

PV on Footscray Railway Station

1. SUMMARY

This 15 kWp grid-connect system was designed and installed on a busy metropolitan train station. The client's goals were to generate energy on site, to have a PV system that was visually appealing to the public, and to be seen to be taking an active and obvious role in emissions reduction.



2. THE SOLUTION

a. What was the design brief from the client?

The client, whilst building a new state-of-the-art train station, specified that the design was to provide the maximum solar yield yet still fit in with the pattern of the architecture and the industrial features of the building. This meant multiple challenges in design with the site constraints.

b. How have you met the design brief?

The project was extremely complicated in regards to the PV layout due to the complex roof structure. With a string inverter system, careful consideration had to be taken into the string wiring in order to maximise solar yield as there were many raised roof areas that unfortunately at certain times of the day would shade particular arrays.

With careful and considered design we were able to achieve the best results for the client (a railway construction consortium) and they won two awards from their industry that included our work with the PV system.

PV on Footscray Railway Station

c. Where the design brief has not been met, what alternative solutions did you provide?

We were extremely pleased to be part of this prestigious project but like many construction jobs the tender specifications rarely reflect the construction as-built drawings. We therefore worked closely with the construction engineers and had to redesign the array layout, inverter location, wind loading and grid and metering connection points.

The construction engineers reviewed the wind loading calculation in close consultation with our chosen PV racking manufacturers and being a busy train station these figures were doubled checked.

Relocating the inverter from directly under the under on the top floor to the basement on the other side of the train tracks was a major challenge. We had to resize the DC cables and install them in large HD conduits over the live DC train lines in a safe manner.

Moving the inverter now meant another AC connection point was required but since the building was near on completion, and all structural and civil works were completed, running another conduit in the slab was out of the question. Fortunately we were able to locate and reassign an old temporary construction sub-main and install a new dedicated solar distribution board.



d. Detail any innovative and unique solutions.

Another item that was missed in the tender specification was that the station was co-gen site meaning that there was a backup generator.

We brought this to the construction engineer's attention early in the installation phase where we engaged to consult on a solution. We were able to design an automatic protection relay system located at the point of supply in which the PV system would remain de-energised whilst the generator was running and reconnect when the normal supply was returned.

PV on Footscray Railway Station

3. SYSTEM DESIGN AND INSTALLATION

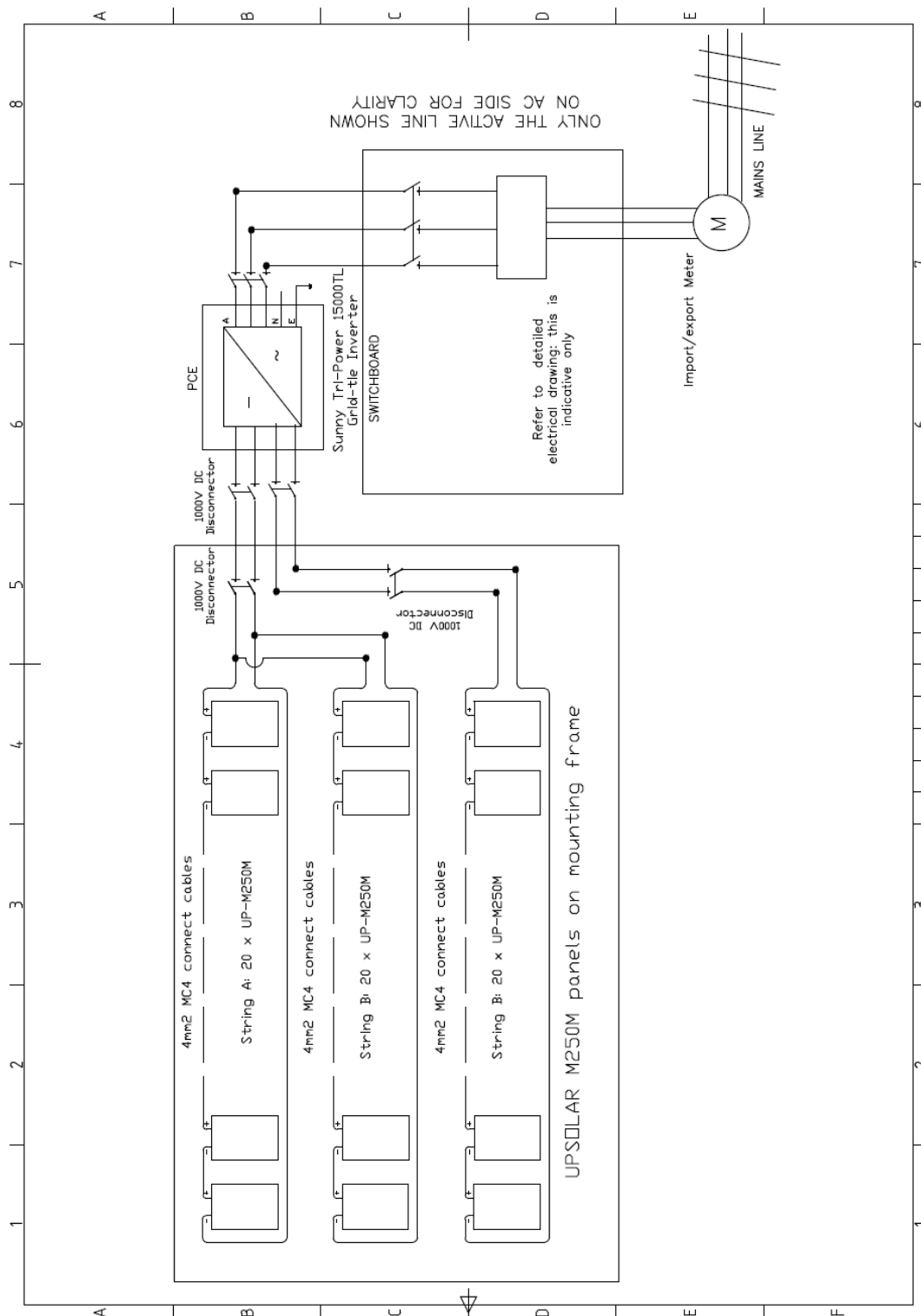
Component list:

