



Engineered in Europe.  
Made for the World.

REVOLUTIONARY  
PHOTOVOLTAIC-THERMAL MODULES (PVT)

10/10/2023

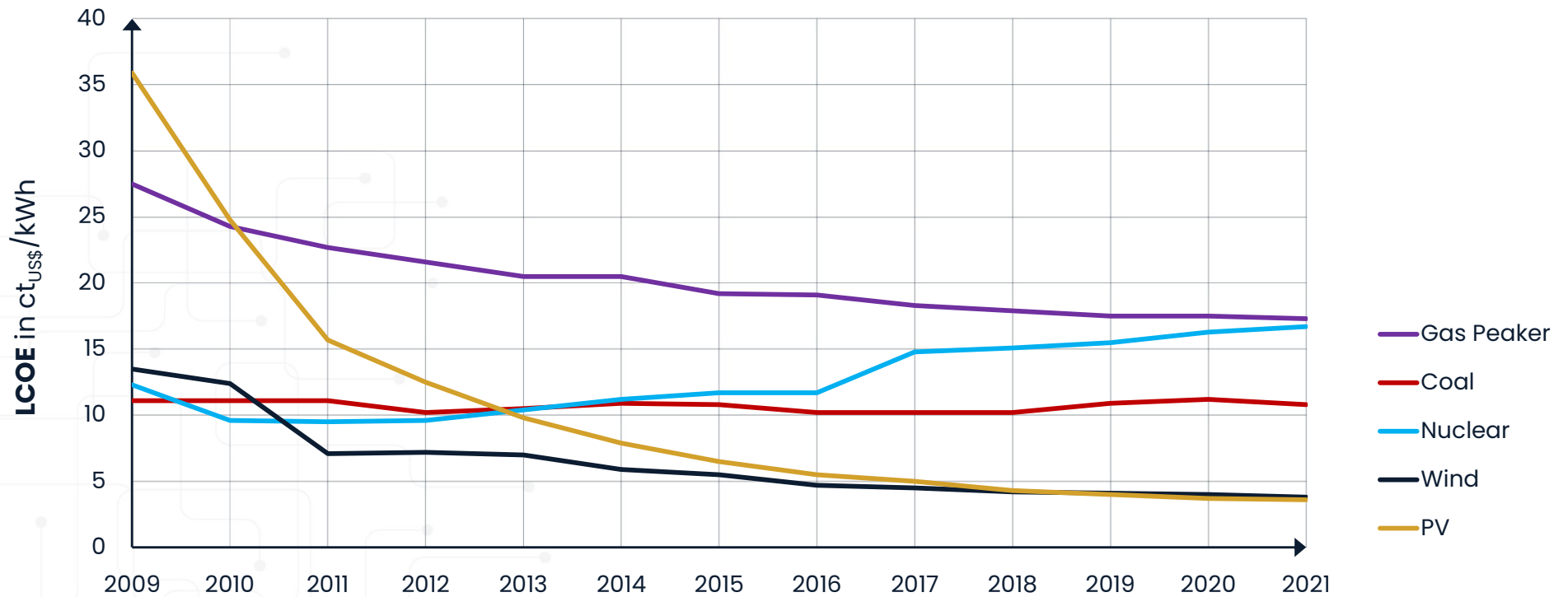
Your Energy Alternative

100% Independent

100% Green



# Renewable energy sources **LEVELIZED COSTS**



Source: Our World in Data / LAZARD. *Lazard's Levelized Cost of Energy Analysis – Version 16.0.* Hamilton, 2023.

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## About us **WHO WE ARE**

### Sunmaxx PVT

- Leading global developer and producer of PVT system that are suitable for mass production
- Combining solar and automotive expertise
- Vision of completely climate-neutral residential, office, and industrial buildings
- Active in Dresden since 2021

### Dr Wilhelm Stein, CEO



Dr Stein is a seasoned Executive with record of achievement in Cleantech and Semiconductor industry. He is a solar veteran with almost 20 years in the industry.

