholder engagement and outreach activities.

This program complements, but does not replace, the electrical safety laws and inspection or compliance programs administered by relevant regulators in each state and territory. State and territory electrical safety regulators are responsible for electrical safety.

While the CER has no direct powers to deal with electrical safety matters, areas of concern are communicated and addressed using a cross agency approach. By law, the CER can declare that installers and designer are ineligible to install and design small-scale PV installation under the SRES.

Individual inspection reports are also provided to the system designer, installer, STC agent and the system owner and consent provider. This gives the designer and installer an opportunity to identify and rectify installation non-compliance and provides the system owner with quality assurance of their installation.

[1] http://www.cleanenergyregulator.gov.au/RET/Scheme-participants-and-installndustry/Agents-and-installers/Small-scale-Renewable-Energy-Scheme-inspections

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3 SRES Inspections program ratings

The SRES Inspections program uses a checklist developed with industry experts to consolidate items from regulations, standards, and industry requirements.

Under the SRES inspections program framework, the inspectors assess compliance against the checklist items. The overall installation is rated as one of the following categories, sometimes automatically, if certain checklist items are ticked or at the inspectors' discretion:

- Compliant
- Substandard
- Unsafe.

3.1 Compliant PV installations

Compliant PV installations meet the required standards, however, minor non-compliance may be identified.

3.2 Substandard PV installations

The CER defines a substandard PV installation as one that does not:

- meet key clauses in the standards and industry guidelines for installation, which may lead to premature equipment failure
- pose an imminent safety risk, however the installation work and/or the equipment should be improved to meet relevant standards and industry guidelines.

PV installations may be automatically rated substandard due to one or more medium-risk non-compliance items identified against the checklist.

PV installations may also be rated substandard at the inspectors' discretion. In this instance, the inspector applies a substandard rating to overwrite the automatic compliant rating. This is usually due to a combination of low-risk non-compliance items identified against the checklist.

3.3 Unsafe PV installations

Unsafe is the most adverse rating in the SRES inspections program. The CER defines an unsafe PV installation as one that has a safety hazard. This may pose an imminent risk to a person or property or a risk which may develop without timely maintenance.

Only a small number of inspections identify systems which pose an imminent safety risk, such as when there are exposed live parts or unsecure PV panels. Additionally, systems which may have water entering the direct current (DC) isolators (a disconnection switch), may become unsafe without timely maintenance.

An automatic unsafe rating will be applied against one or more of the following five checklist items:

- exposed live parts
- PV panels not securely mounted to the roof
- damage to the DC isolators near the inverter due to water entering
- damage to the rooftop (array) DC isolators due to water entering
- damage to cable junction boxes due to water entering.

PV installations can also be rated unsafe at the inspectors' discretion. In this instance, the inspector applies an unsafe rating to overwrite the automatic substandard rating. This could be due to a combination of non-compliance items identified against the checklist. For example, a system may have several non-compliant

wiring items identified against the checklist that individually are not an imminent safety risk but together make a system unsafe.

4 Inspections results – an overview

During the 2022-23 Inspection Program, the CER undertook both random (statistically significant), and appropriate or necessary inspections. This inspections update outlines the results.

4.1 Random inspections

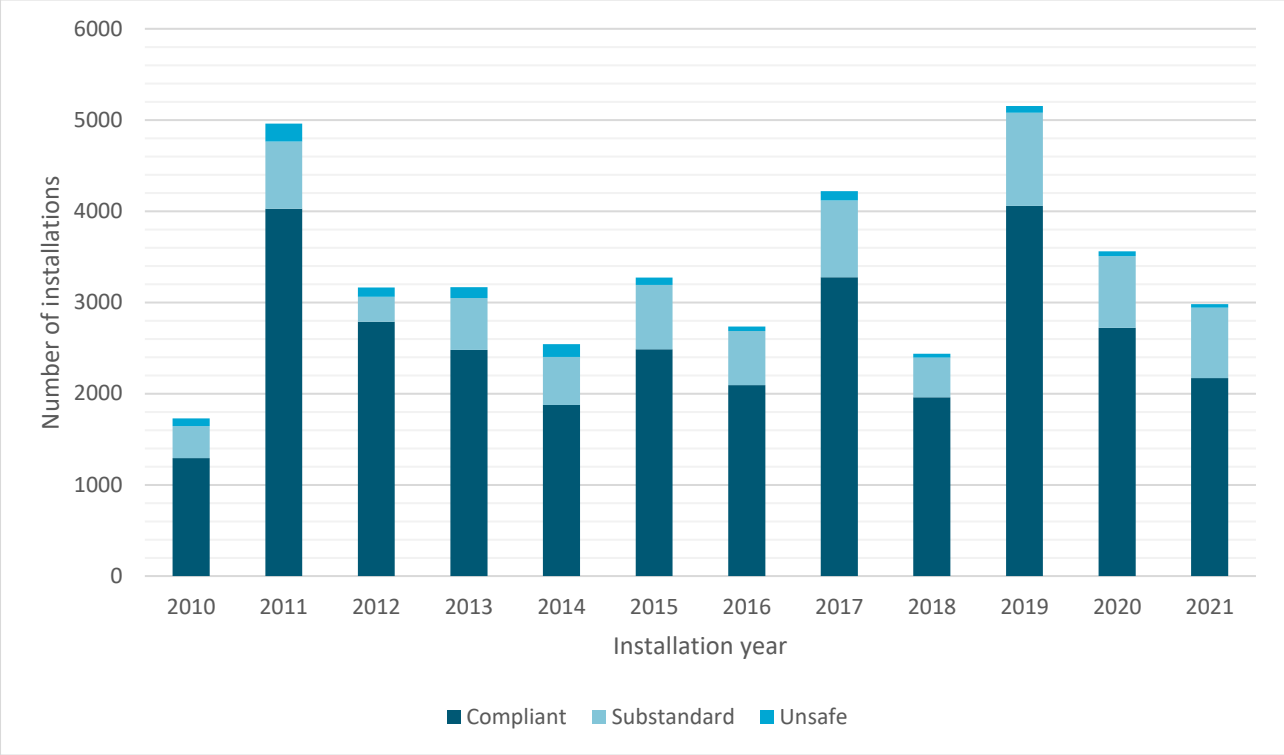
Since mid-May 2011 (when the inspections program began) to 30 June 2023, 39,932 random inspections have been completed. These inspections were conducted on PV installations from 2010 to 2021 (Figure 1). Listed in Table A1 in Appendix A are the number of inspections completed and substandard and unsafe installations in each state and territory up to 30 June 2023 (over the life of the program).

