



25 – 26 November 2025
Chamber of Commerce
Florence, Italy

Marcus Baeckmann

INVITAIC Co. Ltd.

Shading-Tolerant Colored Facade BIPV Modules

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INVITAIC – part of AESOLAR Germany

From module manufacturing to building integration.

Under the AESOLAR banner, INVITAIC operates as a dynamic and independent entity, focused on premium BIPV products.

AESOLAR was founded in 2003 and is a BNEF Tier German manufacturer of high-quality PV modules, with production lines in China and Turkey.

INVITAIC blends the technology and solar expertise of the group companies together with aesthetically elegance into visual harmony for buildings.

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INVITAIC References

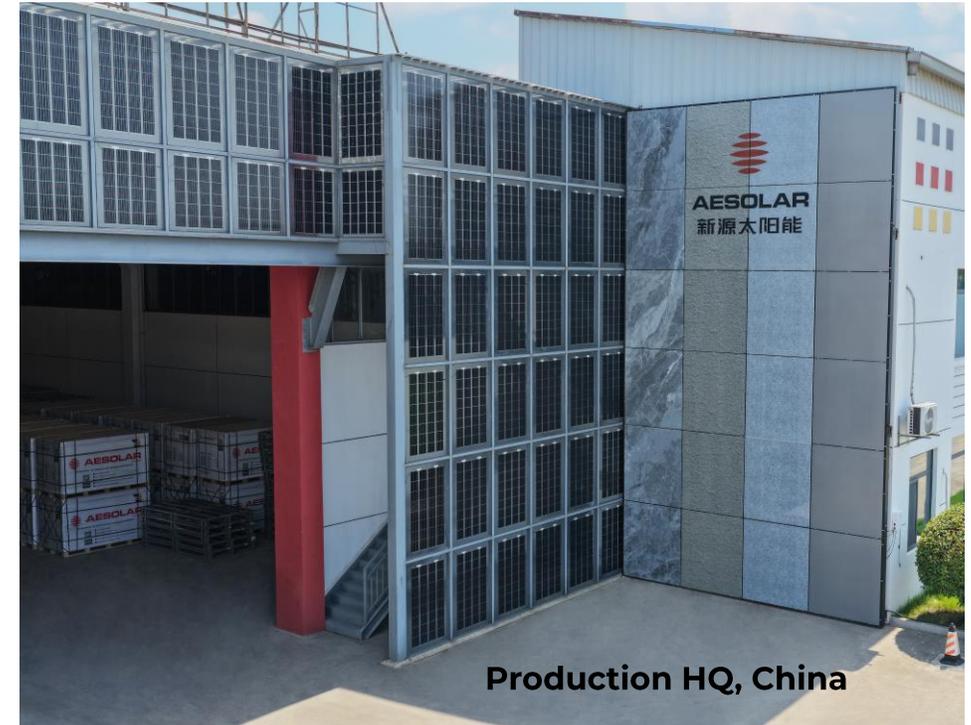


Sydney, Australia: Fish Market



Zurich, Switzerland

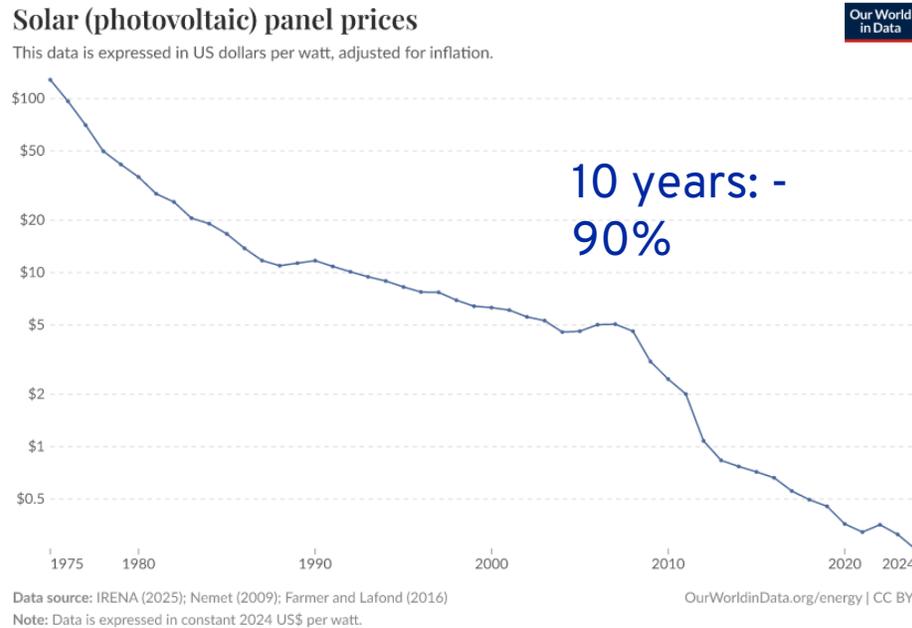
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Production HQ, China

