

YOUR PRODUCT

WITH A TOUCH OF SOLTECH

Specific needs for reliability in integrated PV

Sophia workshop, April 25th 2024 – Stefan Dewallef

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ABOUT SOLTECH

Genk, België

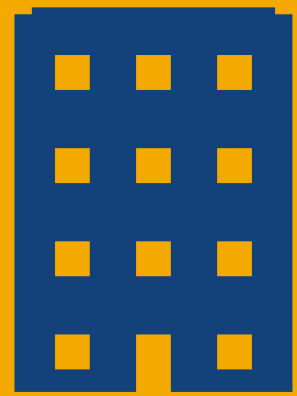


- A tailor-made Photovoltaic modules production company
- Created as spin-off of IMEC in 1989
- High investment in Research & Development
- Total system engineering
- Autonomous applications
- Grid connected BIPV
- Prototyping
- Production of customized and high-quality solar panels
- Project related customized modules
- Production runs

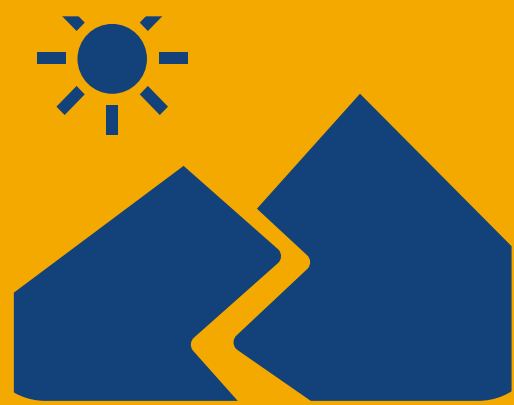
STRONG SHAREHOLDERS



Turn everything into a solar panel



BIPV



IIPV



Off-grid



VIPV



PIPV



Grid-connected



PIPV

Product Integrated Photovoltaics



VIPV

Vehicle Integrated Photovoltaics



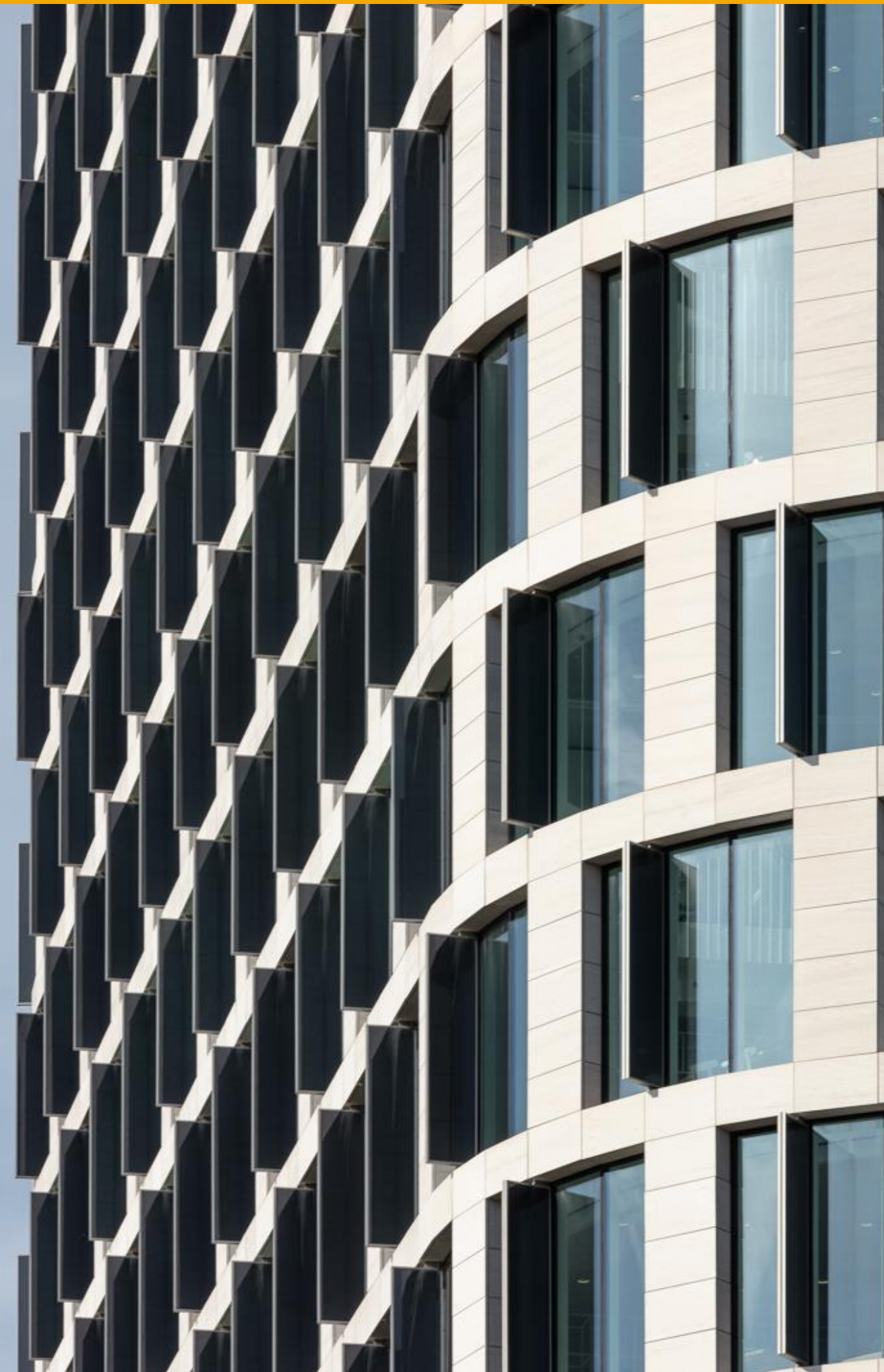
IIPV

Infrastructure Integrated Photovoltaics



BIPV

Building Integrated Photovoltaics



Why is BIPV different?

Not only functional as PV
but also as building element

- > a lot of extra requirements
- > certifications as building element
- > often different composition

Visual aspects are very important
Not necessarily installed by electricians
A total different environment in terms of aging - **safety**
High replacement cost (often even impossible to copy panels)

Price pressure is a bit less than on standard PV



Reliability challenges

Safety

Electrical safety

- cables have to be hidden
 - visual
 - accessibility (electrocution risk)
- difficult access to cabling for inspection

Good panel design and system design are mandatory



Reliability challenges

Safety



Higher fire safety risk

Not only PV-installation damage!!!
building – people

Fire initiation