The CER aims for 12-18 months between system installation and inspection. This allows for an agent to claim STCs and time for safety issues to manifest such as water entering equipment. STCs may be created up to 12 months after installation.

During the 2022-23 financial year, a total of 2,982 PV installations installed in 2021 were inspected. Of the PV installations inspected:

- 2,172 (72.84%) were compliant
- 770 (25.82%) were substandard
- 40 (1.34%) were unsafe.

Figure 1: Yearly inspections numbers over the life of the program for PV installations in 2010 to 2021



4.2 Appropriate or necessary inspections

The CER may also conduct inspections on purposely selected PV installations at any time when considered appropriate or necessary to do so.

As a result of collaboration with state and territory electrical safety regulators, the appropriate or necessary inspections were conducted in the 2022-23 financial year. The CER is continuing to work with the state and territory regulators and the CEC to educate industry in the key noncompliance areas identified through the inspections. The CER also has the legislative power to declare non-compliant installers and designer's ineligible to install and design PV installations under the SRES.

During the 2022-23 financial year, the CER conducted an additional 85 appropriate or necessary inspections on installations completed by 20 installers in 2021. Of the PV installations inspected:

- 40 (47%) were compliant
- 44 (52%) were substandard
- 1 (1.18%) was unsafe.

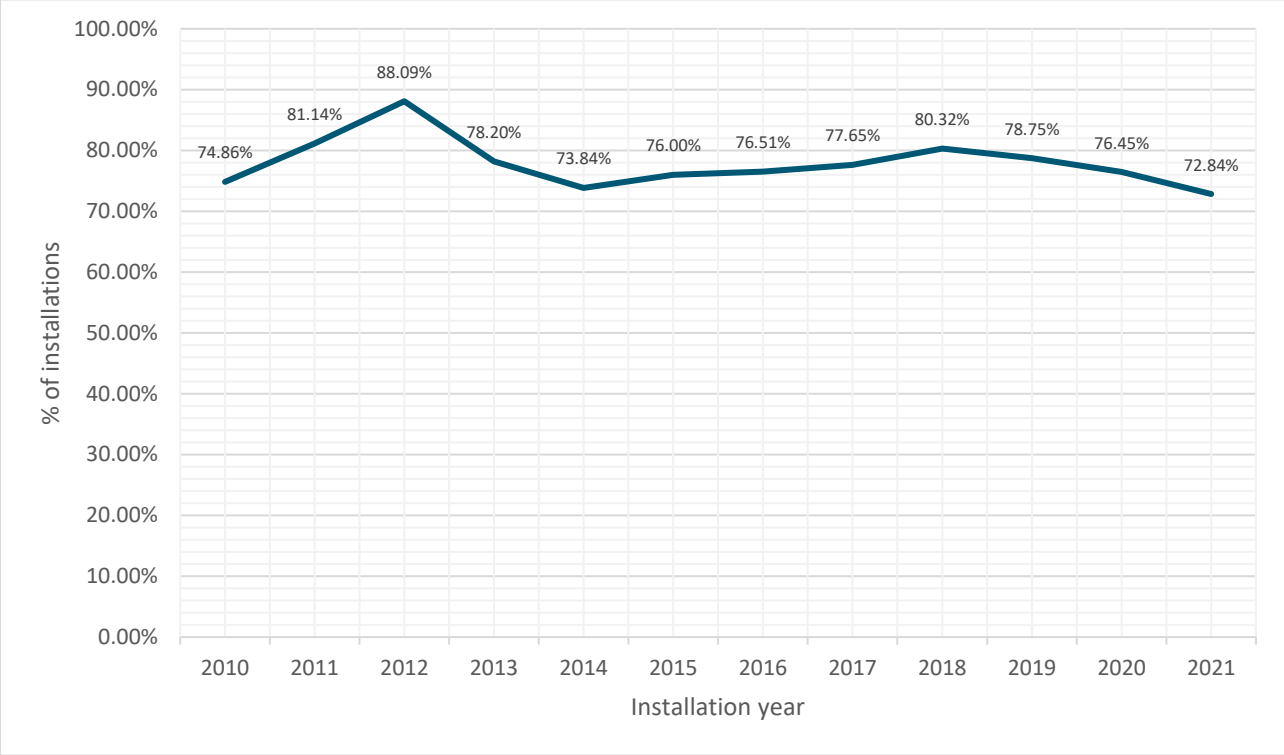
Further results are included in Appendix B.

