



# SUSTAINABLE SOLAR — EUROPE 2024

# Opening

12 December 2024





# Sara Matthieu

MEP,  
European Parliament

SUSTAINABLE  
SOLAR \_\_\_\_\_  
EUROPE 2024



# Dries Acke

Deputy CEO,  
SolarPower Europe

SUSTAINABLE  
SOLAR \_\_\_\_\_  
EUROPE 2024

# Sustainable Solar

Environmental, social, and  
governance actions along  
the value chain



[solarpowereurope.org](https://solarpowereurope.org)



# Context

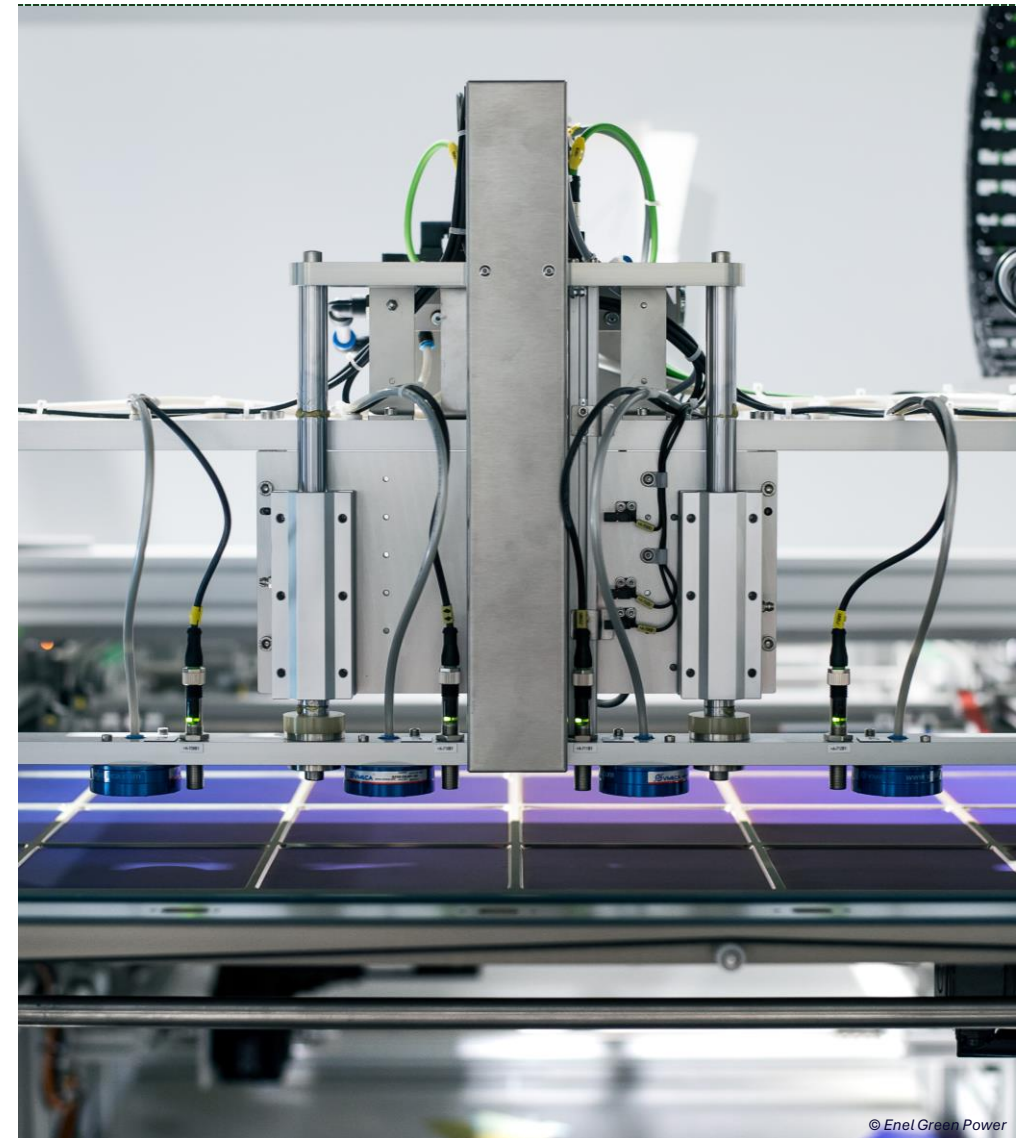
- Solar PV is a **crucial technology** in global decarbonisation efforts
- The concept of sustainability, however, goes much **beyond climate change** and affordable clean energy
- The solar sector is mindful of its own sustainability and **committed to continuing efforts to reduce its impact** across various domains

