

AFFORDABE high Bifacial c-Si Agri PV + Battery

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Gate-East Garching

Solagria BAY BG, Sofia

Presentation Pazardzik Bulgaria

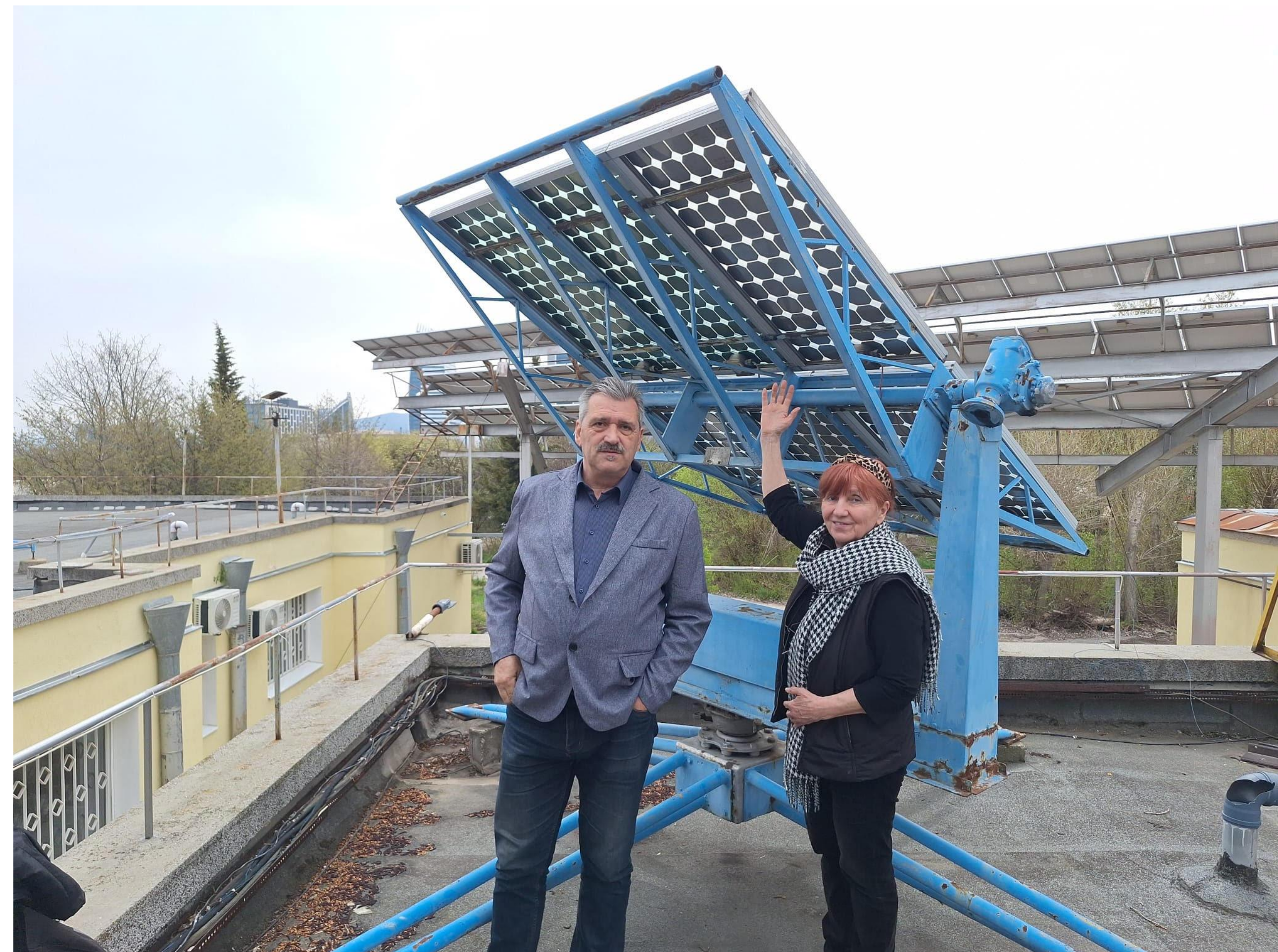
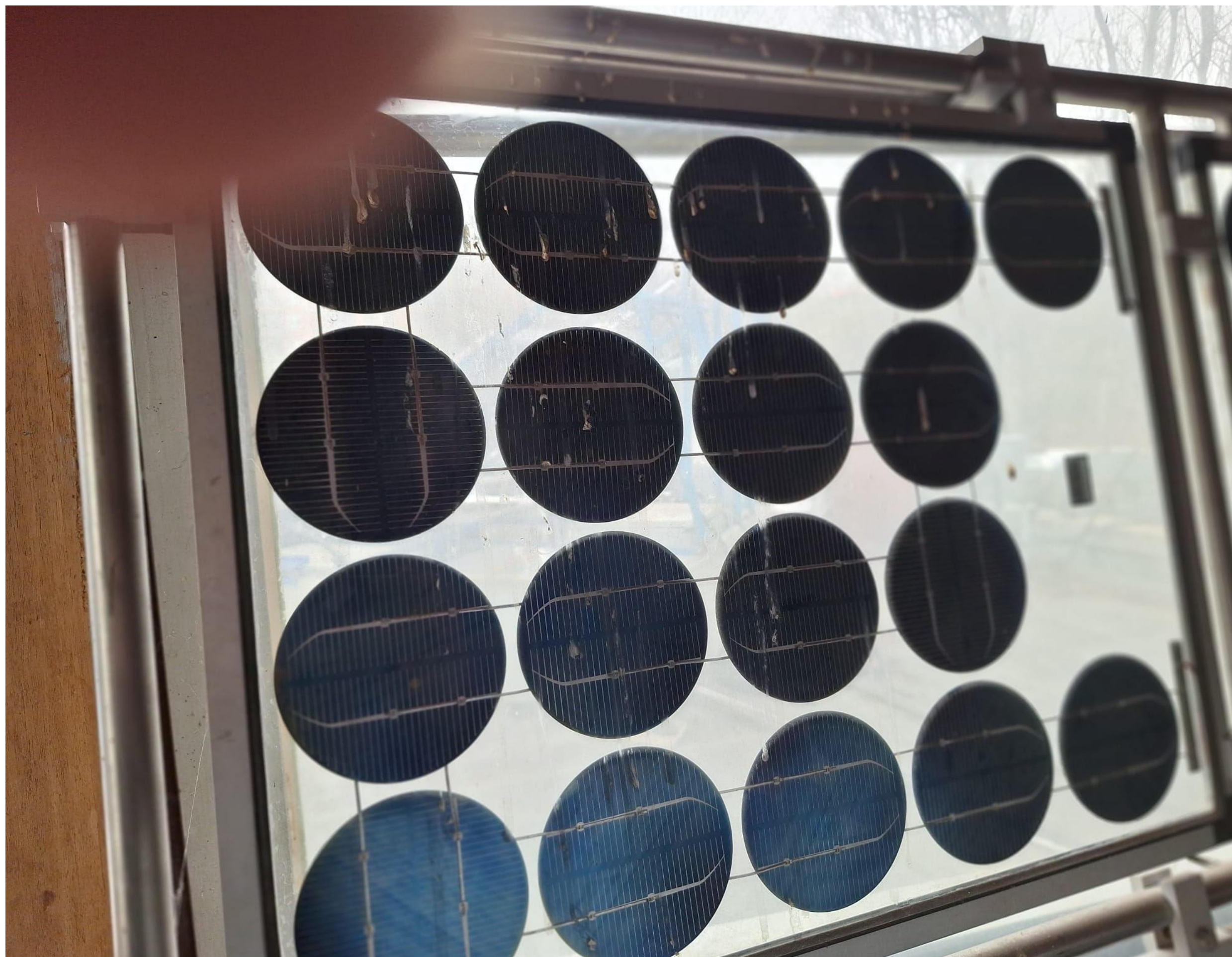
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1. MILESTONES - c-Si PV

