



QHS Certification Services



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# ROOF-MOUNT CAPABILITIES STATEMENT



**DEVELOPER  
EPC  
PROJECT DELIVERY  
O&M**

**earthconnect**  
renewable energy specialists

GROUP OF COMPANIES  
PTY LTD | EPC | DEVELOPMENTS

# Turn-Key Solar Energy Solutions

Supporting sustainability efforts one project at a time.

earthconnect is one of the leading Engineering, Procurement and Construction (EPC) providers of solar and energy solutions to the commercial, industrial and large-scale sectors of the renewable energy market.

We deliver programs on a local, national and international scale.

Since 2009, we've established a reputation as a company committed to safety, performance and quality in providing best in class turn-key solar energy solutions.

earthconnect are accredited by the Clean Energy Council as solar system designers and installers as well as being EcoSmart accredited engineers. We are also members of the Smart Energy Council.

All Roof Mount solar services by earthconnect include operation and maintenance programs complete with back-office monitoring, to give you peace of mind knowing that our designs are consistently performing beyond expectations.

## Our expertise

Expect the best with a full in-house end-to-end solar solution.

We'll provide you with accurate predictions using industry-leading power system modelling tools that compare yields for individual sites and includes comprehensive information to precisely evaluate feasibility for grid connect hybrid and stand-alone solar systems.

We also offer:

- Financial and production modelling that reflects user tariffs and captured value;
- Electricity market analysis;
- Risk management profiling;
- Grid connect, hybrid and stand-alone solar system design;
- Product selection and optimisation;
- Energy generation and distribution optimisation;
- Cost and budget planning and management;
- System installation;
- Comprehensive 24/7 software monitoring of system performance; and
- Coordination of building and planning approval (where required).

Medium and large scale Roof Mount energy solutions require diverse and specialist skills to design, install and commission, which is why you can trust in earthconnect to ensure your solar project is delivered to the highest standard to provide maximum efficiency and effectiveness.



## Our experience

Known for being capable and professional.

Our experienced staff are skillful in undertaking all areas of *Project Management, Project Engineering and Project Delivery*, including:

- Feasibility;
- Preliminary Design;
- Critical Design;
- Structural Adequacy Assessment
- Construction;
- Testing;
- Commissioning;
- Operation; and
- Maintenance.

Our team includes:

- Mr Adam James** – Chief Executive Officer
- Mr Jason Marko** – Chief Technical Officer
- Mr Darcy Haines** – Delivery Manager, Major Projects
- Mr Michael McGregor** – Site Manager, Major Projects
- Mrs Shelbee Miller** – Operations Manager
- Mr Mitchell Stephens** – Renewable Engineering Intern
- Mrs Amy Page** – Administration Manager



## Our Value Offering

We are committed to providing outstanding work regardless of project size or complexity.

earthconnect has delivered multiple megawatts of solar energy solutions, mostly through repeat work.

earthconnect also took on a pivotal role in the delivery of an 8.0MW solar farm project in the Asia Pacific region.

Our scope is broad, and because every project is managed in-house by our professional team, we have a consistent track record of success.

At earthconnect, we take appropriate steps to ensure processes are put in place to manage or eliminate any potential environmental impacts that may occur during the design phase, throughout construction or post-delivery.

### Our objective throughout the project lifecycle is to deliver an asset which will represent value for the client.

Which is why every project earthconnect delivers includes four (4) quarterly complimentary on-site inspections to ensure every system is operating at its full potential.

Additionally, to give us better insight into how a system is running, we conduct remote system monitoring using platforms such as Sunny Portal and Solar Analytics.

Moreover, we may engage industry experts to provide independent assessments and advice for specific tasks like structural adequacy reviews.

We can also evaluate solar resources, estimate energy yields and losses as well as minimise risks to ensure bankability.

Furthermore, as our promise to you, we provide a comprehensive five (5) year scheduled/preventative maintenance program with every commercial Roof Mount installation.

## Our Quality Assurance

We follow stringent quality standards that exceed our client's expectations.

