

# Improving Electrical Safety in Queensland

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A REPORT BY THE COMMISSIONER FOR ELECTRICAL SAFETY

January 2020

**Letter to the Honourable Grace Grace MP  
Minister for Education and  
Minister for Industrial Relations.**

**Attachment 1:**

A Report by the Commissioner for Electrical Safety – Improving Electrical Safety in Queensland

**Attachment 2:**

Feedback from Solar Farm Industry Roundtable members on report recommendations - Meeting #3 (20 November 2019)

**Attachment 3:**

Submissions from Solar Farm Roundtable members - Post Meeting #3 (20 November 2019).

Your reference: 19/396402, FILE27363, REC27364

The Honourable Grace Grace MP  
Minister for Education and  
Minister for Industrial Relations  
Email: [industrialrelations@ministerial.qld.gov.au](mailto:industrialrelations@ministerial.qld.gov.au)

Dear Minister

I am pleased to present you with 'Improving Electrical Safety in Queensland – a report by the Commissioner for Electrical Safety', January 2020 (the Report).

In forming my recommendations for the Report, I have drawn on my experience as Chair of the Electrical Safety Board and Chair of the Electrical Licensing Committee, as well as my comprehensive discussions with industry throughout my tenure as Commissioner for Electrical Safety and as Chair of the Solar Farm Industry Roundtable (the Industry Roundtable).

The findings of the Supreme Court of Queensland against section 73A of the *Electrical Safety Regulation 2013* (Qld) highlights the significant changes in technology for electricity generation, supply and distribution and the challenge of ensuring our electrical safety laws keep pace with emerging technologies. Many of these changes simply were not able to be contemplated at the time the *Electrical Safety Act 2002* (Qld) (ES Act) was drafted almost 18 years ago. For this reason, I recommend the Queensland Government undertake a comprehensive review of the ES Act to ensure the electrical safety laws are contemporary and able to keep pace with new and emerging technologies as they arise into the future. In addition, I also recommend a number of other matters that should be explored as part of the review.

I continue to support the Queensland Government in its efforts to ensure safety on solar farms remains paramount as this important industry continues to grow. Accordingly, I recommend that unlicensed electrical workers can undertake locating, mounting and fixing of solar photovoltaic modules (solar panels) to an array or structure but only when under the direct supervision of a licensed electrical worker. In considering the most effective means of implementing this recommendation, I have further recommended the definition of 'electrical equipment' under the ES Act be amended to make it clear that both solar panels with the purpose of generating power collectively above extra low voltage (either grid connected or stand-alone), and individual battery cells connected to other cells with the purpose of storing and releasing power collectively above extra low voltage (either grid connected or stand-alone), are considered 'electrical equipment'.

There are polarised views on these recommendations, primarily due to the lack of agreement on the exact electrical safety risks present during mounting, locating and fixing of solar panels. While I have taken into account the various positions of Industry Roundtable members, it is my view that safety risks remain and need to be addressed.

To provide immediate certainty regarding the application of existing legislative requirements to solar farms and to ensure high safety standards for workers, I have also made a number of short term non-legislative recommendations. The Industry Roundtable is supportive of most of these recommendations, particularly the development of minimum training requirements for all workers on solar farms.

Attachment 1 provides a summary of the Industry Roundtable discussions on the draft recommendations from their 20 November 2019 meeting, with Attachment 2 providing the written comments received following this meeting.

I would like to express my appreciation to the stakeholders who contributed to the Industry Roundtable and note I considered all their views in developing the solar farm specific recommendations of my report.

I intend to continue using the Industry Roundtable as a reference point in the future and, following your acknowledgement of the enclosed Report, I seek to provide members with a copy of the Report and acknowledge their participation in this process. If you require further information or assistance, please contact me on (07) 3406 9884.

Yours sincerely



Gregory Skyning  
**Commissioner for Electrical Safety**

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# Improving Electrical Safety in Queensland

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A REPORT BY THE COMMISSIONER FOR ELECTRICAL SAFETY

January 2020

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## Executive Summary

Over the last two decades, Australia's electricity markets have transitioned at a rapid pace. Demand for electricity is declining in some jurisdictions, households are installing solar photovoltaic (PV) modules and older, traditional large-scale electricity generation infrastructure is being replaced with new technologies such as solar and wind. Technology is fundamentally changing the nature of the electricity industry through options for consumer-based generation and energy generation.

Rapid growth in the solar farm industry has resulted in new entrants to the Queensland electricity generation market 'learning on the go' in some circumstances, with a lack of awareness causing a failure to comply with existing electrical safety and work health and safety requirements. I acknowledge there has been robust discussion amongst industry regarding the precise nature and severity of risks surrounding the locating, mounting or fixing of solar panels and that a common view is not shared.

From 1 August 2017 the Electrical Safety Office (ESO) within the Office of Industrial Relations (OIR) conducted audits of large-scale solar farms. These audits uncovered real and significant safety risks for workers working with solar PV modules, including risks of electrical shock and fire. In response to these findings, in May 2019 the Queensland Government sought to provide clarity and guidance to industry through the introduction of a new section 73A into the Electrical Safety Regulation 2013 (Qld) (the ES Regulation). This new provision introduced new safety requirements for solar farms with respect to locating, mounting and fixing of solar PV modules.

Section 73A of the ES Regulation was found to be invalid by the Supreme Court of Queensland and subsequently by the Court of Appeal. However, this ruling was made on technical legal grounds and did not address the substantive safety matters that resulted in the introduction of section 73A.

To address these safety measures, on 23 July 2019 the Honourable Grace Grace MP, Minister for Education and Minister for Industrial Relations, requested I urgently convene an industry roundtable to discuss safety within the large-scale solar farm industry (the Industry Roundtable) and that I provide the Minister with my advice on ways in which electrical safety matters on solar farms can be addressed to ensure Queensland has the highest possible safety standards. Specifically, the Minister requested that I canvass the following themes in providing my advice:

1. *clarity around existing legislative provisions and safety standards;*
2. *options for legislative amendment to create certainty and to ensure the definitions under the Electrical Safety Act 2002 (Qld) (the ES Act) keep pace with the fast-growing solar farm industry; and*
3. *matters that need to be addressed in a longer-term review of the ES Act.*

Under section 71(d) of the ES Act, one of my functions is 'to advise the Minister on electrical safety matters generally' and in forming my advice to the Minister and developing recommendations to improve electrical safety in Queensland, I have drawn on experience from my role as Chair of the Electrical Safety Board (ESB) and Chair of the Electrical Licensing Committee (ELC), as well as my comprehensive discussions with industry throughout my tenure as Commissioner for Electrical Safety. The views of the Industry Roundtable were considered in my development of recommendations specific to the large-scale solar farm industry. Information on the conduct of the Industry Roundtable can be found in **Appendix 1**.

It is my view that significant technological changes to electricity generation, supply and distribution were not able to be contemplated at the time the ES Act was drafted almost 18 years ago. The invalidity of section 73A has highlighted vulnerabilities in updating the electrical safety legislative framework through regulatory amendment, when more fundamental limitations need to be addressed holistically in the ES Act. For this reason, I recommend the Queensland Government undertake a review of the ES Act to clarify the objects and regulation-making power of the ES Act and to ensure Queensland's electrical safety legislative framework can keep pace with new and emerging technologies.

The circumstances surrounding the removal of section 73A from the statute book has created uncertainty and confusion about what is, and who can undertake, electrical work and other work at solar farms. This is concerning for both managing electrical safety risks and actively growing the renewable energy sector in Queensland. Consequently, this report recommends that during the construction and operation of solar farms:

- competent workers (i.e. unlicensed) can install array support structures for solar PV modules, including support structures that may provide an earth path as part of the approved earthing design (e.g. footings and steel support frames as part of civil and mechanical works);
- the mounting, fixing or locating of solar PV modules and arrays can be undertaken by competent workers (i.e. unlicensed) however they must be directly supervised by a competent licensed electrical worker; and
- all earth cabling and connections, and module cabling and connections, must be installed, inspected and tested by a competent licensed electrical worker.

This report further recommends the review of the ES Act should canvass changes to the definition of 'electrical equipment' to ensure these concepts are enshrined in legislation.

I acknowledge that consensus on this recommendation is unlikely. However, providing clear and immediate guidance to industry and workers is considered a desirable outcome in lieu of achieving agreement of stakeholders who hold diametrically different positions on this contentious policy issue.

Providing immediate certainty to industry with respect to the application of existing legislative requirements to solar farms is essential to ensuring high safety standards for workers and to support the industry to continue to grow and to yield meaningful and local employment opportunities for Queenslanders, especially in regional areas. As a result, this report recommends a number of short-term non-regulatory initiatives to ensure government can take immediate action to provide this certainty. These recommendations include:

- industry to develop a minimum training requirement for all workers on solar farms;
- the Minister for Education and Minister for Industrial Relations consider updating the *Construction and operation of solar farms Code of Practice 2019* to refer to these requirements once developed;
- the continuation of compliance and enforcement campaigns across the solar farm industry by the ESO and Workplace Health and Safety Queensland (WHSQ); and
- to promote industry accountability and responsibility, industry should ensure they inform members of ways to manage new and emerging electrical safety risks and lessons learnt from the findings of any regulatory compliance action.

In recognition of the growing renewable energy industry, and the Queensland Government's efforts to expand this sector and accelerate the economy towards a clean energy future, this



report also recommends the ESO undertake a compliance and enforcement campaign for other solar installations and notes the government's commitment to develop a code of practice for the construction and operation of wind farms.

Finally, this report makes a number of recommendations that should be considered in the review of the ES Act. These recommendations have been informed by my work as the Commissioner for Electrical Safety and my observations of critical areas requiring electrical safety reform. Recommendations include providing greater safety switch coverage in Queensland, improving electrical safety for workers in residential roof spaces, and addressing the safety risks where electrical workers work near exposed live parts, as well as a range of other legislative areas that require review.

# Recommendations by the Commissioner for Electrical Safety under section 71(d) of the Electrical Safety Act 2002

## Part 1: Clarity around existing legislative provisions of the Electrical Safety Act 2002 (Qld)

### Recommendation 1

In light of the recent court ruling regarding section 73A, the Queensland Government should undertake a review of the *Electrical Safety Act 2002* (Qld), including the objects of the Act and the regulation-making powers, to ensure it is fit for purpose and can keep pace with new and emerging technologies.

## Part 2: Options for legislative amendment to definitions of the Electrical Safety Act 2002 (Qld)

### Recommendation 2

In relation to the mounting, fixing and locating of solar PV modules on solar farms it is recommended that:

- competent workers (i.e. unlicensed) can install array support structures for solar PV modules, including support structures that may provide an earth path as part of the approved earthing design (e.g. footings and steel support frames as part of civil and mechanical works);
- the mounting, fixing and locating of solar PV modules and arrays by competent workers (i.e. unlicensed) must be directly supervised by a competent licensed electrical worker; and
- all earth cabling and connections, and module cabling and connections, must be installed, inspected and tested by competent licensed electrical workers.