- Ultra clean Si, **1954**, Wacker&Siemens in BAY
- First c-Si PV cells, **1956**, Bell Labs USA
- First bifacial c-Si PV cells for space, **1974**, Prof. N. Burdina, Russia
- First bifacial c-Si PV cell terrestrial, **1976**, A. Luque, Isofoton, Spain
- SENES BAS, **1977**, BG; NREL USA, **1977**, USA
- First very high efficient c-Si Cell, **1983**, Prof. M. Green, UNSW Australia
- Renewable Energie Source Act EEG, **2000**, Germany



MILESTONES - c-Si PV

- AFFORDABLE Agri PV- Vision, **2002**, V. Koch Gate-East Garching, Germany
- Affordable 2mm Thermaly Toughened Antireflection Solar Glass, **2010**, Lisec, Austria
- High Efficient (more than 22%) High Bifacial **HJT** (more than 90%, wr), **2015**, Hevel Russia, Meyer Burger D & CH
- **Low Cost**, 25% efficient, 95% bifacial HJTc-Si cell, **2023** Hevel, China
- Multicut, high efficient, high bifacial, low cost cell **HJT** c-Si cell, **2026**, **Dinto Solar** China
- **ABC** bifacial, high efficient, low cost, **2026**, **AIKO** and Longi China
- Mounting Systems, stationary and tracking- galvanized steel, no milestones so far!

