



steel
CONNECT

ROOF DESIGN FOR SOLAR PANEL INSTALLATION



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Waiting for others to join



Q&A

All (0)

Select a question and then type your answer here.
There's a 256-character limit.

Send Send Privately...

> Polling

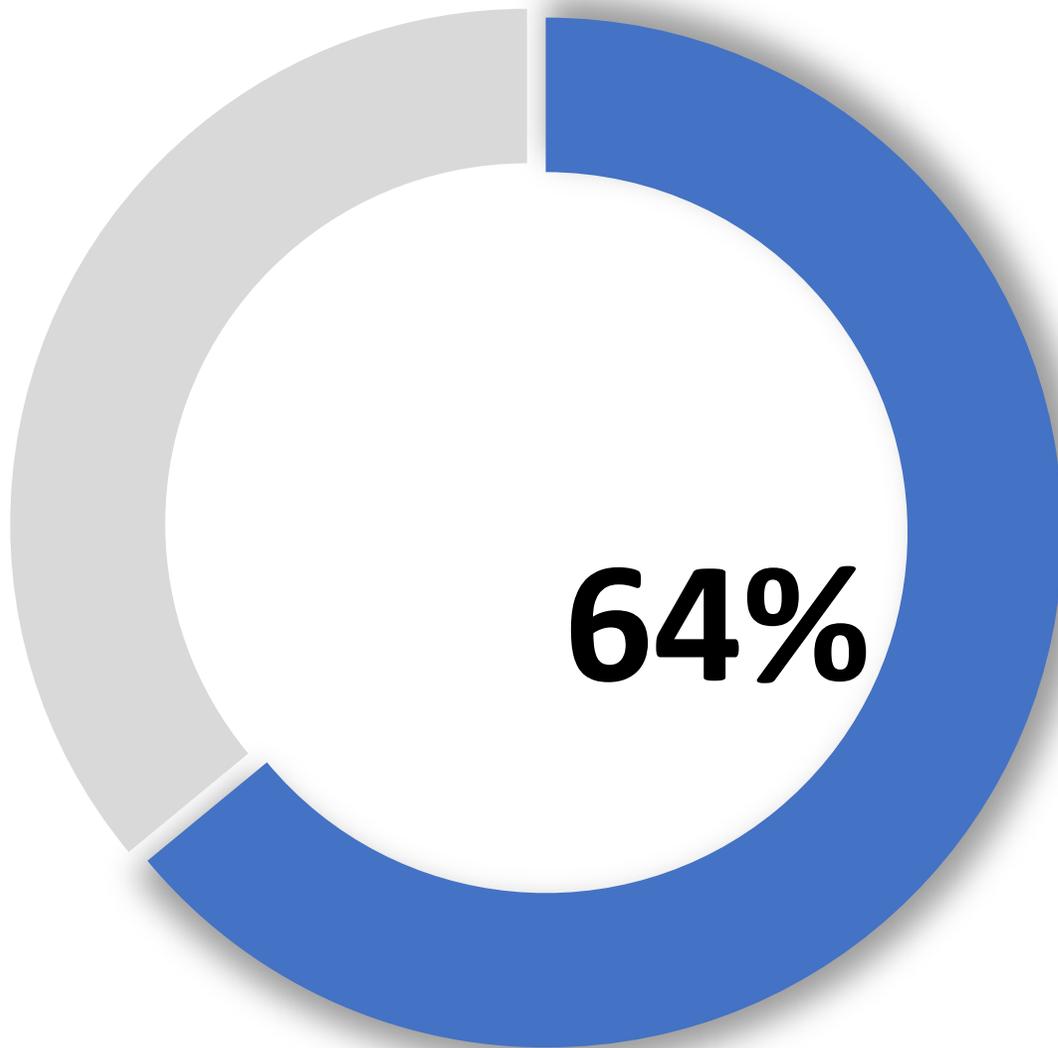


steel
CONNECT

ROOF DESIGN FOR SOLAR PANEL INSTALLATION

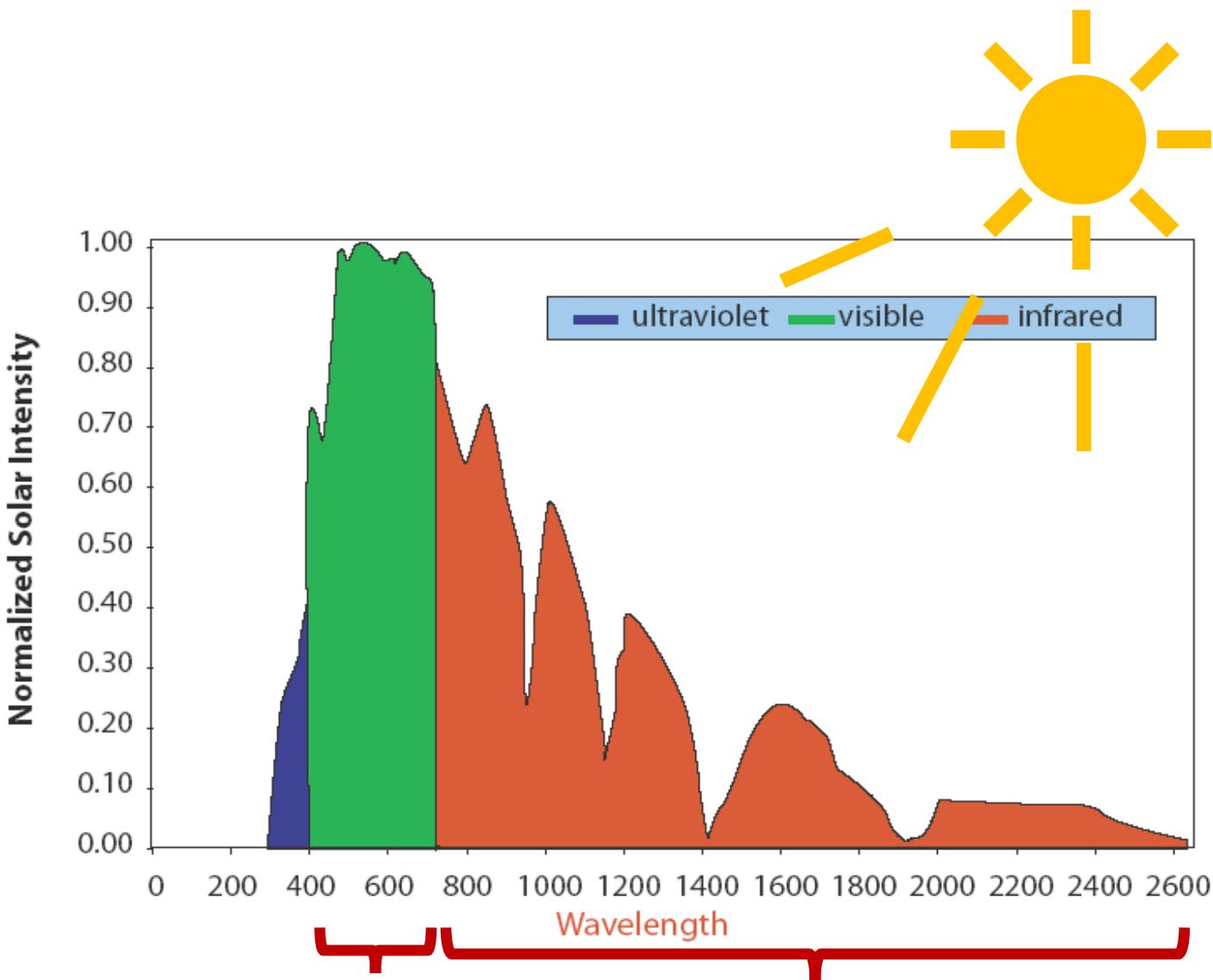


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■ Plan to install solar panel ■ No plan