FIGURE 1 SUSTAINABILITY CHALLENGES AND THE UN SUSTAINABLE DEVELOPMENT GOALS



# Methodology and scope

- The report goal is to illustrate how the solar sector is addressing **multiple sustainability challenges** across its complex value chain
- The report covers sustainability considerations across the solar value chain – from the **supply chain phase**, through the **use phase**, and to the **end-of-life phase**
- For each sustainability domain, it outlines the overall **context and background**, an overview of **approaches and best practices**, and hands-on **case studies**



© Enel Green Power

## How did we do it?

4

SolarPower Europe  
workstreams involved

63

SolarPower Europe member  
experts contributing

17

SolarPower Europe team  
members involved

9

Month process

100

Pages report

40

Meetings dedicated to the  
report

# Chapter 1: Supply chain phase

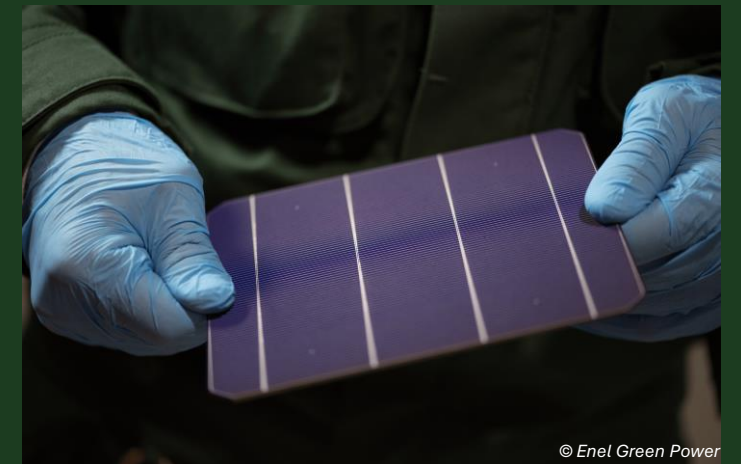
## 1.1: Human rights due diligence, responsible sourcing, and decent work



## 1.2: Carbon footprint



## 1.3: Circular design



Focus: Human rights due diligence,  
responsible sourcing, and decent work

# Solar Stewardship Initiative



solarpowereurope.org



- Solar-specific, multi-stakeholder sustainability assurance scheme
- Working with all relevant stakeholders, fosters responsible production, sourcing, and stewardship of solar materials
- Supply Chain Traceability Standard published today

# Chapter 2: Use phase

## 2.1: Community engagement



## 2.2: Land use



## 2.3: Biodiversity



Focus: Community Engagement

# Cedillo Solar Village



- Iberdrola's 375 MW solar park in Extremadura, designed to enable natural vegetation to grow and act as an ecological corridor
- Large-self consumption project through the Cedillo Solar Community benefits local citizens and businesses, saving up to 50% of their energy bills

# Chapter 3: End-of-life phase

## 3.1: Revamping and repowering



## 3.2: Reuse and repair



## 3.3: Waste management and recycling



Focus: Waste management and recycling

# Advanced PV module recycling



- SOLAR MATERIALS' PV recycling plant recovers 98% of PV module raw materials
- Without using environmentally harmful chemicals and with reduced energy consumption, key materials as silver, silicon, and high-quality glass, are recovered
- Current capacity of 3,000 tons per year is planned to increase to 10,000 tons by spring 2025

Download SolarPower Europe's latest report

# Sustainable Solar:

Environmental, social, and governance  
actions along the value chain



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SOLAR\_\_\_\_\_

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EUROPE 2024

# THANK YOU



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# SUSTAINABLE SOLAR — EUROPE 2024

# European Solar Sustainability Award 2024

12 December 2024



# Michael Schmela

Executive Advisor & Director of  
Market Intelligence,  
SolarPower Europe

# Dr. Jan-Philipp Mai

CEO  
Solar Materials



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EUROPE 2024



SOLAR  
MATERIALS

Solar panel recycling revolution  
for real green solar energy.



## PROBLEM

Solar panel waste is the fastest growing electronic waste segment around the globe.

- ✦ Global waste volumes with multifold several times over the next decade.
- ✦ Europe is currently the largest recycling market but will be overtaken by Asia-Pacific and the USA.

Annual  
recycling  
volumes

100kt

1 Mt

6 Mt

2024

2030

2050

## TECHNICAL & ENVIRONMENTAL CHALLENGE

Current recycling processes  
lose 50% of raw material value and  
waste critical resources.