Cost Reduction wanted and expected, is a chance for Mega Business.

Working with Dr. Vesselinka Koch



Making Agri-PV Affordable and Scalable

FROM TECHNOLOGY TO FIELD

HJT

DintoSolar 

HJT

710-740w Deliverable Power

23.8% Max. Deliverable Efficiency

Bifacial Dual-glass HJT Module (G12-132)



HJT 0BB Technology

Lower resistance, higher cell efficiency & module power.



High-Reliability Encapsulation

PIB and dual-layer glass ensure extended module durability and a long operational lifespan.



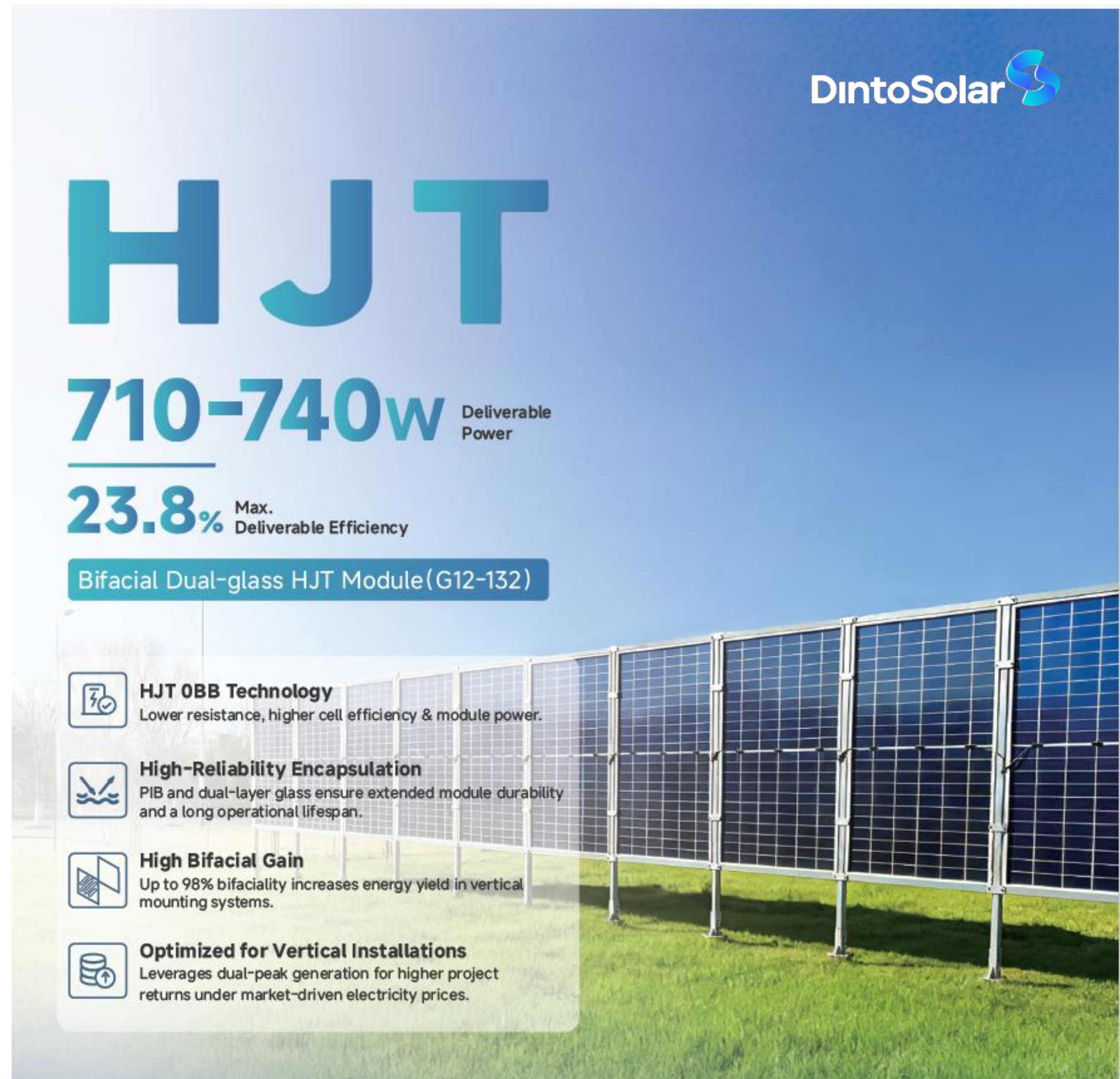
High Bifacial Gain

Up to 98% bifaciality increases energy yield in vertical mounting systems.