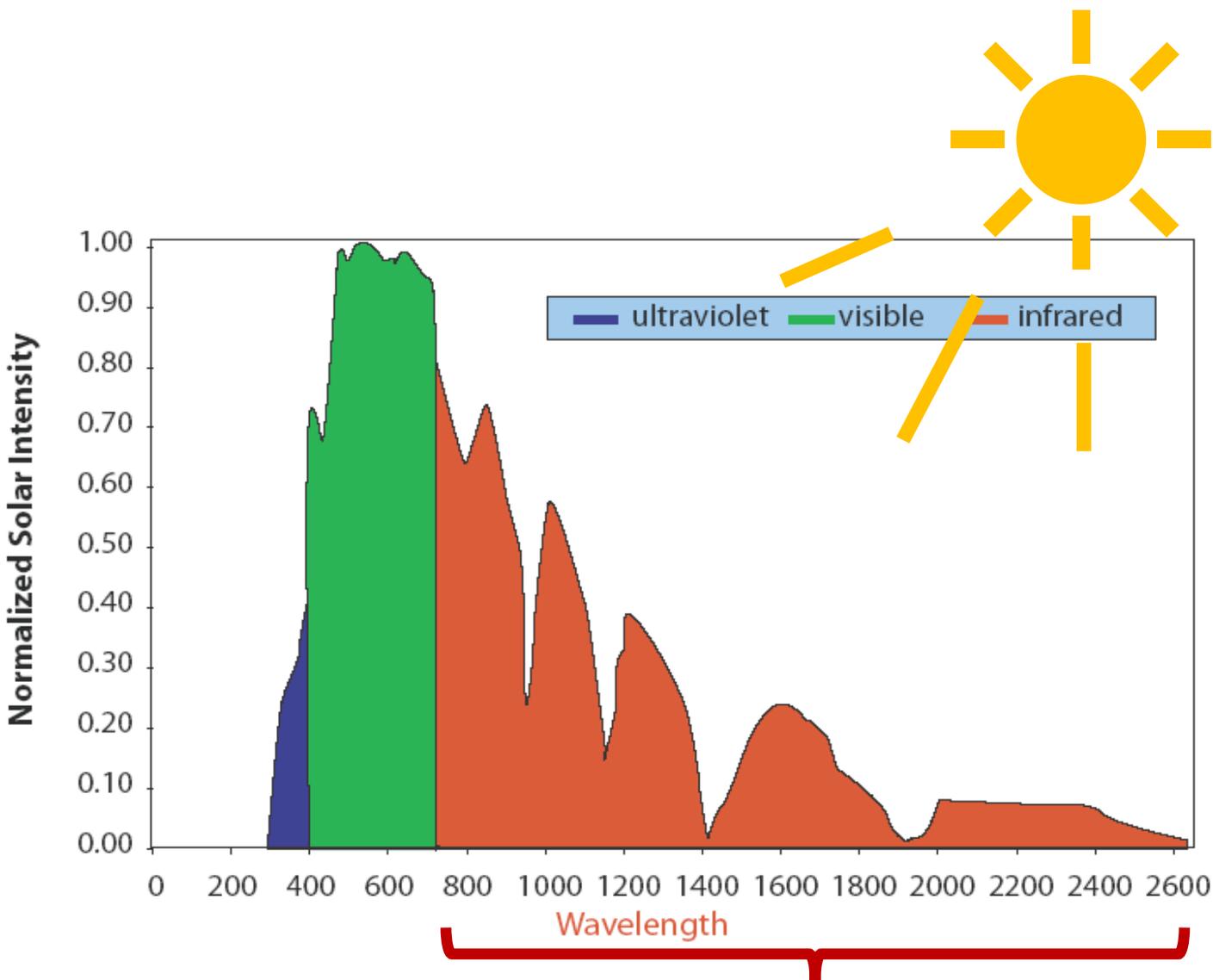
**AUDIENCE
WHO PLAN TO
INSTALL
SOLAR PANEL
SYSTEM ON
THEIR NEXT
PROJECT**



SOLAR ENERGY

VISIBLE

**INFRARED
(NOT VISIBLE)**



**INFRARED
(SOLAR
ENERGY)**

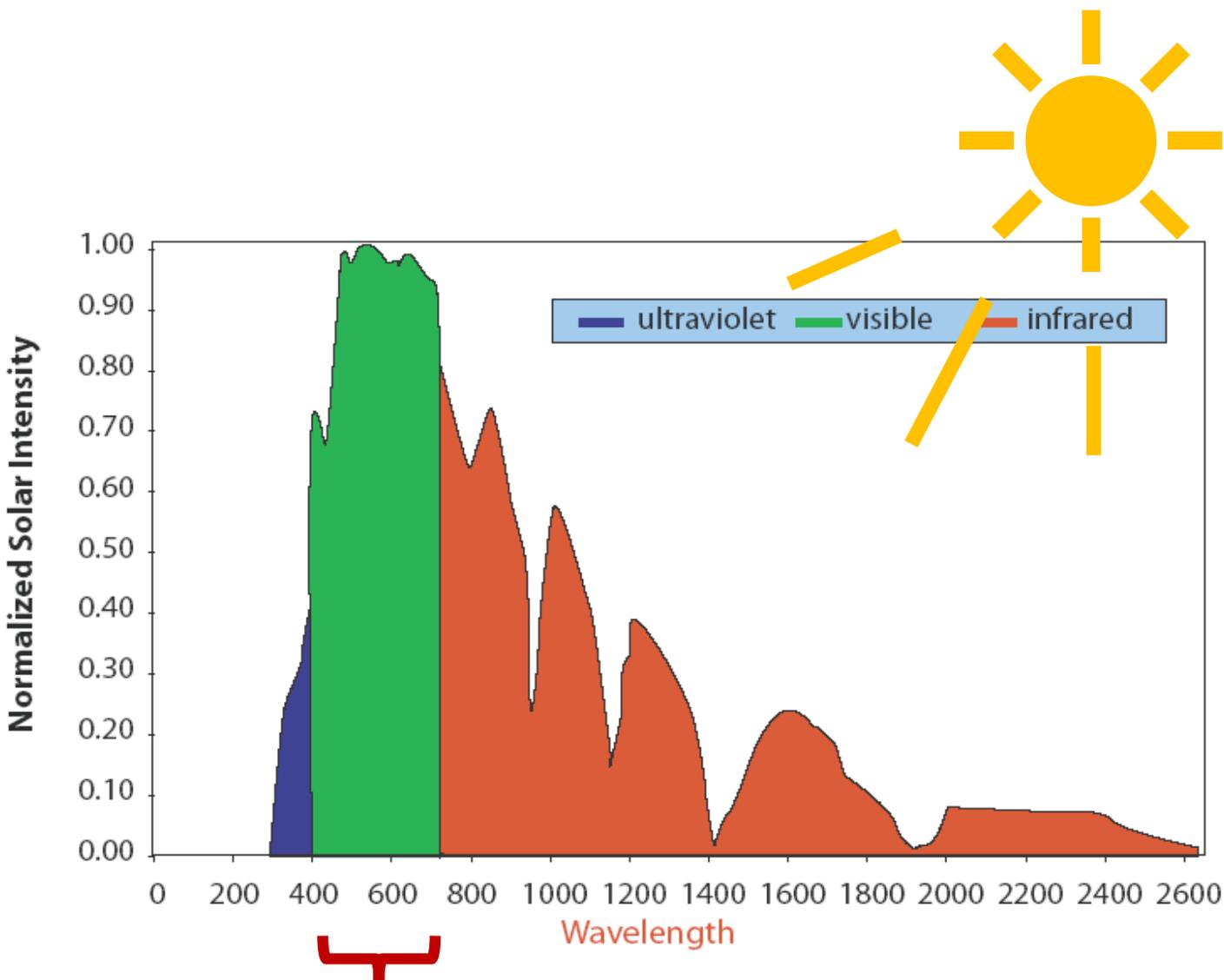
**INFRARED
(NOT VISIBLE)**



SOLAR WATER HEATER (HEAT ENERGY)



