

A close-up, angled view of a solar panel. The panel is dark blue/black with a grid of cells. A prominent red stripe runs diagonally across the panel. The background is dark and textured.

Bringing back Photovoltaic cells and modules manufacturing to Europe with high quality products

Madlen Apel

Head of Product Management

Technology Briefing Photovoltaics | 1. December 2022

Meyer Burger – almost 70 years of experience, including 40 years in PV

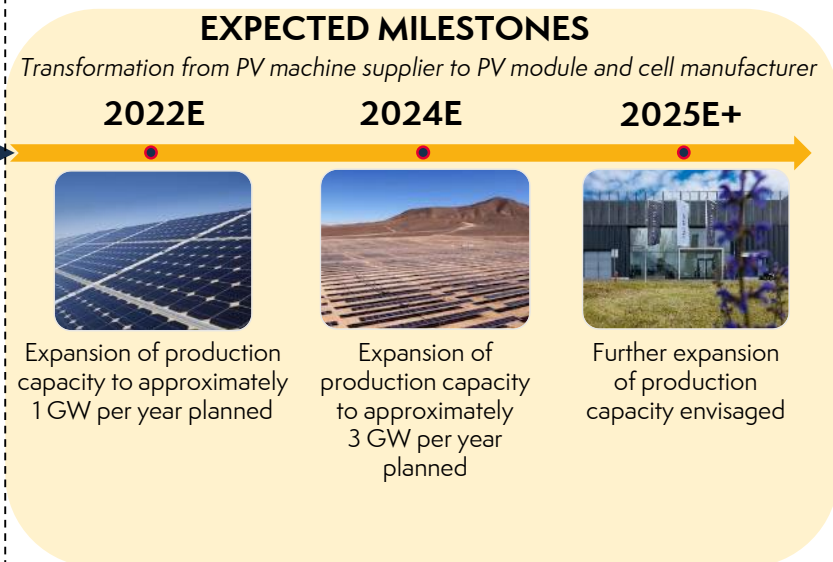
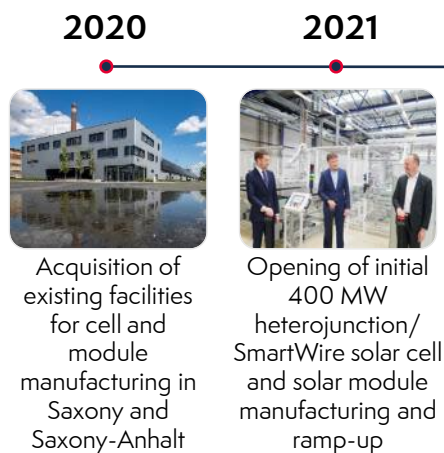
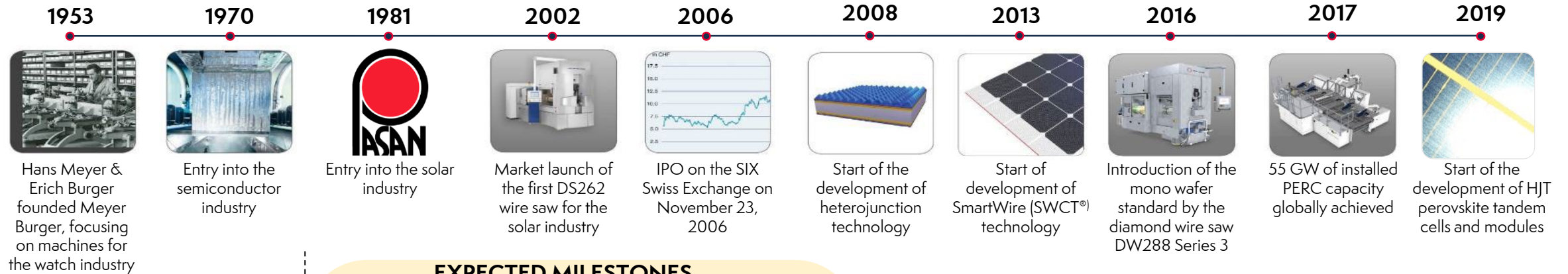
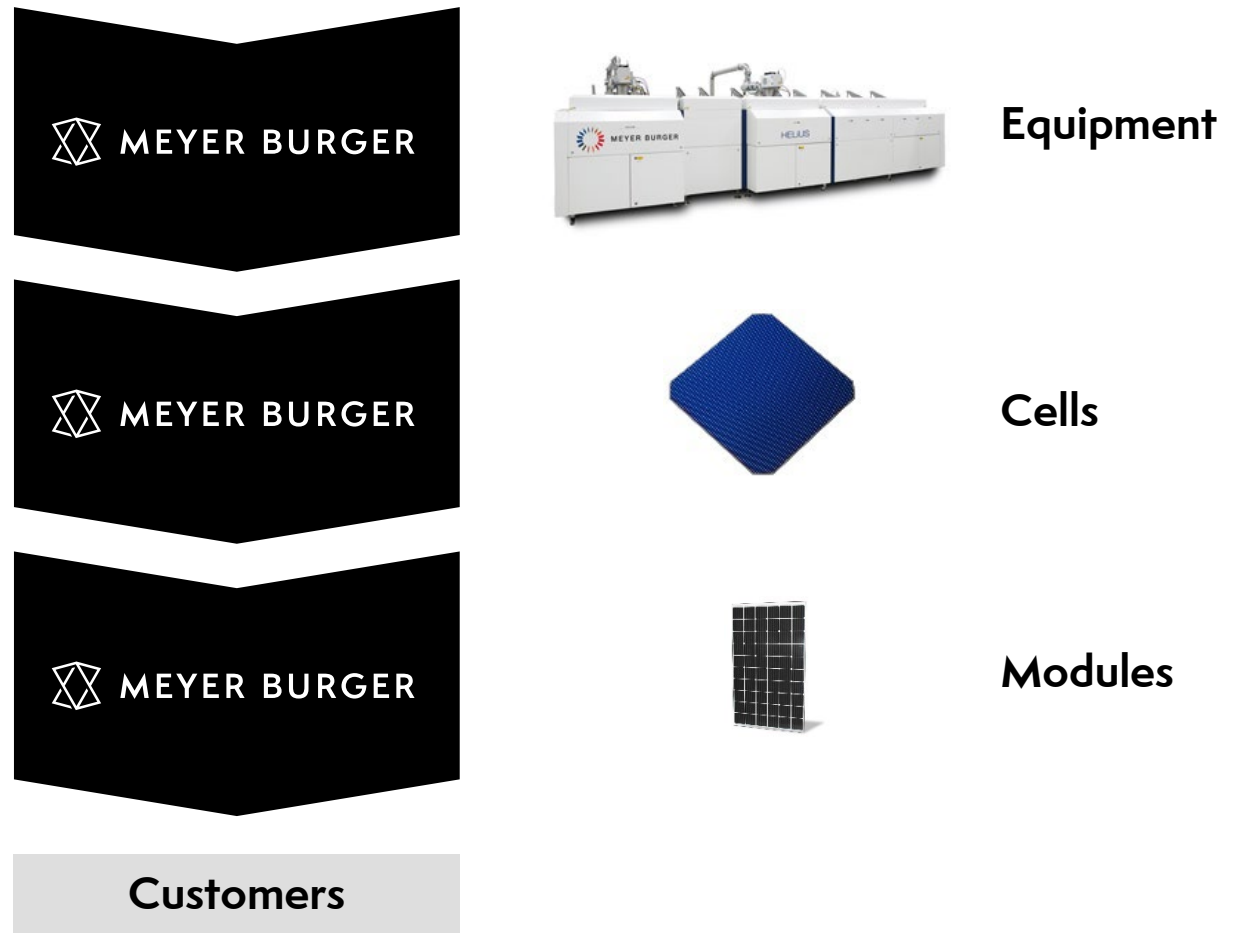