5 Analysis on random inspections

5.1 Compliant PV installations (random inspections)

2,172 of the 2,982 (72.84%) 2021 PV installations inspected were compliant (Figure 2). Over the life of the program, 78.22% of the PV installations inspected have been deemed compliant. Compliant installations is trending down slightly from 2018 to 2021 . In response to the downward trend, the CER is continuing to work with state and territory regulators to address and educate industry in key non-compliance areas of the installations (as shown in Figure 4 and 6).

Figure 2: Inspections where the PV installations were compliant



5.2 Substandard PV installations (random inspections)

770 of the 2,982 (25.82%) 2021 PV installations inspected were substandard (Figure 3). The increase in substandard percentage from 2020 (22.1%) to 2021 (25.82%) is mostly due to the increase in discretionary substandard ratings from 4.78% in 2020[2] to 10.19% in 2021. Figure 4 shows the 2021 installations that were automatically rated substandard which were mostly due to issues with:

- PV array earthing (6.84%)
- PV array mounting (6.71%)
- DC isolators (rooftop and inverter, total 1.68%)
- cabling (1.54%).

Automatically rated substandard installations due to DC isolators, PV array earthing and cabling has dropped in comparison to 2020 installations. The increase in discretionary substandard from 4.78% to 10.19% is analysed in the section 5.3.

[2] Inspections update No 21 at Small-scale Renewable Energy Scheme inspections (cleanenergyregulator.gov.au). https://www.cleanenergyregulator.gov.au/RET/Scheme-participants-and-industry/Agents-and-installers/Small-scale-Renewable-Energy-Scheme-inspections