[linkedin.com/in/wilhelmstein](https://www.linkedin.com/in/wilhelmstein)

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# Photovoltaic thermal modules THE TOTAL ENERGY SOLUTION

FOSSIL INDUSTRY

**Gas firing**  
Efficiency  
ca. 30 %



**Combined heat and power (CHP)**  
Efficiency  
> 60 %

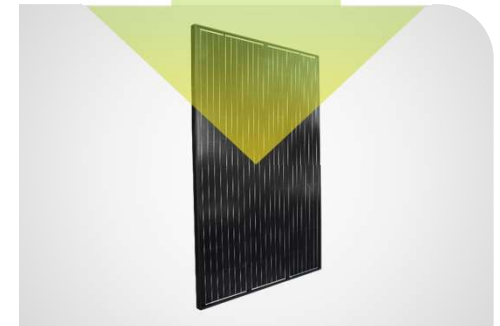


RENEWABLE INDUSTRY

**Photovoltaic modules (PV)**  
Efficiency  
ca. 20 %



**Photovoltaic thermal collectors (PVT)**  
Efficiency  
> 80 %





# Photovoltaic thermal modules PVT VS PV (1 MWp installation)

## Photovoltaic module (PV)

Efficiency  
**≈ 20 %**

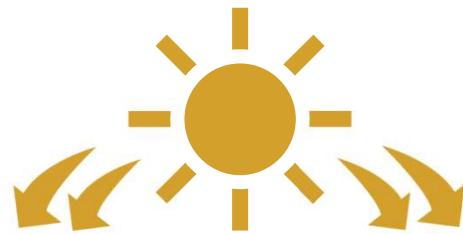
Electrical yield  
**1,000 MWh/year**

Thermal yield  
**0 MWh/year**

CO<sub>2</sub> savings  
**500 t/year**

Conversion factor Germany  
Electrical: 0,50 kg CO<sub>2</sub>/kWh, thermal: 0,25 kg CO<sub>2</sub>/kWh\*

\* Note: Conversion factor given for natural gas, however in reality it is much higher, since there is additional leakage during exploration and transport leading to direct CH<sub>4</sub> emission (80 x stronger climate gas than CO<sub>2</sub>)



## Photovoltaic thermal module (PVT)

Efficiency  
**> 80 %**

Electrical yield  
**1,100 MWh/year**

Thermal yield  
**2,000 MWh/year**

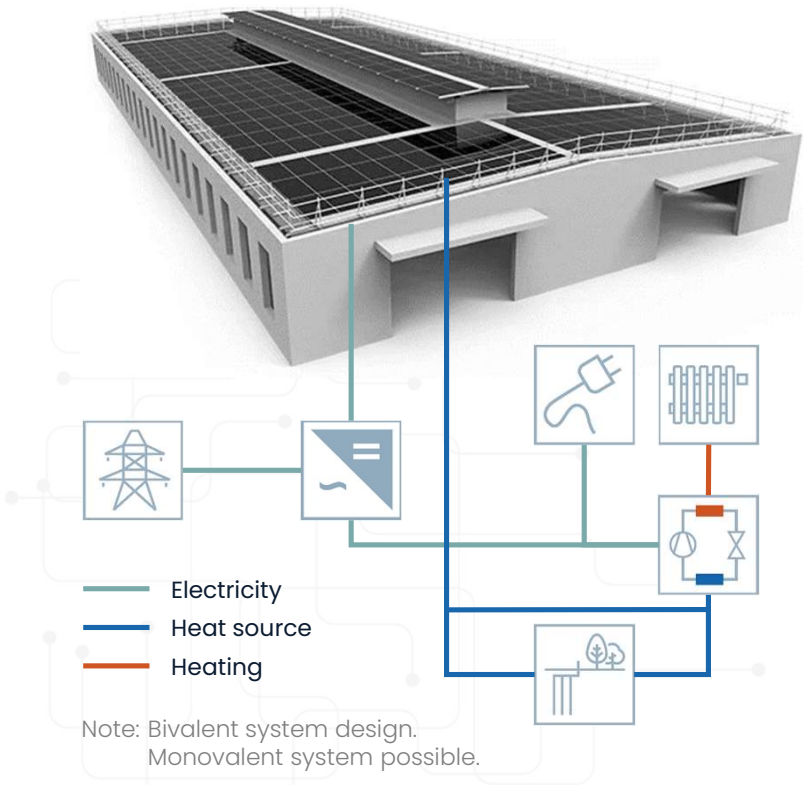
CO<sub>2</sub> savings  
**1,050 t/year**