**SOLAR
WATER
HEATER
(HEAT →
ELECTRICAL
ENERGY)**



VISIBLE

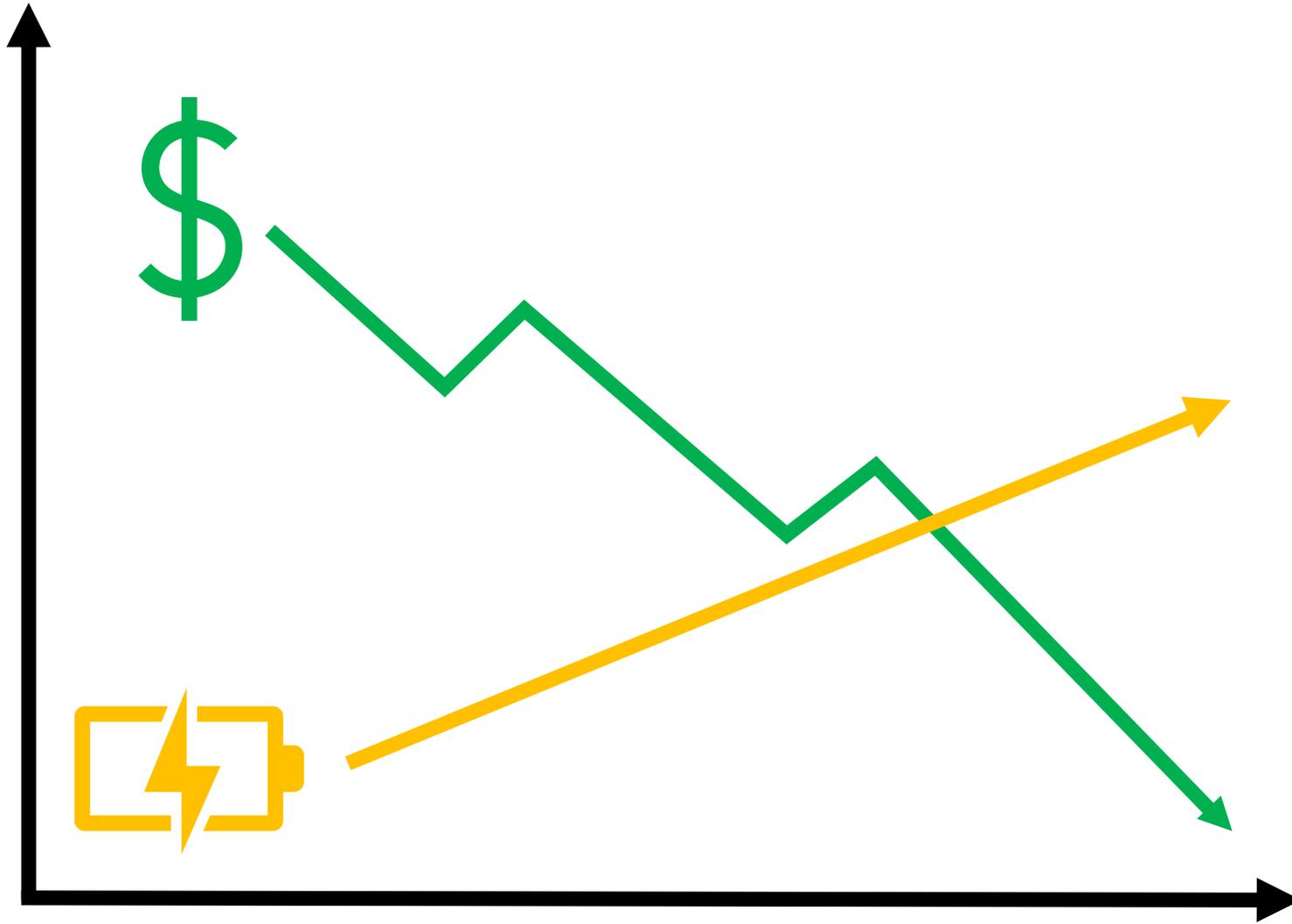
VISIBLE LIGHT (SOLAR ENERGY)



SOLAR PHOTO- VOLTAIC (ELECTRICAL ENERGY)



1953 FIRST APPLICATION OF SOLAR PANEL FOR ELECTRICITY



**LOWER COST
OF
PRODUCTION
+
INCREASED
EFFICIENCY**



MORE ATTRACTIVE DEALS





SOLAR PANELS ON GROUND



SOLAR PANELS ON WATER



SOLAR PANELS ON ROOF

“By number of project, approximately 90% of the projects we have completed are solar panels on the roof.”

Mr Ling Seng Wee
Business Development Manager, Plus Solar

ELEVATED FROM THE GROUND



ASPECTS TO CONSIDER





5 ASPECTS OF **ROOF DESIGN** FOR SOLAR PANEL INSTALLATION

Photo from
<https://wallpaperset.com/wall/ey1pdil6llhSSHpmOFtpUDl0WVRPcGZPWU1xSHc9PSIsInZhbHVlIjoiR3RSOWRWRVnkU3h4bVRleDRnMFFKdz09liwiYWJlIjo1YzY2NkNmE4NWZOGM1MDFiMzU0ZGFxMTJlYzllOWNkYzg2OTZkMzFmMjc4YUldmYWwZGY2OTVhMjk1MDkwMCI9>



1

ROOF PITCH

1 ROOF PITCH

**AFFECTS
RAINWATER
RUN-OFF**

A close-up photograph of a roof's edge. The roof is covered in dark asphalt shingles. Water is dripping from the eaves, forming several distinct streams. The background is a dark, out-of-focus sky.