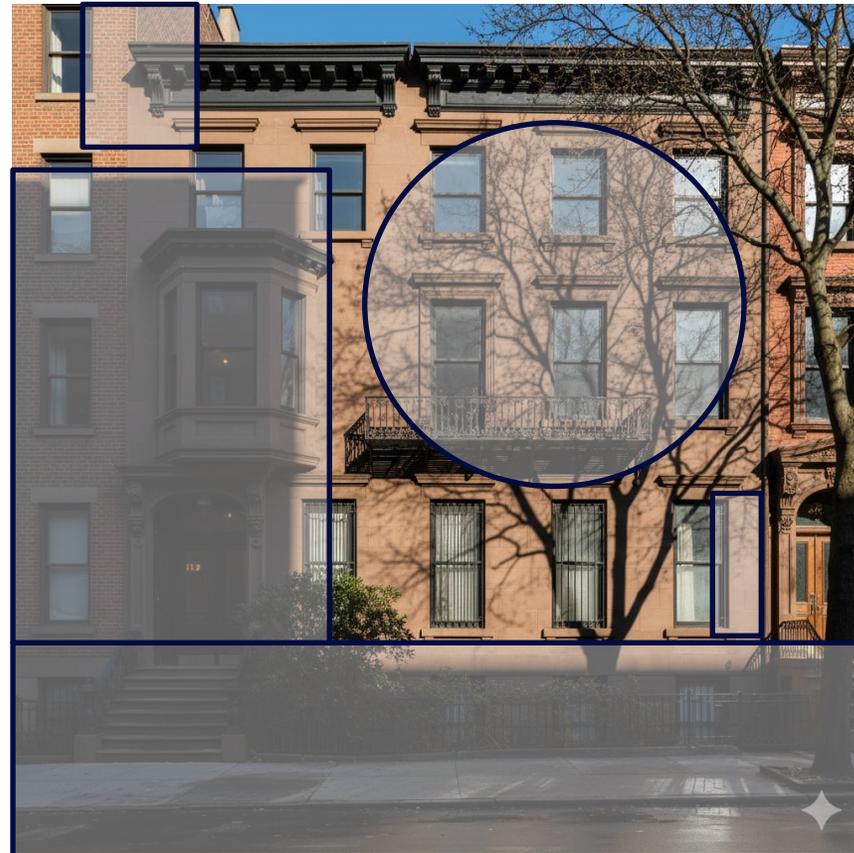
PV is Cheap – BIPV is Not

Diverging Trends: Engineering Costs ↑ vs. Module Costs ↓



Focus 2026: Shading as a Key Limiting Factor

Complex buildings have
complex shading.



Simple buildings have
complex shading.

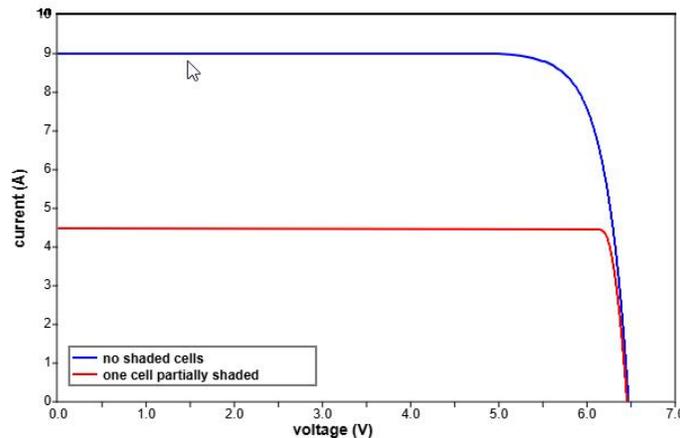
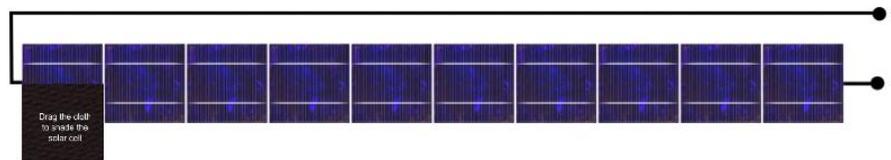