**30,1 °C**

**22,9 °C**



# Photovoltaic thermal modules IN YOUR ENERGY SYSTEM



## PVT modules

Provide heat and electricity with > 80 % efficiency

## Heat pump

Needs electricity and source heat

## Earth probes

Store solar heat from summer to winter (seasonal)

**The most energy-efficient, most sustainable and most reliable renewable heating**

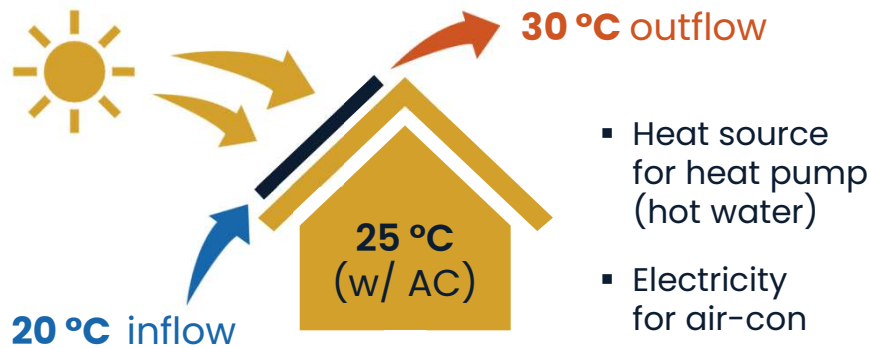


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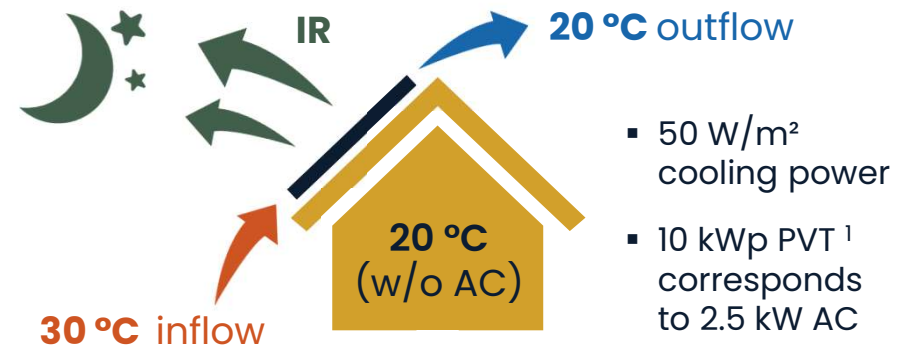


# Passive cooling with PVT RADIATION OVER NIGHT (Southern Europe)

Day: 40 °C



Night: 30 °C



- Sunmaxx PVT modules cool the building overnight, more comfort for sleeping
- IR radiation into the sky overnight, only circulation pump needs to run
- Building remains cool during the day due to a cool morning starting temperature
- **Significant reduction in the electricity bill for cooling**