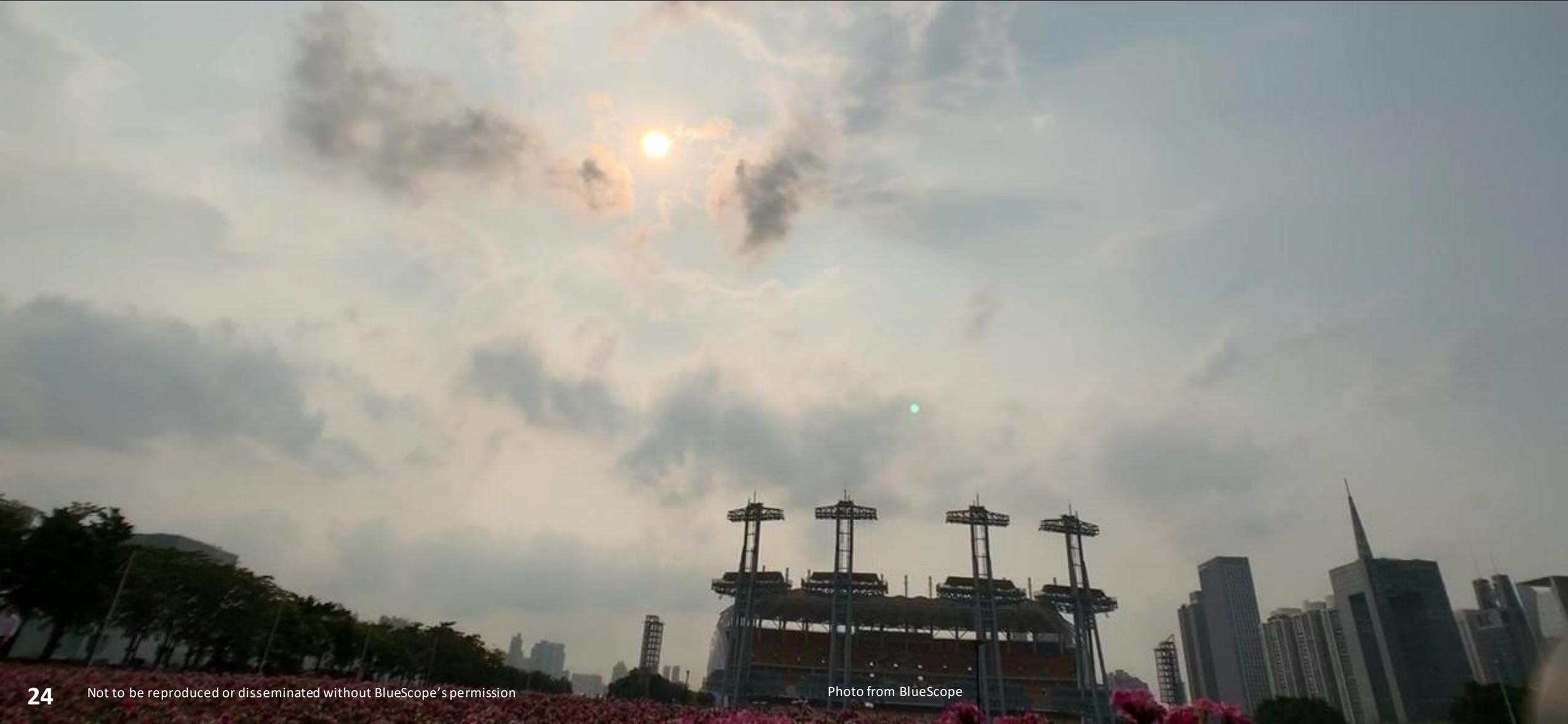
1 ROOF PITCH

**AFFECTS
RAINWATER
RUN-OFF**

① ROOF PITCH

**AFFECTS
RAINWATER
RUN-OFF**

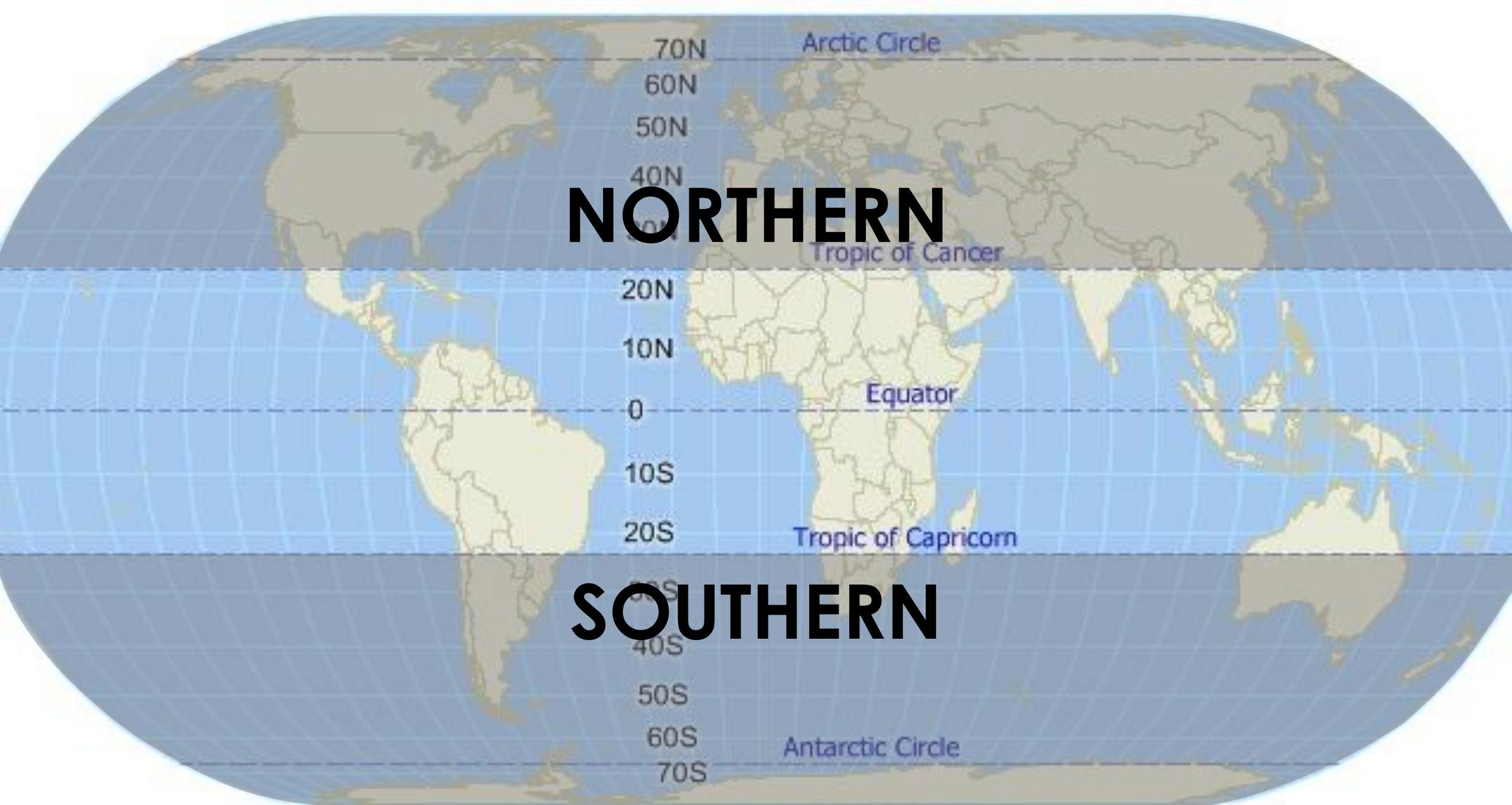
PEAK SUN HOUR ($>1,000$ WATT/M²)