Figure 3: Inspections where the PV installations were substandard

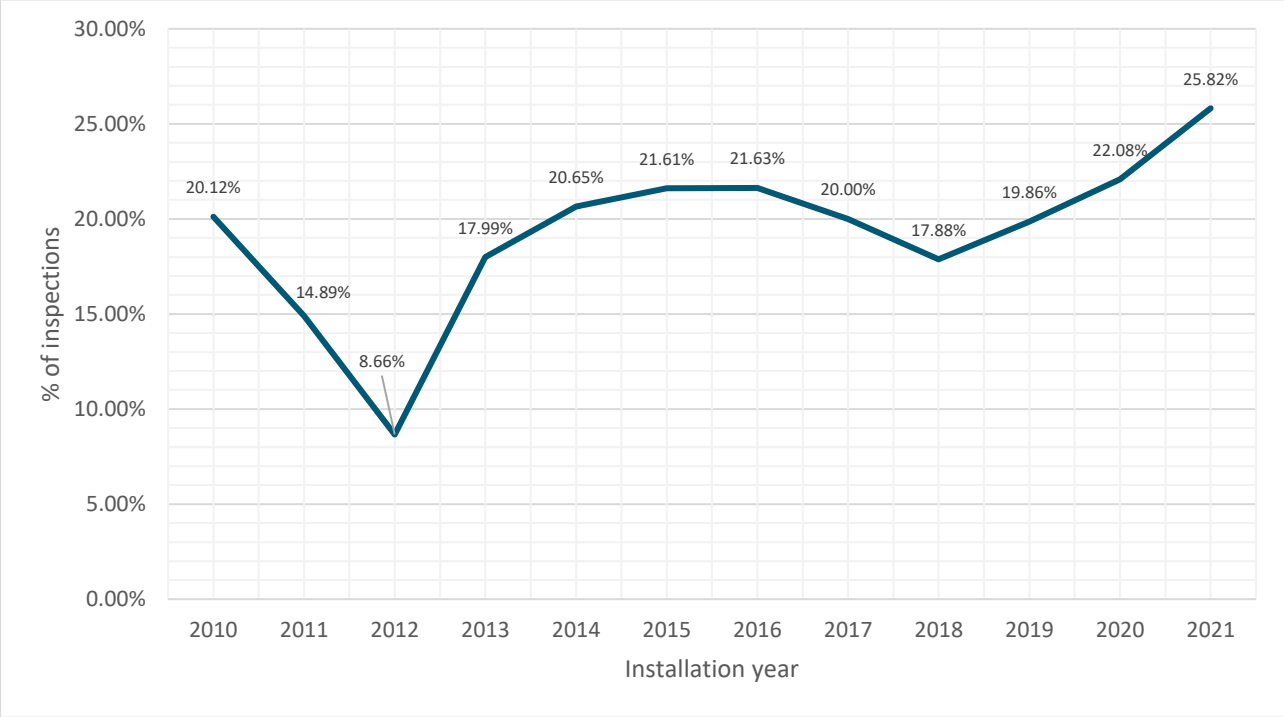
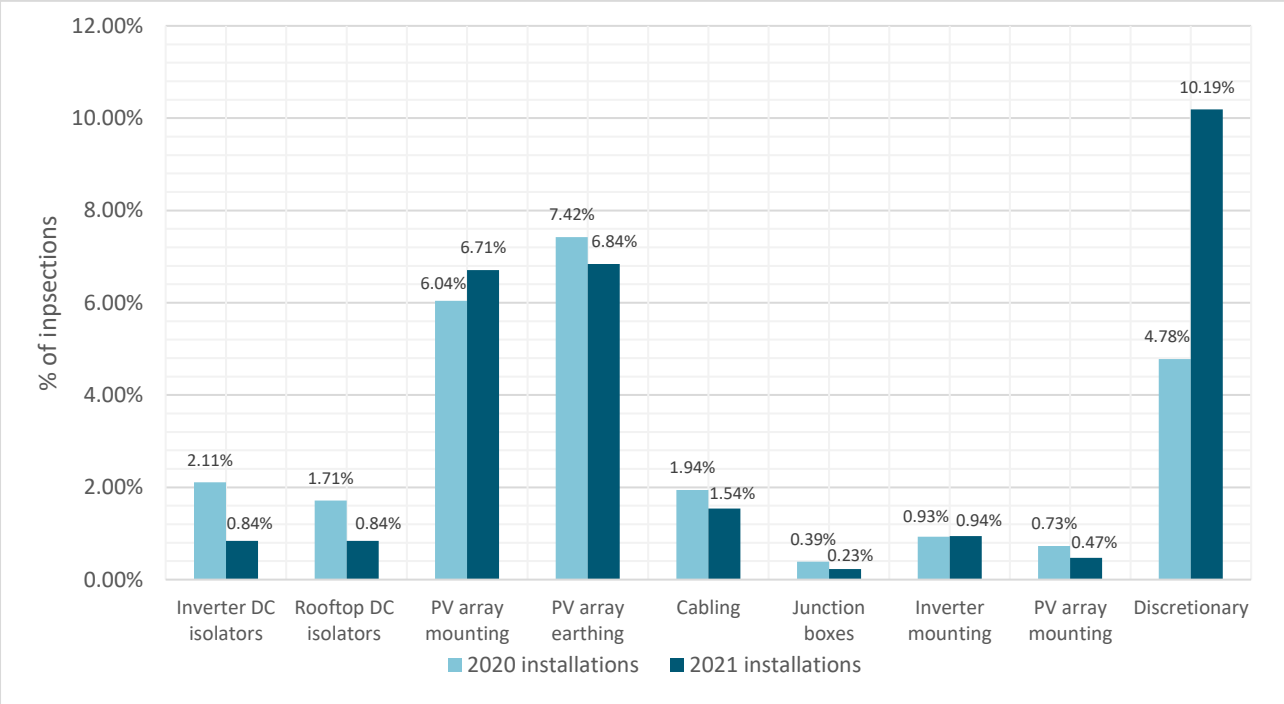


Figure 4: Causes of substandard installations for the inspection of 2020 and 2021 installations



The causes for substandard installations in Figure 4 sum to greater than the unsafe total, as one or more noncompliance checklist items may be selected in an inspection.

5.3 Discretionary substandard installations (random inspections)

A PV installation can be rated substandard at the inspectors' discretion. Figure 4 shows there is a large increase in substandard ratings for discretionary reasons.

The inspectors holistically assessed the combined effect of low-risk non-compliance against the SRES inspections checklist items. These installations are rated substandard by inspectors overwriting the automatic rating under the SRES inspections framework. Table 1 compares the categories of non-compliance checklist items for discretionary substandard installations in 2020 and 2021.

For 2021 installations, 304 installations were rated discretionary substandard. 618 low-risk non-compliance items identified against the checklist contributed to these discretionary substandard installations. The checklist items mostly relate to cabling, signage, PV array earthing and mounting (Table 1). Some of the items were also selected for the automatic substandard rating, however, in discretionary substandard installations the non-compliance items are of less risk.

In comparison, 170 of the 2020 installations were rated discretionary substandard for 380 low-risk non-compliance checklist items that mostly relate to cabling, signage, PV array earthing and mounting (Table 1).