- ✦ Silicon is labelled a critical raw material by EU and USA, but its recycling rate is 0%.
- ✦ Silver demand for solar panels is already 10% of annual global production and could outrun supply.
- ✦ Shredding and sorting are unable to recover minor metal fraction like silver at only 0.07% of total weight.

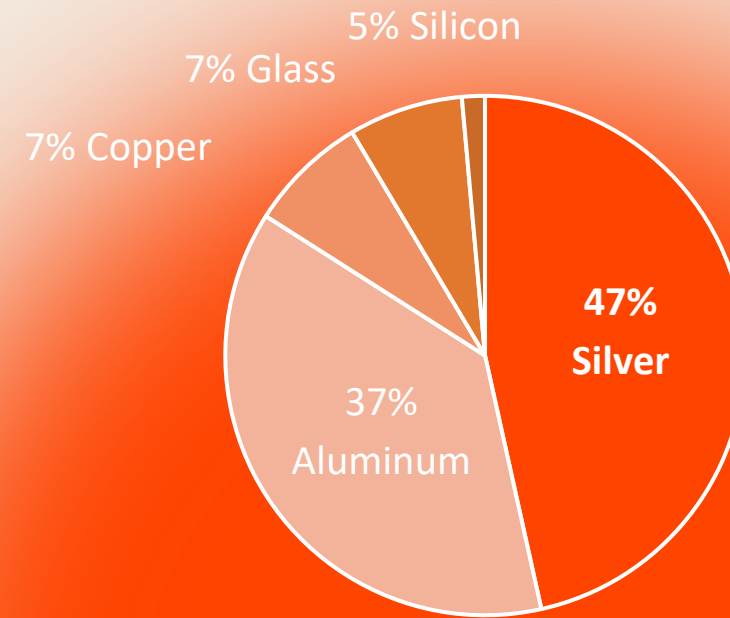
recovery rate for

0%

silicon & silver

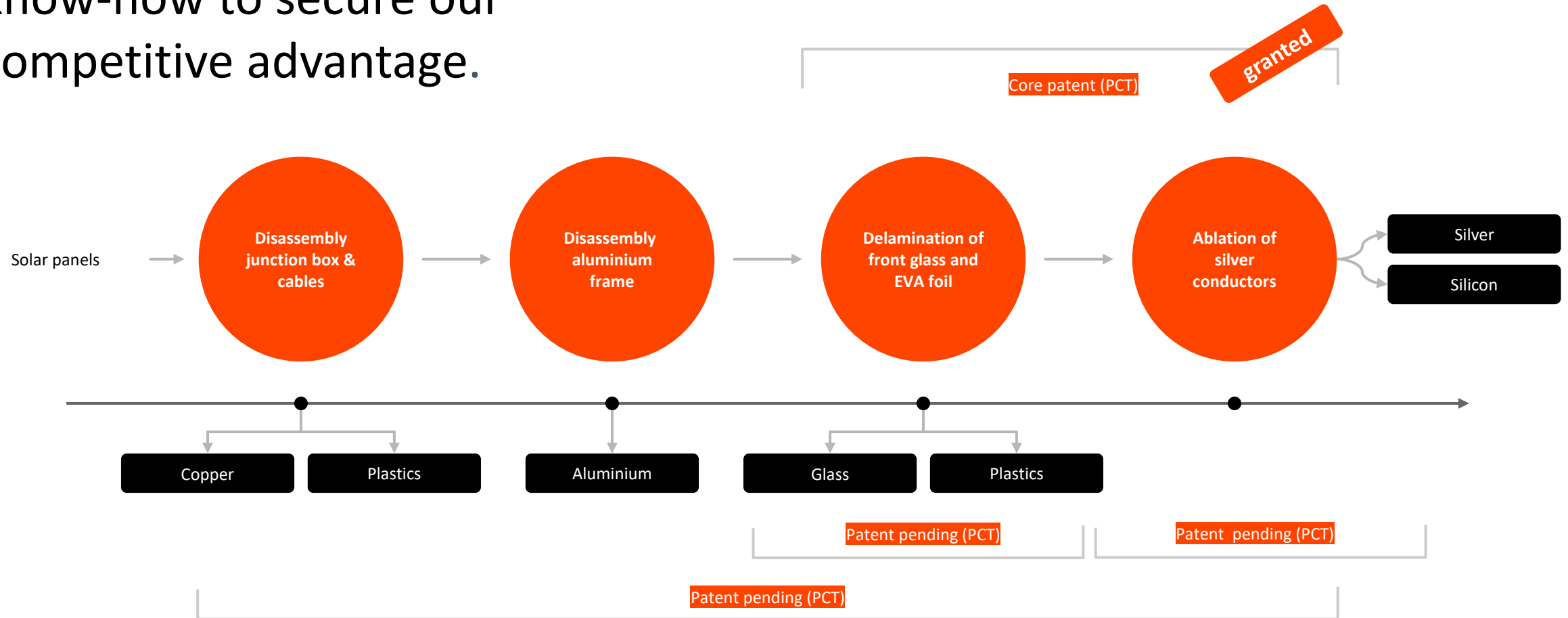
## OUR TECHNICAL USP

With our patented, thermo-mechanical process, we recover all raw materials.  
Silver is the key value driver.