Consideration should be given to amending the *Electrical Safety Act 2002* (Qld) to give effect to this recommendation.

### Recommendation 3

In undertaking the review of the *Electrical Safety Act 2002* (Qld), the following should be considered 'electrical equipment'

- individual solar PV modules designed to be connected to other solar PV modules with the purpose of generating power collectively above extra low voltage (either grid connected or stand-alone); and
- individual battery cells connected to other cells with the purpose of storing and releasing power collectively above extra low voltage (either grid connected or stand-alone).

Work undertaken to implement this recommendation should include:

- careful consideration and analysis of any unintended consequences on the broader industry and community;
- a review of all definitions under the Act (due to their interconnectedness) to ensure relevance and effectiveness; and
- future proofing the Act for other emerging renewable energy and energy storage devices.

#### Recommendation 4

Before 30 June 2020, industry should develop minimum training requirements for all workers (both licensed and unlicensed) and supervisory persons on solar farms to ensure they are competent in understanding electrical safety risks and what work they can perform, including what work should be done by, or under the supervision of, a licensed electrical worker.

The Minister for Education and Minister for Industrial Relations should consider amending the *Construction and operation of solar farms Code of Practice 2019* to refer to the minimum training requirements once developed.

#### Recommendation 5

The Electrical Safety Office and Workplace Health and Safety Queensland should continue their compliance and enforcement approach to solar farms and other solar installations.

#### Recommendation 6

The Electrical Safety Office and Workplace Health and Safety Queensland should continue their ongoing efforts to share the results of audit and compliance campaigns with industry through communication channels such as the eSafe newsletter.

Additionally, to promote industry accountability and responsibility it is recommended that industry ensure they inform members of ways to manage new and emerging electrical safety risks and lessons learnt from the findings of any regulatory compliance action.

#### Recommendation 7

In developing a code of practice for the construction and operation of wind farms, the Queensland Government should undertake a gap analysis on the suitability of the current legislation and standards. The development of this code of practice should include consultation early in the process with relevant unions and industry associations.

### Part 3: Matters to be explored in long-term review of the Electrical Safety Act 2002 (Qld)

#### Recommendation 8

The review of the *Electrical Safety Act 2002* (Qld) should also canvass issues not limited to solar farms, including

- amendments to strengthen the duties of suppliers and consumer protections;
- amendments to strengthen the effectiveness of provisions related to: rectifying defective work, inspectors' powers to enter residential premises, cancelling registration of an electrical equipment supplier and excluding unscrupulous individuals and companies from being granted new licences following disciplinary action;
- better alignment of provisions of the *Electrical Safety Act 2002* (Qld) with Queensland's work health and safety legislative scheme; and
- requirements for generating entities.

#### Recommendation 9

The review of the *Electrical Safety Act 2002* (Qld) should include a review of issues specific to the *Electrical Safety Regulation 2013* (Qld) , including:

- new safety switch requirements as part of minimum housing standards for residential tenancies;

- mandating the de-energising of residential buildings before work can commence in their roof space; and
- options to address the risks of workers working near exposed live parts.

## Part 1: Clarity around existing legislative provisions of the *Electrical Safety Act 2002* (Qld)

This part provides an overview of the Supreme Court of Queensland's finding of invalidity against section 73A of the ES Regulation 2013 (upheld by the Court of Appeal) and discusses how this ruling impacts on the regulation-making power of the ES Act and recommends a review of the ES Act.

### 1.1 Section 73A of the Electrical Safety Regulation 2013 (Qld)

The Electrical Safety (Solar Farms) Amendment Regulation 2019 commenced on 13 May 2019, amending the ES Regulation by inserting section 73A. Section 73A was introduced in response to the reports of unlicensed workers inadvertently performing electrical work during the mounting, locating, and fixing of solar PV modules.

The effect of section 73A was to require a licensed electrical worker to locate, mount, fix or remove 'PV modules' in place at a solar farm and require work on solar PV modules to comply with the wiring rules.

On application by Maryrorough Solar Pty Ltd, the Supreme Court of Queensland declared section 73A of the ES Regulation invalid. The Queensland Government appealed to the Court of Appeal, with a hearing held on 7 June 2019. On 25 June 2019, the Court of Appeal dismissed the appeal, meaning that section 73A remains invalid.

The Court of Appeal ruling was made on the basis of technical legal grounds surrounding the exercise of the regulation making power under the ES Act. These grounds included:

- the contents of section 73A were inconsistent with the detailed provisions of the ES Act pertaining to the scope of the electrical licensing scheme;
- section 73A involved a 'new step in policy' which cut across aspects of the ES Act by requiring a licence for work that is not electrical work; and
- section 73A was 'practically irreconcilable' with the effect of section 20(1) that such a licence only authorises the performance of 'electrical work'.

The judgement ultimately dismissed the appeal after finding that while, *'a solar farm may be designed to supply electricity that has been generated by a system of PV modules...s73A concerns only work on a PV module at that solar farm and a PV module generates electricity rather than supplies electricity.'*<sup>1</sup>

### 1.2 Implications of section 73A ruling

There is a clear need to provide clarity around the regulation-making power of the ES Act to ensure Government can continue to effectively respond to emerging technologies and related electrical safety risks.

Regulations, by nature, are typically used:

- to ensure efficient use of parliamentary time, particularly where legislation is too technical or detailed to be suitable for parliamentary consideration;
- to deal with rapidly changing or uncertain situations; and
- to allow for swift action in the case of an emergency.

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<sup>1</sup> *State of Queensland v Maryrorough Solar Pty Ltd* [019] QCA 129.

However, regulations must be within the scope of the Act under which they purport to be made. In other words, they must complement not supplement the authorising Act. This report considers that one of the most significant implications of the recent court ruling on section 73A was that it found the regulation involved ‘a new step in policy’ and challenged the accepted use of regulation making powers under the ES Act.

### 1.3 Review of the *Electrical Safety Act 2002 (Qld)*

In terms of history, in February 2000, the then Minister for Employment, Training and Industrial Relations, the Honourable Paul Braddy MP and the then Minister for Mines and Energy, the Honourable Tony McGrady MP established a joint Ministerial Taskforce (the Taskforce) to investigate and make recommendations on the manner in which electrical incidents can be prevented, investigated and dealt with. The Taskforce reported in April 2001 and recommended standalone electrical safety legislation as a matter of urgency, based on the *Workplace Health and Safety Act 1995 (Qld)* and complementary to other safety legislation.

The resulting ES Act was a key component of the Queensland Government’s reform package to address Queensland’s poor electrical safety record and respond to criticism from the Queensland Ombudsman and independent reviewers. The explanatory memorandum accompanying the Electrical Safety Bill 2002 identifies the purpose of the ES Act as, “to provide a comprehensive framework for electrical safety in Queensland homes and workplaces and to reduce the human cost to individuals and families in the community caused by death and injury”. A review of the record of proceedings for the Queensland Parliament Scrutiny of Legislation Committee from this time identifies the provisions intended to achieve this were, “basically a contemporary version of regulatory provisions which have long been incorporated in statute”.

Since 2002, energy technology and Australia’s electricity markets have transitioned at a rapid pace. Demand for electricity is declining in some jurisdictions as households are installing solar PV modules and older, traditional large-scale electricity generation infrastructure is being replaced with new technologies such as solar and wind. Technology is fundamentally changing the nature of the electricity industry through options for consumer-based generation and energy generation. For example, currently in the electricity sector hydrogen is emerging as a storage mechanism for large amounts of energy due to the opportunity for it to contribute to the resilience of electricity systems. The ‘contemporary regulatory provisions’ contemplated at the time of inception of the ES Act appear to have become outdated with the changing landscape of the electrical industry.

This report notes the recent attempt to utilise regulations to legislate for technological changes has revealed the complex and interrelated nature of various provisions of the ES Act and ES Regulation.

The failure of section 73A to withstand legal challenge highlights the danger of pursuing regulatory amendments to address fundamental limitations in legislation. For this reason, this report considers a review of the ES Act should be undertaken. This should include a thorough investigation of the regulation-making powers of the ES Act to ensure government is able to respond to emerging issues. Ideally, a single review of the ES Act, rather than legislating in a staged response to individual issues, is recommended due to the interconnectedness of a number of key concepts underpinning the Act and to allow for unintended consequences to be given due consideration.

Further, this report submits the ‘object’ of the ES Act, or any piece of legislation, should by definition, provide a clear and simple statement which prescribes the fundamental principles on which the legislation is predicated. Other provisions in the ES Act should be able to be

tested against these principles. The objects of the ES Act also help inform legislators who are contemplating amendments about the underpinning principles on which the legislation is based. Accordingly, any review of the ES Act should include a review of its object to ensure it is fit for purpose.

Part 3 of this report provides further detail on other issues that should be considered as part of the review.

### **Recommendation 1**

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*In light of the recent court ruling regarding section 73A, the Queensland Government should undertake a review of the Electrical Safety Act 2002 (Qld), including the objects of the Act and the regulation-making powers, to ensure it is fit for purpose and can keep pace with new and emerging technologies.*

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## Part 2: Options for legislative amendment to definitions of the *Electrical Safety Act 2002* (Qld)

This part examines the current legislative environment for regulating electrical safety on large-scale solar farms in Queensland, including an overview of the safety issues identified at these sites. It provides an assessment of the issues raised at the Industry Roundtable and, on balance, recommends that competent workers (i.e. unlicensed) can only perform work that amounts to locating, mounting and fixing of solar PV modules to an array or structure only when under the direct supervision of a competent licensed electrical worker. This part then recommends legislative amendment to achieve this and highlights a necessary analysis of any unintended consequences. This amendment should be canvassed in the review of the ES Act.

Finally, this part recommends taking several short-term non-regulatory actions to provide immediate certainty about work requirements on solar farms. These recommendations are intended to ensure high safety standards for workers and the industry.

### 2.1 Electrical safety issues at large-scale solar farms

WHSQ and the ESO closely monitor the development and construction of solar farms in Queensland. In fact, data collected by these agencies during audits of solar farms over the last twelve months indicates over 100 statutory notices have been issued for breaches of work health and safety and electrical safety laws.<sup>2</sup> Examples of non-compliance includes unlicensed electrical work, use of non-conforming products and no safe systems of work.

There have been 25 reported incidents at solar farms involving electrical shock, electrical burns, fire or explosion, risk of injury from damage to solar PV modules from grass fires and severe storms.

Safety audits have also uncovered cases of unlicensed workers and contractors performing electrical work on solar farms. For example, in one case a principal contractor was forced to pay considerable rectification costs after an investigation by the ESO found that high voltage and low voltage supply cables installed by unlicensed workers did not meet safety standards.

These audits have also concluded there is confusion within industry about when a licensed electrical worker is required to undertake work at solar farms.

This report considers that unsafe or incorrect installation of solar PV modules can create significant electrical safety risks such as electrocution, fire and system faults. These risks are amplified by the large scale of solar farm installations, the amount of energy generated and the potential for safety incidents to occur during the life of the solar farm due to incorrect earthing or installation of panels during construction.