Optimized for Vertical Installations

Leverages dual-peak generation for higher project returns under market-driven electricity prices.



2. WHY AgriPV?

Till 2025:

- ca. 3 TeraWp c-Si installed worldwide 2026
- ca. 125 GWp in Germany, ca. 1.000.000 installations and owners
- ca. 25 GWp in BAY (BAY is the world champion per inhabitant!),
- 8 GWp in BG; ca. 100 installations and owners
- All FF installations are standard

PV roofs, balcony systems and facades particularly in Germany

No multiple use!



PV Bulgarian Biggest FF Installation, Apriltsi, 2025

2. WHY AgriPV?

- Standard FF Installations vs. all others 40%:60% in Germany, FF favoured
- 1 MWp FF consumes ca. 1 ha land
- In Germany so far ca. 500 km² roofs and 500 km² FF are already installed, (all modules imported from China!)
- The electricity consumption grows extremely rapid with the boom of the AI
- Too much Farmland is consumed. There is tension between the Standard FF PV Business and the Farmers
- It is time to say **Good Bye to the Standard FF Installations**
- and to **welcome the AgriPV solutions** also in BG

Agri PV Examples

- Kartoffeln AgriPV, **1981**, ISE Germany, Prof. Götzberger, A. Zastrov
- Tubular Solyndra AgriPV, **2008**, UC Davis CA, Prof. H. Lieth
- Tracking c-Si AgriPV, HSWT Weihnstephan, **2011**, Prof. M. Beck, Dr. V. Koch,
- Nextracker in California founded in **2013**.
- Agri PV in Japan, China, etc.
- **AgriPV-Solutions**, Eckental BAY founded in **2021** by **Thomas Franke**, strategic Partner Gate-East since **2022**

Agri PV Examples

1.



UC Davis CA, system built in 2008

Agri PV Examples

2.



Agri PV-Solutions, BAY, Thomas Franke, 2025-2026

Examples 1-2 more expensive than standard FF Installations.

3. AFFORDABLE high bifacial HJT c-Si Agri PV, brand of Solagria BAY BG

- **The Vision of AFFORDABLE** vertical, high bifacial PV System developed at Gate -East Garching, named Solagria by F. Koch in 2011. AFFORDABLE means Agri PV System, which price is comparable with the standard PV installations.
- **The first pilot Agri PV system** of this type based on **Bifacial HJT Modules made in Europa** was financed and installed by **Global-Test BG** at the BAS, in Sofia, 8th km in **2021**.
- The Pilot AgriPV 6 kWp Installation at BAS 8th km in Sofia



Two types of AFFORDABLE Mounting systems: galvanized steel and ennobled wood.

Welcome to see this pilot System in Sofia!

In **2024** V. Koch/ Gate-East in BAY and G. Krustev/ Global-Test BG co- founded the start up **Solagria BAY BG**.

3. AFFORDABLE high bifacial HJT AgriPV, a brand of Solagria BAY BG

- In **2024** V. Koch/ Gate-East in BAY and G. Krustev/ Global-Test BG co- founded the start up **Solagria BAY BG**.
- In **2025** Solagria BAY BG got a unique chance to build ca. 700 kWp in TUM Campus Dürnas, Freising







5. Status of the AgriPV in Germany , BAY and BG:

- In Europe 2026:



Santa Maria di Galeria, north Rome, 450 ha, **100 MWp**, 100.000.000 €

5. Status of the AgriPV in Germany , BAY and BG:

- **In Germany:**

ca. **200 MWp** completed, the largest so far-**80 MWp** in Mecklenburg-Vorpommern Vorpommern

ca. **1.2 GWp** under construction in **2026-2027**

- **In Bavaria:**

ca. **40 MWp** completed, the largest so far, **17 MWp** in Oberdorf, Tracking Feldsystems

the biggest **230 MWp** to be build by Goldbeck Solar

- **In Bulgaria:**

Zero AgriPV (except the Pilot Instalation in Sofia?!!!!)