We promise to deliver and carry out quality construction work following the manufacturer's installation guidelines and under our Quality Management System which has been certified as meeting ISO 9001 Quality Management System Requirements.

To achieve this, we use a comprehensive ITP (Inspection and Test Plan) to review and assess works at every stage of construction.

Whether it be mechanical/structural ITP's, electrical ITP's, point to point or megohm tests, rest assured that all our QA results will be meticulously documented and filed.



PICTURED:  
ROOF TOP  
SOLAR FOR A  
MANUFACTURING  
FACILITY IN  
CHARMHAVEN, NSW

OUR LATEST ROOF MOUNT PROJECTS



PICTURED  
**CENTRAL COAST  
MANUFACTURING  
FACILITY**  
788KW OF ROOF TOP  
SOLAR INSTALLATIONS



PICTURED  
**CENTRAL COAST  
INDUSTRIAL  
FACILITY**  
1.4MW OF ROOF TOP  
SOLAR INSTALLATIONS



LEFT  
**NEWCASTLE  
EDUCATIONAL  
FACILITY**  
310.6KW OF ROOF TOP  
SOLAR INSTALLATIONS



PICTURED  
**WESTERN NSW  
MANUFACTURING  
FACILITY**  
10.0MWDC OF ROOF TOP  
SOLAR INSTALLATIONS

**QUALITY WORK  
GUARANTEED.**

# FROM FEASIBILITY TO REALITY. SOME OF THE MANY PROCESSES REQUIRED TO PROGRESS A DREAM

## Project Feasibility Phase

From integrated project developer/EPC to various levels of project services, we'll tailor each service based on the needs of the project.

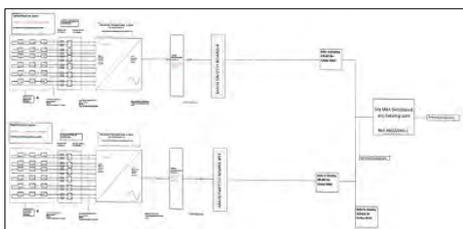
For any given project, the feasibility process is paramount. We consider a range of critical tasks to prove that the project will be constructable and bankable.

To come up with a proficient feasibility program, we take into account the following considerations:

- Structural adequacy assessment;
- Mechanical engineering design;
- Top level electrical design;
- Development application and approval; and
- Construction activities.

## Top-Level Electrical Design

Below is an example of an SLD - Single Line Design.



## Structural Adequacy Assessment

We first have our consulting engineers assess permissible loading for the proposed roof area. We'll use our judgement and experience to advise you as to where on the roof we deem suitable in estimating PV system sizing.

Our consulting engineers then review multiple images of the structural roof and support members as well as any engineering drawings available.

BELOW  
A PORTION OF A  
TYPICAL STRUCTURAL  
ADEQUACY REPORT

Once the interim costings are approved, our consulting engineer will then conduct an on-site visit and perform a detailed assessment of the roof structure. They'll also perform a static and dynamic loading calculation to confirm the approved loading for each proposed roof area.

The results generally present a maximum allowable dead load/m<sup>2</sup> allowance, which is then compared to the expected static load of the solar array, mounting and associated cabling and cable tray.

### Certification of Structural Adequacy Proposed Solar Panel Installation to Existing Roof Areas.

As requested, the structural design check of the above existing factory buildings for solar panel loading was carried out by [redacted] Engineers Pty Ltd, as detailed in the following documentation:

- [redacted] Engineers Drawings: 7118: S01/A to S06/A
- [redacted] Engineers Drawings: 8486: S01/A to S04/E
- [redacted] Construction Drawings: [redacted] Solar Project, SK-01/A, SK-02/A
- The structure has been designed in accordance with the following Australian Standards:
- AS/NZS 1170.0 - Structural Design Actions - Part 0 : General principles
- AS/NZS 1170.1 - Structural Design Actions - Part 1 : Permanent, imposed and other actions
- AS/NZS 1170.2 - Structural Design Actions - Part 2 : Wind actions
- AS 4100 - Steel Structures
- AS/NZS 4600 - Cold-Formed Steel Structures
- The following design loading parameters have been used:
- Solar panel total load = 13 kg/m<sup>2</sup>
- 50 kW Inverter load = 82 kg each
- Additional loads as per [redacted] Construction Drawing SK-03/A

I hereby certify, for & on behalf of [redacted] Engineers Pty Ltd, that the structural design review of the existing buildings has been carried out in accordance with the Building Code of Australia and the above referenced Australian Standards, and the existing building is structurally adequate to support the imposed loading.

