



## **Webinar** **powered by** **JinkoSolar**



**Mark Hutchins**  
Editor  
pv magazine

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**pv magazine group**

## **Bifacial Modules with transparent backsheets – performance, reliability and insurance**

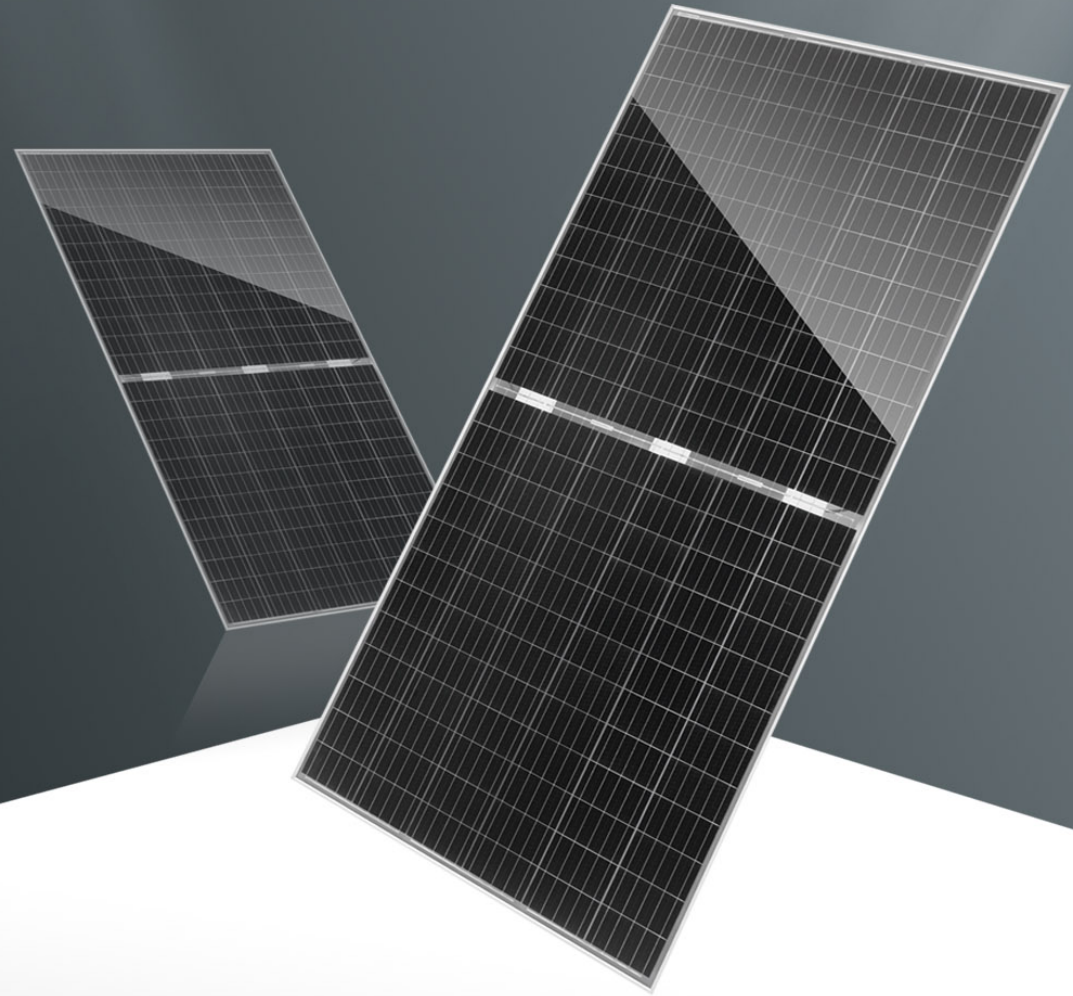


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# Bifacial Modules Performance