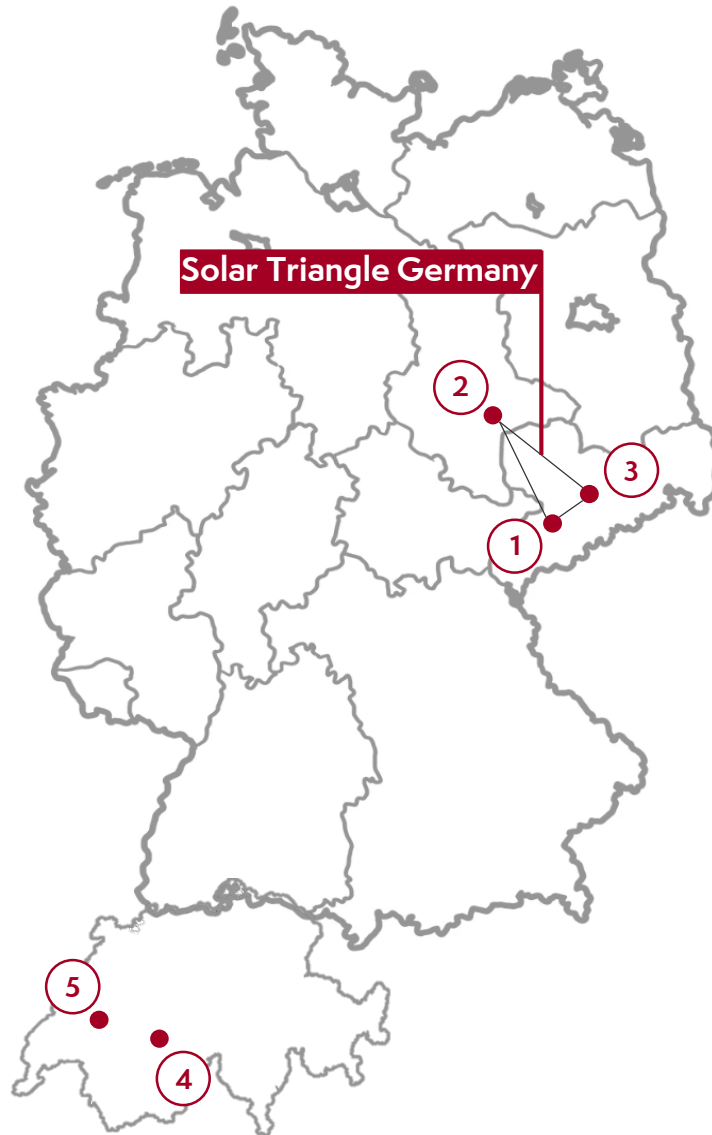
Photo: Grand opening ceremony solar cell factory Thalheim, May 18, 2021 with Saxony-Anhalt Prime Minister Dr. Haseloff (left), MBTN CEO Gunter Erfurt and Saxony-Anhalt Minister Prof. Armin Willingmann