## OUR COMPETITIVE ADVANTAGE

5 patents and extensive process know-how to secure our competitive advantage.



## OUR ACHIEVEMENTS

We are one of only two certified recycling sites specializing in solar panels in Germany.

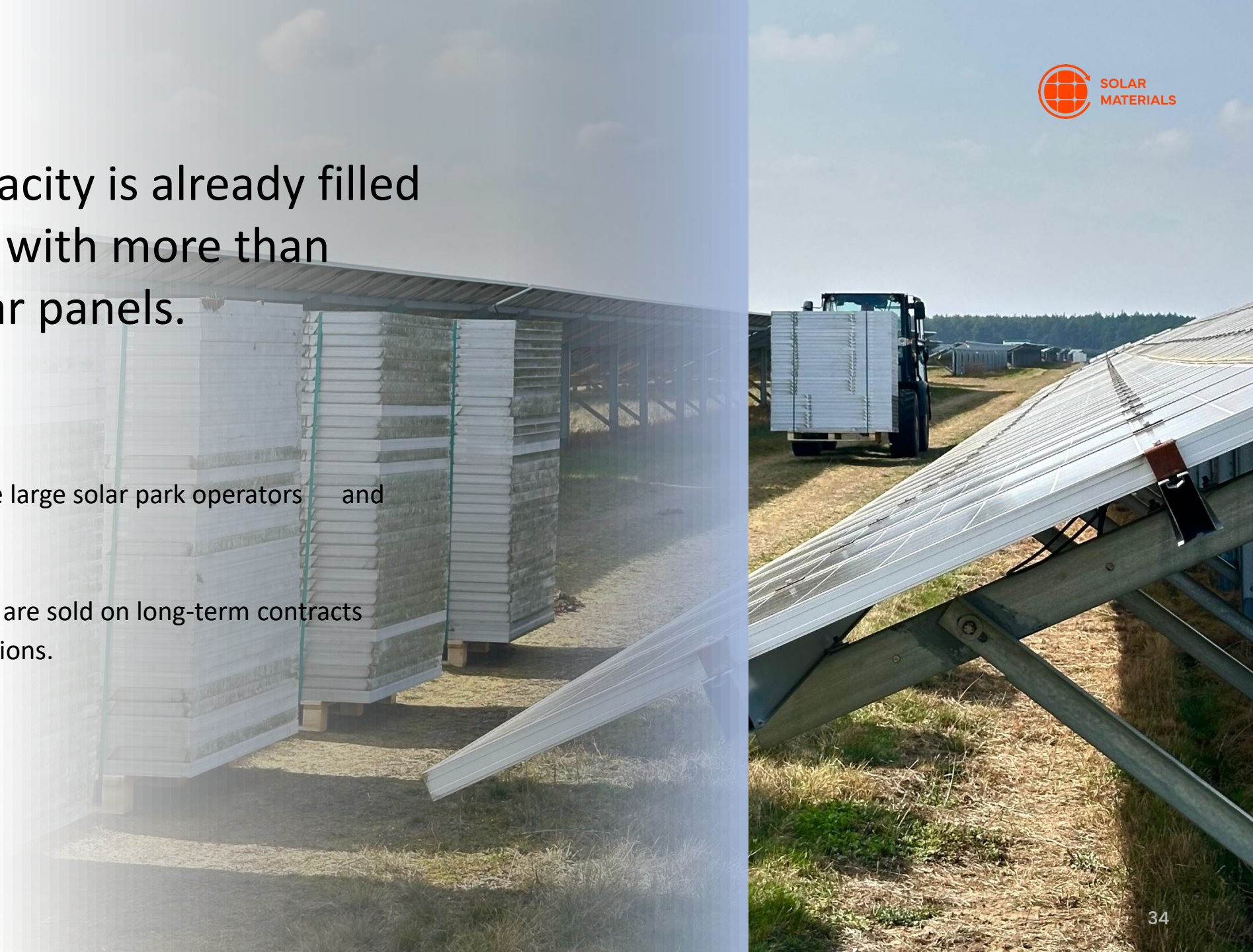
- ✦ Fully certified as two first treatment plant for solar panels since 2023 with over 3,000 tons of capacity.
- ✦ €12.2M Series A round with current investors and supported by EIC Accelerator grant.
- ✦ Currently expanding our recycling capacity to 10,000 tons by end of 2025.

