

Trends in Research on Solar

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Introduction on Avans

Status of Photovoltaics (PV)

Trends in PV

Applications on Buildings

Avans University of Applied Sciences

Avans Lectorate Solar

- Application of Solar Foils
- Business Models for Solar

Close contacts with:

Solliance (Thin-Film) and SEAC (Buildings) (TNO-IMEC-Uni's)

Hugo de Moor

Expertise on PV and Buildings since 1997

ECN Zonnedak 2010
Smart Energy Facade

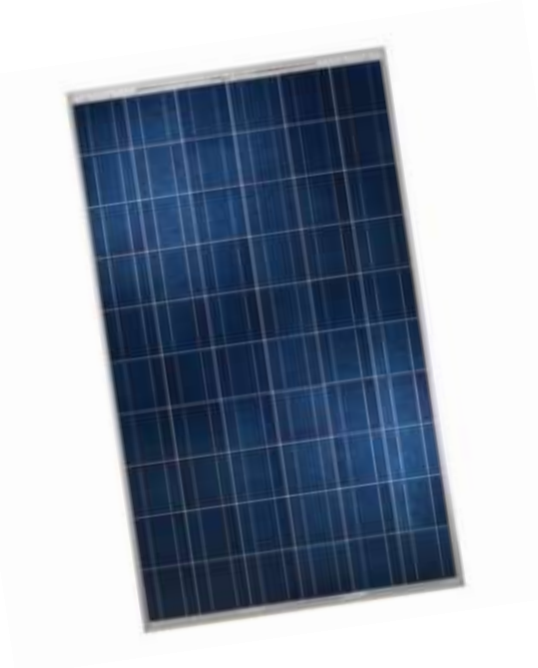
Scheuten Solar Roof integration of standard modules
Custom made BIPV modules
Standards on PV and Buildings

Avans Integration of Solar Foils

Module Types

Crystalline Silicon

Thin-Film (CIGS, CdTe)