New captive business model since 2020

A sustainable business transformation

- Leading R&D with in-house process and equipment development
- Equipment and technology exclusively for Meyer Burger's own use
- Safeguards intellectual property and competitive advantage
- Captures value of technology for Meyer Burger
- Creates strategic independence

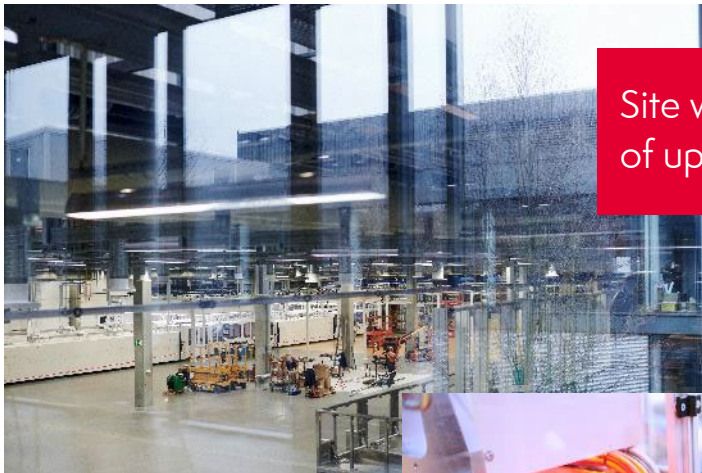




- 1 Technology and Production Equipment Center**
industrialization of latest-generation solar cell and module technologies and production equipment manufacturing (Hohenstein-Ernstthal, Germany)
- 2 Solar Cell Production**
HJT solar cell production with an annual capacity of 400 MW, which will be increased to several GW in further expansion stages (Bitterfeld-Wolfen, Germany)
- 3 Solar Module Production**
High-performance solar module production with an annual capacity of 400 MW, which will be increased to up to 1 GW in a further expansion (Freiberg Germany)
- 4 Solar Module Research & Development Center**
R&D Center for solar module development, especially for SmartWire Connection Technology (SWCT™) (Gwatt, Thun, Switzerland)
- 5 Solar Cell Research & Development Center**
R&D Center transferring technologies from laboratory to mass-production scale (Hauterive, Switzerland)

Our two PV plants are highly modern and fully-automated production facilities in Saxony-Anhalt and Saxony

Cell production – Thalheim (Bitterfeld-Wolfen)



