



# Berenschot

## Upscaling the application of BIPV: examples, challenges and solutions in the ecosystem

*COST Action PEARL PV's Conference Enabling the PV Terawatt Transition*

By Marlon Drent

# Content

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1. Context in the Netherlands
2. Market characteristics
3. Challenges/barriers in the ecosystem and solutions
4. Inspiration: example projects

# BIPV in the Netherlands: means to a sustainable end!

## Energy sector:

- 70% of all electricity to be renewable by 2030



## Construction sector:

- 7m residential & 1m non-residential buildings off gas by 2050
- First: renovate 1.5m existing homes by 2030 → sustainability
- EPBD: all non-residential buildings energy label C by 2023.
- >2021 new BENG regulation: all new buildings nZEBs

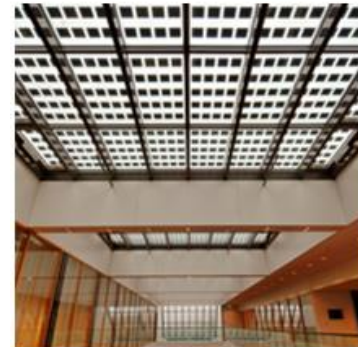
+ roof and façade capacity in the Netherlands



Opportunities for the Dutch BIPV sector!



Source: Solinso (2020)









Source: Hermans Techniglaz (2020)

## However...

- BIPV is not yet applied on a large scale:
  - 2014: 1% (10 MWp) of the total installed PV power
  - 2019: 2% (137 MWp) of the total installed PV power
- Multiple challenges to the upscaling of BIPV application



# Segmentation of the BIPV market

	Market segment	Type of use	Owner/decision maker (DMU)	Influencers
	<b>High-rise residential buildings</b>	1) Private housing 2) Social housing	1) Private housing: property owner (private rental), body corporate (Dutch: VvE) 2) Social housing: housing corporations	Architects, building and energy consultants, contractors, construction companies, installers, financial organizations
	<b>Low-rise residential buildings</b>	1) Private housing 2) Social housing	1) Private housing: property owner (private rental), house owner, project developer (in case of new construction) 2) Social housing: housing corporations	Architects, contractors, construction companies, installers, financial organizations, future user (in case of new construction), energy company
	<b>High-rise non-residential buildings</b>	Offices, hospitals, commercial buildings	Property owner/user, property investor	Architects, building and energy consultants, financial organizations, future user (in case of new construction)
	<b>Low-rise non-residential buildings</b>	Offices, hospitals, commercial buildings	Property owner/user	Architects, building and energy consultants, financial organizations, future user (in case of new construction)
	<b>Industrial and agricultural buildings</b>	Distribution centers, factories, agricultural buildings, etc.	Property owner/user	Architects, building and energy consultants, financial organizations, future user (in case of new construction)
	<b>Governmental and institutional buildings</b>	Public buildings including City Halls, schools, universities, etc.	Government (Rijksvastgoedbedrijf)	Architects, building and energy consultants, politics, governmental organizations (e.g., municipalities, provinces)

Source: T. Vroon, 2021. *Escaping the Niche Market: An Innovation System Analysis of the Dutch Building Integrated Photovoltaics (BIPV) Sector*



Different buildings, different clients, different solutions



# Challenges and solutions in the BIPV sector

## Challenges

- All tailormade solutions – no mass production
- Lack of awareness in the building industry, but large dependence
- Limited demand for BIPV solutions
- Lack of freedom of choice for the end-user
- Renovation projects are a challenge
- Lack of thermal technology in BIPV solutions



## Solutions

- Standardization
- Industrialisation
- Upscaling
- BIPV + thermal
- Collaboration with the building industry, solar and HTSM industries

## There is momentum!

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- Increasing demand for BIPV
- Sustainable construction is increasingly becoming a 'must'
- Rising energy prices
- Pressure from the government
- Geopolitical circumstances

