

		<b>Solar ready roof</b>		created	JL
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## INTRODUCTION

A “solar ready roof” will simplify the later installation of a solar PV array. This technical bulletin is intended to assist architects, building designers and structural engineers to design solar ready roofs.

## ISSUES TO CONSIDER

### Roof coverage

Buildings can last more than 100 years. As market for solar PV matures, building owners may wish to cover the entire roof with a solar PV array. Such installations are already common in Europe and the USA. Therefore, building designers should allow for this scenario.

### Roof pitch

The ideal roof pitch is 10° to 30°, as it is cheaper and easier to install a solar PV array flush (or parallel to) the roof than to use a tilt frame. Note that a solar PV array should be inclined at least 10° above horizontal to allow rain to clean the modules and to prevent the buildup of dirt or deposits.

### Static load

A solar PV array will increase the static load on the roof by 10 – 15 kg/m<sup>2</sup>. Typically, this won't impact the design of the building frame as the frame will already have capacity to withstand a live load of 25 kg/m<sup>2</sup>.

However, some large cost-optimised commercial buildings may be limited by a combination of static load and wind down force. In these cases the purlins and rafters will need to be upsized.

### Wind load

A solar PV array is subject to wind actions (uplift or down force) defined by AS/NZS1170.2. Different zones of the roof are exposed to different loads. Furthermore, tilted PV arrays are subject to larger wind actions than flush mounted arrays. Either SunLock or our partner Partridge Structural can assist with these calculations.

Typically, uplift governs the design of the solar PV frame and its method of attachment to the building frame.

### Fixing method

The simplest, fastest and lowest total cost method is to fix the solar PV frame to the building frame using standard roofing screws. This requires the building to use standard sheet metal roof cladding.

Membrane roofs are not recommended as they are very difficult to fix through.

### Durability of roof cladding

Sheet metal roof cladding with 0.48 mm BMT will be more durable than the 0.42 mm BMT commonly used on domestic residences. Commercial solar PV installations require more time and traffic on the roof than domestic installations - the thicker cladding offers a lower lifetime cost.

### Parapets

Note that parapets can reduce the wind load on nearby solar PV arrays but can also increase shading.

### Roof access

Installation and maintenance personnel need to be able to access the roof, move safely about on the roof and access the solar PV array from all sides. On domestic residences it is useful to maintain a 1 m gap between the roof edge and the array. On commercial buildings a 4 m gap is typical. Commercial roofs should be provided with safe access points and harness attachments points.

## **CERTIFICATION**

SunLock provides installation manuals and certificates of structural suitability for download at [www.sunlock.com.au](http://www.sunlock.com.au). Contact SunLock for site specific advice or certification if required.

## **SUMMARY & RECOMMENDATIONS**

Designing a solar ready roof adds little to the capital cost of a building but can be critical to allowing the building roof to be partially or fully covered by solar PV.

### **Residential**

SunLock recommends using standard sheet metal roof cladding pitched at 10° to 30° and fixed using standard roofing screws.

If the building will use light weight engineered trusses, ask the truss supplier to design (and warrant) their product with sufficient capacity to allow the entire roof to be covered with a solar PV array.

### **Commercial**

SunLock recommends using 0.48 BMT sheet metal roof cladding pitched at 10° and fixed using standard roofing screws. Purlins should have a maximum spacing of 1800 mm.

If the building will use a light weight cost optimised frame, ask the structural engineer to design the building frame with sufficient capacity to allow the entire roof to be covered with a solar PV array. This will most likely require minor changes to the frame such as upsizing purlins and some rafters.

## **FURTHER INFORMATION**

For further information contact Apollo Energy on 1300 855 484 or [sunlock@apolloenergy.com.au](mailto:sunlock@apolloenergy.com.au).