The CER is working with inspectors to reduce the number of discretionary substandard rating in financial year 2023-24 inspections.

Table 1: Noncompliance contributing to discretionary substandard rating of 2020 & 2021 installations

	Count of low-risk non-compliance items identified against the checklist contributing to discretionary substandard installations.	
	2020 installations	**2021 installations**
Cabling	126	212
Signage	103	173
PV array earthing	82	135
PV array mounting	42	60
Inverter DC isolator	11	10
Rooftop DC isolator	7	9
AC Circuit Breaker	9	19
Total	380	618

The total number for the above counts is greater than the total number of discretionary substandard installations as multiple checklist items may be selected for individual installations.

5.4 Actions taken for substandard installations

The following actions are taken for both random, and appropriate or necessary inspections.

- The owner and occupier of the premises were advised by the inspector of the nature and extent of the risk posed by the substandard issues at the time of the inspections.
- The system owner, occupier, designer, installer and STC agents were provided a copy of the final report.
- The state and territory electrical regulators were provided a copy of the final report.

- The CER is working with state and territory electrical regulators as well as the CEC to further analyse non-compliance and develop actions to address the issues.
- The CER has the legislative power to declare non-compliant designers and installers ineligible to design and install PV installations under the SRES.

5.5 Unsafe installations (random inspections)

40 of the 2,982 (1.34%) 2021 PV installations inspected were unsafe. This percentage has decreased slightly from 2020 installations (Figure 5).

Over the past 5 years, the percentage of unsafe installations has steadily decreased. Unsafe installations due to rooftop and inverter DC isolators decreased from 0.69% and 0.57% to 0.13% and 0.27% during the last 5 installation years. The CER expects to see less issues relating to rooftop DC isolators with the implementation of updated AS/NZS 5033:2021 PV installation standards.

2021 installations that were automatically rated unsafe (Figure 6) were caused by the following safety hazards:

- inverter DC isolators (0.27%)
- rooftop DC isolators (0.13%)
- exposed live parts (0.07%)
- junction boxes (0.03%)
- panel mounting (0.03%).

In comparison to 2020 installations, automatically rated unsafe installations due to DC isolators and exposed live parts has dropped (Figure 6). The increase in discretionary unsafe installations from 0.51% to 0.83% is analysed in section 5.6.