Multi



Mono

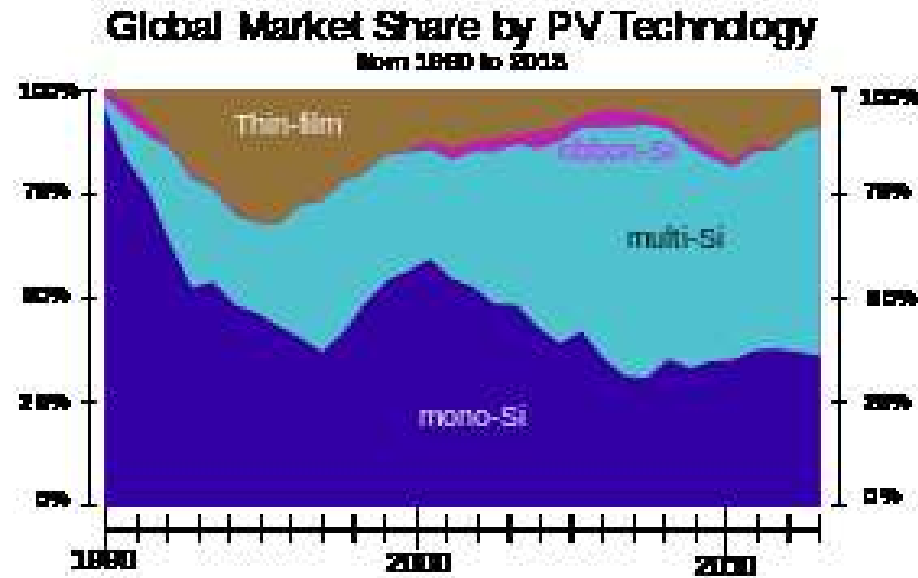


Glass-Glass



Foil

Technology Mix



Wikipedia

Solar module = glass plate

Trends in PV

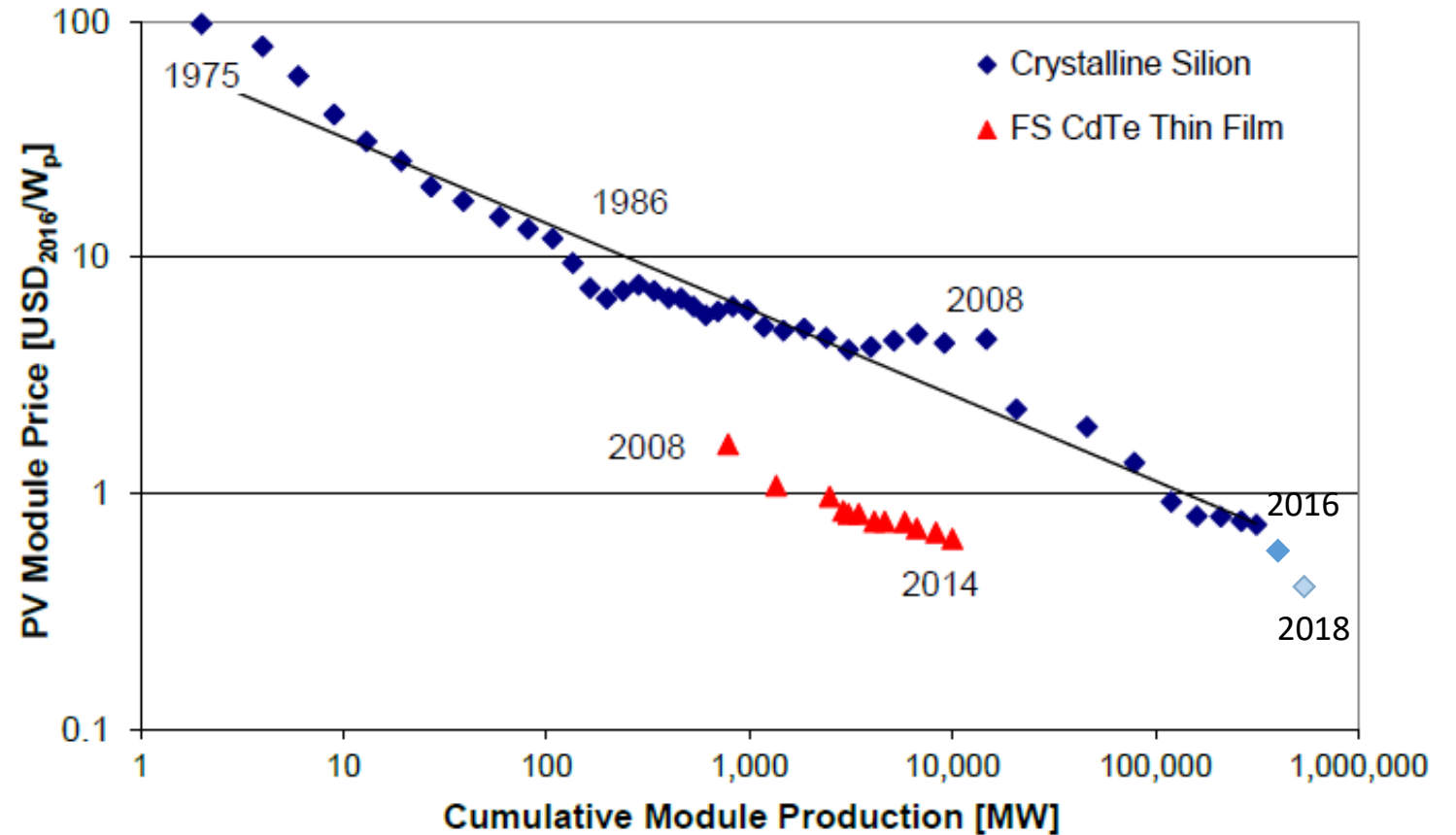
Modules

2018 → 2022
 Efficiency > 17% 20%

Module Cost <<

Cost = Module + BoS

≈ 1 €/Wp
 0,10 €/kWh