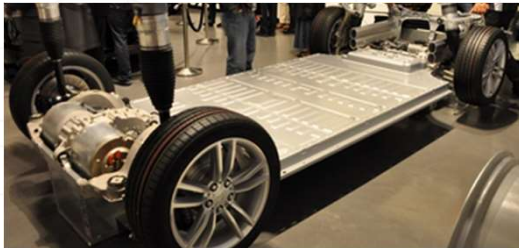
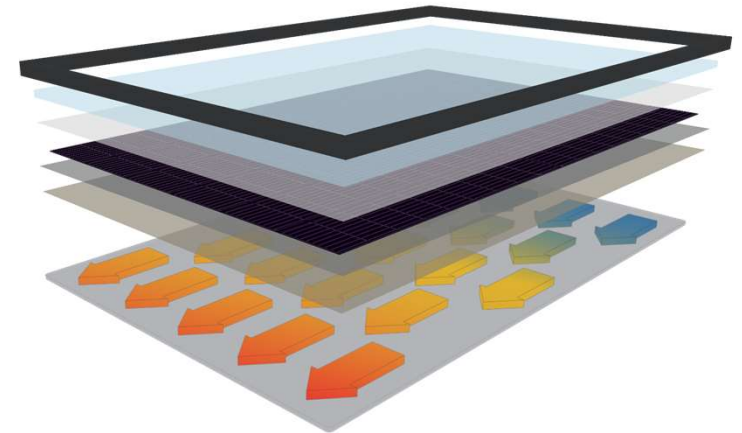
<sup>1</sup> 25 modules or 50 m<sup>2</sup>



Our module  
**DEVELOPED WITH MAHLE**



**MAHLE**  
World Leading  
Electric Car Cooling Tech



**First PVT-Module**  
Integrating Automotive  
Thermo-Management Heat Converter

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A photograph of two men in a factory setting, leaning over a large, dark, rectangular solar panel. The man on the left is wearing a black long-sleeved shirt and white gloves, while the man on the right is wearing a light green long-sleeved shirt and white gloves. They are both looking intently at the panel. The background shows industrial equipment and a clean, well-lit environment.

**PV Magazine International**  
March 2023

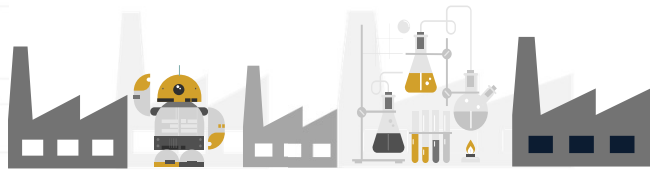
“ German  
manufacturer  
achieves 80 %  
overall efficiency  
with new PVT  
solar module ”