The certification is only relevant to and based on the solar panel installation being carried out in accordance with, the abovementioned documentation. I certify that I am a fully qualified and practising structural engineer in accordance with the requirements of the Building Code of Australia and The Institution of Engineers, Australia.

Yours faithfully,

[redacted] Engineers Pty Ltd

# CONTINUED. CONSTRUCTION PHASE



## Mechanical Engineering Design

The mechanical engineering design process requires us to strictly follow the manufacturer's guidelines and the structural adequacy assessment.

Finalising the roof mounting design (anchoring points/m2 etc.) depends on the location (wind zone region) roof sheeting type, the mounting brackets used - penetrative or non-penetrative, as well as the purlin spacings and actual dead loads, kg's/m<sup>2</sup>.

Although a solidly built mechanical structure will have an impact on the reliability and longevity of a Roof Mount asset, it can profoundly impact bankability if the proposed roof structure is incapable of supporting the additional load of a proposed PV system. And if the roof condition is ageing, it will end up needing to be replaced, which will also affect bankability.

**For these reasons, we must conduct a comprehensive structural adequacy assessment for every site before commencing the construction phase.**

## Development Application (DA) and Approval Complying Development Certificate (CDC)

earthconnect are well versed in all aspects associated with achieving approval through the formal Development Application (DA) process.

Although some clients handle this process themselves, we are more than happy to manage it as part of our EPC role.

**Each site contains its own set of challenges, and are generally unique.**

## Construction Activities

Pictured to the right are examples of our construction activities from previous projects.

## Health and Safety

Both our Technical Director and Project Engineer conduct a full risk assessment on-site in consultation with the client's Site Safety Officer to:

- Determine the roof access, materials storage compound and ladder lift locations;
- Gain sign-off for the rooftop demarcated safe work zone areas; and
- To cordon off "harness only work zones".

This inspection then leads on to the development of the site-specific SWMS (Safe Work Method Statement) and daily pre-start inclusions.

Upon completion of the safety documentation, we send it off to the Site Safety Officer for their review and approval.

During construction and commissioning, every person who wishes to gain access to the roof top area whether earthconnect personnel or otherwise, must read, understand and sign onto our SWMS before gaining access.

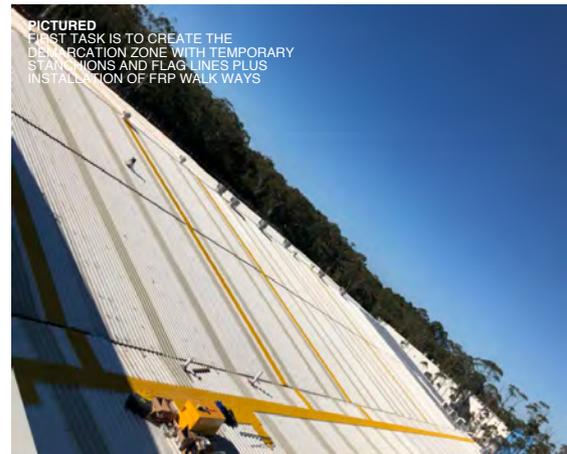
Pre-start meetings are conducted every morning in the ground level compound before any staff member can begin work on the roof areas.

No individual may proceed beyond the rooftop flagged area unless they are:

- Harnessed;
- Accompanied by a second individual; and
- Trained to do so.