- higher risk for hot spots due to shading
 - down to street level: buildings/trees/...
 - mounting systems – positioning PV
 - developed by architects - estetical requirements
- > **more diodes are necessary** (cfr. Project INVEZO)
- sometimes proximity of other building materials (wood,...)
- all electrical connections are dangerous

Extra care for material choices – cabling - implementation

Reliability challenges

Safety

Fire propagation

Actually very difficult to obtain permission for high rise building fire class A (building materials) more and more required difficult to obtain because of the encapsulant

Example of ventilated facade with high air flow

Possible solutions

correct framing

interruptions every floor

material choices

mounting and panel materials -

development of new encapsulants?)



Reliability challenges Panel construction

Requirement for 30 years at least

- in line with BAPV
- but also visual aspects

Often the higher module temperature
reduces the lifetime of the materials / electronics (diodes)

- avoid non ventilated BIPV
- avoid direct mounting on insulation materials
- extended lifetime testings (more cycles – higher temperature)

Glass/glass helps for lifetime/safety



Reliability challenges Panel construction



Often edge boxes are required (visual – non accessibility cables)

- difficult to find good boxes (even certified boxes are not necessary OK)
- less robust
- risk of water in profiles

New materials implemented in PV-panel
color - films

lifetime (visual, adhesion, extra film (fire ratings)
uneven light transmissioin

Forces of mounting method on PV-panel (example of backrails)

Extra validation/certification is mandatory for every new BOM
often tests combined with mounting structure necessary