Data: Bloomberg New Energy Finance en PV News

Trends in PV

Inverters

Micro Inverters	DC → AC	=>	Independent modules
Optimizers	DC → DC		

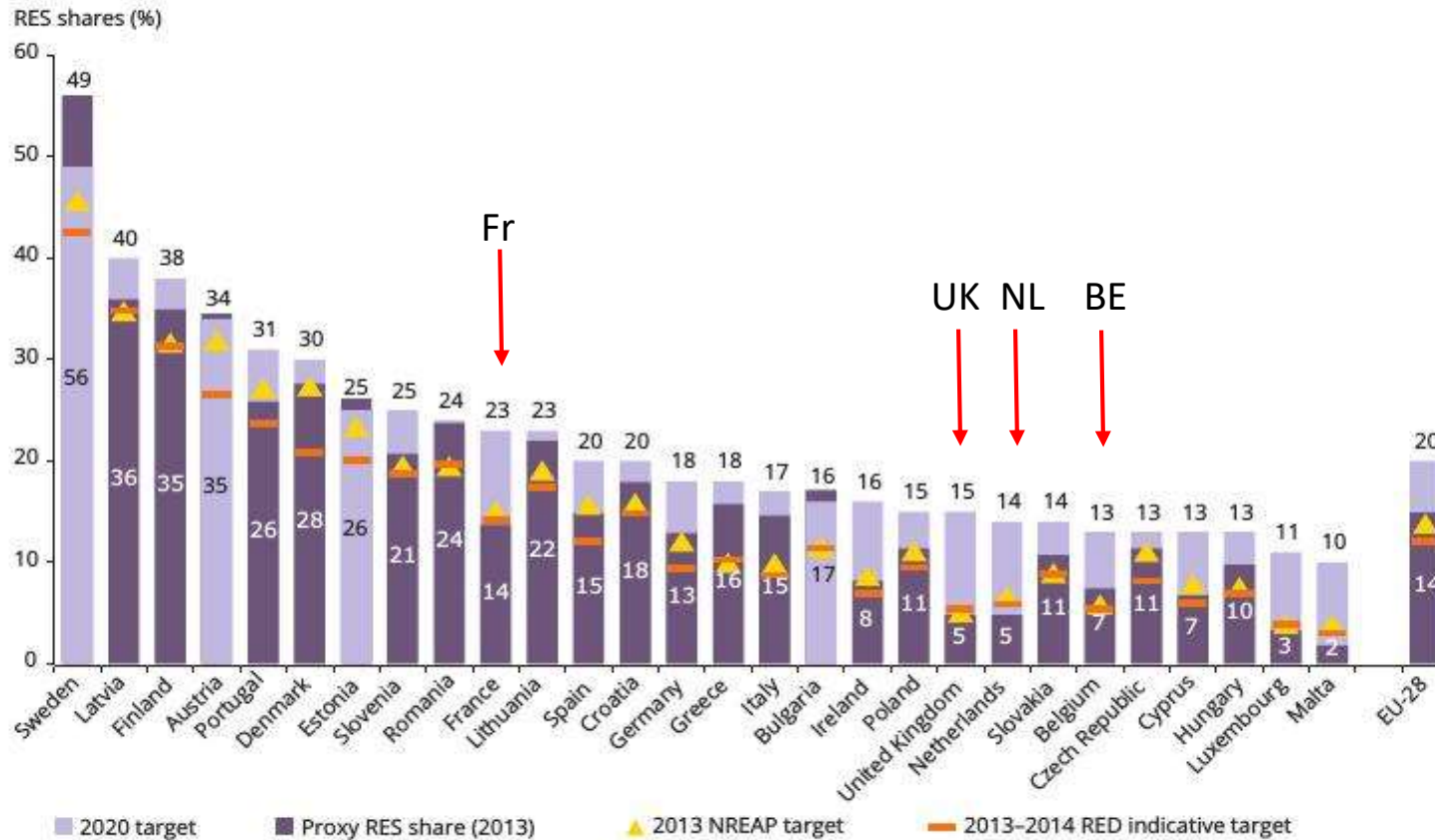
Modules

Optimizer IC		=>	Independent strings
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Tolerance for Shading