Site with expansion potential of up to ~5 GW



27.000 m² of space in a former solar cell production line

Module production – Freiberg



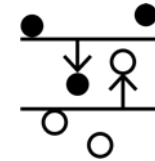
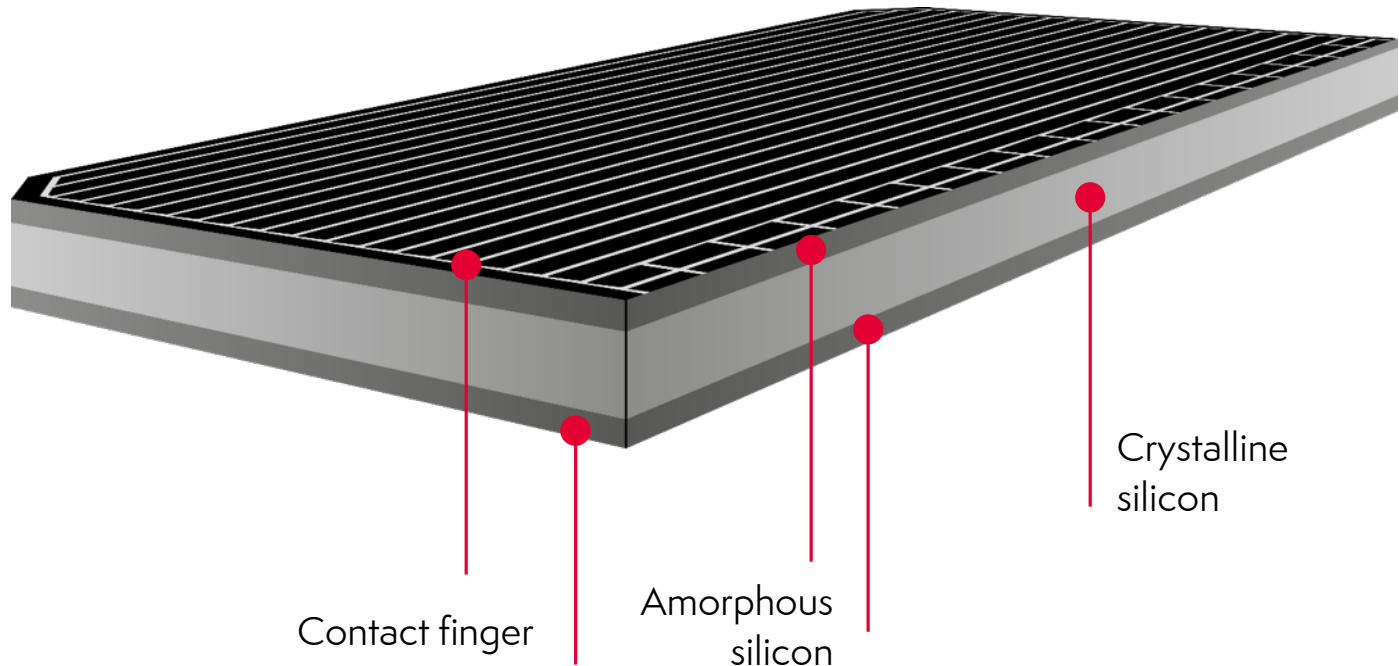
Europe's biggest solar modul plant with an annual capacity of 1 GW

33,000 m² including state-of-the-art logistics and distribution center



The Heterojunction Technology (HJT)

Made in Germany
Designed in Switzerland



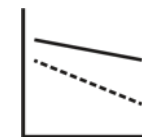
Highest efficiency due to reduced recombination losses at the surface



Higher yields on hot days due to particularly low temperature coefficients



More performance due to highest bifacial factor for energy generation on both sides