# Our customers **MARKET SEGMENTS**

## COMMERCIAL & INDUSTRIAL

Replacing  
**Fossil fuels on  
industrial production sites**



**Industrial customers**

**B | BRAUN**

**MAHLE**



## DISTRICT HEATING

Replacing  
**Fossil-based high-  
temperature heating network**



**Energy provider and public services**  
low-temp. district grid solutions



## RESIDENTIAL

Replacing  
**Air heat pumps with  
high electricity demand**



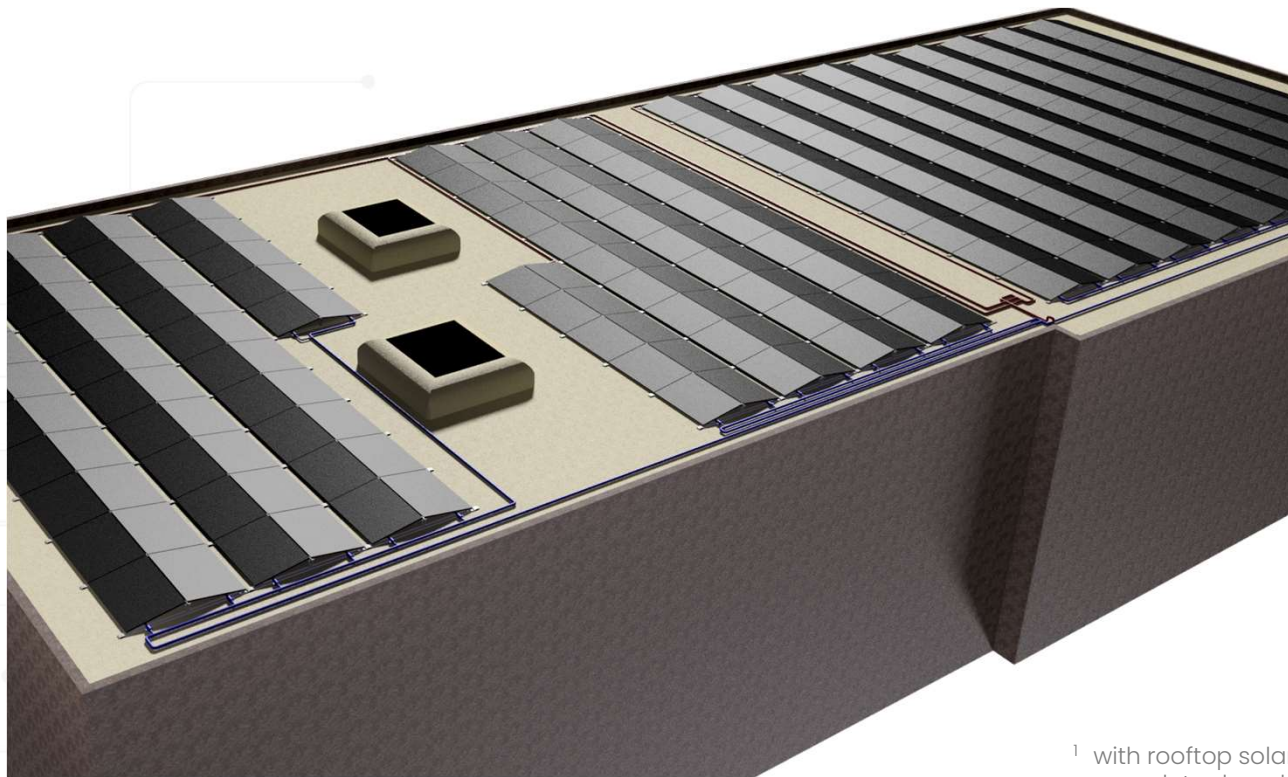
**Wholesalers to installers and  
partner network**



Wagner Solar



## Our customers **INDUSTRIAL**



- Production plant
- 5.4 GWh/year electricity  
1.9 GWh/year heat
- 1,400 pcs PVT, 560 kWp
- CO<sub>2</sub> savings: 900 t/year<sup>1</sup>
- Planned for Q1/2024
- Invest w/o PVT: €10m  
w/ PVT reduced to €4m
- Amortisation 7-9 years
- **Levelized cost of heat  
LCOH = 6 - 8 ct<sub>€</sub>/kWh**

<sup>1</sup> with rooftop solar only (stage 1), with PV only 450 t/year.  
complete decarbonisation with additional free field installation (stage 2).

sunmaxx. Our customers  
**INDUSTRIAL**

**B | BRAUN**  
SHARING EXPERTISE



- Production plant
- 1,025 pcs PVT, 410 kWp
- Focus:  
maximum scalability
- Heat pump and  
seasonal storage
- 80 °C process heat
- **Amortisation  
after ca. 10 years**

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# sunmaxx. Our customers **COMMERCIAL**



- Drilling company
- 36 pcs PVT, 14.4 kWp
- Regeneration of earth probes
- **No gas needed in future**

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## Our customers **BUILDING RENOVATION**



- Neighbourhood redevelopment in Regensburg
- 1,5 GWh/year electricity  
2,1 GWh/year heat
- 352 pcs PVT, 141 kWp
- Complete renovation of buildings and heating systems
- Heat networks 4.0
- **Winner of German Building Award 2022**