Figure 5: Inspections where the PV installations were unsafe

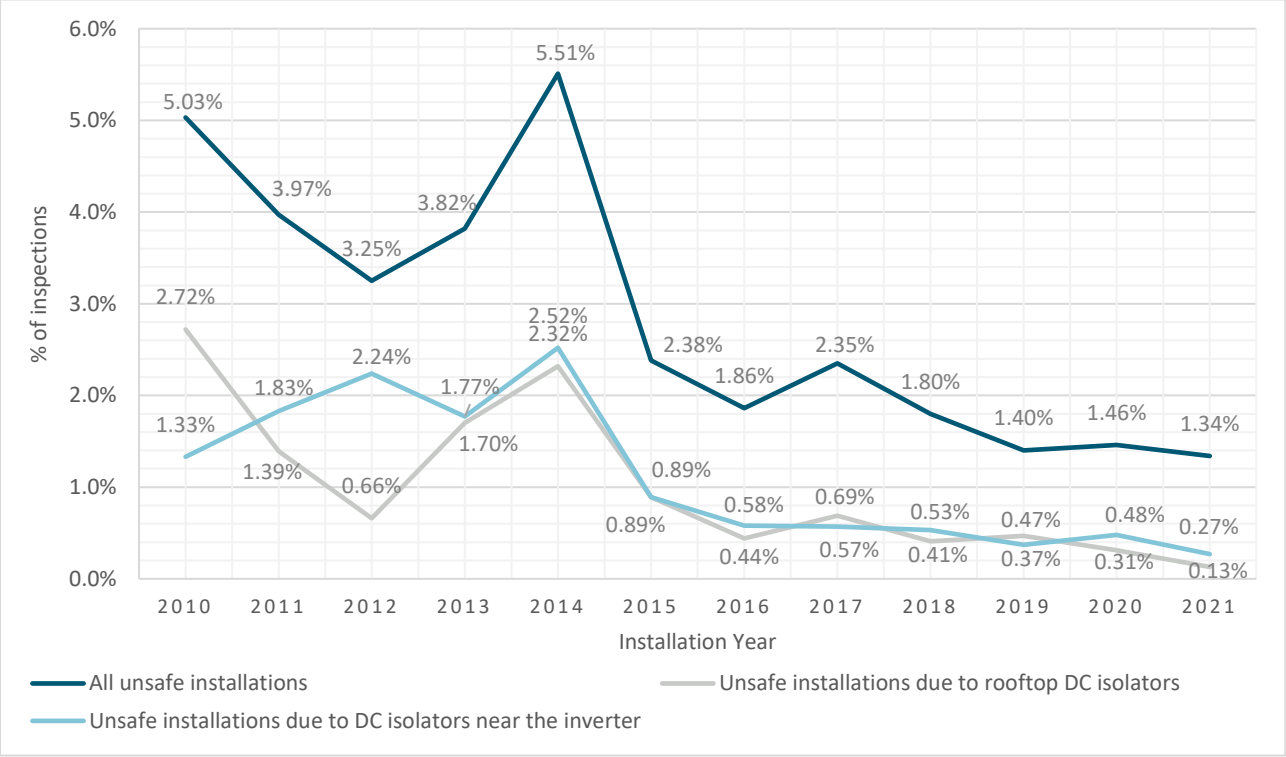
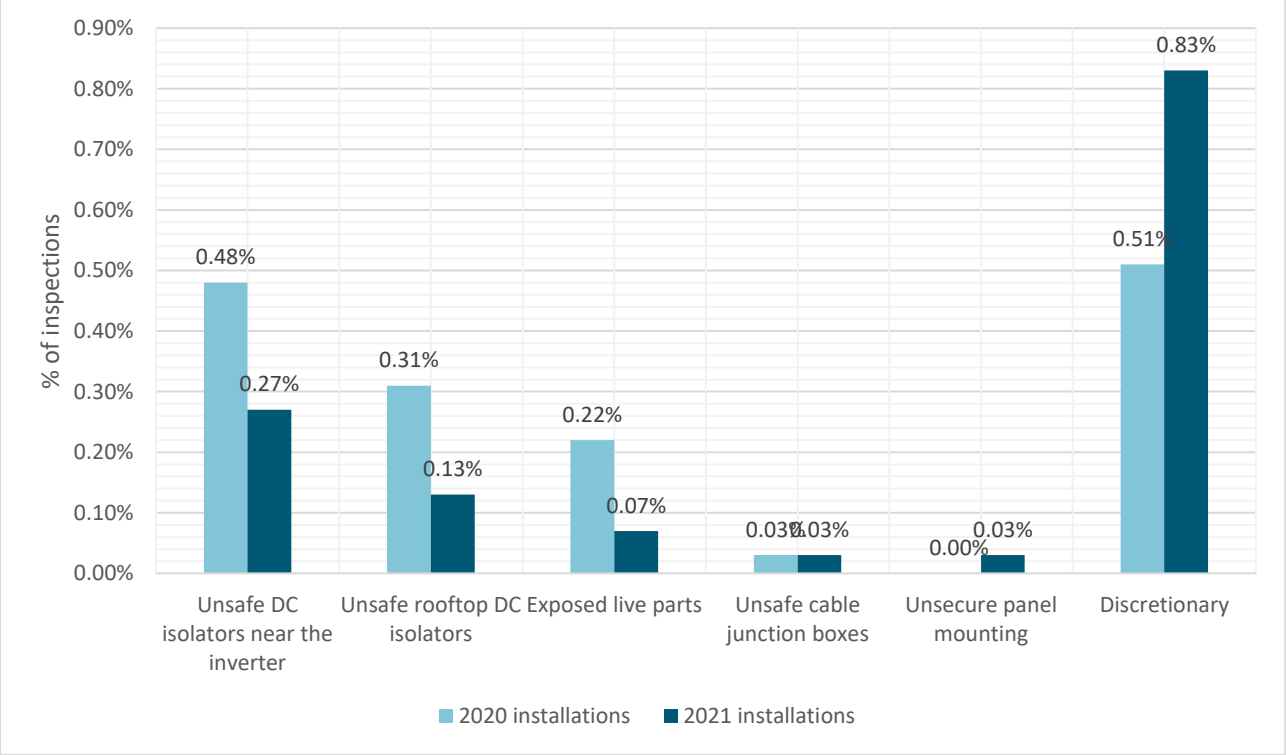


Figure 6: Causes of unsafe installations for the inspection of 2020 and 2021 installations



The causes for unsafe installations in Figure 6 sum to greater than the unsafe total, as one or more non-compliance checklist items may be selected in an inspection.

5.6 Discretionary unsafe installations (random inspections)

A PV installation can receive an unsafe rating at inspectors' discretion as noted in Section 3.3. In 2021, 0.83% of installations were rated unsafe at the inspectors' discretion.

The inspectors holistically assessed the combined effect of medium-risk non-compliance against the SRES inspections checklist items. The inspectors then rate these PV installations unsafe by overwriting the automatic rating under the SRES inspections framework. Table 2 compares the categories of non-compliance against checklist items for discretionary unsafe installations in 2020 and 2021.

For 2021 installations, 25 installations were rated as discretionary unsafe. 51 medium-risk non-compliance-items identified against the checklist contributed to these discretionary unsafe installations. The checklist items mostly relate to cabling, signage, array mounting and earthing (Table 2). Some of the items were also selected for the automatic unsafe ratings. However, for discretionary unsafe installations the non-compliance is of lower risk.