### 2.2 Current application of *Electrical Safety Act 2002* (Qld) to large-scale solar farms

Currently, under the ES Act there are requirements for 'electrical work' that may apply to some work at solar farms. Specifically, electrical work is defined as:

- connecting electricity supply wiring to electrical equipment or disconnecting electricity supply wiring from electrical equipment; or

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<sup>2</sup> This figure reflects statutory notices issued to large-scale solar farms across Queensland up to October 2019.



- manufacturing, constructing, installing, removing, adding, testing, replacing, repairing, altering or maintaining electrical equipment or an electrical installation.<sup>3</sup>

Generally, this definition will not apply to work on solar PV modules, as individually they do not meet the definition of ‘electrical equipment’, as they are not above the level of ‘extra low voltage’. The Court of Appeal also held this view and noted that work on a solar PV module was not electrical work because, ‘a PV module is not electrical equipment’.

### 2.3 Work requirements at large-scale solar farms

The Industry Roundtable acknowledged there is a clear gap in the electrical safety legislative framework as it pertains to locating, mounting, or fixing solar PV modules in place at a solar farm. There was consensus this generated confusion within industry about when a licensed electrical worker is required. However, views differed on what work can be performed by unlicensed workers on solar farms.

The Electrical Trades Union (ETU) submitted:

*“Solar panel are different to other pieces of electrical equipment. Unlike a light fitting, or switchboard, these solar panels are generating voltage as soon as they are exposed to sunlight. In fact, these PV Modules are generating power, rather than connected to supply.*

*They are the supply.*

*When a number of panels are connected the total voltage then becomes higher than the extra low voltage requirements. Hence when these panels, when installed, must be considered electrical equipment and installed by a licensed electrical worker.*

*The Queensland Government cannot afford to have a Home Insulation Fatality due to unsafe work practices by unlicensed workers installing PV modules.”*

Accordingly, the ETU strongly recommended:

*“A change to section 18 of the Act to ensure that when it comes to the installation of panels that this work be undertaken by a licensed electrical worker or by a unlicensed electrical worker who is directly assisting in accordance with section s18g.”*

Section 18(g) of the ES Act allows for an unlicensed electrical worker assisting a licensed electrical worker to carry out electrical work, on electrical equipment under the direct supervision of the electrical worker, if the assistance does not involve physical contact with any energised electrical equipment. .

Master Electricians Australia (MEA) recommended:

*“non-electrical workers should be able to undertake the mounting and fixing of solar panels provided there are safe systems of work and the worker is provided with appropriate training.”*

The Clean Energy Council (CEC) recommended that:

*“Solar PV panels are fully insulated (and in most cases, double insulated), extra-low voltage equipment...it would be practically impossible for a worker to suffer shocks or electrocution from handling an unconnected panel.*

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<sup>3</sup> See section 18 *Electrical Safety Act 2002* (Qld).

*The CEC position is that the task of mounting and fixing solar panels onto a frame is not electrical work. The task only becomes electrical work in the act of making the wiring connections between the extra-low voltage panels.”*

I note the views of the MEA and the CEC, however I recommend that solar PV modules designed to be connected to other modules with the purpose of generating power collectively above extra low voltage (either grid connected or stand-alone) should be considered ‘electrical equipment’ to ensure work that is electrical work or tasks related to electrical work are performed by licensed electrical workers or completed under the direct supervision of a licensed electrical worker.

It is further recommended that competent workers (i.e. unlicensed) should be able to install array support structures for solar PV modules, including support structures that may provide an earth path as part of the approved earthing design (e.g. footings, steel support frames). However, because of their unique nature, the mounting and fixing of solar modules to arrays must be supervised by a competent licensed electrical worker. Further, all earth cabling and connections, module cabling and connections, must be installed, inspected and tested by competent licensed electrical workers.

Consideration should be given to amending the ES Act to give effect to this recommendation.

This view has been formed after a detailed consideration of the electrical safety incidents on large-scale solar farms. The fact that solar PV modules begin generating voltage as soon as they are exposed to sunlight has also been considered. To allow for situations where an unlicensed electrical worker may inadvertently perform wiring or earthing of solar PV modules ignores these very real and significant risks.

To ensure highest safety standards for Queensland, consideration should also be given to safe systems of work, risk assessments and isolation procedures and to ensuring the Lock Out Tag Out (LOTO) of solar modules occurs before module cabling installation and connection work commences. These matters could be considered in the development of minimum training requirements (please see recommendation four for further information on this proposal).

## **Recommendation 2**

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*In relation to the mounting and fixing of solar PV modules on solar farms it is recommended that:*

- *competent workers (i.e. unlicensed) can install array support structures for solar PV modules, including support structures that may provide an earth path as part of the approved earthing design (e.g. footings and steel support frames as part of civil and mechanical works);*
- *the mounting, fixing and locating of solar PV modules and arrays by competent workers (i.e. unlicensed) must be directly supervised by a competent licensed electrical worker; and*
- *all earth cabling and connections, and module cabling and connections, must be installed, inspected and tested by competent licensed electrical workers.*

*Consideration should be given to amending the Electrical Safety Act 2002 (Qld) to give effect to this recommendation*

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## **2.4 Definitions of ‘electrical equipment’ and ‘electrical work’**

To ensure competent workers (i.e. unlicensed) can only perform the mounting, fixing or locating of solar PV modules to an array or structure when under the direct supervision of a

licensed electrical worker, it is recommended the definition of 'electrical equipment' be amended. The MEA made a further recommendation in regard to amending the definition of 'electrical work'. This electrical work proposal is discussed in point 2 below.

### **1. Amend definition of 'electrical equipment' as provided by the Electrical Safety Act 2002 (Qld)**

During the conduct of the Industry Roundtable, the MEA and ETU shared a proposal in relation to amending the definition of 'electrical equipment' under the ES Act.

The proposal of the MEA and ETU was to insert:

*“sub-section 14(1)(e) - an individual solar module connected to other modules with the purpose of generating power collectively above extra low voltage either grid connected or stand alone; and*

*sub-section 14(1)(f) - an individual battery cell connected to other cells with the purpose of storing and releasing power collectively above extra low voltage either grid connected or stand alone.”*

The Industry Roundtable noted that if this proposal was adopted definitions of terms such 'solar module', 'individual battery cell', 'grid connected' and 'stand-alone' would require more detailed consideration.

Additionally, it is noted that in June 2017 the Electrical Equipment Committee (EEC) recommended that the ESB review adding extra low voltage energy storage equipment into the definition of electrical equipment. The EEC considered this would, *“ensure that the installation of multiple battery cells, or the installation of battery systems is required to be done by licensed electricians and further by suitably qualified persons”*. The EEC made this recommendation after reviewing evidence of safety issues with solar PV module systems, including fires to DC isolators and other installation issues.

This report considers that in effect proposed sub-section 14(1)(e) would result in individual solar PV modules being a form of electrical equipment. This would have the flow-on effect of clarifying and meaning that, for example, connecting or disconnecting supply wiring in solar farms would constitute “electrical work” (section 18(1)(a)), as well as installing the individual solar PV modules (section 18(1)(b)). These forms of work (i.e. connecting or disconnecting supply wiring) would require an electrical work licence, restricting work to these workers (and apprentices under supervision). Sub-section 14(1)(f) would have a similar practical result for work on large-scale batteries. Note: Section 18(g) of the ES Act allows for an unlicensed electrical worker to carry out work on electrical equipment under the direct supervision of the electrical worker, if the assistance does not involve physical contact with any energised electrical equipment – this would include locating, mounting and fixing of these solar PV modules).

It is acknowledged that limitations of this recommendation include:

- use of specific terms such as “solar module” and “battery” may not cover similar emerging forms of generation and storage (e.g. ultra-capacitors) when they arise into the future and may not ‘future proof’ the electrical safety legislation; and
- the suggested changes are not likely to capture other renewable energy technologies broadly;

Importantly, the consequence of this definitional change is that it would apply to installation of solar PV modules on domestic residences. Current industry practice for installation on domestic residences is that individual solar PV modules may be separately mounted in position beside another solar PV module, and a row of solar PV modules may all be mounted,

by a person who does not hold an electrical work license. However, a key requirement of the proposed recommendation is that work can only be undertaken under the direct supervision of a licensed electrical worker. This report considers the close geographical proximity of work undertaken on domestic installations lessens the unintended regulatory burden as current practice indicates that a licensed electrical worker is typically in the immediate vicinity to perform the connections and final safety checks.

I am aware businesses in this industry have previously raised concerns about the unintended consequences of any regulatory proposal to address safety risks at solar farms that incidentally applies to the rooftop installation of solar PV modules. This includes concerns over extra costs, job losses and impacts on business viability.

An unintended consequence of this recommendation is that it may also capture solar PV modules used by individuals for camping or used in the manufacturing of caravans. Implementation of this recommendation should also include detailed consideration of these impacts.

However, after balancing the unintended consequences of this proposal against the need to provide industry with certainty on this issue, it is recommended the Queensland Government amend the meaning of 'electrical equipment' to make clear that both individual solar PV modules designed to be connected to other solar PV modules with the purpose of generating power collectively above extra low voltage (either grid connected or stand-alone) and individual battery cells connected to other cells with the purpose of storing and releasing power collectively above extra low voltage (either grid connected or stand-alone) are considered 'electrical equipment'.

This report also acknowledges the ES Act provides for a number of other definitions beyond 'electrical work' and 'electrical equipment'. Given the rate of change in the area of energy technology, it is recommended the review of the ES Act include a review of all definitions under the ES Act to ensure they are relevant and effective.

Additionally, the CEC noted that while:

*“there may be merit in such additions to the Act at some time in the future, we caution any haste in recommending or pursuing these changes until broad industry and public consultation has taken place”*

This report shares similar concerns and notes the need to ensure all affected stakeholders are aware of the impacts of proposed changes and, where possible, actions are taken to minimise or avoid unintended consequences. Consequently, it is recommended that implementation of this recommendation should occur as part of the review of the ES Act to ensure thorough consultation occurs.

### **Recommendation 3**

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*In undertaking the review of the Electrical Safety Act 2002 (Qld), the following should be considered 'electrical equipment'*

- *individual solar PV modules designed to be connected to other solar PV modules with the purpose of generating power collectively above extra low voltage (either grid connected or stand-alone); and*
- *individual battery cells connected to other cells with the purpose of storing and releasing power collectively above extra low voltage (either grid connected or stand-alone).*

*Work undertaken to implement this recommendation should include:*

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- *careful consideration and evaluation of unintended consequences on the broader industry and community; and*
  - *a review of all definitions under the Act to ensure relevance and effectiveness; and*
  - *future proofing the Act for other emerging renewable energy and energy storage devices.*
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## **2. Amend definition of ‘electrical work’ as provided by the Electrical Safety Act 2002 (Qld)**

During discussions at the Industry Roundtable, the MEA further proposed additional amendments to section 18(2) of the ES Act to exclude certain work on solar farms and large-scale batteries from the meaning of “electrical work”, with the effect that a licensed electrical worker would largely not be required.