Need for PV

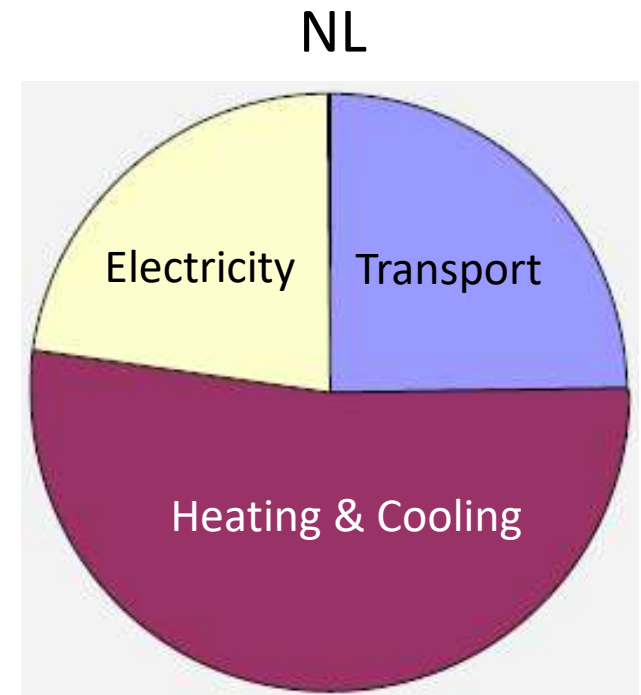
Figure 2.10 Proxy shares of renewable energy in gross final energy consumption and targets (EU countries), 2013



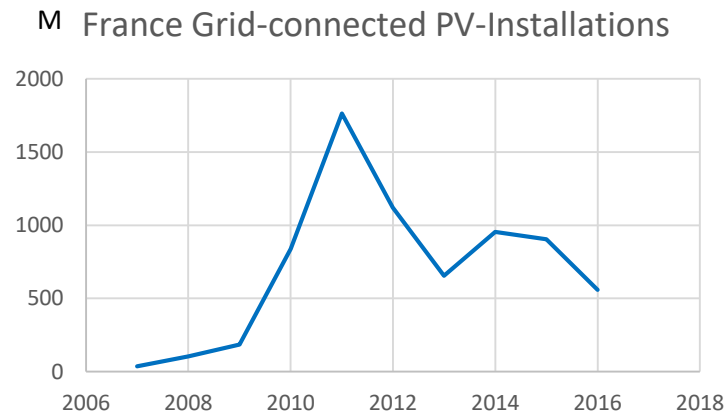
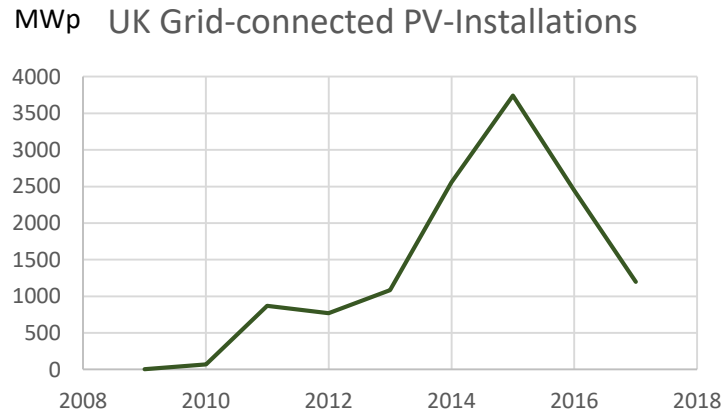
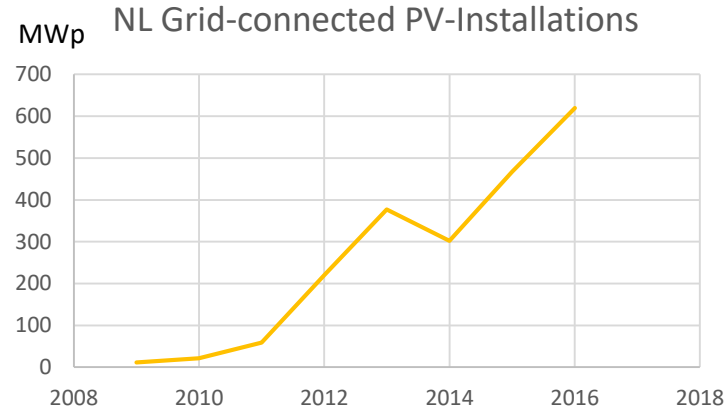
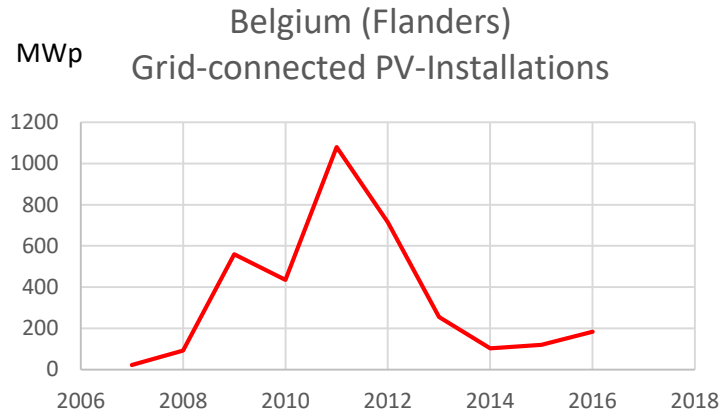
Note: The 2020 targets are set in the RED. Details on the normalisation applied to hydro and wind are presented in Section 3.2.