## COMMERCIAL TRACTION



Our recycling capacity is already filled until mid of 2026 with more than 6,000 tons of solar panels.

- ✦ Our customers are large solar park operators and asset owners.
- ✦ Our raw materials are sold on long-term contracts for major weight fractions.



## TEAM

Combining expertise and passion to revolutionize the solar recycling market.



**Fridolin Franke (CMO)**

Marketing  
Business  
Development



**Dr. Jan-Philipp Mai (CEO)**

Organization  
Supply & Sales



**Jan Bargel (CTO)**

Production  
Research &  
Development

**From  
30 to 50 FTE  
by mid of 2025.**

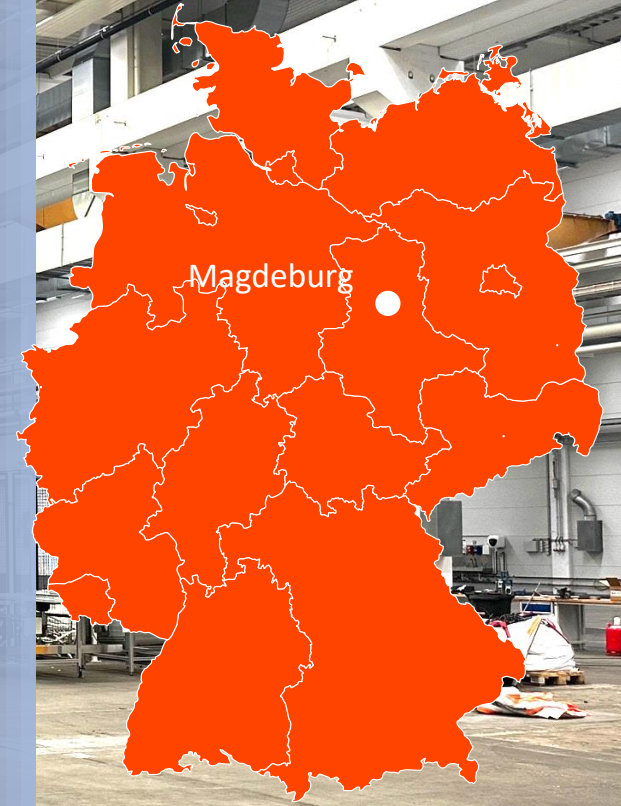
**Key positions:**

Head of Finance  
Head of Production  
Head of R&D

## INDUSTRIAL PLANT

Our first industrial plant will start its operations in April 2025 adding 7,200 tons of capacity.

- ✦ We further plan to more than triple our recycling capacity to 36,000 tons by 2026.
- ✦ We will build our first European plant in Italy in 2025.
- ✦ We are currently raising a €20-30M Series B round to close in early 2025.





SOLAR  
MATERIALS

THANK YOU

Let's transform solar  
into a circular economy together.

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LinkedIn

bmp Ventures

FIRSTIMAGINE!



EUROPÄISCHE UNION  
EFRE  
Europäischer Fonds für  
regionale Entwicklung

# European Solar Sustainability Award 2024

## Jury



**Michael Schmela**

Executive Advisor & Director of  
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Principal Risk Officer,  
Sustainable Supply Chains,  
IFC (International Finance  
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Environmental Engineering,  
Iberdrola



**Noor Yafai**

Europe Director Global Policy  
and Institutional Partnerships,  
TNC

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# Martín Behar

Director of Research and  
Environmental Affairs  
UNEF

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Environmental integration tool :  
**Seal of excellence in sustainability**



**Developed collaboratively by 30 experts over one year**

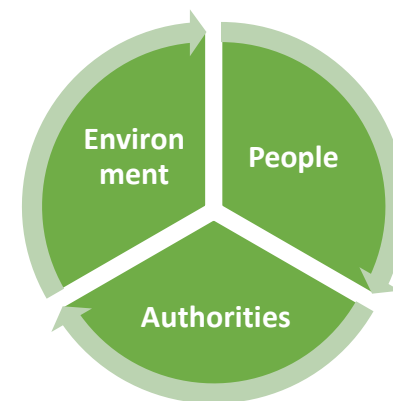
**Endorsed by 5 leading environmental associations**



**GREENPEACE**



Designed for projects that **create a positive long-term impact**



**Objective: Raise Standards to Excellence**



# Seal of excellence in sustainability



## Socioeconomic impacts

Training for employment	Local job creation	Tractor effect
Job placement	Compatibility of uses	Benefit to the community