PICTURED GROUND LEVEL FENCED MATERIALS STORAGE COMPOUND AREAS



PICTURED FIRST TASK IS TO CREATE THE DEMARCATION ZONE WITH TEMPORARY STAY LINES AND FLAG LINES PLUS INSTALLATION OF FRP WALKWAYS



PICTURED INDIVIDUAL CABLE TRAY CARRYING DC & AC CABLE TRAYS MOUNTED 100W SMA VOLTAGE INVERTERS



PICTURED INSTALLATION OF MOUNTING RAIL AFTER THIS IS THE DC CABLE TRAY AND CABLING



PICTURED ONE OF MANY ROOF TOP DC COMBINER BOXES



PICTURED LADDER LIFT IN USE



PICTURED PANEL PLACEMENT AND THE LAYING OF CABLE

# CONTINUED. CONSTRUCTION PHASE



PICTURED ABOVE  
THE PLACEMENT OF ONE OF SEVERAL  
INVERTER RACKS

**Delivering a 10 MW  
roof-mount project  
is no easy feat.**

**But our team has  
the capabilities to  
accomplish it.**

The resources needed to deliver a 10 Megawatt (MW) project comprised of 27,000 solar panels occupying a roof area of close to 8 hectares and convert this amount of solar energy into usable power is enormous.

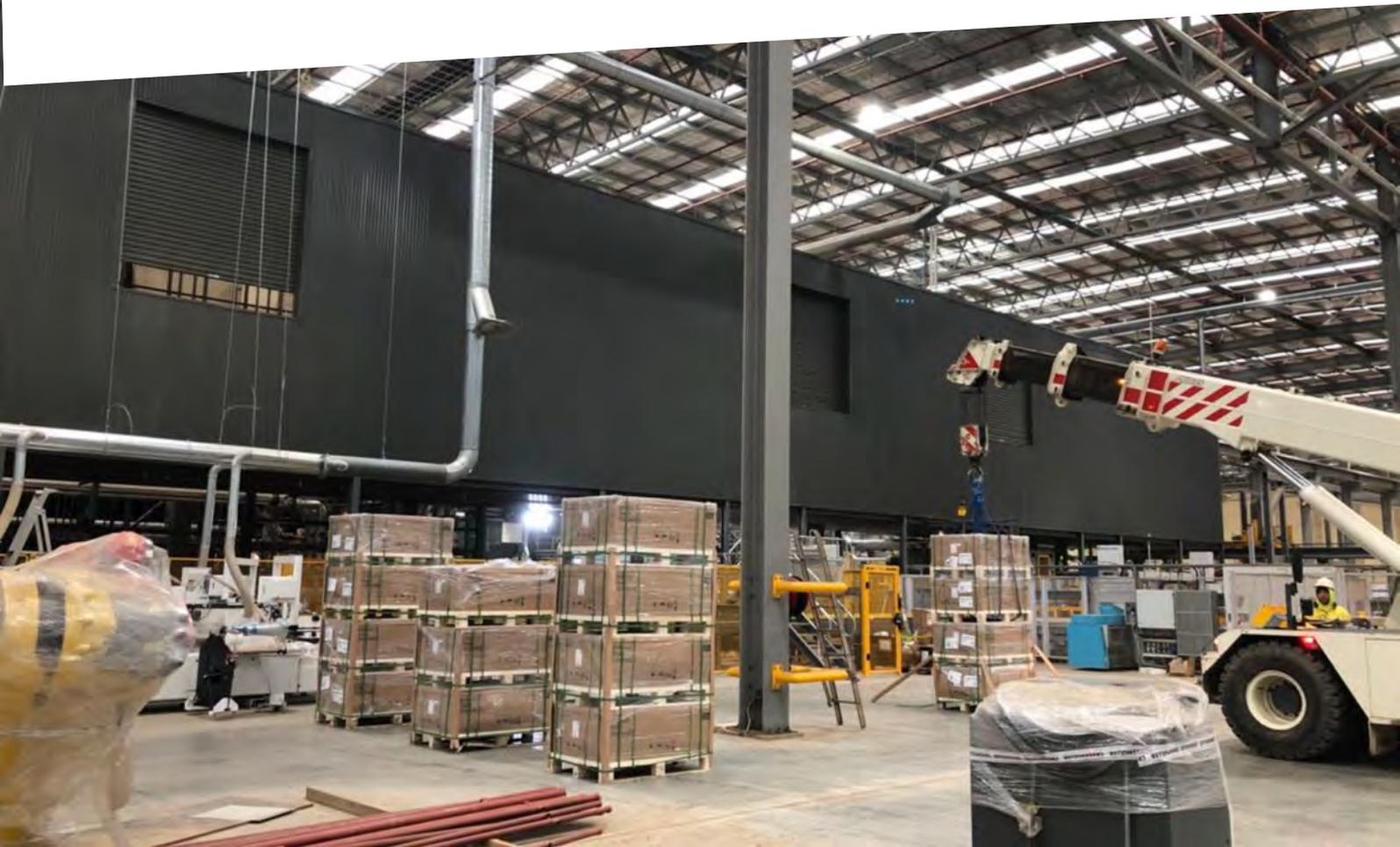
We achieved this feat by installing many kilometres of DC cable, including around 45 kilometres of mounting rail to support the 27,000 panels.