Source: EEA, 2014 (authors' work).

RE 2020 20%
 2030 32%



PV Installations



New Elan is needed

- Support
- Applications

Applications on Buildings

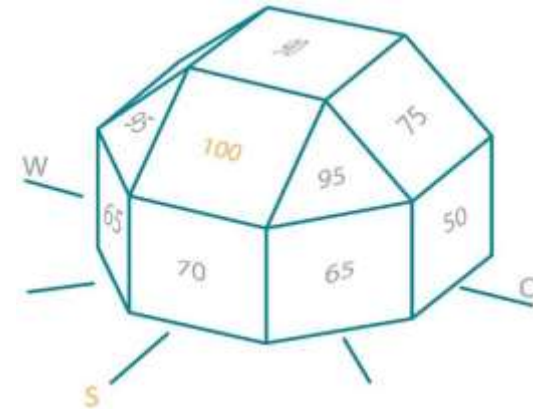
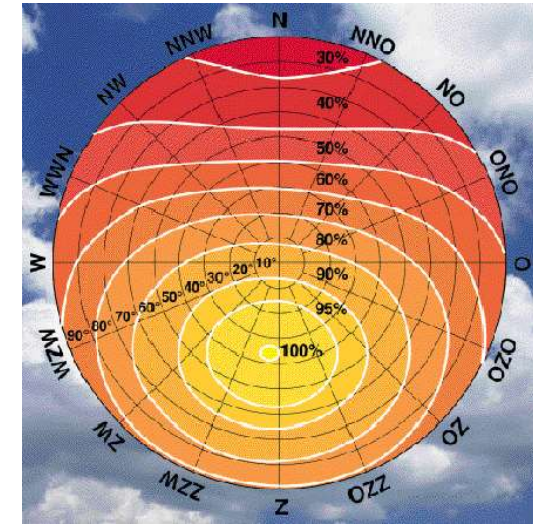