In comparison, 18 of the 2020 installations were rated discretionary unsafe against 36 non-compliant checklist items. These mostly related to cabling, signage, PV array earthing and mounting (Table 2).

The CER is working with inspectors to reduce the number of discretionary unsafe rating in financial year 2023-24 inspections.

Table 2: Noncompliance contributing to discretionary unsafe rating of 2020 & 2021 installations

	Count of medium-risk non-compliance items identified against the checklist contributing to discretionary unsafe installations.	
	2020 installations	**2021 installations**
Cabling	14	25
Signage	8	11
PV array earthing	7	9
PV array mounting	3	5
Inverter DC isolator	1	0
Rooftop DC isolator	1	1
AC circuit breaker	2	0
Total	36	51

The total number for the above counts exceeds the total number of discretionary unsafe installations, as multiple checklist items may be selected for individual installations.

5.7 Actions taken for unsafe installations

The following actions are taken for both random inspections, and appropriate or necessary inspections.

- The system was shut down or otherwise rendered safe by the inspector.
- The owner and/or occupier of the premises were advised by the inspector of the nature and extent of the safety risk.

- The relevant state or territory electrical regulatory authorities, the CEC and energy network provider were advised by the inspector of the nature and extent of the safety risk.
- The system owner, occupier, designer, installer and STC agents were provided a copy of the final report.
- The state and territory electrical regulators were provided a copy of the final report.
- The CER is working with state and territory electrical regulators as well as the CEC to analyse non-compliance issues and develop actions to address the issues.
- The CER has the legislative power to declare non-compliant installers and designers ineligible to design and install PV installations under the SRES.

Appendix A

Table A1: Number of inspections completed, substandard and unsafe installations for states and territories up to 30 June 2023 (over the life of the program)

	Number of inspections	Substandard installations	Unsafe installations
ACT	464	59	14
NSW	9,621	1,902	276
NT	227	39	7
QLD	11,088	2,394	324
SA	4,425	803	62
TAS	469	74	20
VIC	7,970	1,196	228
WA	5,668	1,148	153
Total	**39,932**	**7,615**	**1,084**

Appendix B

Appropriate or necessary inspections results

The CER may conduct inspections on purposely selected PV installations at any time when considered appropriate or necessary to do so.

During the 2022-23 financial year, the CER conducted 85 appropriate or necessary inspections on 2021 PV installations. These inspections were a result of collaboration between the CER and the electrical safety regulators in each state and territory. Given the nature of these inspections it is not unexpected to see higher levels of substandard or unsafe ratings for these installations.

The CER has legislative powers to declare installers with three or more substandard or unsafe inspection results ineligible to install solar PV under the SRES. The CER is reviewing these latest inspection results and will take action against those found in breach of these requirements. The CER is continuing to work with state and territory regulators to address and educate industry in key non-compliance areas.

Of the 85 installations inspected (Figure B1):

- 40 (47%) were compliant
- 44 (52%) were substandard
- 1 (1.18%) was unsafe.

The 85 PV installations were installed by 20 installers. 19 of the 20 installers were identified with 1 or more substandard or unsafe installations.

PV installations may be automatically rated substandard or unsafe under the SRES inspections program framework. Automatic substandard ratings were mostly due to issues with PV array mounting (5.88%), PV array earthing (5.88%), inverter mounting (3.54%), and rooftop DC isolators (3.53%) (Figure B2).

The inspectors may also overwrite the automatic ratings and apply discretionary substandard or unsafe ratings. Discretionary substandard installations (36,47%) were mostly due to non-compliance against checklist items relating to cabling, signage, PV array earthing, and PV array mounting. The 1 (1.18%) unsafe installation was rated due to noncompliance in PV array earthing.

Figure B1: Percentages of compliant, substandard and unsafe installations identified through appropriate or necessary inspections