Higher residual power due to lower degradation of the solar cells

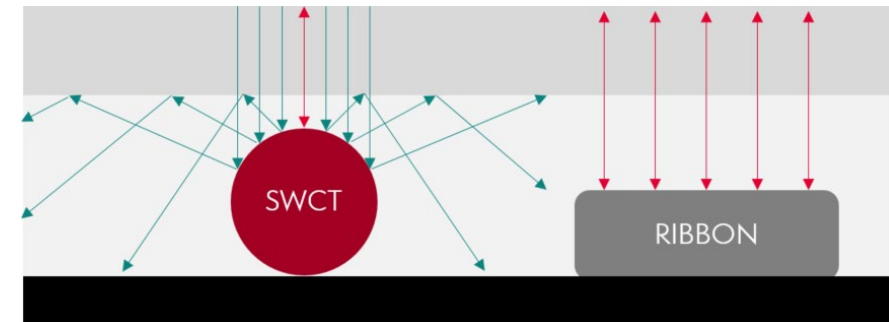
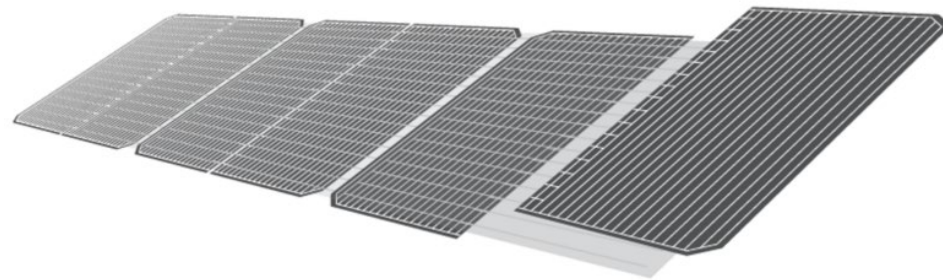
SmartWire Connection Technology (SWCT™)

Made in Germany
Designed in Switzerland



Patented technology (by Meyer Burger) for perfect optical appearance

- SWCT™ for the electrical interconnection of solar cells in a solar module
- For ideal electrical contacts and best optic appearance: busbar-less cell design
 - Wires are integrated in the encapsulant foil
 - ideal conduction of electric current
- Thin round wires minimize shading losses
- Optimized cell stability and less susceptibility for micro cracks



SmartWire Connection Technology (SWCT™)

Made in Germany
Designed in Switzerland



Patented technology (by Meyer Burger) for perfect optical appearance

- Energy saving due to combination of process steps:
 - Electrical interconnections are formed during the lamination process
 - Low temperature process: minimizes thermal stress on the cell



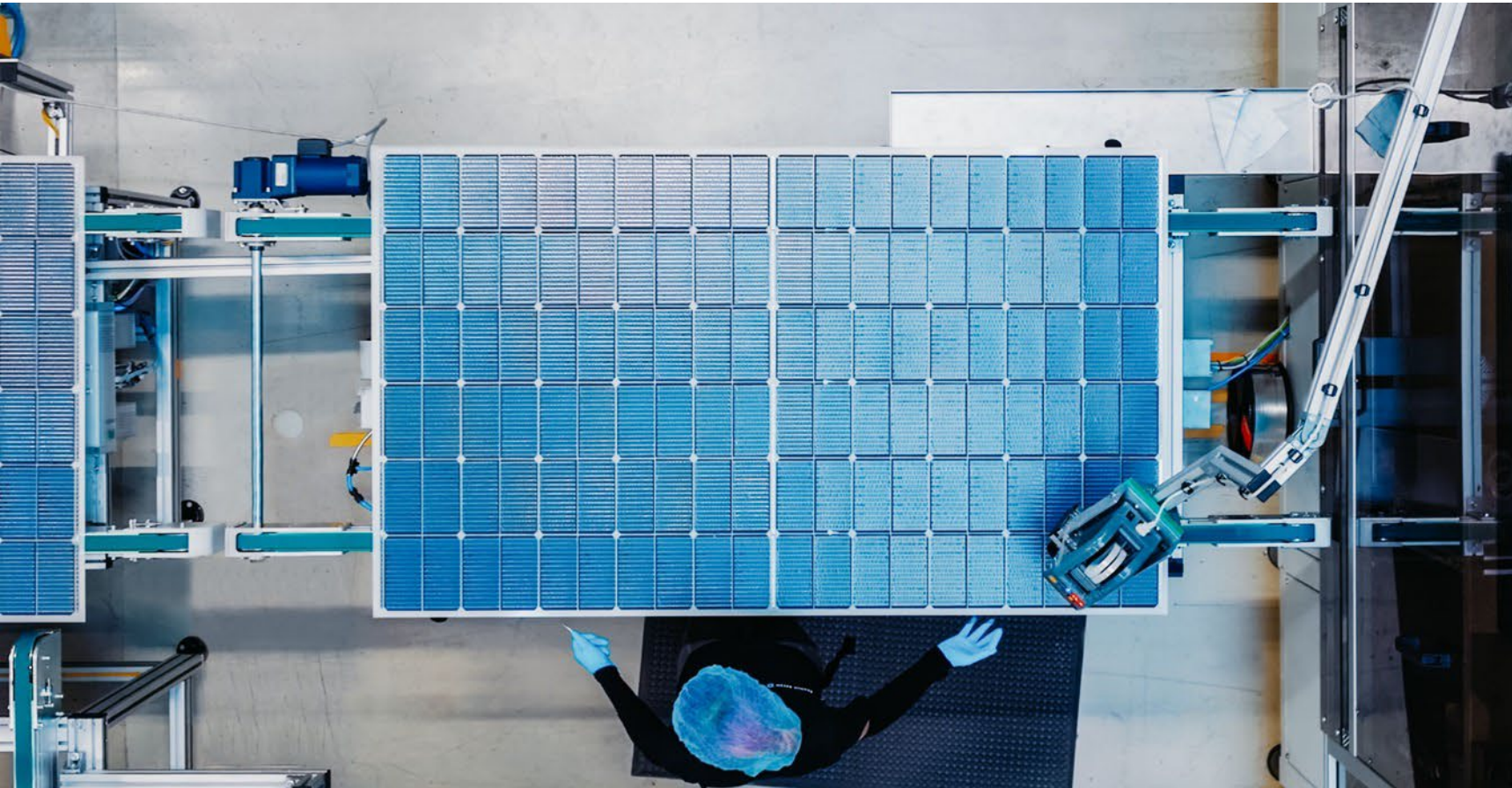
- Environmental friendly: lead-free
- Reduced silver consumption due to combination of HJT cell and SWCT™
 - 65 % less silver consumption as for standard 5 BB half cell