This proposal of the MEA was to insert:

*“a new section 18(2)(e) which would require all parts of the structure becoming part of the earthing section to be done under the supervision of, a licensed electrical worker; and*

*a new section 18(2)(f) which would allow trade assistants to perform the mounting and fixing of panels to a structure but take no part in the wiring or connection. The employer would need to ensure a safe system of work is used and the people are appropriately trained. The earthing of the panels would need to be completed and confirmed by a licensed electrical worker and all electrical connections and supply wiring undertaken by a licensed electrical worker.”*

Under this proposal, solar PV modules and large-scale batteries would be considered ‘electrical equipment’. However, there may be significant unintended consequences surrounding the proposal due to the way ‘mounting of electrical equipment’ is treated under the ES Act. In effect, the proposal could apply to all circumstances involving the locating, mounting and fixing of electrical equipment.

This report considers the implications of the proposed definitional changes would create unacceptable outcomes for industry and create an unsustainable policy position for government. On balance, the adoption of this proposal is not recommended, however the definition of electrical work should be reviewed in general.

### **2.5 Short-term non-regulatory actions to improve safety standards**

This report acknowledges the *Construction and operation of solar farms Code of Practice 2019* (the Code of Practice) successfully provides guidance to ensure safety at solar farms throughout their life. It achieves this through consolidating existing electrical and work health and safety requirements for solar farms, including information on how designers, constructors and operators can comply with their existing safety duties.

However, it is accepted that circumstances surrounding 73A may have generated industry confusion about regulatory requirements on solar farms. In this regard, it is considered the Code of Practice could be complemented through additional short-term non-regulatory actions to ensure continued high safety standards for workers.

In recognition of this, the Industry Roundtable supported developing minimum training requirement for all workers and supervisory persons on solar farms as a means of ensuring the mounting, locating and fixing of solar PV modules is undertaken by appropriately skilled and qualified workers and to manage electrical safety risks.



In discussing minimum training requirements, the majority of the Industry Roundtable agreed that mounting of solar PV modules could be done by competent workers (i.e. unlicensed) under the supervision of a licensed electrical worker.

The CEC supported:

*“the development of a basic competency module to educate PV module installation workers of the key hazards, risks and controls associated with their tasks, and general risks associated with working on solar projects.”*

*Such a training module would provide workers with a basic foundation of knowledge and could be conducted prior to arriving at site or alternatively as part of a site induction process.”*

This report supports the views of the Industry Roundtable and recommends industry should lead the development of minimum training requirements for all workers (both licensed and unlicensed) on solar farms. The minimum training requirements should clearly define what work trade assistants and non-trades can perform, including what work should be done by, or under the supervision of, a licensed electrical worker. The training requirements should also ensure the worker has a thorough understanding of electrical safety risks, with a specific emphasis on risks which are exacerbated by the nature of work on solar farms (i.e. latent electrical safety risk such as electrocution, fire and system faults due to incorrect installation or earthing during mounting of solar PV modules). Consideration should also be given to how this can be linked to existing site-specific inductions.

The ESO should assist industry in developing the minimum training requirements. The risk register developed by the Industry Roundtable Technical Subcommittee should be referred to in this process as it details risks associated with certain aspects of work and any current competencies required.

To provide consistency of safety training across the renewable industry, consideration should also be given to how minimum training requirements could be adapted to other industries, e.g. wind farms.

Industry should report back to the Commissioner for Electrical Safety by 30 June 2020.

The Minister for Education and Minister for Industrial Relations should also consider amending the Code of Practice to refer to this minimum training requirement once developed.

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#### **Recommendation 4**

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*Before 30 June 2020, industry should develop minimum training requirements for all workers (both licensed and unlicensed) and supervisory persons on solar farms to ensure they are competent in understanding electrical safety risks and what work they can perform, including what work should be done by, or under the supervision of, a licensed electrical worker.*

*The Minister for Education and Minister for Industrial Relations should consider amending the Construction and operation of solar farms Code of Practice 2019 to refer to the minimum training requirements once developed.*

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The Industry Roundtable also noted the remote location of solar farms presents unique difficulties in ensuring compliance at these sites.

Evidence and data available to this report supports acting to enforce compliance where there are unmanaged risks and contraventions with high levels of culpability leaving workers and others exposed to the likelihood of serious injury or illness. In this regard, it is recommended

that the ESO and WHSQ continue the ongoing compliance approach to solar farms in Queensland. The risk register developed by the Industry Roundtable Technical Subcommittee could also be used to inform future compliance audit campaigns as it identifies the risks involved and relevant control measures for aspects of work performed on solar farms.

This report also notes there are significant worker, public and property safety risks posed by the large-scale installation of solar PV modules due to the amount of energy generated. In particular, the high voltage generated collectively by solar PV modules poses an increased potential for electrical shock or fire if a fault occurs from incorrect earthing or installation.

Consequently, the report recommends the ESO and WHSQ should undertake compliance campaigns and audits of other installations of solar PV modules to identify non-compliance and enforce safety standards. Compliance campaigns should be initiated on a risk-based approach that balances the growth of the industry with the potential for harm to workers, the public and property. For example, in September 2019, the ESO had identified over 70 large scale commercial rooftop installations had made an application to connect to the electricity network. The risks associated with commercial rooftop installations share some similarities with solar farms.

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### **Recommendation 5**

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*The Electrical Safety Office and Workplace Health and Safety Queensland should continue their compliance and enforcement approach to solar farms and other solar installations.*

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During the Industry Roundtable, some stakeholders indicated that had they been aware of electrical safety issues identified on solar farms, they would have acted to address these findings. This report considers that communicating safety audit findings and data to external stakeholders can assist in developing a cohesive industry response to electrical safety issues.

The ESO and WHSQ should continue to share their audit and compliance results with industry associations.

This report acknowledges the current efforts of the ESO to provide news and practical information for workers and contractors in the electrical industry through the circulation of the eSafe Electrical Newsletter. For example, in September 2019 an eSafe article was published to advise industry of the outcomes of audits and investigations on solar farms. This is considered an effective means of sharing compliance results and this report recommends the ESO and WHSQ continue their efforts in this regard.

This report considers that Government, as a regulator, plays a vital role in ensuring the health and safety of Queenslanders by administering and enforcing legislation that is aimed at eliminating the death, injury and destruction that can be caused by electricity and which covers thousands of workers, businesses and organisations. However, there are significant opportunities for industry, particularly representative bodies, to work alongside government to continue to develop and maintain high standards of electrical safety.

To promote industry accountability and responsibility in this regard, it is recommended that at a minimum industry continue to educate and inform members on ways of managing new and emerging electrical safety risks. This should also include the findings of any regulatory compliance action shared by the department to help spread the message about lessons learnt and ways to minimise risks.

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### **Recommendation 6**

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*The Electrical Safety Office and Workplace Health and Safety Queensland should continue their ongoing efforts to share the results of audit and compliance campaigns with industry through communication channels such as the eSafe newsletter.*

*Additionally, to promote industry accountability and responsibility it is recommended that industry ensure they inform members of ways to manage new and emerging electrical safety risks and lessons learnt from the findings of any regulatory compliance action.*

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Construction of large-scale wind farms is increasing. **Appendix 2** provides an overview of current operational wind farms and planned wind farms as at June 2019.

Wind farm jobs involve high risk construction work, including risks associated with working at height, complex crane lifts, the interaction of people and plant, hazardous environmental conditions, remote work, electrical safety and confined spaces.

The current efforts of WHSQ and ESO to closely monitor the development and construction of wind farms in Queensland to ensure planning, construction, operation and maintenance is done safely are acknowledged.

This report notes the Queensland Government has committed to developing a separate code of practice for the safe construction and operation of wind farms.

During the development of this code of practice, a gap analysis should be undertaken to understand the suitability of the current legislation and standards to this industry.

Consultation should occur early in the process with relevant unions and industry associations.

#### **Recommendation 7**

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*In developing a code of practice for the construction and operation of wind farms, the Queensland Government should undertake a gap analysis on the suitability of the current legislation and standards. The development of this code of practice should also include consultation early in the process with relevant unions and industry associations.*

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## Part 3: Matters to be explored in long-term review of the *Electrical Safety Act 2002 (Qld)*

This part recommends key issues that should be considered in the long-term review of the ES Act. The recommendations have been informed by my experiences as Chair of the ESB and Chair of the ELC, as well as my comprehensive consultation and contact with industry throughout my tenure as Commissioner for Electrical Safety.

### **Recommendation 8**

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*The review of the Electrical Safety Act 2002 (Qld) should also canvass issues not limited to solar farms, including*

- *amendments to strengthen the duties of suppliers and consumer protections;*
  - *amendments to strengthen the effectiveness of provisions related to: rectifying defective work, inspectors' powers to enter residential premises, cancelling registration of an electrical equipment supplier and excluding unscrupulous individuals and companies from being granted new licences following disciplinary action;*
  - *better alignment of provisions of the Electrical Safety Act 2002 (Qld) with Queensland's work health and safety legislative scheme; and*
  - *requirements for generating entities.*
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This part also addresses areas requiring critical electrical safety reform which fall within the ambit of the ES Regulation.

### **Recommendation 9**

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*The review of the Electrical Safety Act 2002 (Qld) should include a review of issues specific to the Electrical Safety Regulation Qld (2013), including:*

- *new safety switch requirements as part of minimum housing standards for residential tenancies;*
  - *mandating the de-energising of residential buildings before work can commence in their roof space; and*
  - *options to address the risks of workers working near exposed live parts.*
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It is recommended that comprehensive industry consultation occur on all matters recommended in this part.

### **3.1 Stronger duties of suppliers and consumer protection**

In Queensland, people involved in the supply chain of electrical equipment have duties to ensure equipment is electrically safe. The main hazards associated with electrical equipment include:

- contact with exposed live parts, which may cause electric shock and burns (for example, exposed leads or other electrical equipment coming into contact with metal surfaces, such as metal flooring or roofs);
- equipment faults, which may cause fires and cause electric shock injury; and

- fire or explosion, where electricity could be the source of ignition in a potentially flammable or explosive atmosphere.

Currently under the ES Act, duties around managing the electrical safety risks of electrical equipment for designers, manufacturers, importers, suppliers, and designers of electrical equipment are predominantly restricted to provision of information. An emerging area of concern for regulatory regimes both nationally and internationally is how to protect the community from safety hazards in the context of consumer law. The tragic events surrounding the Grenfell Tower fire in the United Kingdom serve as a sobering reminder that responsibility in the safe use of products should be shared by all industry participants, including designers, manufacturers, importers and suppliers.

This report understands that concerns over product safety supplier duties have also been raised in the context of the Queensland Governments response to silicosis and the importing of engineered stone benchtops.