Roof

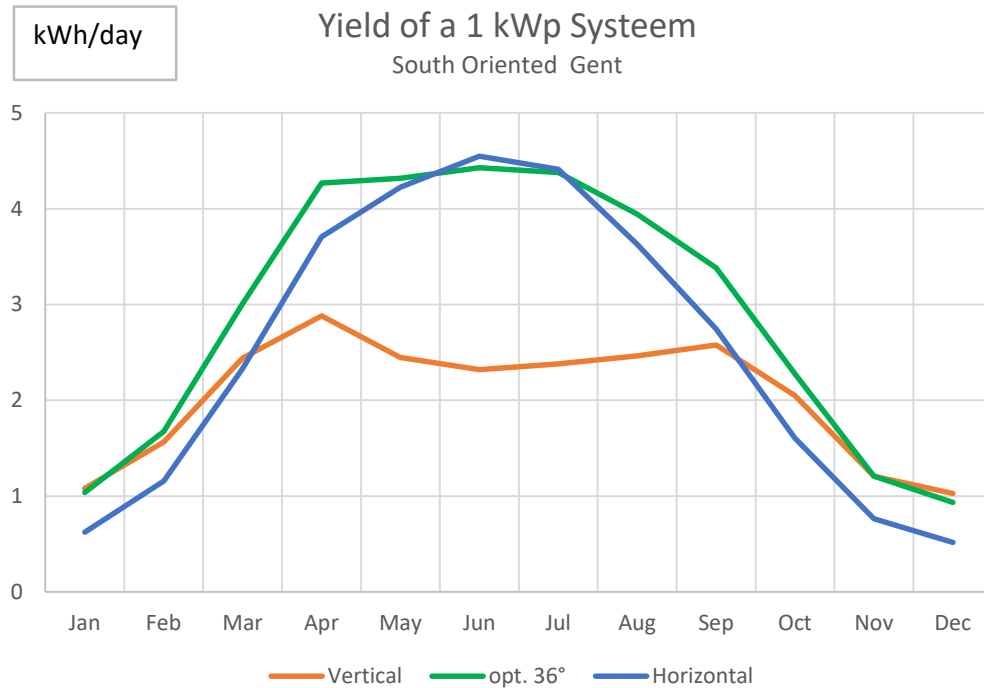
Facade

Parapet

Sun protection



Yield



Daily Irradiation	Wh/m ² /day		
	Horizontal	Optimal	Vertical
Gent	2790	3420	2400
Amiens	3120	3580	2480
Portsmouth	3220	3800	2690
Heerhugowaard	3000	3510	2490

Gent Facade per m² (150 Wp) Yield 110 kW/Year Cost 300 €? Value ??

Traditional



Stad van de Zon (Heerhugowaard)



Applications on Buildings

Production



Regular Roofs



Applications on Buildings

Specials/design

Visible Exposure



Applications on Buildings

Invisible (monitoring display)