Lead-free Less silver



The Heterojunction SmartWire Connection Technology



- High cell efficiency: $>25\%$
- Particularly low degradation: $<0.25\%$ p. a.
- Extremely low temperature coefficient: $0.26\%/K$
- Market leading bifacial factor: $90\pm 2\%$
- Higher stability due to gentle material processing
- Free from toxins



Meyer Burger modules: same basics

- 120 half-cells, mono *n*-Si, HJT with SWCT™
- Electrical connection via SWTC™
- Positive sorting (0 / + 4.99 W_p)
- Market leading temperature coefficient for power (-0.259 %/K)
- 3 bypass diodes
- Front cover: solar glass with anti-reflective coating
- Frame: 35 mm, black anodized aluminum
- Lead-free
- Designed in Switzerland, Made in Germany



Glass-Foil-Modules



Made in Germany
Designed in Switzerland



High-performance heterojunction solar module with SmartWire Connection Technology (SWCT™)

MEYER BURGER BLACK

For maximum yields combined with outstanding design.

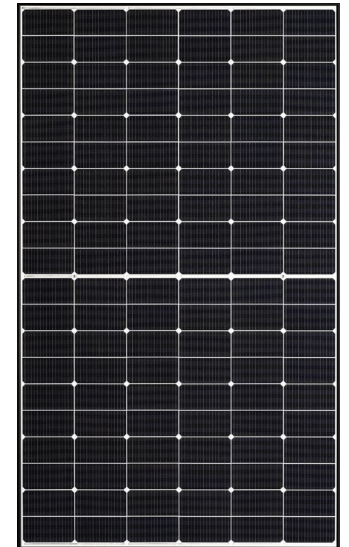
Cell technology	120 half-cells, mono <i>n</i> -Si, HJT with SWCT™ bifacial cell technology
Power classes	375 - 395 W _p
Efficiency	up to 21.5 %
Dimensions	1767 mm x 1041 mm x 35 mm
Weight	19.7 kg
Back cover	Black water-barrier backsheet
Max. system voltage	1000 V



MEYER BURGER WHITE

For higher energy yield over the same area.

Cell technology	120 half-cells, mono <i>n</i> -Si, HJT with SWCT™ bifacial cell technology
Power classes	380 - 400 W _p
Efficiency	up to 21.7 %
Dimensions	1767 mm x 1041 mm x 35 mm
Weight	19.7 kg
Back cover	White water-barrier backsheet
Max. system voltage	1000 V



Glass-Glass-Module



Made in Germany
Designed in Switzerland

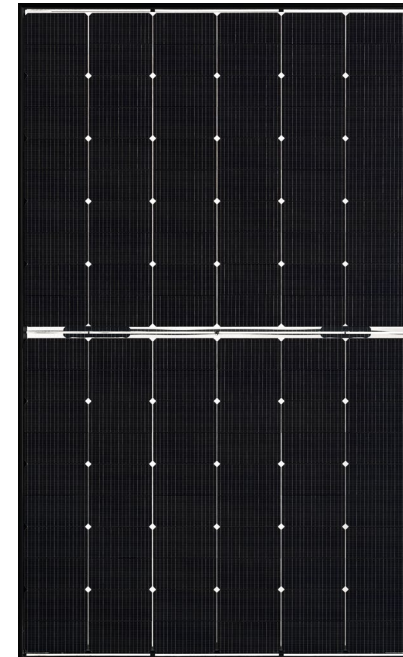


Bifacial high-performance heterojunction solar module with SmartWire Connection Technology (SWCT™)

MEYER BURGER GLASS

For maximum stability and utilizing the full potential of the sun from all sides.