Stage 1 is a 2MWDC system comprised of 6,000 solar panels fed into 28x 50,000 TL inverters.

Stage 2 comprises 21,000 solar panels fed into 53x 110,000 TLs.

The total DC system size is slightly over 10 MW or 10,000 KW.

PICTURED BELOW  
UPLIFTING THE FIRST TWO OF 53x  
110,000TL INVERTERS INTO ONE OF THE  
SWITCH ROOMS



# CONTINUED. CONSTRUCTION PHASE



PICTURED ABOVE  
DURING THE DELIVERY OF THIS  
PROJECT, OUR INSTALLATION TEAM  
FACED MANY CHALLENGES, INCLUDING  
EXTREMES OF WEATHER

Despite the disruptions caused by the Covid-19 pandemic, poor weather and interruptions to the supply chain, the project was commissioned and delivered on schedule.

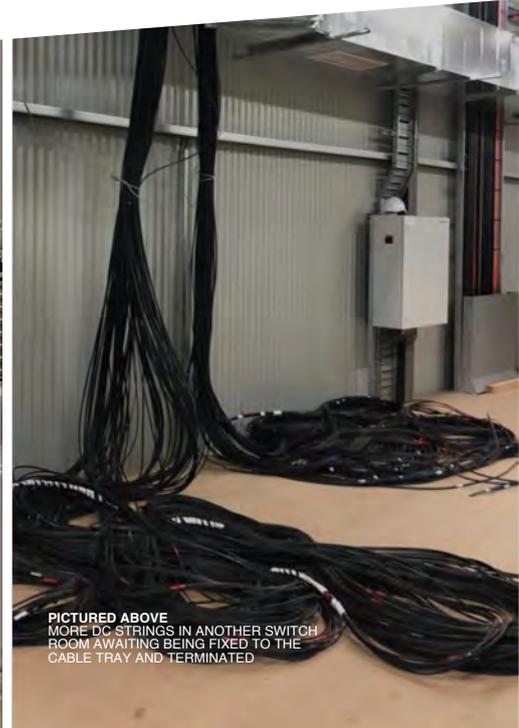
We expect this massive rooftop solar PV system to generate 14 GWh of clean energy each year which will help reduce carbon emissions by an estimated 14,980 tonnes annually.



PICTURED ABOVE  
THE OPEN DC CABLE TRAY SLOWLY  
BEING FILLED WITH CABLE RUNS FROM  
ROOFTOP TO INVERTERS



PICTURED ABOVE  
SOME DC STRINGS READY TO BE FIXED TO THE  
CABLE TRAY AND TERMINATED



PICTURED ABOVE  
MORE DC STRINGS IN ANOTHER SWITCH  
ROOM AWAITING BEING FIXED TO THE  
CABLE TRAY AND TERMINATED



**OUR REPUTATION  
PRECEDES US.  
TRUST IN  
EARTHCONNECT  
FOR YOUR NEXT  
ROOF MOUNT  
SOLAR PROJECT.**

**Talk to one of our  
specialists today.**

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