Architectural Integration



Applications on Buildings

Special Modules

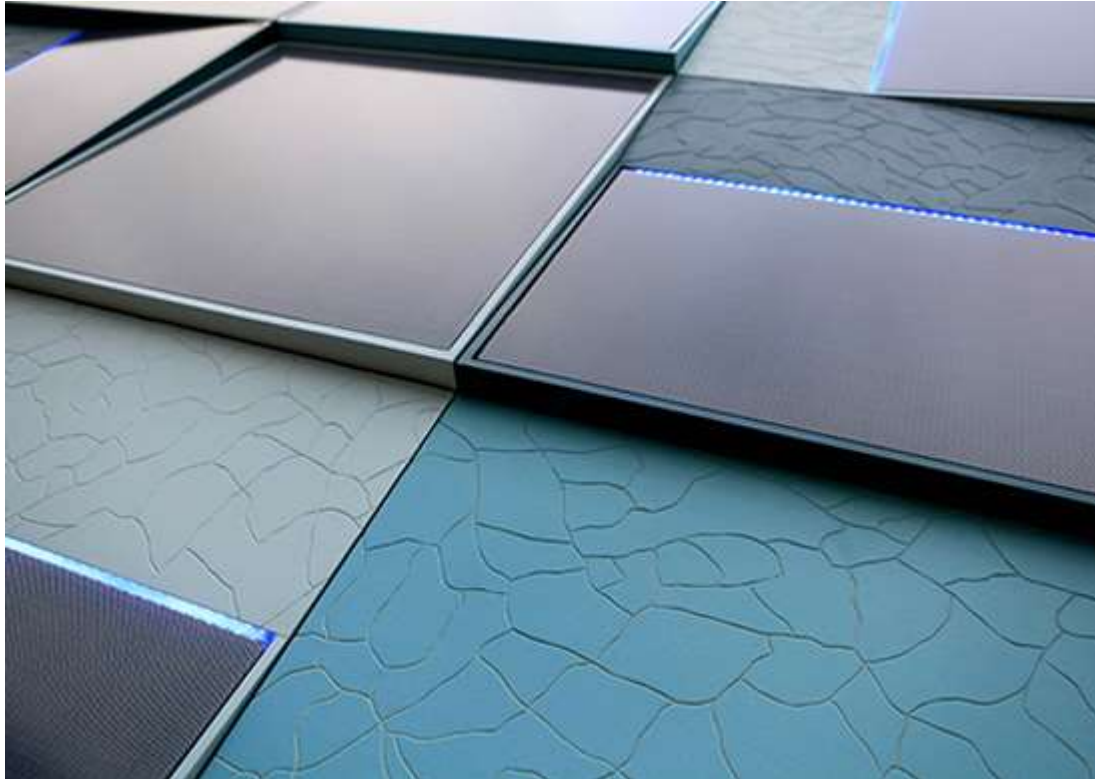


Yield < 10-30%

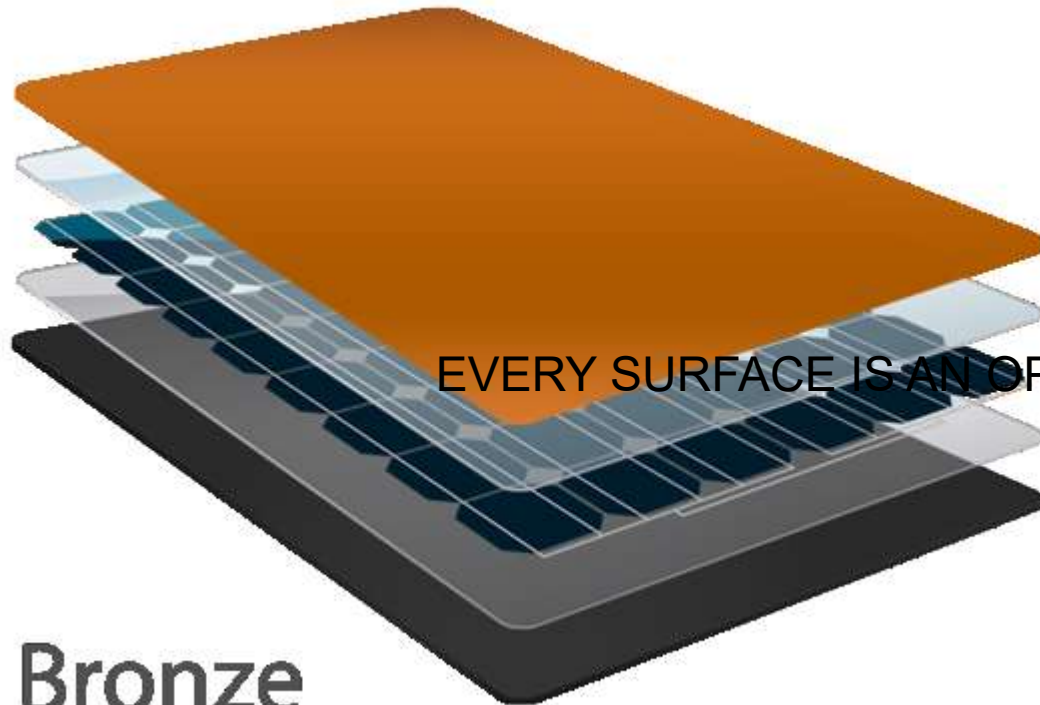
Reliability ?

Thank you for your attention

Solarix Studio



Kameleon



EVERY SURFACE IS AN OPPORTUNITY.

Bronze