Strengthening duties of suppliers and consumers should be pursued as part of the ES Act review. Specifically, this report recommends:

- introducing an additional provision to the duty of suppliers, to require the product itself to be electrically safe;
- clarifying the scope of the term ‘importer’;
- investigation of an additional extra-territorial recall power for electrical equipment and consideration of who is best placed to exercise these powers (i.e. Minister or Regulator);
- expanding of recall orders to wider duty holders (e.g. suppliers and officers of a company);
- expansion of enforcement measures to enable the regulator to direct that unsafe electrical products be removed from display and sale; and
- expanding the jurisdiction of the ES Act to enable clearer duties to be imposed on markets which have a nexus with Queensland (i.e. online platforms).

### 3.2 Strengthening provisions related to powers of the regulator, persons appointed by the regulator and statutory bodies

During my tenure as Chair of the ESB and Chair of the ELC a number of provisions have been raised by stakeholders or have been identified through work of the board or committee, as areas requiring strengthening or review to ensure their effectiveness.

For example, there have been instances where an electrical contractor has been the subject of disciplinary action at the ELC for performing negligent and incompetent electrical work. The electrical contractor has subsequently gone into voluntary liquidation. However, the ESO have no capacity to refuse the granting of a new electrical contractors’ licence to the sole director (i.e. phoenix activity). This is because under the current provisions of the ES Act, there are no grounds similar to a ‘fit and proper person test’, effectively allowing rogue contractors to hide behind ‘the corporate veil’.

Accordingly, this report recommends the review of the ES Act, to encompass amongst other things, a review of the provisions relating to:

- directions to rectify defective work as there is a current gap in the legislation where licensed electrical workers and contractors can only be directed to rectify faulty work through conditions imposed by the ELC in a disciplinary proceeding;
- inspectors' powers to enter residential premises as it is currently unclear if inspectors can access residential premises (without warrant or consent) to examine a switchboard and assess if it is electrically safe;
- what circumstances cancelling the registration of an electrical equipment supplier extends to; and
- the capability of the ELC to address instances of individuals and companies engaging in 'phoenixing' activities through the introduction of a 'fit and proper person' test.

### 3.3 Aligning provisions of the *Electrical Safety Act 2002 (Qld)* with the work health and safety legislative framework

As noted earlier in this report, Queensland's electrical safety laws were originally templated on the work health and safety framework to ensure consistency in application. Over the last two decades, amendments have been made to harmonise the two legislative frameworks. For example, amendments to the ES Act in January 2014 adopted terms and concepts from the *Work Health and Safety Act 2011 (Qld)* (WHS Act). However, this report considers there are some aspects of the legislative framework that could be more closely harmonised. Specifically, these are:

- strengthening requirements for accredited auditors to hold and maintain appropriate insurance;
- including a new provision about the status and functions of codes of practice under the ES Act to align them with section 26A of the WHS Act which requires a PCBU to comply with an approved code of practice or another method that ensures safety to an equal or higher standard than the code;
- power of the regulator to grant an exemption from compliance with any provision of the ES Regulation;
- amending the ES Act to provide clarity over reviewable decisions including a table that sets out decisions that are reviewable (similar to schedule 2 of the WHS Act); and
- prescribing the powers and functions of the Work Health and Safety (WHS) Prosecutor in the ES Act as enshrining these provisions in legislation would cement the independence of the WHS Prosecutor in conducting and defending proceedings under the ES Act, rather than acting as a delegate of the regulator (as is currently the case).

The report recommends the aforementioned issues, and any other matters identified by the department, should be considered in the review of the ES Act.

In addition, there are a number of miscellaneous administrative and technical matters that have arisen during the course of the department's enforcement of the ES Act, and my work as the Commissioner for Electrical Safety, that should also be considered as part of the review. These matters can be provided to the Minister for Education and Minister for Industrial Relations as required.

### 3.4 Requirements for generating entities

Currently in Queensland the electrical safety legislative framework places various specific requirements on electricity entities. However, generating entities appear to mainly have the

overriding duty of an electricity entity to ensure its works are electrically safe and operated in a way that is electrically safe.

In recent years the transitioning energy market and development of new technologies has resulted in some businesses, or even households, generating electricity and using and storing it in the form of batteries, effectively becoming generating entities. This raises questions if new technology generation, for example solar and wind farms, are adequately addressed by the ES Act in terms of ensuring high safety standards. For example, a generating entity is not a prescribed electricity entity and consequently does not have to have a safety management system in place.

This report considers that the linear concepts of the ES Act has created a gap in coverage in this respect. It is recommended that consideration should be given to whether the duties of electricity entities should be extended to encompass these situations, or if it would be more appropriate to develop separate tailored regulations.

### 3.5 Safety switches

Next to Western Australia, Queensland has the most comprehensive safety switch requirements in the country due to requirements of the Wiring Rules and the ES Regulation. For residential properties, safety switches are currently mandated on all circuits only when:

- a home is sold;
- a tenancy agreement is entered;
- electrical conductive ceiling insulation is to be installed; and
- a home is newly constructed or undergoes significant renovation (as at January 2019, via the commencement Wiring Rules amendments).

The ES Regulation requires that only licensed electricians perform electrical installation work on a home if a safety switch is installed as part of the work, which has cost implications for consumers. Requirements for commercial premises are similarly strict, but more technical in nature, depending on the amount of electrical current in certain circuits, environmental conditions and the type of electrical installation and work processes at the property.

This report notes that many stakeholders have called for greater safety switch coverage in Queensland. Potential responses to these calls include:

- a strict legal rule requiring safety switches on all residential and commercial circuits;
- further work to increase awareness and education on the benefits of safety switches; and
- payment plans and rebate scheme options to assist with the costs of installing safety switches and switchboards for vulnerable customers.

This report acknowledges the efforts of the Queensland Government in running public awareness campaigns to encourage homeowners to install safety switches on all circuits in recent years. However, there is clearly still a level of confusion amongst the community regarding safety switch requirements. It is considered that successful engagement of the community on this safety issue also requires promotion by industry. Effective ways of achieving this could include electricians making one on one contact with homeowners. This is just one example of ways industry can engage in promotion of electrical safety to protect the community.

The tragic fatalities that have occurred where safety switches have not been installed on all circuits are reminders of the importance of individuals checking that safety switches are

installed on all electrical installations where possible. Consequently, this report considers that in the long-term safety switches on all circuits should be required.

However, it is acknowledged that introduction of this requirement will require significant cost benefit balancing. I recognise the previous efforts of the department in this regard and support a more rigorous and extensive consultation on this matter before any regulatory amendments are introduced.

In the short term, this report recommends the Queensland Government should consider enhancing safety switch requirements on rental properties to ensure vulnerable members of the community are protected.

### 3.6 Roof spaces

Four young people lost their lives while installing insulation in roof spaces under the Federal Government's Home Insulation Program, with three of these deaths occurring in Queensland in 2009–2010. In all three Queensland cases, the roof space of the residential property was not de-energised prior to undertaking work.

This report acknowledges this is a significant electrical safety issue and requires policy reform.

The advocacy of some stakeholders regarding the application of this proposal to commercial roof spaces is also noted. However, requiring the full gamut of commercial roof spaces to be de-energised prior to work being undertaken in the space is significantly more complex and problematic than for residential roof space.

Electrical installations within commercial premises can be complex due to the size and layout of the electrical switchboards and equipment. A large commercial installation can contain multiple switchboards and isolation points. Even if isolation is performed, there may still be electrical cables in one part of the ceiling space being energised due to originating from another switchboard. Domestic or residential premises are a much simpler layout, so a process of isolation at the switchboard can be simple and highly effective in a domestic installation.

Further complications for commercial premises include that:

- de-energisation of a residential roof space is unlikely to be required for extended time periods and would result in minor inconveniences for any residents in the home. In contrast, requiring de-energisation of an entire roof space in a commercial building could have major impacts; and
- due to the varied nature of commercial premises, not all installations can have their electricity turned off. This would include such commercial installations such as hospitals, 24-hour manufacturing plants and major hazard facilities. De-energising a roof space in a shopping centre may result in lost business revenue, spoiled goods and food safety implications, and loss of important services (e.g. banking and electronic teller services).

In this regard, the report considers the de-energisation of commercial roof spaces prior to work being undertaken is not practical.

This report understands the department has previously undertaken industry consultation to introduce regulations to increase electrical safety in residential roof spaces. It is noted this proposal was likely stymied by the results of the court ruling on section 73A and subsequent implications.

This report considers that requiring the de-energising of residential building before work can commence in their roof space would effectively increase protections for workers with lower

levels of electrical safety awareness (e.g. domestic pest inspectors and insulation installers) and would be consistent with other national approaches to this electrical safety issue.

Consequently, this report recommends the Queensland Government should investigate ways to mandate the de-energisation of residential buildings before work can commence in their roof space. Further consultation on this issue should occur.

### 3.7 Working near exposed live parts

Arc flash incidents are avoidable but continue to happen regularly in Queensland. For example, since 1 January 2019 there have been eight arc flash-related serious electrical incidents. This include one instance where an electrical worker received burns to his hand, neck and face from an arc flash while he was terminating cables running to a switchboard.

The dangers of working near exposed live parts also include electric shock and damage to property. The purpose of the ES Act is to prevent people from being killed or injured and property from being destroyed or damaged by electricity. It is therefore recommended the Queensland Government explore avenues to address the safety risks presented by working near exposed live parts.

This report acknowledges that possible options to address this electrical safety risk have previously been considered. These include:

- further education and awareness campaigns (recommended by the ESB);
- regulatory amendments to require the de-energisation of electrical installations when electrical workers work near the installations; and
- amendments to the definition of “electrical equipment” in the ES Act, section 14, to include a switchboard as a kind of “electrical equipment”, as opposed to a kind of “electrical installation”.

Recent reforms in Western Australia makes it an offence to carry out electrical work, or cause electrical work to be carried out, on or near an energised part of an electrical installation, subject to two exemptions. The first exemption concerns situations characterised by four conditions:

- a. where there is “no reasonable alternative” to connect to a supply of electricity,
- b. where a risk assessment has been carried out by a competent person,
- c. where a safe work method statement has been prepared and followed, and
- d. where personal protective equipment (PPE) is used as required.

The second exemption is for electrical work on the service apparatus of a major network operator.

In addition, in Western Australia, it is also a mandatory requirement under legislation to comply with the *Code of Practice for Persons Working on or Near Energised Electrical Installations*. The majority of this code is dedicated to guidance on performing electrical work on or near energised electrical installations pursuant to the first exemption set out above. Appendix B to the Code also contains a useful decision-making flowchart for electrical workers to navigate the requirements of the amendments.

In light of these possible options, this report recommends the long term-review of the ES Act canvass these proposed options and consultation with industry be undertaken to determine the preferred mechanism for reform.



## Appendix 1 – Conduct of the Solar Farm Industry Roundtable

The Solar Farm Industry Roundtable (the Industry Roundtable) was established by the Commissioner for Electrical Safety in August 2019 following a request from the Honourable Grace Grace, Minister for Education and Minister for Industrial Relations, to urgently convene an industry roundtable to discuss safety in large-scale solar farms.