① ROOF PITCH

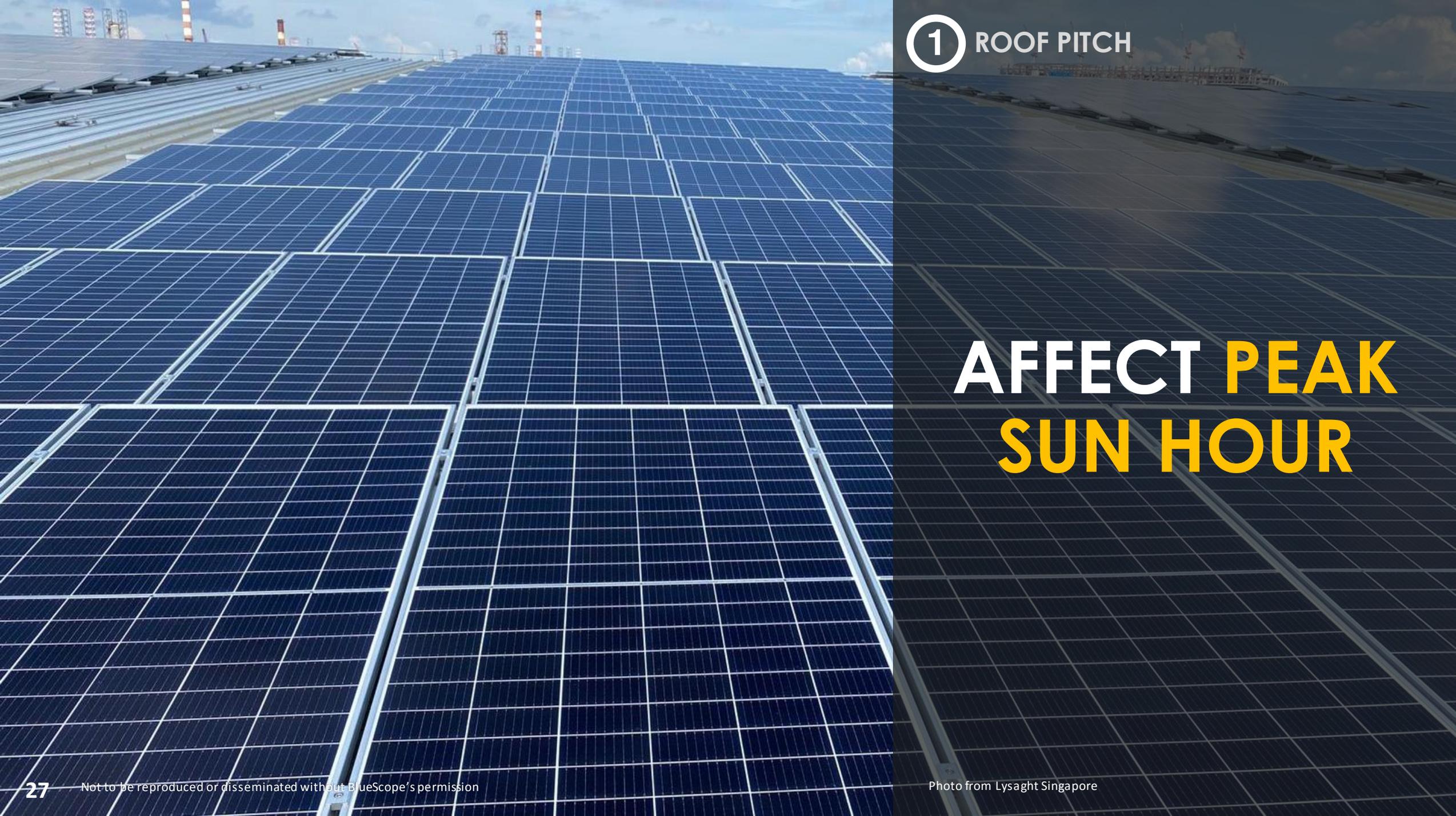


**COMMON
TILT ANGLE**



NORTHERN

SOUTHERN



1 ROOF PITCH

**AFFECT PEAK
SUN HOUR**

MALAYSIA AT EQUATOR



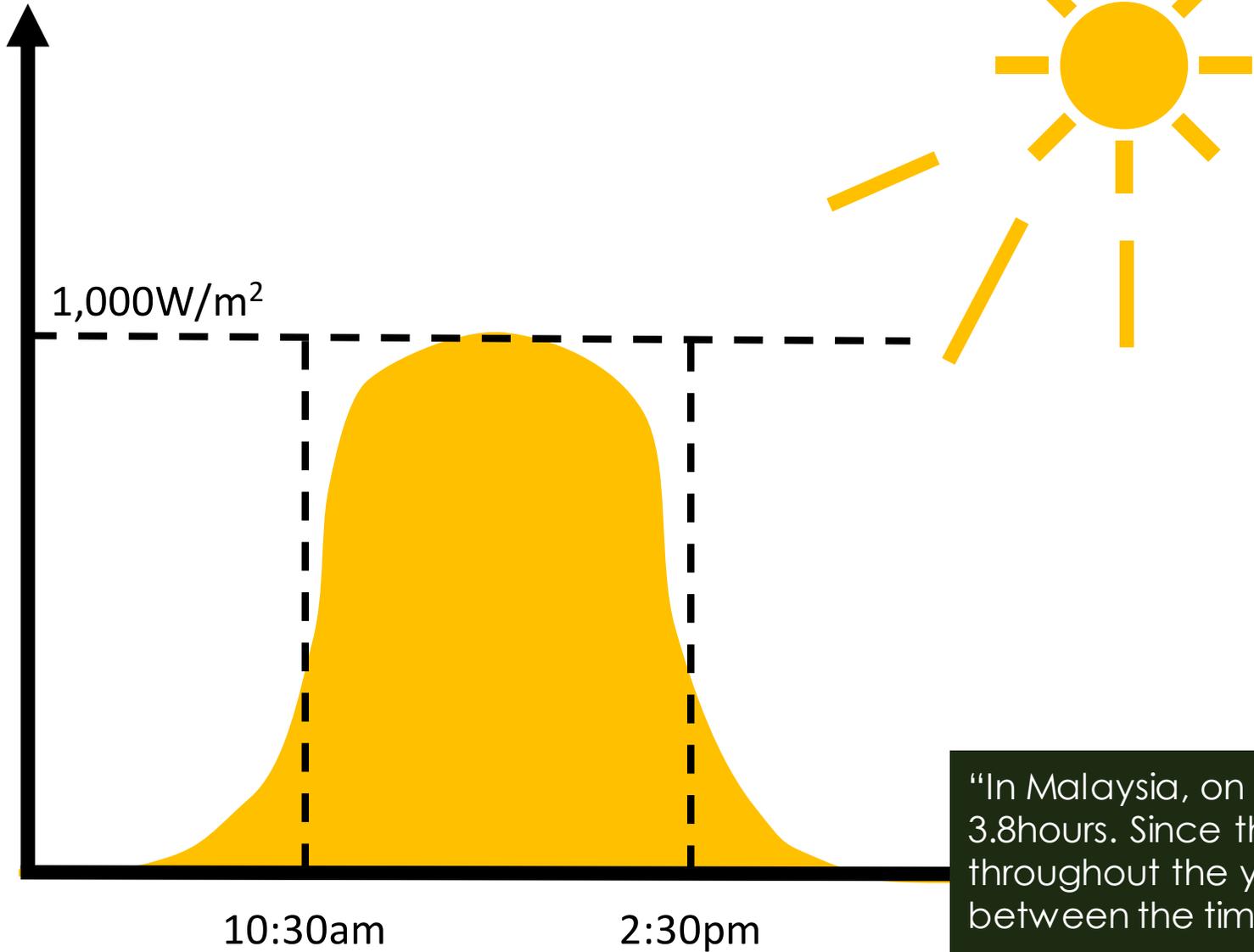
① ROOF PITCH

**SOLAR PANEL
SHOULD BE
TILTED $\sim 5^\circ$ OR
LOWER**

“In Malaysia, we are slightly on the Northern side, therefore if we have a tilt angle that is roughly 5° facing South (up to 10° is also fine), that would give us an optimum energy yield from solar PV. Having said that, in the equatorial region, having tilt angle of 5° facing South or 5° facing North, the energy gain difference is very negligible.”

Mr Ling Seng Wee
Business Development Manager, Plus Solar

1 ROOF PITCH



AVERAGE PEAK SUN HOUR IN MALAYSIA

“In Malaysia, on average the peak sun hour range from 3.3 up to 3.8hours. Since the movement of sun is almost consistent throughout the year, so most of the sun hour is roughly in between the time of 10:30am to 2:30pm.”

Mr Ling Seng Wee
Business Development Manager, Plus Solar

1 ROOF PITCH



EASES ROOF
ACCESS FOR
INSPECTION

① ROOF PITCH

FOR MAINTENANCE



2

ROOF AREA

**MALAYSIA
HAS 4.1MIL
BUILDINGS
READY FOR
SOLAR
PANELS**

② ROOF AREA

**BIGGER
BUILDING**

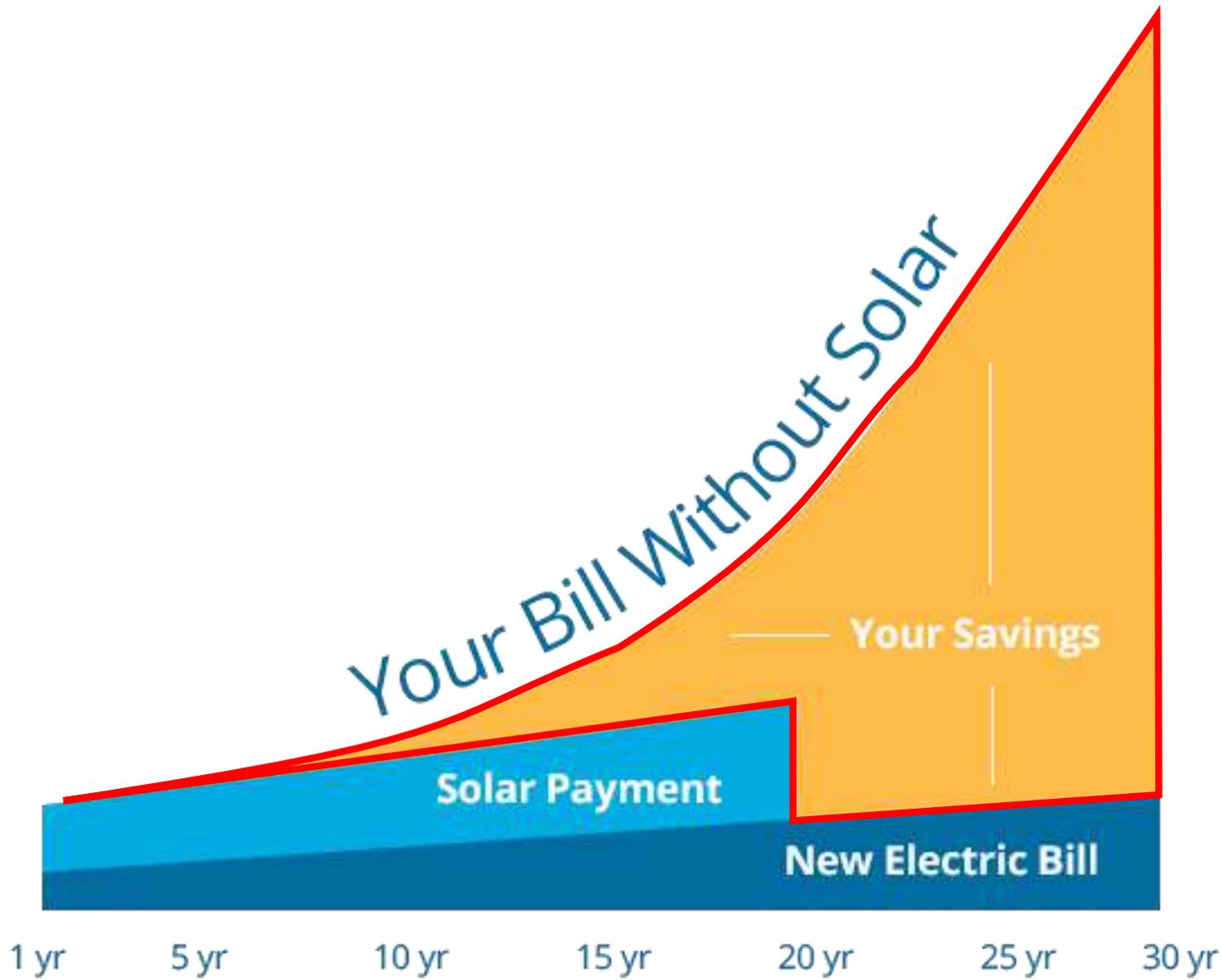
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**LARGER ROOF
AREA**