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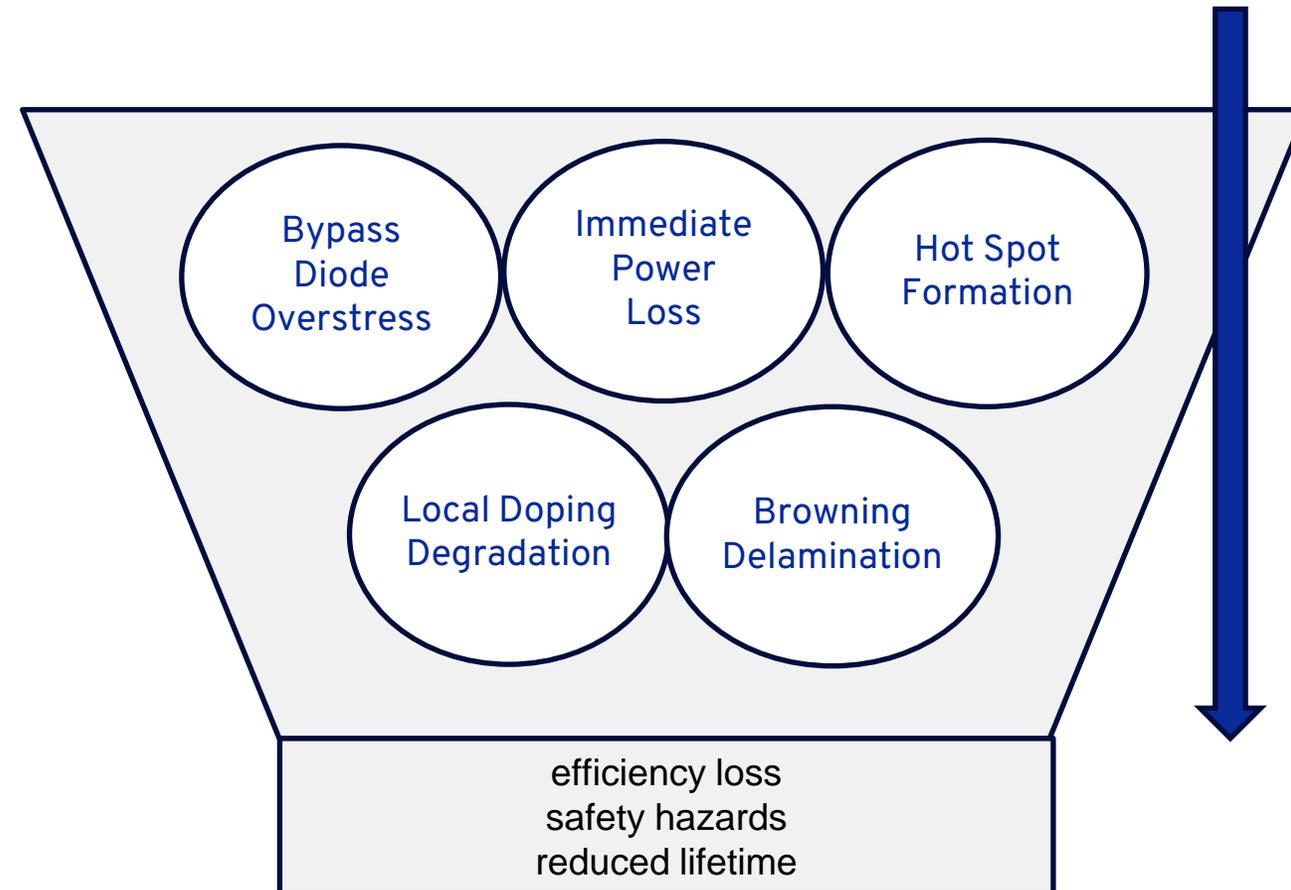
Shading - Starts with Lost Energy - Ends with Lost Lifetime

Let's see how shading affects a conventional module before we look at back contact (BC) cells...