In her letter, the Minister asked the roundtable to canvass:

- clarity around existing legislative provisions and safety standards;
- options for legislative amendment to create certainty and to ensure the definitions under the *Electrical Safety Act 2002* (Qld) keep pace with the fast-growing solar farm industry; and
- exploration of the matters that need to be addressed in a longer-term review of the *Electrical Safety Act 2002* (Qld).

Membership of the Industry Roundtable was based on expertise and involvement in the solar farm industry. Nominations were sought from the following industry representatives:

- Clean Energy Council,
- Smart Energy Council,
- Ai Group,
- Electrical Trades Union,
- Construction, Forestry, Maritime, Mining and Energy Union,
- Master Electricians Australia,
- National Electrical and Communications Association,
- Local Government Association of Queensland,
- Department of Natural Resources Mines and Energy, and
- Department of Employment, Small Business and Training.

The Local Government Association of Queensland declined the invitation to participate in the Industry Roundtable. All other invited nominees participated.

The Industry Roundtable met on 7 August 2019, 9 October 2019 and 20 November 2019.

A technical sub-committee of the Industry Roundtable was developed to consider issues in more detail. The technical sub-committee met on 27 August 2019, 16 September 2019 and 2 October 2019.

The technical sub-committee produced a report to inform discussion at the Industry Roundtable. Key conclusions of the report were:

- The non-government stakeholders were not in agreement that work to install solar PV modules onto a supporting structure was under the classification of building work.
- General agreement by all stakeholders that extra low voltage solar PV modules and extra low battery systems be clearly defined as a piece of electrical equipment by regulation where used to form a low voltage supply.

## Appendix 2 – Wind Farms

Since January 2016, Queensland has seen an unprecedented level of renewable energy investment activity. The number of wind power projects in the state – built, under construction or going through the feasibility or development approval process is currently more than 2,200 MW.

As at June 2019, there were currently **4 operational wind farms** in Queensland located at Coopers Gap, Mount Emerald, Windy Hill, and Thursday Island:

- The first 2 turbines of the Coopers Gap Wind Farm, located on farming land between Dalby and Kingaroy, started operating in June 2019. Once fully operational, it will be one of the largest wind farms by megawatt capacity (453 megawatts) in Australia.
- Mount Emerald commenced operations in August 2018. It comprises 53 wind turbines with a nameplate capacity of 180 megawatts.
- Windy Hill was commissioned in 2000. Its 20 turbines produce 12 megawatts of electricity, which can supply energy to around 3500 homes—this is equivalent to the nearby towns of Atherton and Mareeba.
- The wind farm on Thursday Island, which was commissioned in 1997, consists of two 225-kilowatt wind turbines that provide around 5-10% of the resident's electricity needs. This saves about 300,000 to 600,000 litres of diesel (used in generators) and 870 to 1700 tonnes of greenhouse gases each year.

Several other wind farms across the State are either under construction or going through feasibility or development approval processes

For example, the recently announced Clarke Creek Wind Farm will be the largest wind farm in the southern hemisphere and when fully constructed, contribute to 4 per cent of Queensland energy.



**Attachment 2:**

Feedback from Solar Farm Industry Roundtable members on report recommendations - Meeting #3 (20 November 2019)

**Attachment 2: Feedback from Solar Farm Industry Roundtable members on report recommendations - Meeting # 3 (20 November 2019)**

Rec. #	Recommendation	Roundtable position	Feedback
<b>Part 1: Clarity around existing legislative provisions of the Electrical Safety Act 2002 (Qld)</b>			
1.	In light of the recent court ruling regarding section 73A, the Queensland Government should undertake a review of the Electrical Safety Act 2002 (Qld), including the objects of the Act and the regulation-making powers, to ensure it is fit for purpose and can keep pace with new and emerging technologies.	Generally supported.	CEC supported this recommendation and noted members looked forward to a robust discussion about the electrical safety legislative framework.  NECA supported recommendation and noted any review should consider examples of emerging technologies such as power over ethernet.
<b>Part 2: Options for legislative amendment to definitions of the Electrical Safety Act 2002 (Qld)</b>			
2.	In relation to the mounting, fixing and locating of solar PV modules on solar farms it is recommended that: <ul style="list-style-type: none"> <li>• competent workers (i.e. unlicensed) can install array support structures for solar PV modules, including support structures that may provide an earth path as part of the approved earthing design (e.g. footings and steel support frames as part of civil and mechanical works);</li> <li>• the mounting, fixing and locating of solar PV modules and arrays by competent workers (i.e. unlicensed) must be directly supervised by a competent licensed electrical worker; and</li> <li>• all earth cabling and connections, and module cabling and connections, must be installed, inspected and tested by competent licensed electrical workers.</li> </ul> <p>Consideration should be given to amending the <i>Electrical Safety Act 2002 (Qld)</i> to give effect to this recommendation.</p>	Consensus not reached.	The SEC raised that the term ‘directly supervised’ should be defined to provide information on thing like ratios and the proximity of supervision.  The CFMMEU also supported defining the term ‘directly supervised’ but did not comment on what it should look like.  CEC stated firm opposition to recommendation citing there is no danger in mounting, locating or fixing of solar panels and there has been a lack of evidence to support any findings to the contrary.  While not providing a specific position on this recommendation, the ETU submitted that, ‘the Queensland Government cannot afford to have a Home Insulation Fatality due to unsafe work practices by non-licensed workers installing PV modules.

**Attachment 2: Feedback from Solar Farm Industry Roundtable members on report recommendations - Meeting # 3 (20 November 2019)**

Rec. #	Recommendation	Roundtable position	Feedback
3.	<p>In undertaking the review of the <i>Electrical Safety Act 2002</i> (Qld), the following should be considered ‘electrical equipment’</p> <ul style="list-style-type: none"> <li>• individual solar PV modules designed to be connected to other solar PV modules with the purpose of generating power collectively above extra low voltage (either grid connected or stand-alone); and</li> <li>• individual battery cells connected to other cells with the purpose of storing and releasing power collectively above extra low voltage (either grid connected or stand-alone).</li> </ul> <p>Work undertaken to implement this recommendation should include:</p> <ul style="list-style-type: none"> <li>• careful consideration and analysis of any unintended consequences on the broader industry and community;</li> <li>• a review of all definitions under the Act (due to their interconnectedness) to ensure relevance and effectiveness; and</li> <li>• future proofing the Act for other emerging renewable energy and energy storage devices.</li> </ul>	Consensus not reached.	<p>SEC:</p> <ul style="list-style-type: none"> <li>• Submitted that if this recommendation was implemented, Queensland would be the only country in the world that adopts this definition for single individual panels.</li> <li>• Noted implications of this recommendation would also mean that every single person who works on a PV module would be caught (and gave the example of cars).</li> <li>• Did not support this recommendation and submitted that instead it should refer to PV modules that have already been connected.</li> </ul> <p>CEC noted firm opposition for this recommendation and expressed that the recommendation did not reflect the clear evidence provided by the CEC to counter claims of danger/significant risks associated with the locating, mounting and fixing of solar PV modules.</p> <p>The ETU strongly recommended there be a change to section 18 of the Act to ensure that when it comes to the installation of panels that this work be undertaken by a licenced electrical worker or by a non-licenced electrical worker who is directly assisting in accordance with section s18g.</p>
4.	Before 30 June 2020, industry should develop minimum training requirements for all workers (both licensed and unlicensed) and supervisory persons on solar farms to ensure they are competent in understanding electrical safety risks and what work they can perform, including what	Generally supported.	<p>CEC:</p> <ul style="list-style-type: none"> <li>• Noted support for the development of a competency module and that members had observed a general lack of understanding on how solar systems work and that this was not exclusive to solar systems.</li> </ul>

**Attachment 2: Feedback from Solar Farm Industry Roundtable members on report recommendations - Meeting # 3 (20 November 2019)**

Rec. #	Recommendation	Roundtable position	Feedback
	<p>work should be done by, or under the supervision of, a licensed electrical worker.</p> <p>The Minister for Education and Minister for Industrial Relations should consider amending the <i>Construction and operation of solar farms Code of Practice 2019</i> to refer to the minimum training requirements once developed.</p>		<ul style="list-style-type: none"> <li>• Stated there was a lack of competency amongst a variety of workers (not just unlicensed) and supported minimum training requirements for all these workers.</li> <li>• Considered that any competency developed should consider different structures of solar panels and that some RTOs already have standards in place that could be useful.</li> <li>• Queried what would be involved in the development of minimum training requirements and noted the formation of a further working group would have an impost on members who contribute to it.</li> </ul> <p>NECA supported the CEC’s comments with respect to this recommendation.</p> <p>SEC:</p> <ul style="list-style-type: none"> <li>• Supported development of a minimum training requirement generally but noted that if industry were to lead this would have a cost to industry.</li> <li>• Stated that as the beneficiary of this minimum training requirement would be the consumer, not the company, the cost to industry should be considered.</li> <li>• Stated that it was the role of government to support the development of such initiatives, in consultation with industry.</li> </ul>
5.	The Electrical Safety Office and Workplace Health and Safety Queensland should continue their	Nil.	No feedback received.

**Attachment 2: Feedback from Solar Farm Industry Roundtable members on report recommendations - Meeting # 3 (20 November 2019)**

Rec. #	Recommendation	Roundtable position	Feedback
	compliance and enforcement approach to solar farms and other solar installations.		
6.	The Electrical Safety Office and Workplace Health and Safety Queensland should continue their ongoing efforts to share the results of audit and compliance campaigns with industry through communication channels such as the eSafe newsletter. Additionally, to promote industry accountability and responsibility it is recommended that industry ensure they inform members of ways to manage new and emerging electrical safety risks and lessons learnt from the findings of any regulatory compliance action.	Consensus not reached.	CEC did not support industry developing a communication strategy to build awareness and education as they had a fundamental issue with any messaging about danger or risks at solar farms. SEC did not support recommendation and cited that it was 'meaningless' as education and awareness was the core job of the SEC.
7.	In developing a code of practice for the construction and operation of wind farms, the Queensland Government should undertake a gap analysis on the suitability of the current legislation and standards. The development of this code of practice should include consultation early in the process with relevant unions and industry associations.	Nil.	No feedback received.
Part 3: Matters to be explored in long-term review of the Electrical Safety Act 2002 (Qld)			
8.	The review of the <i>Electrical Safety Act 2002</i> (Qld) should also canvass issues not limited to solar farms, including <ul style="list-style-type: none"> <li>• amendments to strengthen the duties of suppliers and consumer protections;</li> <li>• amendments to strengthen the effectiveness of provisions related to:</li> </ul>	Nil.	Not discussed at roundtable as recommendation is not directly related to large-scale solar farms.