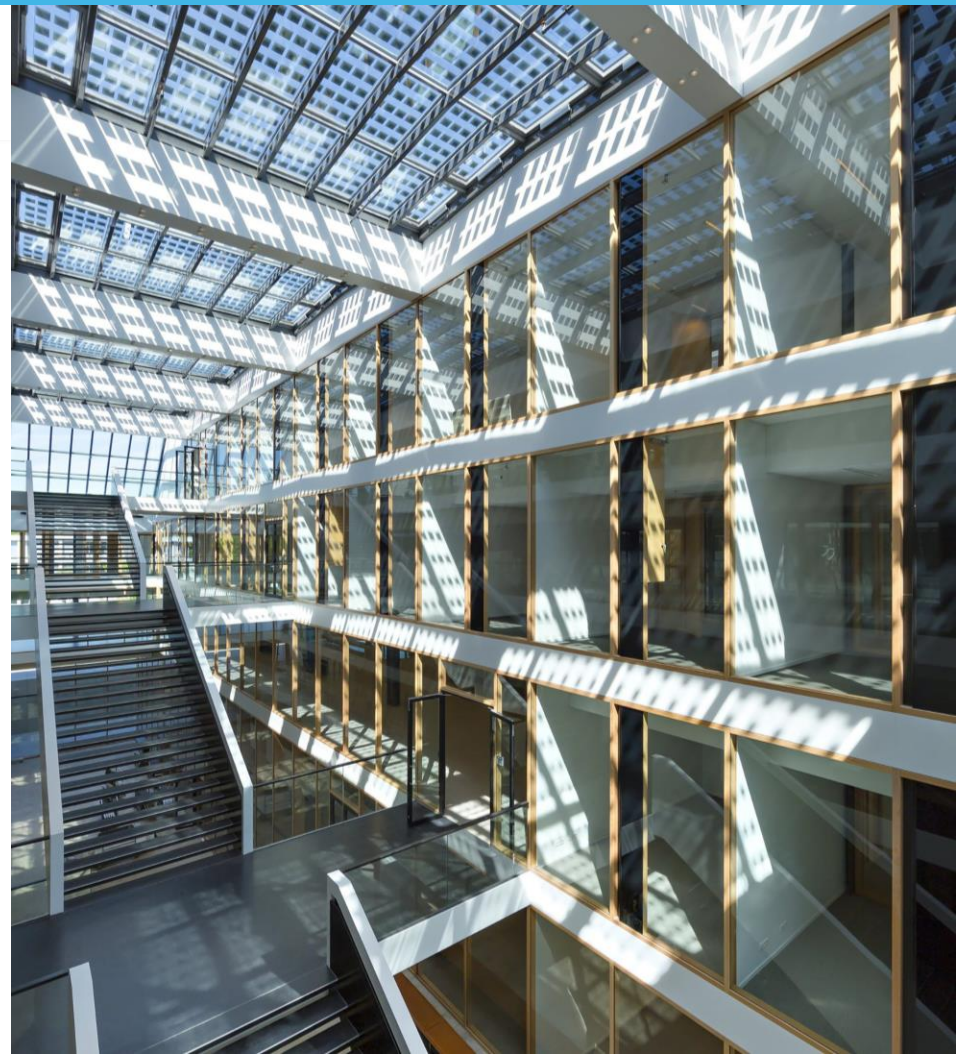
## Example projects

BIPV in glass by Hermans Techniglaz.  
Grotiusgebouw Radboud Universiteit,  
Nijmegen

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Openbaar





## Example projects

Gildenhof in Dronten, 29 residential units by GSE Integration.



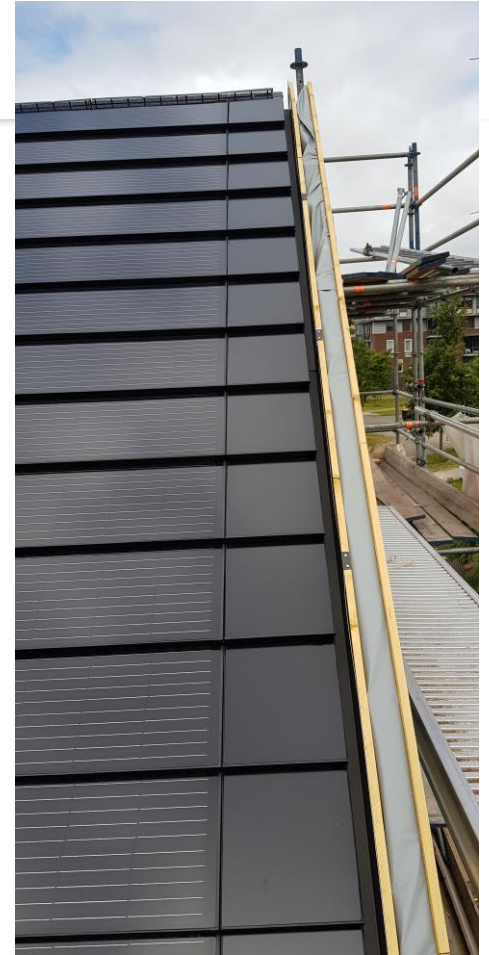
## Example projects

Dempsey flat in Sittard by  
ZigZagSolar >



## Example projects

Building Integrated PV-product by Solinso on residential building in Purmerend. V







Oktober 2021

41 residences in Vathorst,  
project Laakse Tuinen



## Example projects



BIPV in façade by Solarix.  
Redevelopment of the Kuijpers  
Engineering office building in  
Helmond.





**Thank you for your attention!**



Thank you!



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