Political boundary conditions like in Germany needed!!!

6. OUTLOOK

- 6.1. **Batteries** suitable for **AgriPV**

must be ECO and cost effective

the NaIBs introduced in 2026 by CATL & Co China are the most promising



6.2 OUTLOOK

- 6.2. Mounting Systems (MS) developed and manufactured in the EU
- **KISS & ME MS** from galvanized steel made in Bulgaria

Negotiating with ATARO Solar Bulgaria in progress

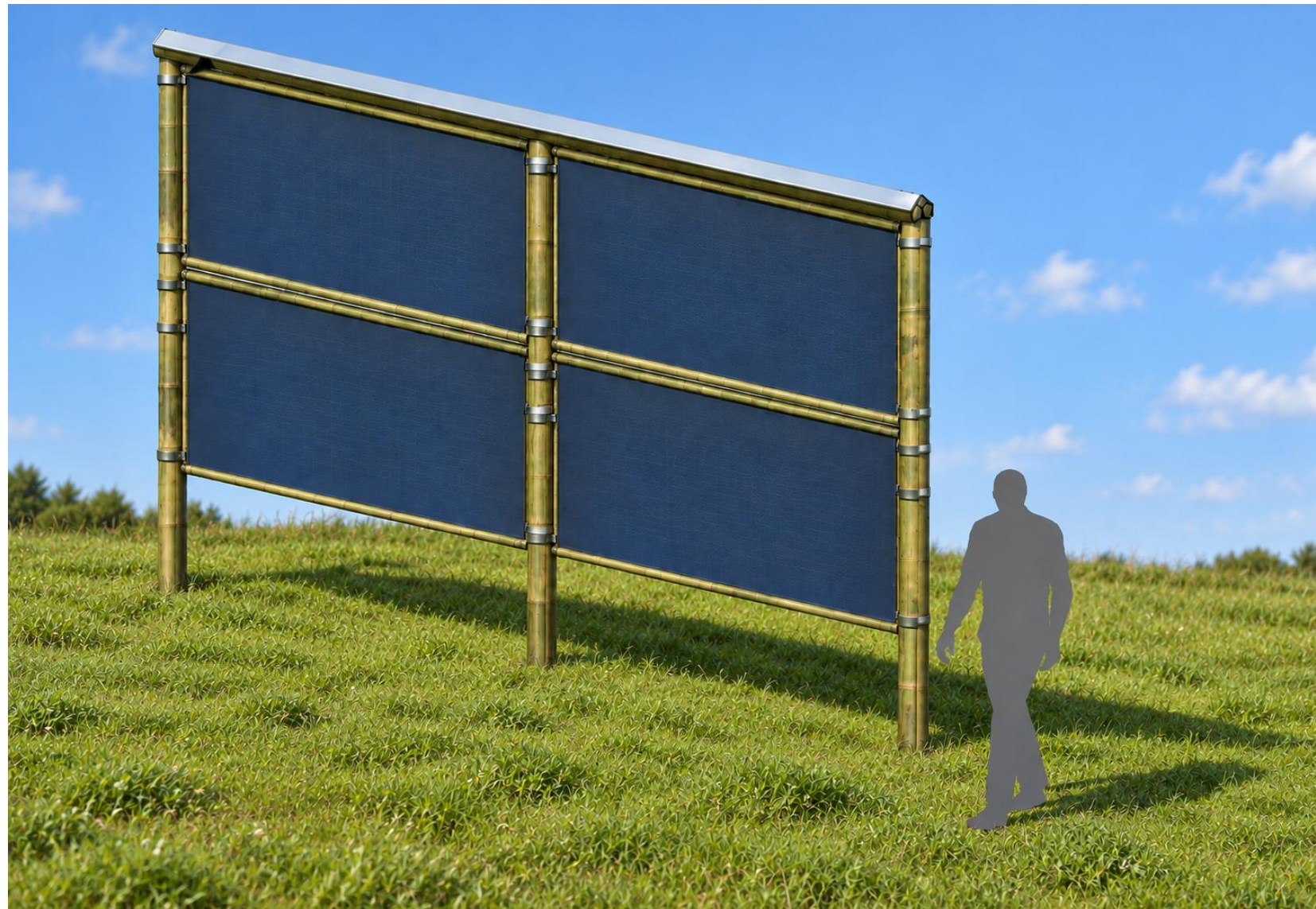