Reliability challenges

System challenges

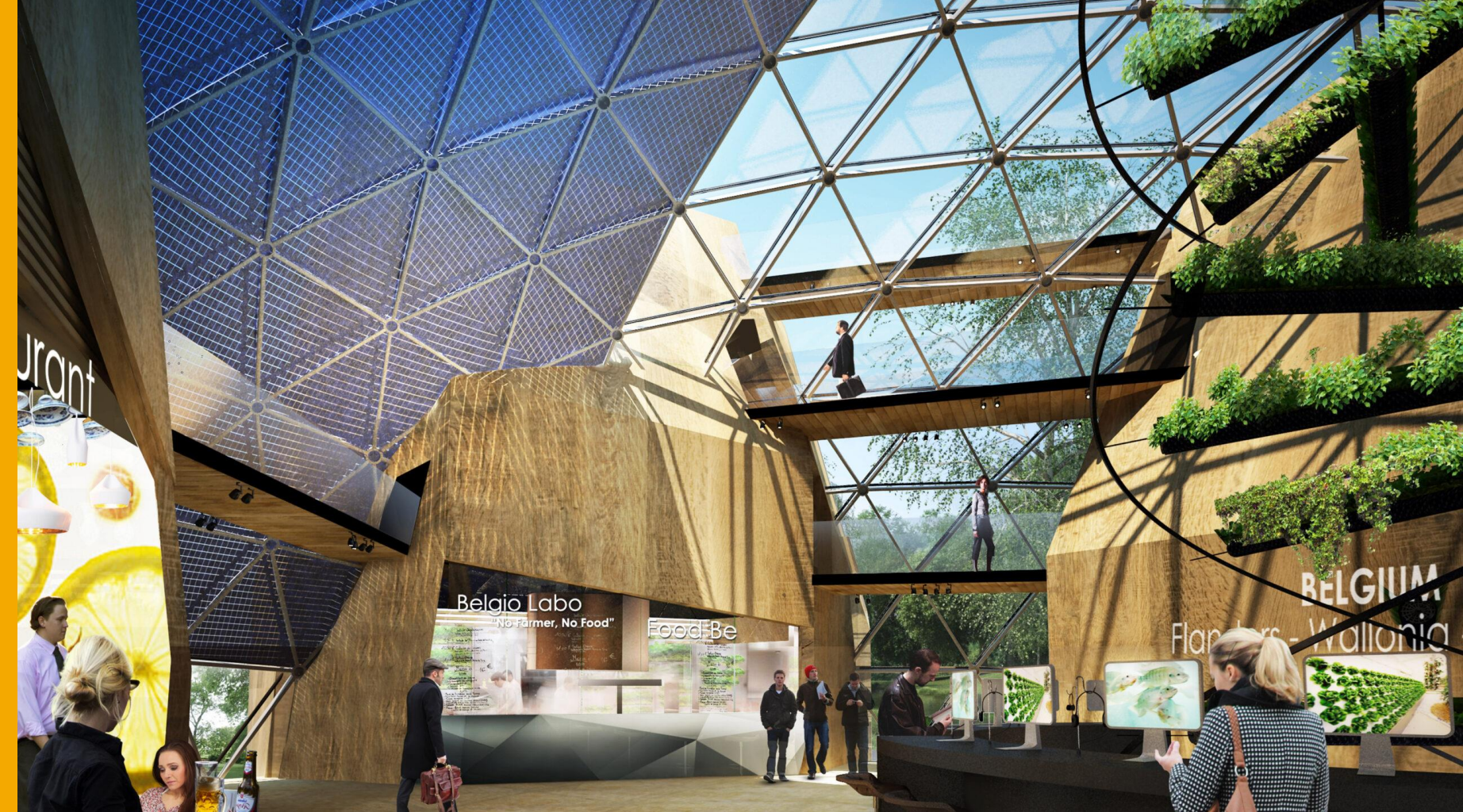
Requirement for 30 years at least

- in line with BAPV
- but also visual aspects

Installation not done by electricians

- pulling on cables (during mounting)
- fixation of cables (stress on boxes – often vertical panels)
- cable routes not always protected – long cables
- cables can be hidden (risk for damage)
- induction (big loops in cables)

Follow-up of 'construction company' is necessary



Reliability challenges

System challenges

Risk of 'bad' system design

Panels are always different

-> not easy for inverter simulations

Wrong series/parallel connections

different panels

shading

different orientations/inclinations

We recommend lower system voltage



Reliability challenges

System challenges

Optimizers are not easy to implement

lifetime if installed integrated (temperature)
cabling complexity if installed indoors
accessibility / lifetime
available space



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THE FUTURE
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