QTY	PARTS
60	UpSolar (UP-M250M-B) Solar Panels
1	SMA STP 15000 TL (3 Phase) Inverter
1	NHP IP66 3 pole AC Switch Isolator (32 AMP)
4	NHP 1000 Volt DC isolator , IP66/67, Metal Enclosure
1	4C6FD(WE) Switchboard Surface Mounting-Full DIN Rail 12 Module - 36 pole busbar
5	MC4 PSP452 Female Cable Coupler, Plus Keyed
5	MC4 PSP451 Male Cable Coupler, Minus Keyed
100	Supplybuild 6mm ² , Black Solar Cable Twin
12	25HD 25mm - Rigid Heavy Duty PVC 4 metre length Grey
8	Gave 1000 Volt String Fuses inc 15 Amp Fuse
30	1 kW Radiant Tripod kits 30 degree pitch
20	Ladder Tray 300mm Cover (Flat) 3m KT3/KT5 [KOUKTFC30G]
20	Ladder Tray 300mm W 50mm H -3m length [KOUKT330G]
	SAFETY SIGNAGE
1	PD36BM Safety Sign: Corrosive Liquids Wear Protective Equipment Safety Sign
1	PS10BM Safety Sign: Electrolyte Burns
1	Emergency Shut Down Safety Sign: Emergency Shutdown Procedure + battery sc current sign
1	Spark H Safety Sign: Spark Hazard 1
1	Grid Connect Package Solar Array on Roof..., Solar located at..(Green),Dual Supply (x2), Dual Supply
	FRAMING - SECURITY FASTENERS - GS supplying Collridge with tilt legs
50	30mm Security Screw 12G x 32mm Security Screw Type 17
50	M6 x 50mm Security Screw M6 x 50mm Security Screw
50	Security Fastener 14SPH. PFD1-B 50mm
50	304 Stainless Steel for Mid & End Clamps



PV on Footscray Railway Station

Schematic



Case Studies: <http://www.goingsolar.com.au/case-studies>

PV on Footscray Railway Station

Innovative and unique solutions are shown through photos.



PV on Footscray Railway Station



PV on Footscray Railway Station

4. OUTCOMES AND BENEFITS

a. Was the client satisfied with the solution?

Our client (the railway construction consortium) was extremely happy with our professional approach to project management, safety plan and quick solutions for the many problems the project entailed. The end client (the government) is also very happy with the success of this project.

b. Were there any stand out social and environmental benefits?

This project shows that government supports solar and reducing carbon emissions. The system is great visually for commuters and visitors (as it can be seen from the overhead walkways) and therefore puts solar in the public eye. This system also promotes how solar can be integrated into new state-of-the-art building infrastructure projects which is beneficial for portfolios of all the engineering and construction companies involved and encourages them to 'think solar'.

c. Were there any unexpected or additional outcomes?

An unexpected outcome was that the construction consortium entered this station into some railway industry awards. It won two categories:

- Sustainable Design Recognition Award (including the PV panel systems)
- Environmental Sustainability Award (including the PV panel systems)

An additional outcome is that it has led to further work with major engineering companies who were impressed with our solutions-based approach.

d. What were the economic benefits?

Although this is a relatively small system in the scale of things its real benefit is in generating interest for more solar projects by being a showcase installation in a prominent area.

e. How does it contribute to the Australian solar industry?

This project called for significant co-operation between our industry solar designers and installers with the construction engineers and the construction companies, to bring out the best solutions – both technically and aesthetically.

It demonstrates that our solar industry members have specialist skills and knowledge not typically available within the wider engineering and construction community. It further demonstrates that skilful solar specialist installers are required to get the best results – particularly for the difficult projects. It also showcases PV systems and is excellent for promotion of government's environmental and social responsibility agendas. Successful solar projects like this railway station system provide a very visual (and practical) solution for government agencies which in turn helps generate ongoing work for our industry.