From Power Loss to Material Degradation

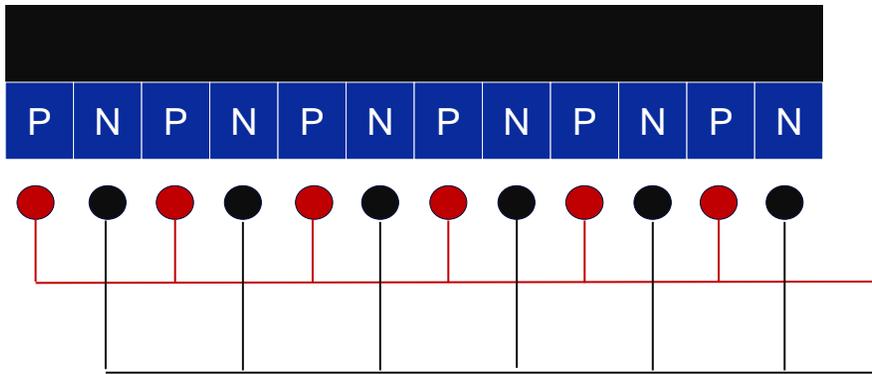


Source: <https://www.pveducation.org/pvcdrom/modules-and-arrays/shading>



BC-Design: Eliminating Front-Side Current Paths

Back Contacts provided by P/N junctions
on the cell backside

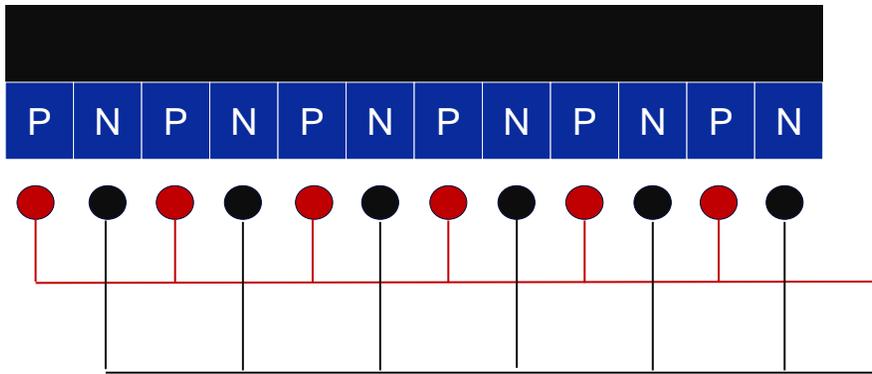


Why Back-Contact Cells Improve Power and Lifetime:

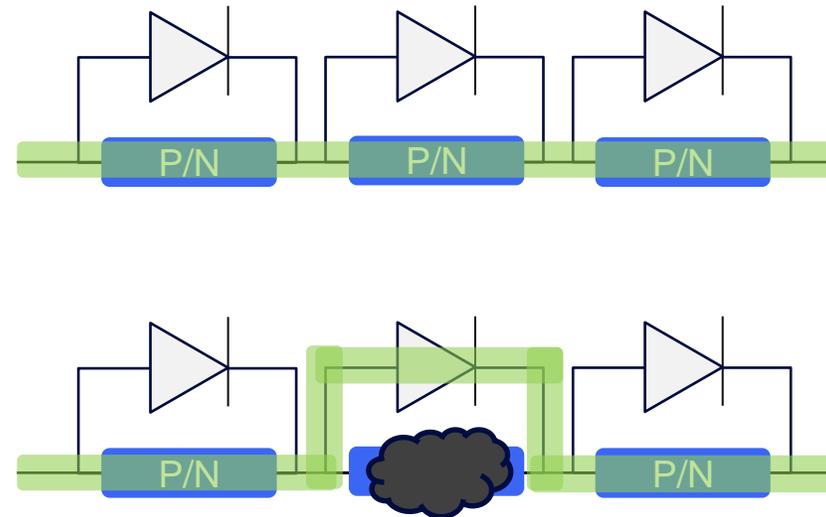
- No busbars on the front -> more power, especially from side angles
- Better temperature behavior -> more power, longer lifetime
- Reduction of local heating -> longer lifetime
- **Higher energy yield +33% in shaded sites**