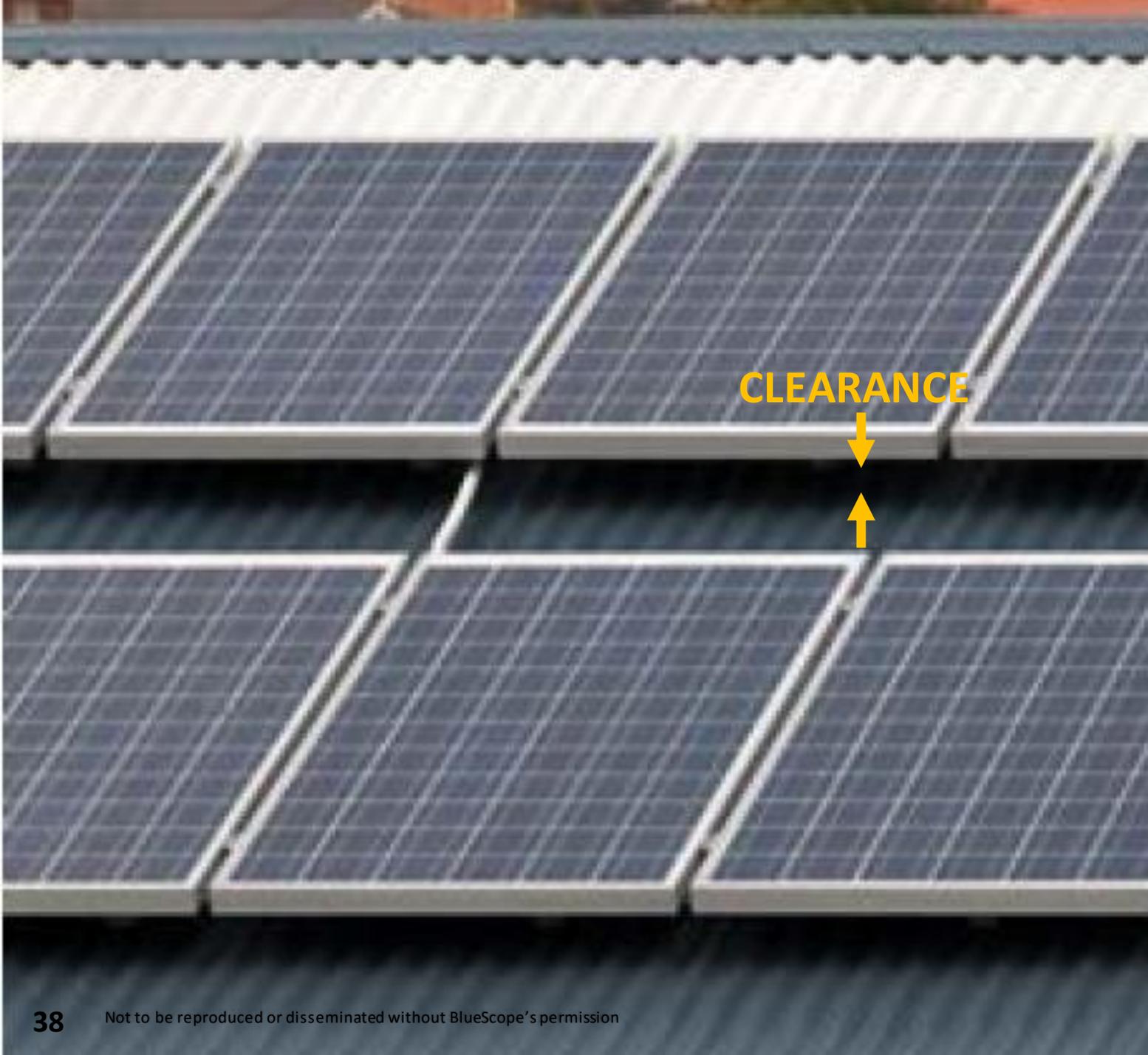


② ROOF AREA

**POSSIBLE FOR
MORE SOLAR
PANELS**



**MORE RETURN
FROM SOLAR
ENERGY
HARVESTING**



③

**CLEARANCE
BETWEEN
PANEL &
ROOF**

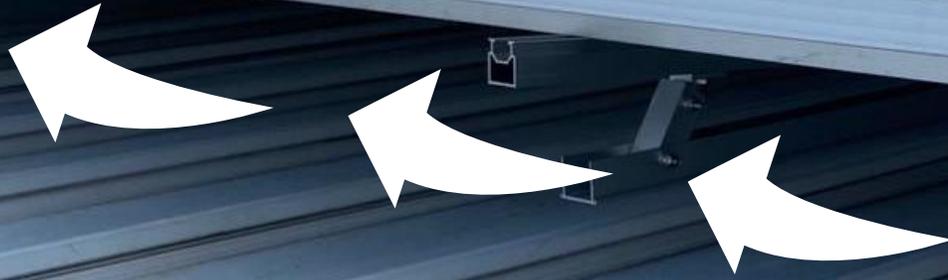
③ PANEL & ROOF CLEARANCE



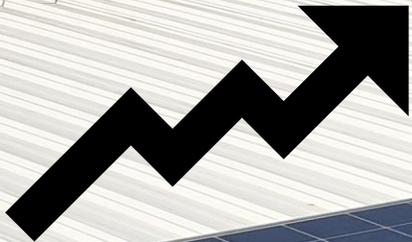
**CLEARANCE
BETWEEN
SOLAR
PANELS &
ROOF**

③ PANEL & ROOF CLEARANCE

**ALLOWS AIR
VENTILATION
TO COOL
SOLAR
PANELS**



EFFICIENCY



③ PANEL & ROOF CLEARANCE

**HIGHER
EFFICIENCY**

③ PANEL & ROOF CLEARANCE

**FOR
MAINTENANCE
&
MECHANICAL
ACCESS**



**PREVENT
LEAVES
BUILDUP OR
BIRD NESTING**

Photo from
https://www.solarpowerportal.co.uk/product_news/birdblocker_protects_rooftop_solar_systems_against_bird_nesting_hazards

**PREVENT
LEAVES
BUILDUP OR
BIRD NESTING**



Photo from
https://www.solarpowerportal.co.uk/product_news/birdblocker_protects_rooftop_solar_systems_against_bird_nesting_hazards

3 PANEL & ROOF CLEARANCE

**PREVENT
LEAVES
BUILDUP OR
BIRD NESTING**

③ PANEL & ROOF CLEARANCE

CLEARANCE

**GENERAL
CLEARANCE
AROUND
100 – 250MM**

“You’ll afford better cooling, but that is offset by a more complicated and the need for a stronger mounting system.”

Mr Ling Seng Wee
Business Development Manager, Plus Solar



4

ROOF DURABILITY



4 ROOF DURABILITY

**10 – 25
YEARS*
POWER
PURCHASE
AGREEMENT
(PPA)**

**NEED TO
CONDUCT
SCHEDULED
MAINTENANCE**

FREQUENT FOOT TRAFFIC ON YOUR ROOF



④ ROOF DURABILITY

DURABLE ROOF FOR MAINTENANCE PURPOSES

Photo from <https://www.bloomberg.com/news/articles/2016-04-06/7-things-to-know-before-installing-solar-panels-on-your-roof>

A close-up photograph of a roof with dark, weathered tiles. A gutter is visible, and several tiles are broken or missing, revealing the underlying structure. The tiles are arranged in a traditional overlapping pattern. The lighting is bright, highlighting the texture and color variations of the tiles.