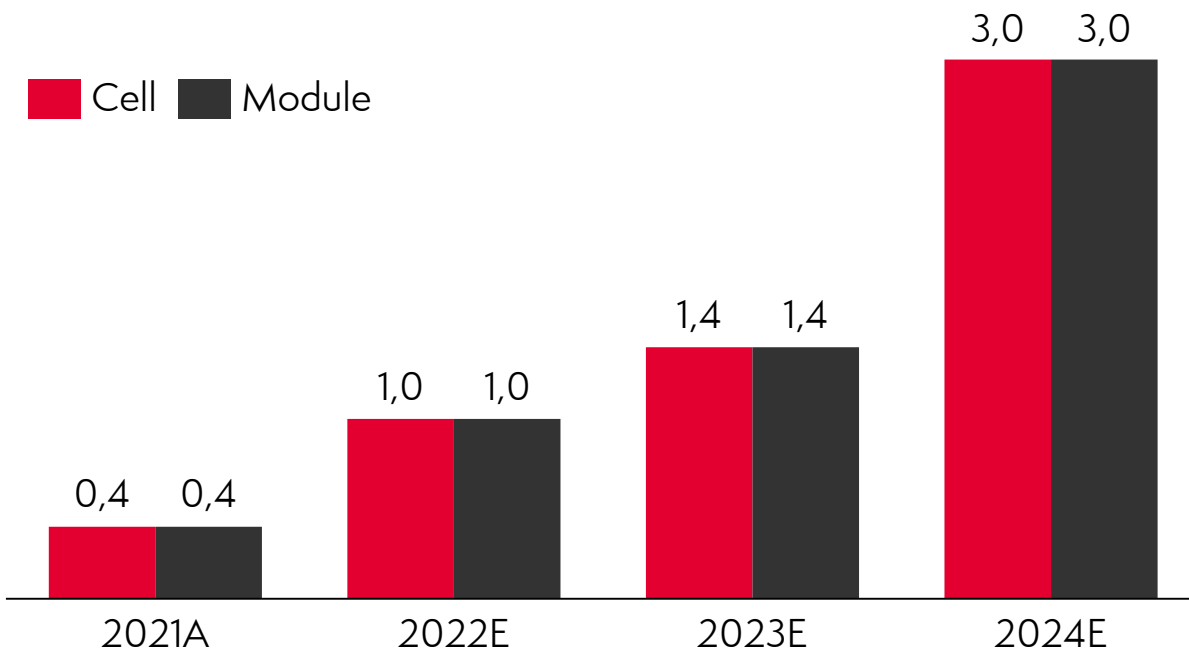
Cell technology	120 half-cells, mono <i>n</i> -Si, HJT with SWCT™ bifacial cell technology
Power classes	370 – 390 W _p
Efficiency	up to 21.8 %
Bifaciality factor	90 %
Dimensions	1722 mm x 1041 mm x 35 mm
Weight	24.4 kg
Back cover	Solar glass, 2.0 mm
Max. system voltage	1500 V



Following the successful build-up of our 0.4 GW capacity, we are continuing our international capacity growth

Cell and module production

Meyer Burger planned installed nameplate production capacity, year-end [GW]



Roadmap:

- Approximately 1 GW cell and module nameplate capacity expected to become available in Thalheim and Freiberg, Germany, respectively, in 2022
- A further ~0.4 GW cell and module capacity expected to become available at the same German sites in 2023
- Expansion by another ~1.5 GW of cell production in Thalheim by 2024, Germany and module production in Goodyear, Arizona planned (thereof up to 1 GW for long-term offtake with DESRI)

Sequentially entering market segments, as we grow available volume

Target segments (entered sequentially)

1 Residential rooftop¹



- Main market segment
- Fully established
- Selling through our distributor network

2 Commercial & industrial rooftop



- Pursuing high-value and strategically relevant projects from Q2/2022
- Won iconic SC Freiburg 2.4 MW stadium project, already installed
- Planning to expand sales team and customer base