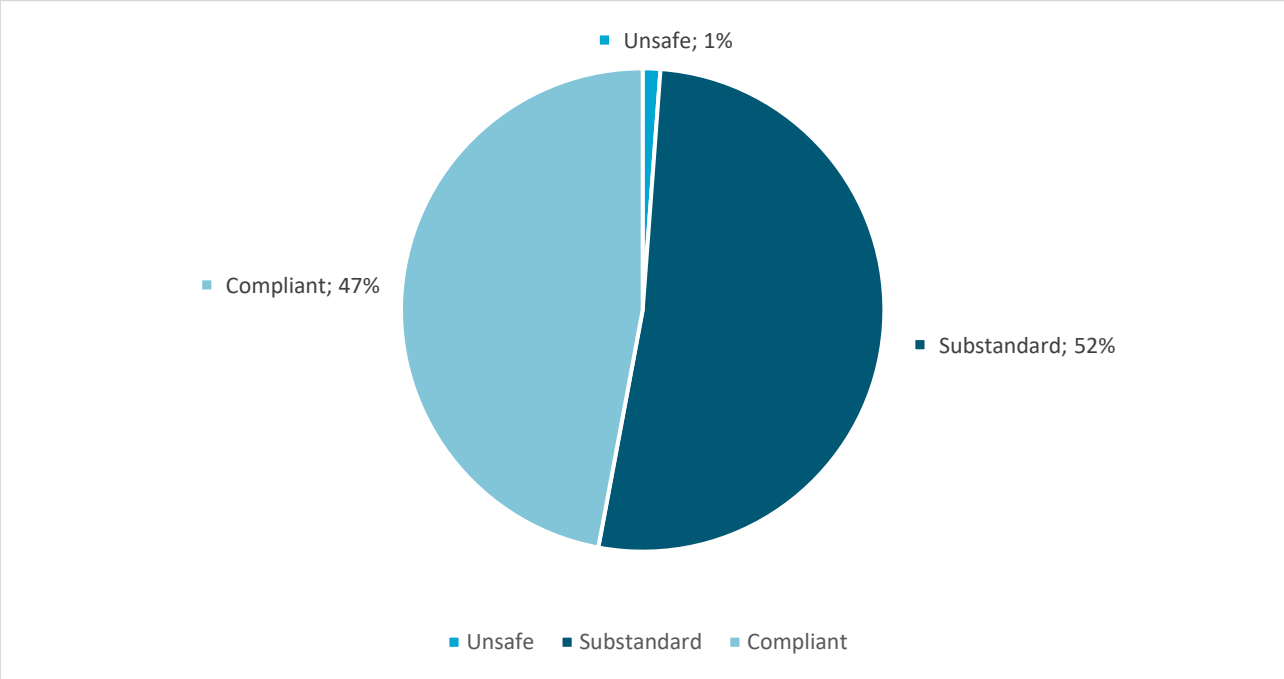
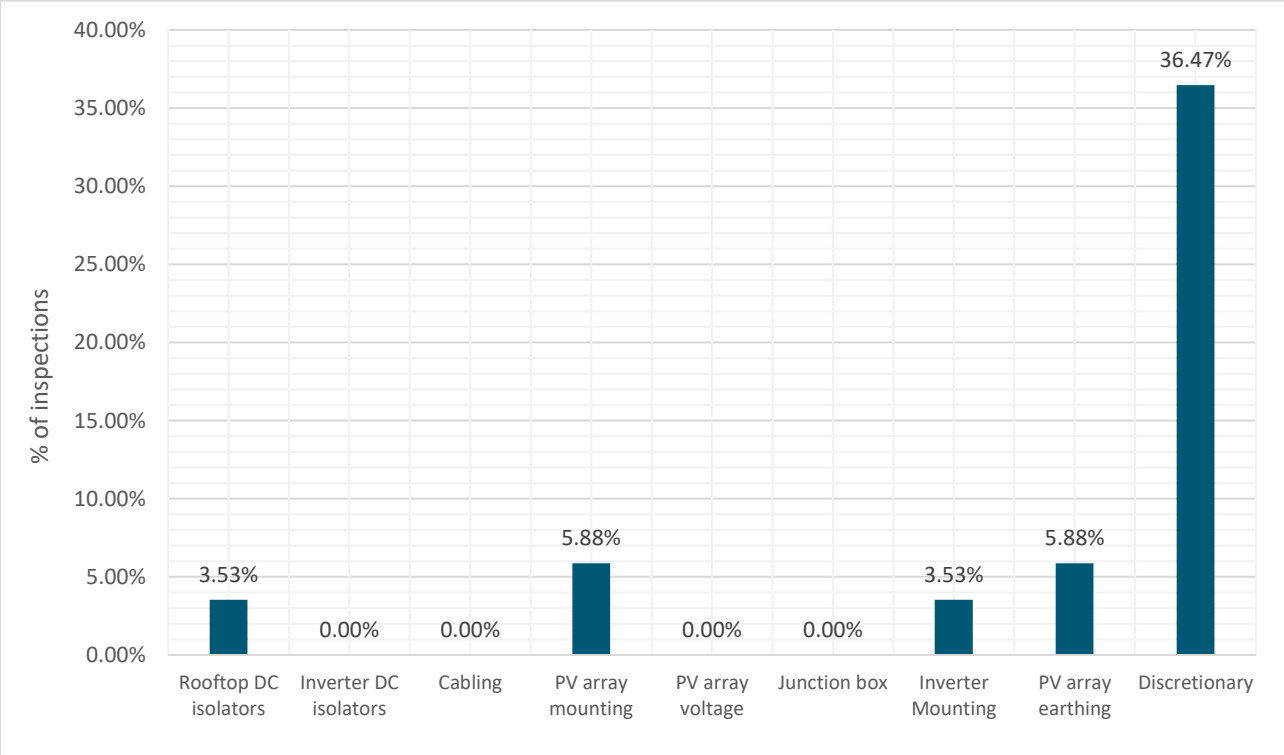


Figure B2: Causes of substandard installations identified through appropriate or necessary inspections



The causes for substandard in Figure B2 sum to greater than the substandard total as one or more noncompliance checklist may be selected in an inspection.