## Environmental integration

Location	Renaturalization	Minimizing occupancy	Transplant
Fencing	Soil	Evacuation lines	Topsoil



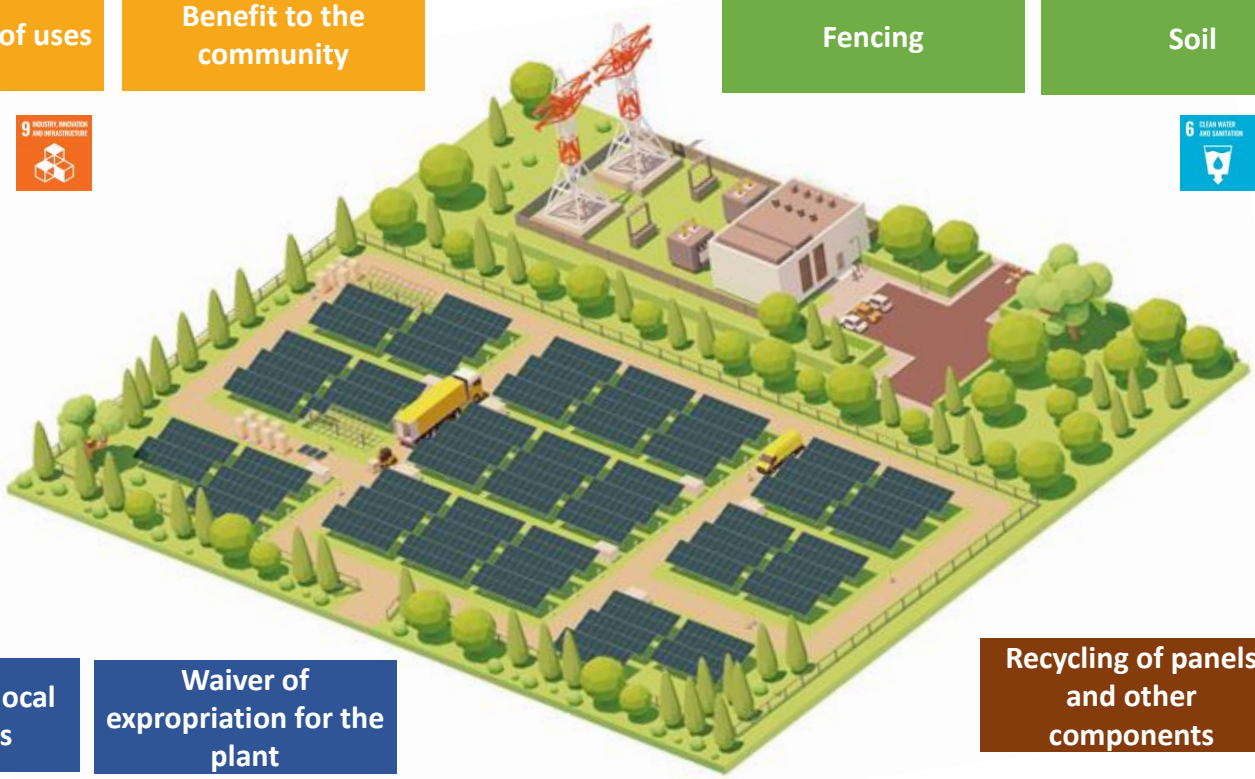
## Governance

Collaboration agreements	Dialogue with local stakeholders	Waiver of expropriation for the plant
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## Circular economy

Recycling of panels and other components	Recycling of materials	waste management
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Independent certifiers



## 52 Total Certified Plants (4,476 MW)

+ 36 Under Development (3,500 MW)

+ 16 in Operation (975.4 MW)

+ 11 under review





# Contrasted results on **BIRDLIFE**

Plants can become **REFUGE OF NATURE**

**Greater richness** in the oldest plants

**Protected species:** Sheltering place such as the alcaraván (steppe), or the “ganga Ortega” in the immediate surroundings.