④ ROOF DURABILITY

**DIFFICULT FOR
MAINTENANCE**



4 ROOF DURABILITY

**DO NOT SAVE
ON ROOF
MATERIAL**

**IMPORTANT
TO HAVE
DURABLE
ROOF**

IF BUILDING NEAR SEA

**IF BUILDING
USED AS
FACTORY**

**IF BUILDING
USED AS
FACTORY**

**ROOF
DURABILITY &
MAINTENANCE
ARE
PARAMOUNT**

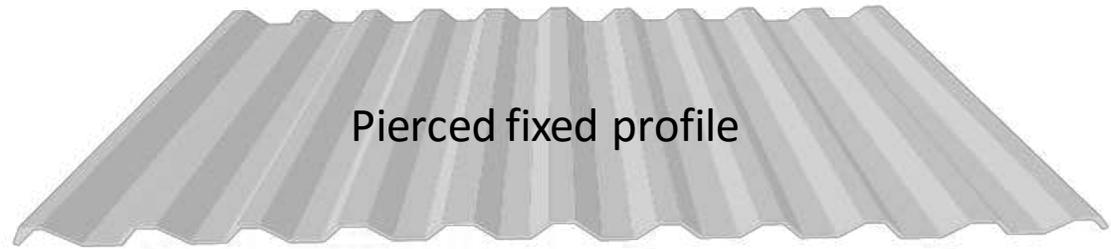


⑤

TYPE OF METAL ROOF PROFILE

**DIFFERENT
PROFILES
PROVIDE
DIFFERENT
SUPPORT
STRENGTHS**

3 GENERAL TYPES OF PROFILES



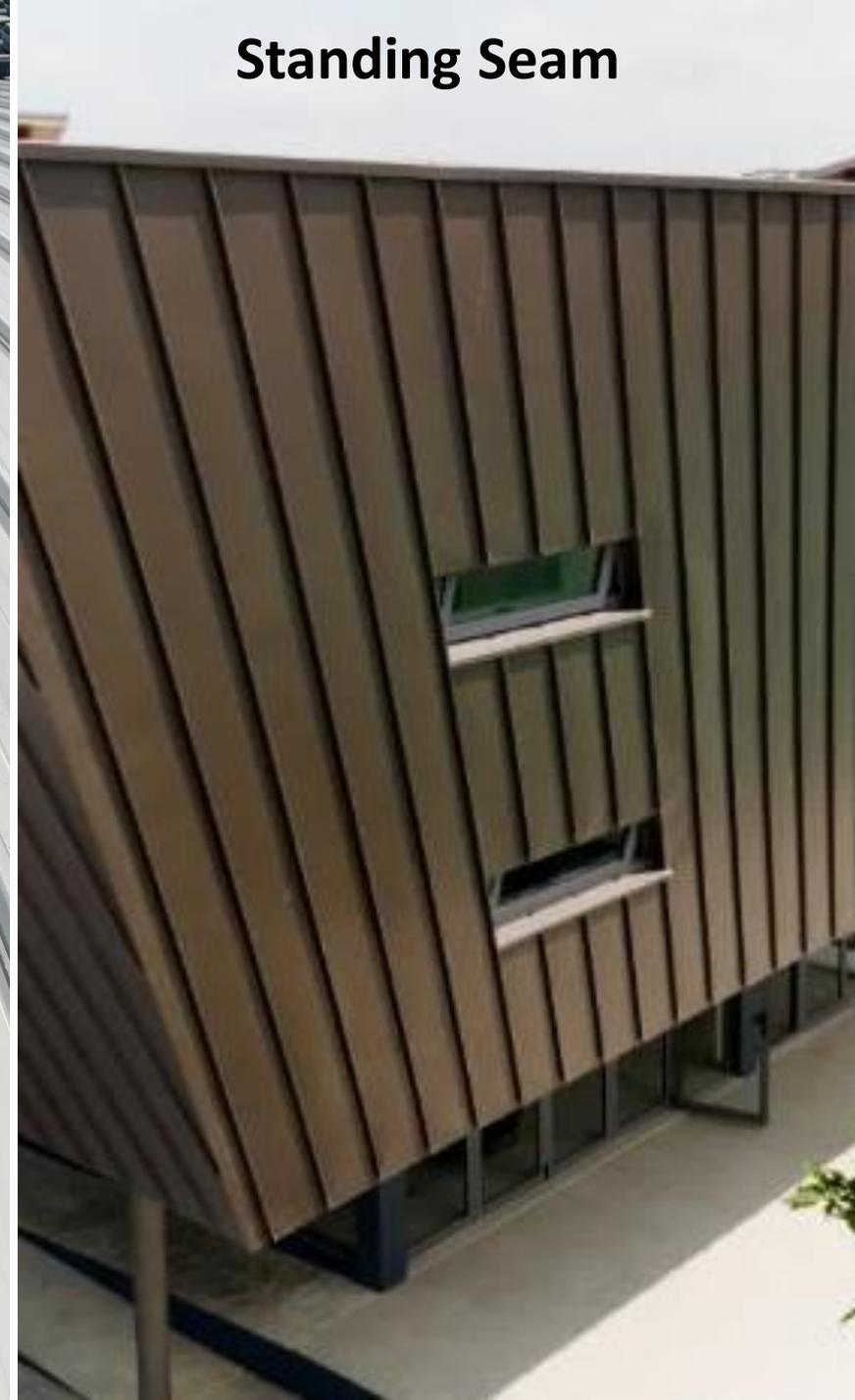
Pierced Fixed



Concealed Fixed



Standing Seam



CORRUGATED PROFILE



CORRUGATED PROFILE (EXTERNALLY FASTENED)

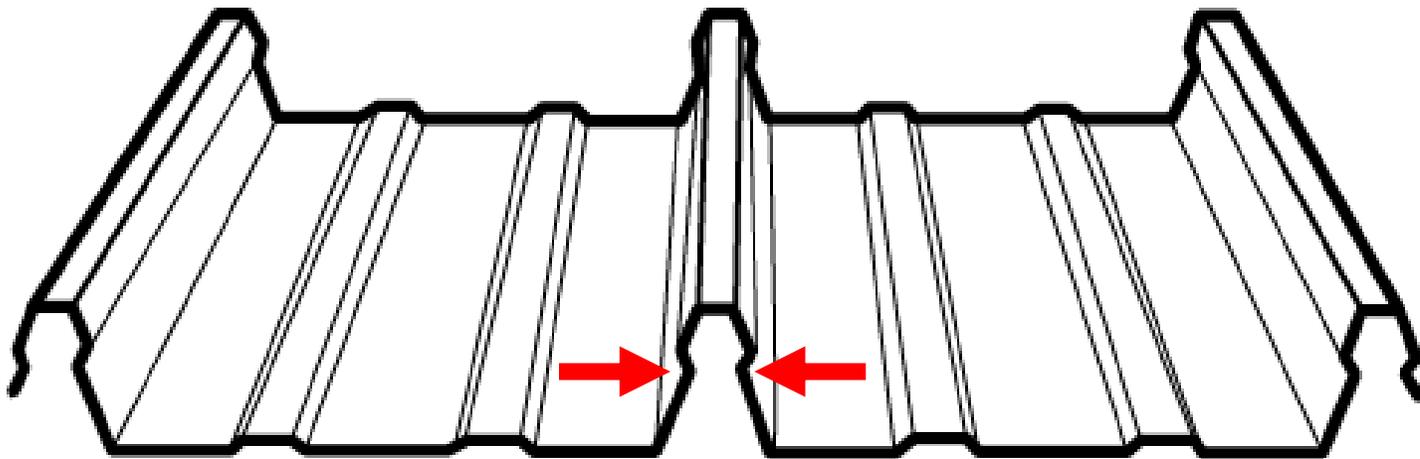
**CORRUGATED
PROFILE
(EXTERNALLY
FASTENED
MECHANISM)**



CONCEALED FIXED PROFILE



CONCEALED FIXED PROFILE



**CONCEALED
FIXED
PROFILE
(SPECIAL
CLAMP)**



5

ROOF PROFILE

STANDING SEAM PROFILE

STANDING SEAM PROFILE

STANDING SEAM PROFILE (SPECIAL CLAMP)