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## Our customers **RESIDENTIAL**



- Single family home near Regensburg
- Replacing existing PV
- Bivalent system with earth collectors
- Complete decarbonisation
- 20 pcs PVT, 8 kWp

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## Suurstoffi, Switzerland **PROVEN SUCCESS OF PVT**



- One of the largest PVT installations worldwide
- Installed in 2014, up and running
- project developer now in **Sunmaxx** team
- Low-temperature district heating
- 2,200 pcs PVT  
2,000 kW<sub>th</sub>, 600 kWp
- **Energy independence**

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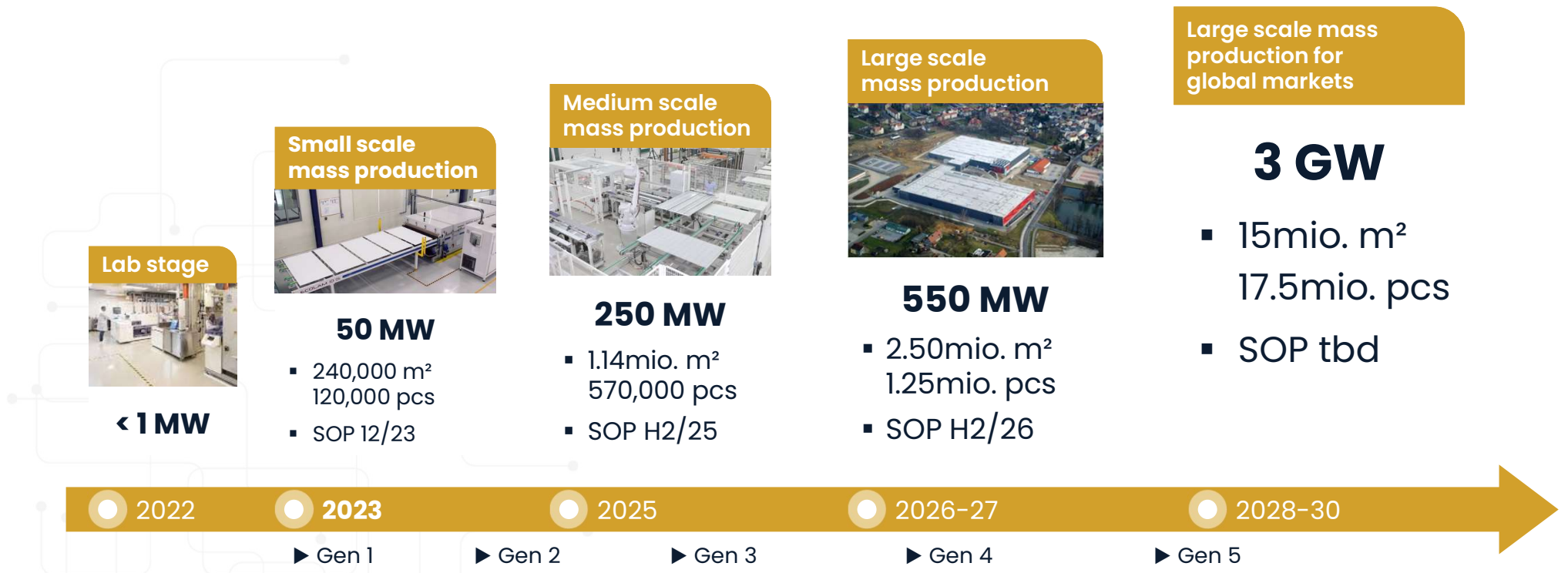
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# Roadmap to large scale OUR WAY TO MASS PRODUCTION



Note: German market scenario PV: 20 GW 2027 (BMW), Worldwide PV: 255 GW 2024 (Solar Power Europe)

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Efficiency Beyond Limits   Your Energy Alternative   100% Green   100% Independent

# Decarbonisation? It's Sunmaxx

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