**Birds of prey:** Notable presence of vultures, eagles, kites, etc.

**Comparison of control areas:** very similar (with the exception of the great bustard).

Bee-eater (Campoarañuelo)



Crested Lark (Almendralejo)



Royal Shrike (Calatrava)



Hoopoe (Totana)



Stone-curlew (Totana)



Hawk



# Contrasted results on **SOCIOECONOMIC IMPACTS**



## **EARLY COMMUNICATION, DIALOGUE WITH LOCAL COMMUNITIES & TRANSPARENCY**

- Collaboration agreement with **local authorities**
- Outreach to citizenship (Totana: open days, 200 people)

## **LOCAL JOB CREATION & EMPLOYMENT TRAINING**

- Núñez de Balboa: 1,200 jobs, 70% of **jobs in the region**
- Peñarrubia: **Training course** 8 weeks long

## **BENEFITS THAT REMAIN IN THE COMMUNITY**

- Proximity purchases
- Long-term **benefits** for local communities

## **COMPATIBILITY WITH OTHER ACTIVITIES**

- Agreements with **local farmers**: Sheep grazing/Agrivoltaics
- Carmona: Cultivation of aromatic plants for extracts used in pharmaceutical products



# UNEF – Unión Española Fotovoltaica

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[estudios@unef.es](mailto:estudios@unef.es)

<https://www.unef.es/es/sello-sostenibilidad>

[www.unef.es](http://www.unef.es)

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Europe Director Global Policy  
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# Tadas Radavičius

Sustainability Manager  
Solitek



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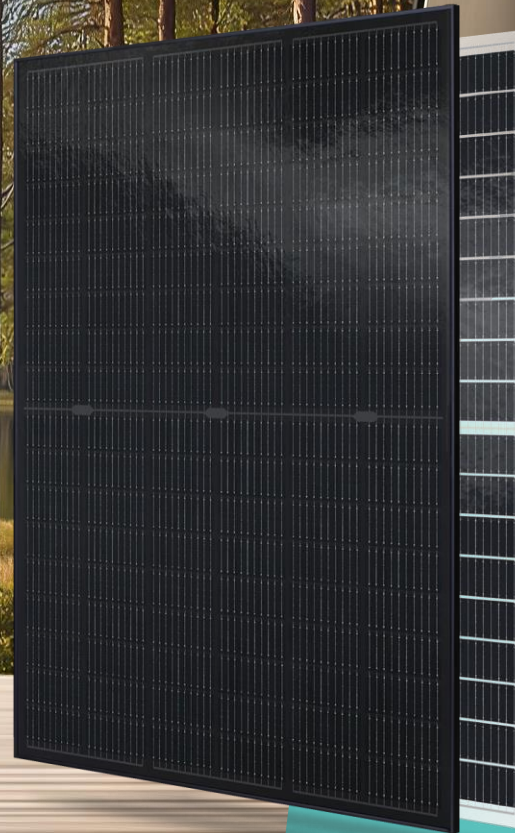


# Dual-purpose solar generation & storage solution provider

Top quality  
glass-glass  
solar panels

Smart energy  
management  
systems

Integrated  
solar  
solutions



We could cover millions  
of hectares with gigawatt PV  
parks...

OR

Utilize existing/future  
infrastructure



# Photovoltaic Noise Barriers – Double Purpose & Benefit



How?

# Huge Potential of PV Noise Barriers



**52.2 GW** on  
Germany's  
national highways



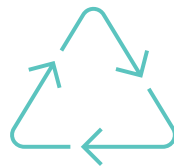
**EU highways and railroads** could  
power over **40M** citizens (size of  
Poland)

## Social benefits

# Delivering substantial value



Reduce noise pollution  
in noise-sensitive areas



Turns unprofitable  
roads/railways into self-  
sustaining system



Generates electricity  
in rural regions

Environmental  
benefits

# Delivering substantial value

EU highways and railroads could:



Generate  
120 000 000 MWh  
of green electricity  
annually



Supply energy to EV  
charging stations



Offset 24 000 000 tonnes  
of CO2 every year, equal  
to half of Germany's  
forests