3 Utility-scale



- Modules to be produced in Goodyear, AZ
- First offtake agreement signed with DESRI (at least 3.75 GW from 2024–2029)
- Discussing further long-term agreements with potential strategic partners

¹) Includes small commercial systems

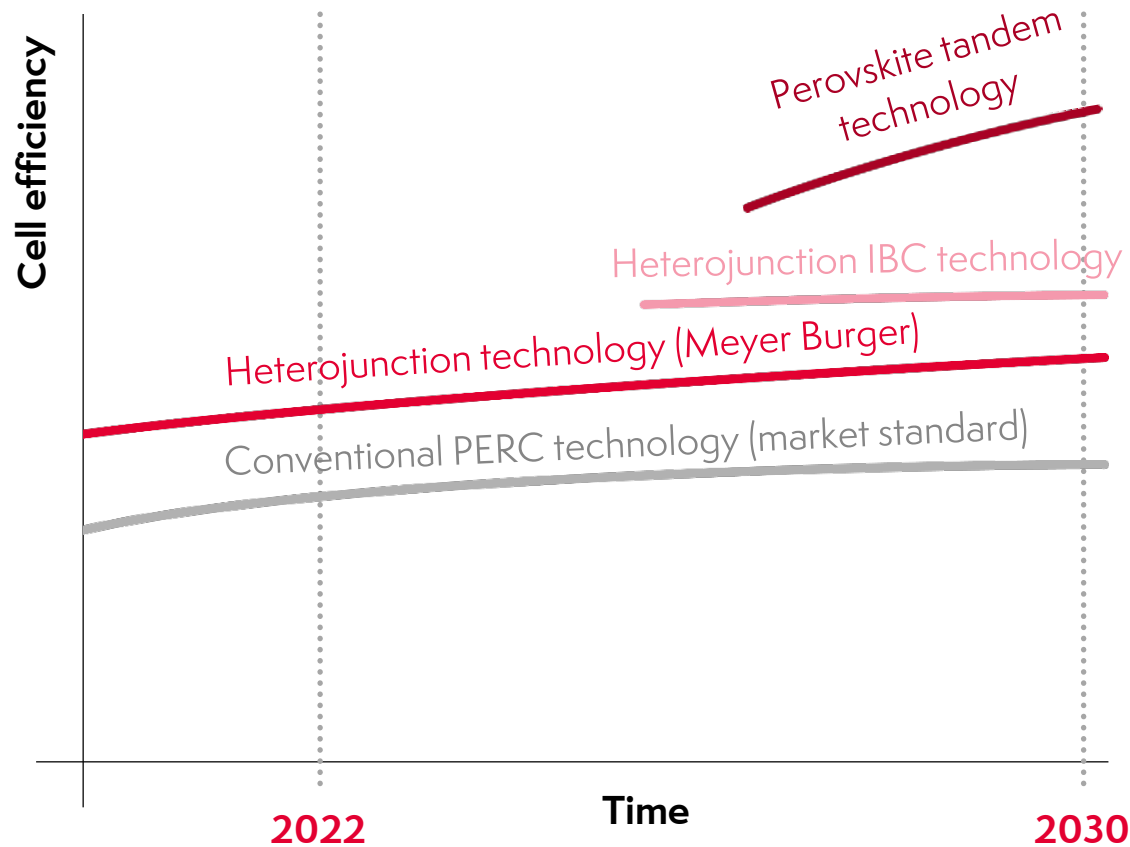
The next-generation heterojunction technology in the works according to our communicated R&D roadmap



Development on track:

- Full-size 60 cell module prototypes using next-generation heterojunction cells (interdigitated back contact) built in May 2021 at Meyer Burger Switzerland
- Proof-of-concept (lab-size SmartWire module) of 24.7% aperture efficiency (externally confirmed in Feb. 2021 by ISFH Hamelin, Germany)
- In-house development of equipment for next-generation cells and modules based on heterojunction technology platform
- Bifacial version envisaged for use in utility projects
- **Commercial module efficiency of >23% expected in mass manufacturing**

Leading the next generation of PV cells and modules



- PERC technology has reached its limits
- Meyer Burger Heterojunction technology is highly competitive today and offers considerable optimization potential in the future
- Meyer Burger drives development of HJT IBC and perovskite tandem solar cells with efficiencies of over 30 percent together with CSEM



With the right energy, anything is possible.