**Attachment 2: Feedback from Solar Farm Industry Roundtable members on report recommendations - Meeting # 3 (20 November 2019)**

Rec. #	Recommendation	Roundtable position	Feedback
	<p>rectifying defective work, , inspectors' powers to enter residential premises, cancelling registration of an electrical equipment supplier and excluding unscrupulous individuals and companies from being granted new licences following disciplinary action.</p> <ul style="list-style-type: none"> <li>• better alignment of provisions of the <i>Electrical Safety Act 2002</i> (Qld) with Queensland's work health and safety legislative scheme; and</li> <li>• requirements for generating entities.</li> </ul>		
9.	<p>The review of the <i>Electrical Safety Act 2002</i> (Qld) should include a review of issues specific to the Electrical Safety Regulation (2013), including:</p> <ul style="list-style-type: none"> <li>• new safety switch requirements as part of minimum housing standards for residential tenancies;</li> <li>• mandating the de-energising of residential buildings before work can commence in their roof space; and</li> <li>• options to address the risks of workers working near exposed live parts.</li> </ul>	Nil.	Not discussed at roundtable as recommendation is not directly related to large-scale solar farms.

**Attachment 2: Feedback from Solar Farm Industry Roundtable members on report recommendations - Meeting # 3 (20 November 2019)**

**Other comments on the Report**

MEA:

- MEA did not attend the meeting on 20 November 2019 where the recommendations were discussed. While the MEA provided an email following the meeting commending the report, the MEA did not provide specific views on any of the recommendations.

CEC:

- Noted the CEC had provided clear evidence to counter claims about the dangers associated with work with solar PV module. Advocated for wording in report to be changed to make clear that there are no 'significant risks' associated with work on PV modules citing that there is no clear evidence that this exists.
- Disagreed with messaging in report around section 73A creating confusion about work requirements on solar farms and noted the CEC considered it provided clarity and relief.

**Attachment 3- Submissions from Solar Farm Industry Roundtable members**

1. Clean Energy Council (29 November 2019)
2. Clean Energy Council (18 October 2019)
3. Smart Energy Council
4. Electrical Trades Union (11 November 2019)
5. Electrical Trades Union (18 October 2019)
6. Master Electricians Association
7. Department of Employment, Small Business and Training





29 November 2019

Mr Gregory Skyring  
Commissioner for Electrical Safety  
Email: [Gregory.skyring@oir.qld.gov.au](mailto:Gregory.skyring@oir.qld.gov.au)

Dear Commissioner,

### **DRAFT REPORT ON SOLAR FARM ELECTRICAL SAFETY**

Thank you for the opportunity to review and provide feedback on your Draft Report, *Improving Electrical Safety in Queensland*, following the stakeholder and technical working group processes over the past few months.

As we have indicated in regular correspondence and discussions with the Government over the past year, it is vital that the rationale and design of improvements to safety legislation, regulations or guidance is evidence-based.

In this context, we are very disappointed with the framing of the report, the lack of evidence to support a number of assertions contained within it, and the wholly unjustified recommendation for licensed electrical supervision of building work (recommendation 2).

For example, on page 3 your report states that:

*'Significant risks are associated with this work because solar PV modules generate power as soon as they are exposed to light and cannot be isolated while they are being mounted. This is particularly dangerous given the large scale of solar farm installations and the quantum of energy generated.'*

These statements are inflammatory, misleading and incorrect. As described in previous correspondence and meetings with your office, solar PV panels are fully insulated (and in most cases, double insulated), extra-low voltage equipment, meaning that it would be practically impossible for a worker to suffer shocks or electrocution from handling an unconnected panel.

The negligible electrical risk associated with locating, mounting and fixing panels is supported by the fact that the *Queensland Building and Construction Commission Regulation Act 1991* and the *QBCC Regulation 2003* states that the installation of solar PV panels constitutes 'building work' requiring a QBCC licence (which in turn is not required if the system is ground-mounted).

The task of mounting and fixing solar panels onto a frame is not electrical work. Electrical work is only performed in the act of making the wiring connections between the extra-low voltage panels, and this connection work is already required to be carried out by licensed electrical workers.

Your report also states that the safety audits conducted by the Electrical Safety Office '*uncovered real and significant safety risks for workers working with solar PV modules, including risks of electrical shock and fire*'.

What the report does not state however is that the ESO's own data collected from more than 200 safety audits finds that there has not been a single registered electrical safety incident involving unlicensed workers locating, mounting and fixing panels to a frame. This is consistent with evidence provided by the industry which confirms that any risks associated with the mounting/fixing of an unconnected solar panel to a frame are not of an electrical nature but more likely to be related to manual handling, sprains and strains.

It is also very clearly set out within the *Electrical Safety Act (2002)*, Section 18(2) that:

*'Electrical work does not include: ....*

*(m) erecting structures for the support of electrical equipment;*

*Examples of structures—*

- electric poles and towers*

*(n) locating, mounting or fixing in place electrical equipment...'*

Given that this work is not electrical work, and no evidence has been uncovered of electrical risk associated with this building work, there can be no case for these tasks to be supervised by licensed electricians. We request that you remove recommendation 2.

We would also like to briefly comment on the following recommendations:

- *Recommendation 3 (The inclusion of two new definitions of electrical equipment in the Electrical Safety Act 2002: individual solar modules and individual battery cells) – At this stage, we are supportive of this recommendation progressing to the next stage of development, which should include a detailed analysis of the implications of the amendment, followed by comprehensive industry and community consultation.*
- *Recommendation 4 (Industry to develop minimum training requirements for all workers on solar farms by 30 March 2020) – We are supportive of the recommendation for an industry position to be developed on minimum training requirements, but consider that more time will be needed to work through all relevant matters and undertake the appropriate level of industry consultation.*
- *Recommendation 5 (Continued compliance and enforcement by the ESO) – We support a strong and ongoing compliance and enforcement role for the ESO.*
- *Recommendation 6 (Industry associations committing to build education and awareness of electrical safety risks) – The CEC would be very pleased to work with the ESO to share key safety messages for solar installations, including the reporting of key safety indicators and findings of safety audit campaigns.*
- *Recommendation 7 (Gap analysis on the suitability of existing legislation and standards for wind farms) – We would welcome the opportunity to engage with the ESO and Workplace Health and Safety Queensland on the adequacy of the frameworks in place to guide the construction and operation of wind farms.*

The CEC has no comments to provide in relation to the recommendations contained within Part 3 of the Draft Report.

We trust that this statement of the CEC's position assists you in finalising your advice to the Minister. Should you have any further queries, please do not hesitate to contact me on 0417 033 752.

Yours sincerely,

A handwritten signature in black ink, appearing to read 'Anna Freeman', written in a cursive style.

Anna Freeman  
Director Energy Generation





18 October 2019

Mr Gregory Skyring  
Commissioner for Electrical Safety  
Email: [Gregory.skyring@oir.qld.gov.au](mailto:Gregory.skyring@oir.qld.gov.au)

Dear Commissioner,

### **SOLAR FARM ELECTRICAL SAFETY**

Thank you for the invitation to be part of the recent stakeholder roundtable consultation process regarding electrical safety on solar farms. The Clean Energy Council (CEC) is pleased to be able to work collaboratively with the Queensland Government to review and enhance safety within the solar industry.

As we have indicated in previous correspondence with the Government over the past year, it is vital that the rationale and design of improvements to safety legislation, regulations or guidance is evidence-based.

We note that the Commissioner has been tasked with responding to a wide-ranging brief about any improvements that could be made to improve electrical safety at solar farms. In the first instance, we would like to respond to the question of unlicensed workers performing the tasks of locating, mounting and fixing of solar panels, which was the issue that originally sparked the court proceedings and this review process.

With the benefit of reviewing the Electrical Safety Office's data on reported incidents at solar farms since 2016, it would appear that there has not been a single registered electrical safety incident involving unlicensed workers locating, mounting and fixing panels to a frame. This is consistent with evidence provided by the industry which confirms that any risks associated with the mounting/fixing of an unconnected solar panel to a frame are not of an electrical nature.

Solar PV panels are fully insulated (and in most cases, double insulated), extra-low voltage equipment, meaning that it would be practically impossible for a worker to suffer shocks or electrocution from handling an unconnected panel. This negligible electrical risk is supported by the fact that the *Queensland Building and Construction Commission Regulation Act 1991* and the *QBCC Regulation 2003* states that the installation of solar PV panels constitutes 'building work' requiring a QBCC licence (which in turn is not required if the system is ground-mounted).

The CEC's position is that the task of mounting and fixing solar panels onto a frame is not electrical work. The task becomes electrical work only in the act of making the wiring connections between the extra-low voltage panels.

We acknowledge that the continuity of the earthing system is essential and we are satisfied that the existing procedures and regulatory framework which requires licensed electrical workers to install, visually inspect and test earthing connections prior to the connection of the PV panels provides the necessary charter to ensure that this task is performed satisfactorily. This requirement is also consistent with the Building Code of Australia, Part 3.4.2 Steel Framing sub-section 3.4.2.2 General (b) which requires a steel frame to be permanently electrically earthed. Construction

practices in these instances do not require electrical workers to install and mount such frames but rather to connect and test the permanently connected earth.

However, to complement these existing controls, the CEC would be supportive of the development of a basic competency module to educate PV module installation workers of the key hazards, risks and controls associated with their tasks, and general risks associated with working on a solar projects. Such a training module would provide workers with a basic foundation of knowledge and could be conducted prior to arriving at site or alternatively as part of a site induction process. It should be noted that site-specific training for module installation crews is already provided by all responsible EPC contractors and as such, an approved competency module would supplement this training.

Were the Queensland Government to pursue the development of a competency module, it would be vital that it was developed in consultation with the solar industry to determine its scope of application (which could possibly include the large-scale, domestic rooftop and commercial segments), and to ensure that it was regarded as valuable and fit for purpose.

In relation to other possible enhancements to the electrical safety framework for solar farm construction, operation and decommissioning, we note that the roundtable's Technical Sub-Committee undertook a comprehensive analysis of the risks and existing controls associated with solar farm design, construction, operation and decommissioning, and identified no gaps warranting regulatory, legislative or licensing changes. Rather, consistent with the above, it noted that the very robust existing electrical safety framework through the *Electrical Safety Act 2002*, the regulations, the Code of Practice and other materials, could be complemented through the basic pre-work competency training.

#### **Proposed changes to the definition of electrical equipment**

At the roundtable on 9 October, stakeholders were asked to provide feedback on a new proposal – put forward by Master Electricians Australia and the Electrical Trades Union – that two new definitions of 'electrical equipment' be added to the *Electrical Safety Act 2002*. These proposed new definitions are:

*Sub-section 14(1)(e)* An individual solar module connected to other modules with the purpose of generating power collectively above extra low voltage either grid connected or stand alone; and

*Sub-section 14(1)(e)* An individual battery cell connected to other cells with the purpose of storing and releasing power collectively above extra low voltage either grid connected or stand alone.

While we recognise that there may be merit in such additions to the Act at some time in the future, we caution any haste in recommending or pursuing these changes until broad industry and public consultation has taken place. This is vital to ensure that the implications of any changes are fully understood by all affected stakeholders and unintended consequences are avoided.