- Ennobled Wood and Bamboo

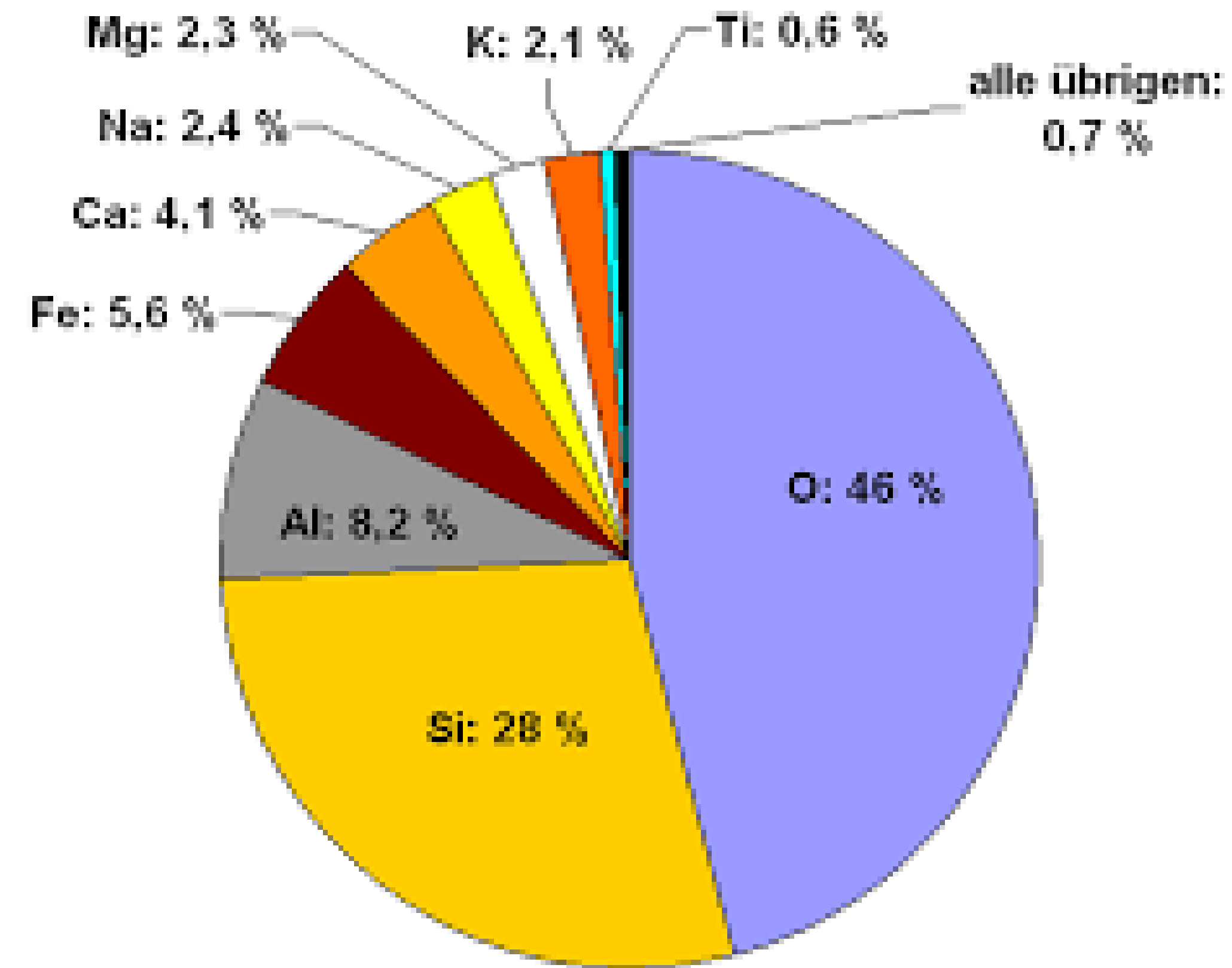


CULMO SOLAR

OUTLOOK

- **First Prototype** of PV-Bamboo Solar System, **CULMO SOLAR- Project HSWT Freisig**
- **Arch. Jorge Figueroa** Architecture and BIM Technologies, München
- **Dr. Vesselinka Koch**, Solagria Bay BG, Garching b. München/Sofia
- **Prof. Neil Thomas**, Node Company, Bamboo Engineering Solutions, London





Thank you!