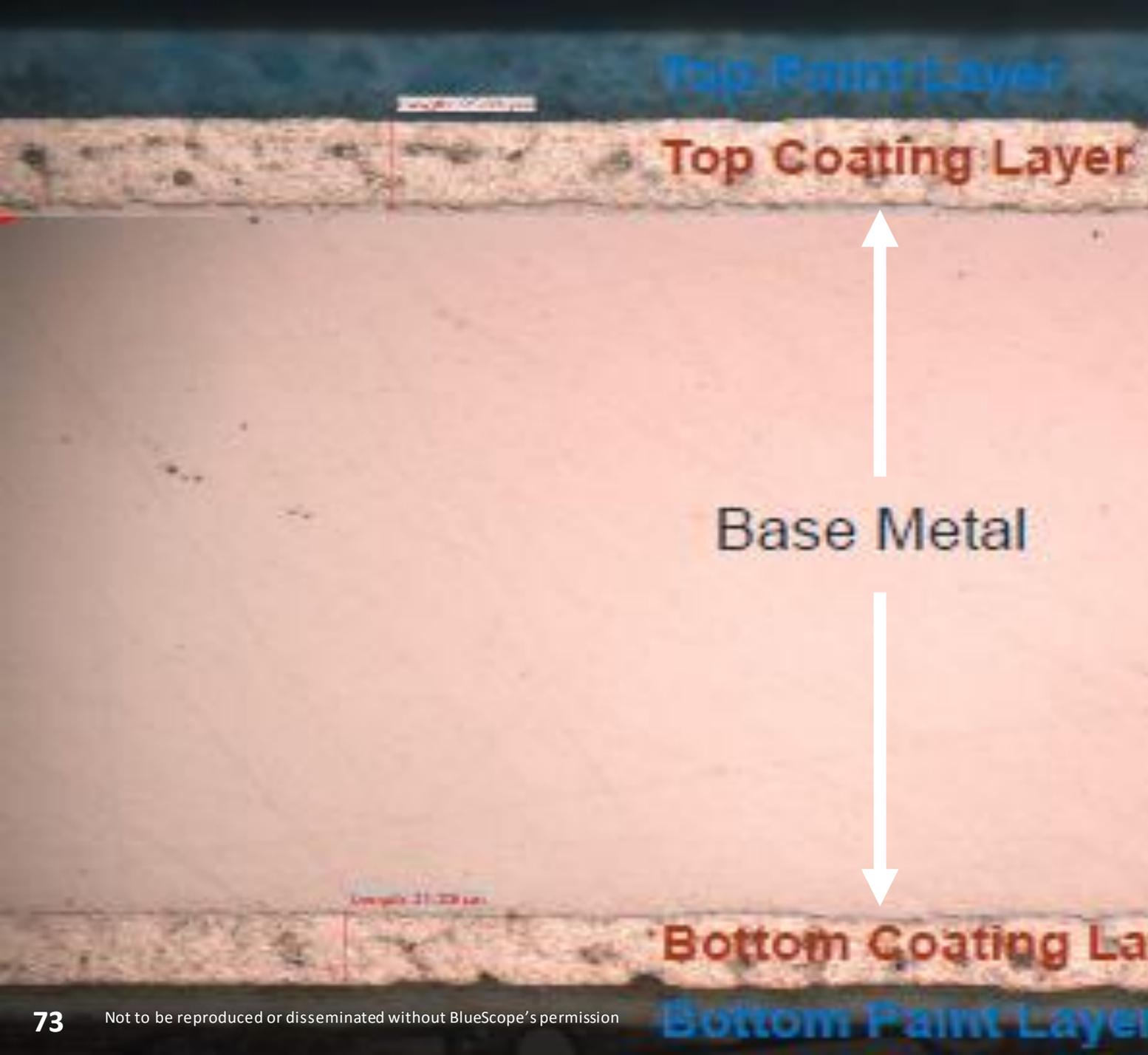


5 ROOF PROFILE

MOST COMMON PROFILE TO INSTALL SOLAR PANELS

“We definitely prefer the “kliplik” type or the standing seam type. The risk of leakages or punctures is inherently lower because we use clamps to clamp on the profile itself to avoid any kinds of punctures.”

Mr Ling Seng Wee
Business Development Manager, Plus Solar



**AFFECTED BY
BASE METAL
THICKNESS
(BMT)**

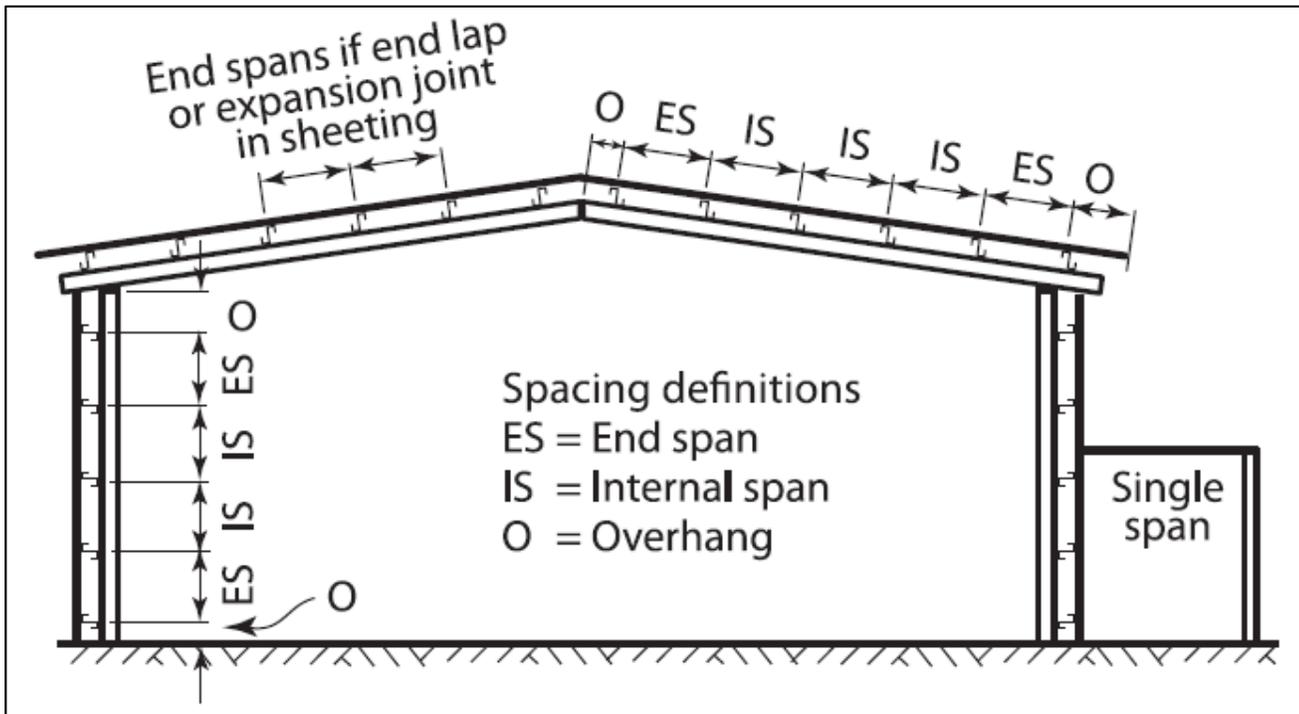
**LOW BMT
-
INSUFFICIENT
STRENGTH**

Concealed Fixed Profile
0.42 MM BMT / 0.47MM TCT

With edge stiffener (mm)

| Span type | | 900 | 1200 | 1500 | 1800 | 2100 | 2400 |
|--------------------|----------------|------|------|------|------|------|------|
| Single Span | Serviceability | 2.05 | 1.65 | 1.29 | 0.96 | 0.70 | 0.52 |
| | Strength* | 5.16 | 4.70 | 4.25 | 3.83 | 3.44 | 3.10 |
| End Span (ES) | Serviceability | 1.44 | 1.20 | 1.01 | 0.87 | 0.79 | 0.72 |
| | Strength* | 3.64 | 2.79 | 2.07 | 1.60 | 1.32 | 1.17 |
| Internal Span (IS) | Serviceability | 0.97 | 0.85 | 0.74 | 0.71 | 0.69 | 0.67 |
| | Strength* | 2.92 | 2.26 | 1.74 | 1.48 | 1.40 | 1.38 |

LOOK FOR
THE LOADING
CAPACITY
TABLE



* A capacity reduction factor of 0.9 is applied to strength capacities. These capacities are based on tests conducted at BlueScope Steel's NATA registered testing laboratory using a direct pressure testing rig.



MAINTENANCE WORKERS AS WALKING PLATFORM

INSTALL OF LIFELINE

INSTALL OF LIFELINE

“Maintenance are sometimes done by internal maintenance facility themselves, so they may not have experience for working at height. So usually lifeline or walkway would be required to ensure their safety. Lifeline can be installed on any profiles, be it screw fixed or clamp on the profiled sheets and it should be designed and manufactured according to EN 795:2012 standard.”

Mr Andy Lee
Director, Hann Systems

INSTALL OF WALKING PLATFORM

“Walkway platform spreads the load of foot traffic to prevent damages on the roof. Besides due to the design, it is a anti-slip solution.”

Mr Andy Lee
Director, Hann Systems



ROOF PITCH

ROOF AREA

**PANEL & ROOF
CLEARANCE**

ROOF DURABILITY

ROOF PROFILE



**QUESTION
&
ANSWER
SESSION**



SURVEY QUESTION

SPECIAL THANKS TO

Mr Ling Seng Wee
Plus Solar Systems Sdn Bhd

Mr Andy Lee
Hann Systems Sdn Bhd



steel CONNECT

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TrueCore®



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