# Yet, nothing comes for free...

## PV Noise Barrier Challenges:

1

Long procurement process: 1,5 years

2

Non-standartized noise barriers infrastructure

3

Grid connection issues

4

Specific requirements: passing vibration & radio-frequency tests

# So, what about the price?

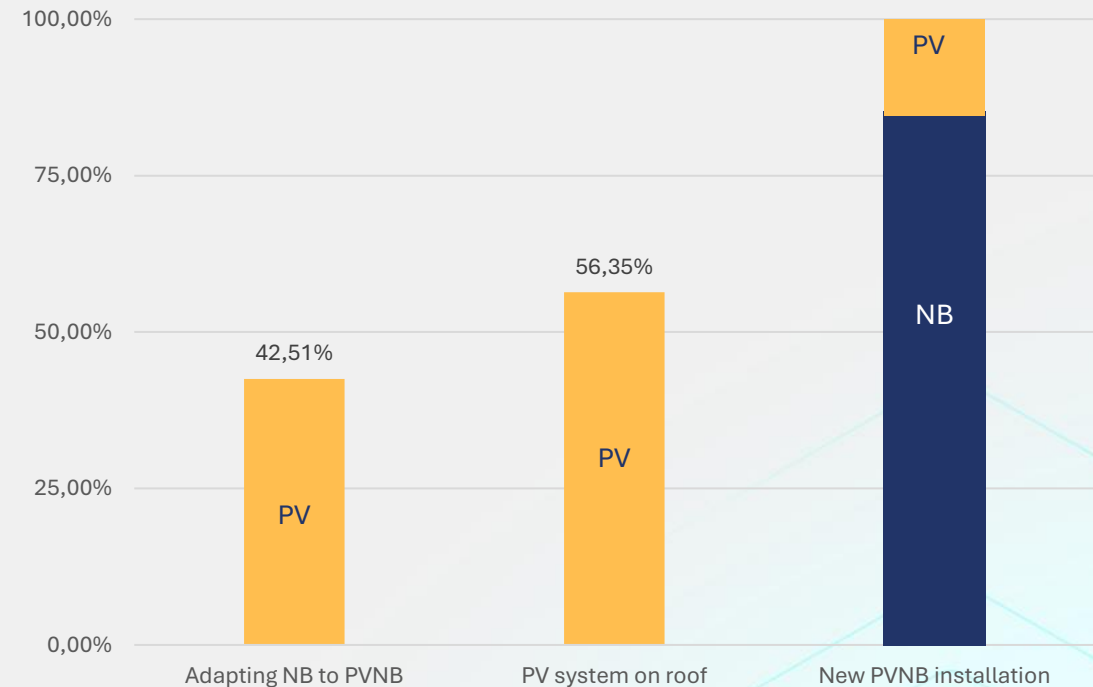
PVNB is competitive when:

1. Adapting NB to PVNB.
2. New PVNB installation.

Energy generation is 20% lower with vertical PVNB installation, yet:

1. More kWh generated in the morning/evening.
2. Grid kWh prices are higher in the morning/evening.

PVNB costs compared to other systems





Let's preserve  
the land for  
food and fun

Making EU roads and railways green!

# Going beyond the industry standard:

## Providing product circularity datasheet

Guiding our clients & end-users to handle PV modules for re-use or recycling properly

### Nice, but how to recycle your recyclable modules?

#### First, re-use

Contact second-hand PV panel buyers

**SecondSol**

**2ndlifesolar**

#### If not possible, then recycle:

Contact our dedicated recycling partner in Germany - LuxChemtech

**LuxChemtech**

#### Preparation for re-use:

please be careful and remove the module from the system without damaging it. Otherwise, it won't be possible to re-use. Carefully stack them on the pallet. The economic return is around 0,03–0,25 EUR/Wp for second-hand PV modules.

#### Preparation for recycling:

please be careful and remove the module from the system without damaging it. Otherwise, it won't be possible to recycle PV modules with the high-efficient recycling process. Carefully stack them on the pallet.

### Material composition

	Framed glass-glass module	Non-framed glass-glass module
Weight	24–35 kg	30–32 kg
Power	370 – 505 Wp	370 – 435 Wp
Aluminum frame	8,7% – 12,3%	none
Front glass	38,8% – 43,4%	46,4% – 46,6%
Back glass	38,8% – 43,4%	46,4% – 46,6%
Junction box	0,25% – 0,35%	0,26% – 0,28%
POE encapsulant film	2,69% – 3,8%	2,94% – 3,1%
Solar cell	1,98% – 2,8%	2,1% – 2,2%
Copper ribbons	0,62% – 0,88%	0,67% – 0,71%
Cables	0,47% – 0,66%	0,5% – 0,53%

### Recyclability

Recycled glass content	35%
Recyclability	95–98%
Energy recover (encapsulation + recycling efficiency loss)	2–5%

### Sustainability

#### Sustainability certifications of SoliTek glass-glass panels



Circularity certificate Cradle to Cradle

Industry leader

Gold level



Digital product passport SundaHus

Industry leader

A level



Digital product passport Byggarbetsmyndigheten

Among the few other

Accepted level



Globally recognized sustainability assessment platform EcoVadis

Among the few other

Silver level

#### What do I get by choosing SoliTek panels with these sustainability certificates?

Extra 7 points

LEED

Extra 5 points

WELL

Extra 2 credits

BREEAM

#### Lifecycle assessment\*

(Cradle-to-gate emissions) Scope 1–3

SoliTek

Industry average

**808–858** **<540** **1050**  
kg CO<sub>2</sub> per kWp on request kg CO<sub>2</sub> per kWp

\*(Calculations based on CERTISOUS methodology)

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# Voting

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# THANK YOU



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