Built-in Shading Protection at Cell Level

Back Contacts provided by P/N junctions on the cell backside



BC equivalent circuit diagram



Diode conducts after shading

Uniform Black Surfaces – Visual Side of Efficiency

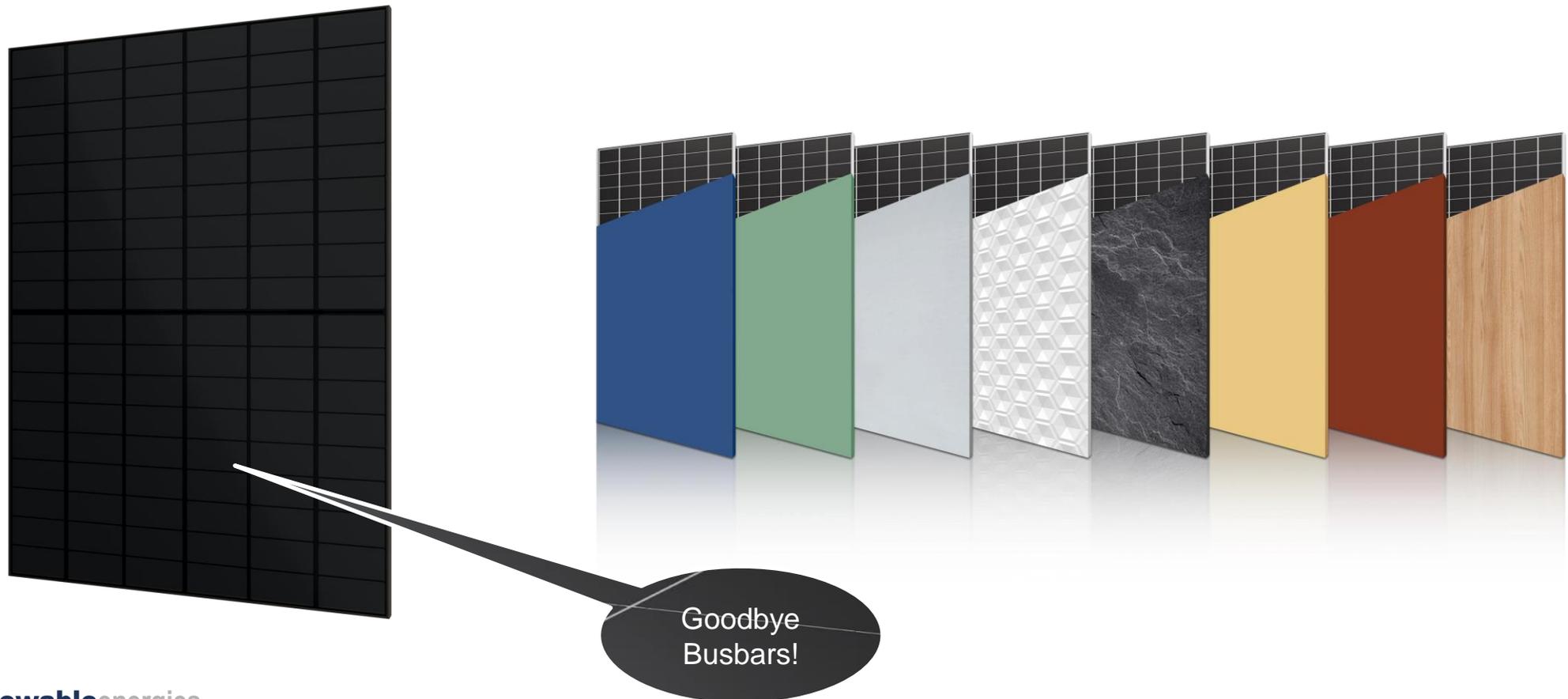
Backcontact is a perfect match for BIPV:

- **More power per m²**
- **More energy per m²**
- **More robust against shading**
- **Reduced hotspot risks**
- **Reduction of planing efforts**

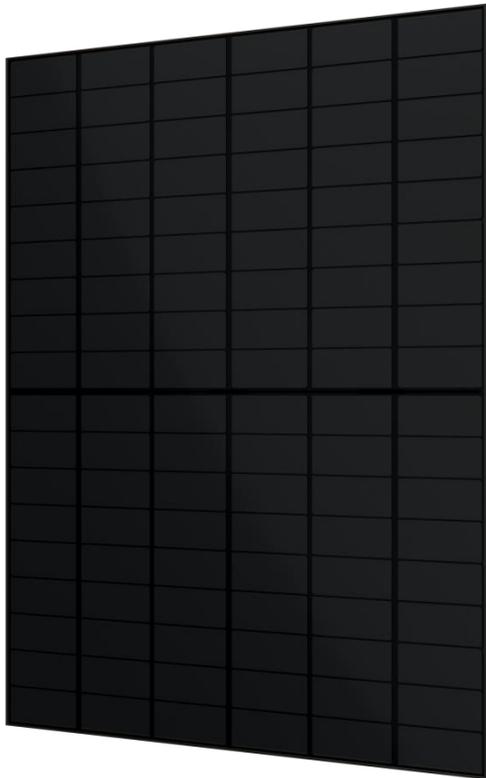
... and there is the aspect of aesthetics



Uniform Black Surfaces – Visual Side of Efficiency



Uniform **COLOR** Surfaces – Visual Side of Efficiency





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“Making BIPV Resilient and Easy to Plan.”

Thank you!

INVITAIC – go@invitaic.ch – Marcus Baeckmann

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