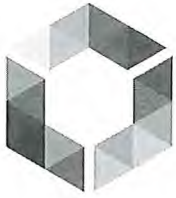
We trust that this statement of the CEC's position assists you in finalising your advice to the Minister. Should you have any further queries, please do not hesitate to contact me on 0417 033 752.

Yours sincerely,



Anna Freeman  
Director Energy Generation





**SMART ENERGY**  
COUNCIL

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Mr Greg Skyring  
Commissioner for Electrical Safety  
Office of Industrial Relations  
Level 11, 1 William Street  
Brisbane QLD 4000

By email: [Gregory.Skyring@oir.qld.gov.au](mailto:Gregory.Skyring@oir.qld.gov.au)

Re: **“Improving Electrical Safety in Queensland” - Consultation**

Dear Greg

Thank you again for the opportunity for the Smart Energy Council (SEC) to participate in the consultation roundtables to assist with your report “Improving Electrical Safety in Queensland”. As you have indicated the *Electrical Safety Act 2002 (Qld)* is in need of review and especially in light of the significant changes in generation and other smart energy technologies that our Members are particularly involved with.

The SEC will continue to participate when review of the Act proceeds, but it there are number of concerns we need to restate. In general those concerns were also expressed by the Clean Energy Council and most by the Master Electricians representatives.

1. Recommendation 2 (page 6) - this looks to be reasonable subject to the definition of “directly supervised by a competent licensed electrical worker”. A sensible approach would be that “directly supervise” means one competent licenced electrical worker could supervise a reasonable number of unlicensed competent workers at a location on site where the ‘supervisor’ is practical, and a “competent licensed electrical worker” should be a either a competent licensed electrical apprentice or a competent licensed electrician. The meaning of ‘directly’ needs to be explicitly defined. clarification on earthing (and other installation) requirements may be needed. Solar panels are live when installed and connected together and certain lock out – tag out is critical even early on during construction and even when the solar farm is not yet back-energised from the grid (which has its own risks and safety requirements), but the report overstates the risks to those directly handling PV modules and dramatically overstates the risks to end user consumers. The most surprising factor is that the report does not assess the recorded safety incidents in Australia or look at international experiences & risk assessments, processes & outcomes to try and

understand the real construction risks. The recommended actions will make solar farms in QLD more expensive with a low likelihood of benefitting safety.

2. Recommendation 3 (page 6) – with regards to individual solar PV modules these should **not be considered to be “electrical equipment” as they are clearly ELV (extra low voltage) devices**. I suggest the following edit to the relevant bullet point

- *individual solar PV modules designed to be connected to other solar PV modules with the purpose of generating power collectively above extra low voltage (either grid connected or stand-alone); and*

The intention is to distinguish between an individual solar PV module (an ELV device) which is currently not considered to be “electrical equipment” and a string of connected solar panels which is capable of generating voltages above ELV and should therefore be considered to be “electrical equipment.” Were such a definition be adopted it would be the only one in the world (as is the ludicrous roof top DC isolator requirement) the practical and commercial implications for consumers would be huge. Ordinary consumers would be caught up in this with commodified over-the-counter PV panels such as are commonly used by recreational campers, fishers, shooters etc and in the agricultural sector. With no improvement in safety.

The Queensland regulators have an excellent record on compliance enforcement, higher than most jurisdictions, but the level of compliance activity needs to be increased as it is the most effective tool for netter safety outcomes. Increased regulation or penalties have little or no impact unless the few who are wilfully non-compliant believe they have a high chance of being caught and that the consequences are severe enough. Rules alone are ineffective act as a deterrent in electrical safety, as they are in other regulated activities such as driving.

The SEC looks forward to working with you further on improving electrical safety in Queensland.

Yours sincerely

John Grimes  
Chief Executive  
Smart Energy Council

29 November 2019



## Briony Logan

---

**From:** Briony Logan  
**Sent:** Tuesday, 3 December 2019 1:42 PM  
**To:** Briony Logan  
**Subject:** FW: Wording change required. - ETU feedback Solar Farm report

**From:** Keith McKenzie (ETU) <[keith@etu.org.au](mailto:keith@etu.org.au)>  
**Sent:** Monday, 11 November 2019 10:44 AM  
**To:** Gregory Skyring <[Gregory.Skyring@oir.qld.gov.au](mailto:Gregory.Skyring@oir.qld.gov.au)>  
**Subject:** Wording change required.

*Page 13 of the Draft*  
*2.3 – two thirds the way down.*

*It should read Section 18 (g) of the ES act allows for a unlicenced electrical worker assisting a licensed electrical worker to carry out electrical work, on electrical equipment under the direct supervision of the electrical worker, if the assistance does not involve physical contact with any energised electrical equipment;*

**Keith McKenzie** (J.P Qual)  
**President**

Electrical Trades Union  
Queensland  
Mobile. 0419 721 056  
Office. 07 38462477  
[keith@etu.org.au](mailto:keith@etu.org.au)  
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Commissioner Greg Skyring.

By EMAIL

18<sup>th</sup> October 2019

The Electrical Trades Union Qld who represents the interests of Electrical workers in Queensland makes the following comments and proposals with respect the legislative changes.

Meaning of *electrical equipment* – including large-scale solar and batteries

1. The ETU propose inserting two new sub-sections in section 14(1) of the ES Act, which defines “electrical equipment”. This would add two new definitions of “electrical equipment” to the ES Act, with the following proposed wordings:
  - Sub-section 14(1)(e) an individual solar module connected to other modules with the purpose of generating power collectively above extra low voltage either grid connected or stand alone; and
  - Sub-section 14(1)(f) an individual battery cell connected to other cells with the purpose of storing and releasing power collectively above extra low voltage either grid connected or stand alone.

We know what is electrical work as defined under the ES Act.

**Meaning of *electrical work* – Section 18**

*(1) Electrical work means—*

*(a) connecting electricity supply wiring to electrical equipment or disconnecting electricity supply wiring from electrical equipment; or*

*(b) manufacturing, constructing, installing, removing, adding, testing, replacing, repairing, altering or maintaining electrical equipment or an electrical*

*installation.*

*Examples of electrical work—*

- *installing low voltage electrical wiring in a building*
- *installing electrical equipment into an installation coupler or interconnector*
- *replacing a low voltage electrical component of a washing machine*
- *maintaining an electricity entity’s overhead distribution system*

**However there is some significant issues with what is not electrical work.**

**Section 18 (g) allows for person without an electrical work licence to directed assist an electrical worker.**

*S18 (g) assisting a licensed electrical worker to carry out electrical work, on electrical equipment under the direct supervision of the electrical worker, if the assistance does not involve physical contact with any energised electrical equipment;*

**Section 18 (g) in fine.**

### **The issue lies with section S18 (n)**

*S18 (n) locating, mounting or fixing in place electrical equipment, other than—*

*(i) making or terminating electrical connections to the equipment; or*

*(ii) installing supply conductors that will connect the equipment to a supply of electricity;*

The concern with S18 (g) is that Solar panel are different to other pieces of electrical equipment. Unlike a light fitting, or switchboard, these solar panels are generating voltage as soon as they are exposed to sunlight. In fact these PV Modules are generating power, rather than them connected to supply.

They are the supply.

When a number of panels are connected the total voltage then becomes higher than the Extra low voltage requirements. Hence when these panels, when installed, must be considered electrical equipment and installed by a licenced electrical worker.

The regulation knocked out in the Federal court of appeals what due to an “err” in laws and the Act did not provide for the regulation change. Whilst this was knocked out as a technicality, the electrical safety issues still remain.

**Accordingly, the Electrical Trades Union Queensland who strongly recommended that there is a change to section 18 of the Act to ensure that when it comes to the installation of panels that this work be undertaken by a licenced electrical worker or by a non licenced electrical worker who is directly assisting in accordance with section s18g.**

Section 18 n who also need be changed to exclude electrical equipment ( PV modules)

*The Qld Government cannot afford to have a Home Insulation Fatality due to unsafe work practices by non licensed workers installing PV modules.*

Keith McKenzie

President

Electrical Trades Union Qld

## Briony Logan

---

**From:** Briony Logan  
**Sent:** Tuesday, 3 December 2019 1:43 PM  
**To:** Briony Logan  
**Subject:** FW: Solar Farm Industry Roundtable  
**Attachments:** In Confidence - Improving Electrical Safety in Queensland - A Report by the Commissioner for Electrical Safety DRAFT.pdf

**From:** Malcolm Richards <[mrichards@mea.asn.au](mailto:mrichards@mea.asn.au)>  
**Sent:** Thursday, 28 November 2019 1:59 PM  
**To:** Gregory Skyring <[Gregory.Skyring@oir.qld.gov.au](mailto:Gregory.Skyring@oir.qld.gov.au)>  
**Subject:** FW: Solar Farm Industry Roundtable

Greg,

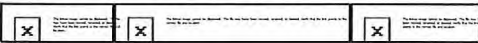
My apologies for not getting back to you earlier. I have located the report, I was looking under your name.

I must commend you on providing a well-balanced report that I think finds the balance between effective electrical safety and commercial reality to develop and grow a new technology industry. I agree the best fix is to review the entire Act and tidy up the definitions to eliminate the current oversight. I also appreciate your additional recommendation 9 to address other significant current issues with the Act.

I look forward to the Ministers reaction to this report.

Regards

**Malcolm Richards**  
**Chief Executive Officer**



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[masterelectricians.com.au](http://masterelectricians.com.au)



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## Briony Logan

---

**From:** Briony Logan  
**Sent:** Tuesday, 3 December 2019 1:44 PM  
**To:** Briony Logan  
**Subject:** FW: Solar Farm Industry Roundtable

**From:** Lance McCallum <Lance.Mccallum@desbt.qld.gov.au>  
**Sent:** Friday, 8 November 2019 12:02 PM  
**To:** OED ESO <OEDES0@oir.qld.gov.au>  
**Cc:** Bradley Bick <Bradley.Bick@oir.qld.gov.au>; Andrea Fox <andrea.fox@oir.qld.gov.au>; Rebekah Jensen <Rebekah.Jensen@oir.qld.gov.au>; Briony Logan <Briony.Logan@oir.qld.gov.au>  
**Subject:** RE: Solar Farm Industry Roundtable

Greg and team , congratulations on a fantastic report.

The report does a really good job of explaining some quite technical issues and in my view the ESC has worked hard to set out the nuances and balance competing interests. I think the approach of putting industry front and centre for some of the immediate responses is a good one.

I have no suggestions for changes to the substance of the report. I have noted some very tiny drafting issues below, which I'm sure will get picked up in a final QA.

- Some of the acronyms aren't clearly spelled out (even though most of the full names appear in Appendix 1)
- On page 12 "non-confirming" should be non-conforming"
- On page 15 one instance of "considered" could read "consideration"

Best

Lance McCallum  
Executive Director  
Queensland Just Transition Group  
Department of Employment, Small Business and Training

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