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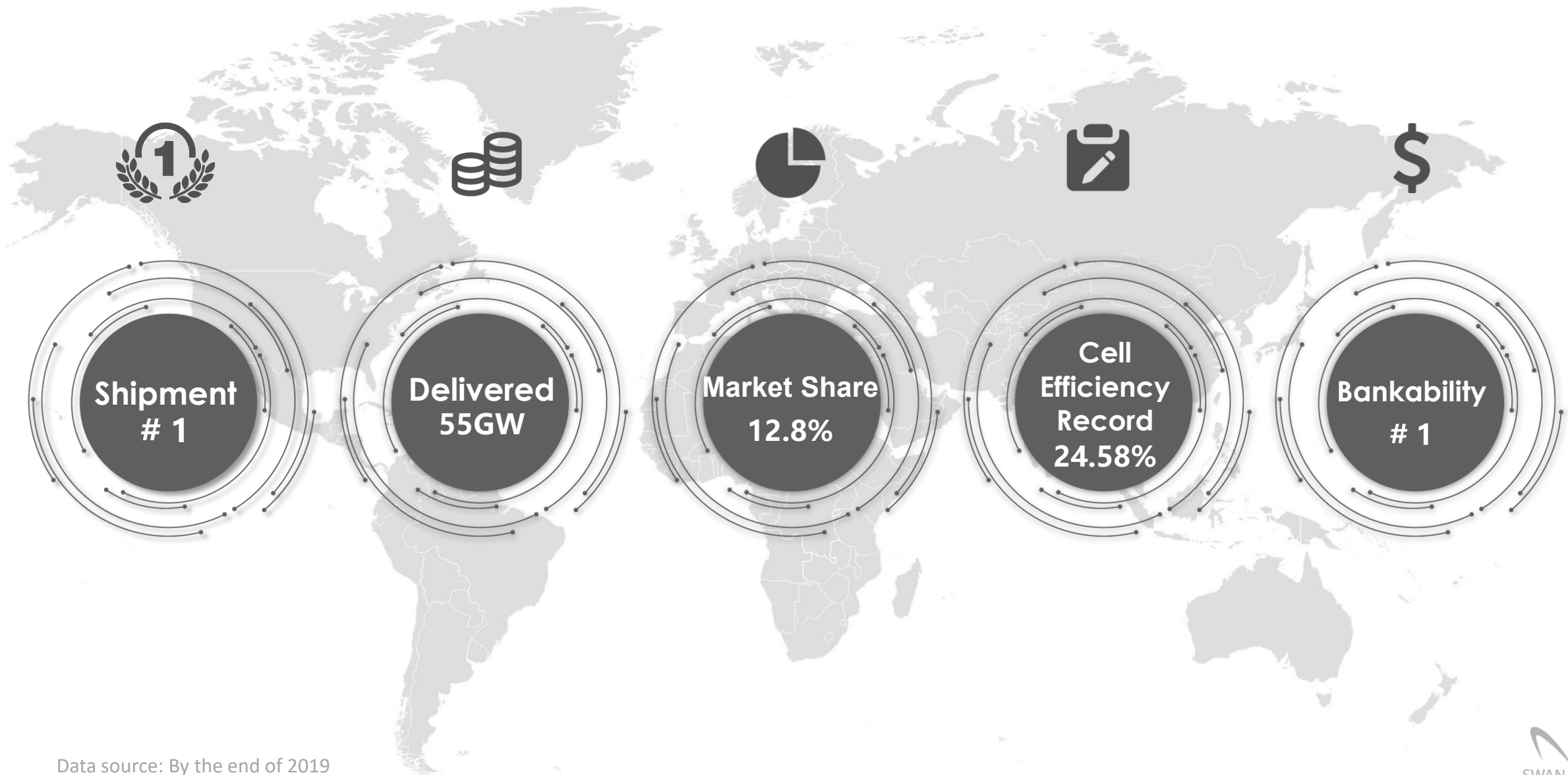
Transparent Backsheet vs. Dual Glass





# About Jinko Solar

# Facts of JKS



Data source: By the end of 2019

# Jinko Milestones - “No one made it before!”

- ✓ World's **no.1** for **4** consecutive years, **13%** market share in 2019
- ✓ **55GW** delivered till 2020
- ✓ **3500+** customers across the world
- ✓ Presence in **140** countries
- ✓ Broke efficiency record **6 times** (Bifacial module efficiency **22.49%** in Jan 2020)
- ✓ **10 GW** of Cheetah modules sold within 18 months
- ✓ **1.7 GW** of bifacial modules sold within 6 months
- ✓ **10 GW** capacity of Tiger modules with efficiency reaching up to **20.78%**
- ✓ Overseas production capacity exceeds **4GW**
- ✓ Overseas R&D center with **US\$ 50m** investment



# Product Portfolio 2020

## Cheetah FC

- 400Wp
- Efficiency 20.17%
- PID resistant
- 25 Year Linear Power Warranty



Cheetah

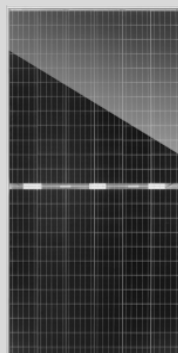
## Cheetah HC

- 410Wp
- Efficiency 20.38%
- PID resistant
- 25 Year Linear Power Warranty



## Swan Bifacial DG

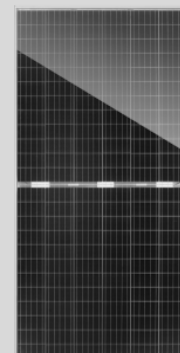
- 400Wp(front only)
- Efficiency 19.54%
- PID resistant
- 30 Year Linear Power Warranty



Swan

## Swan Bifacial TB

- 400Wp(front only)
- Efficiency 19.54%
- PID resistant
- 30 Year Linear Power Warranty
- Lower weight



## Tiger Monofacial

- 465Wp
- 9BB
- Efficiency 20.71%
- PID resistant
- 25 Year Linear Power Warranty



Tiger

## Tiger Bifacial TB

- 460Wp(front only)
- 9BB
- Efficiency 20.21%
- PID resistant
- 30 Year Linear Power Warranty

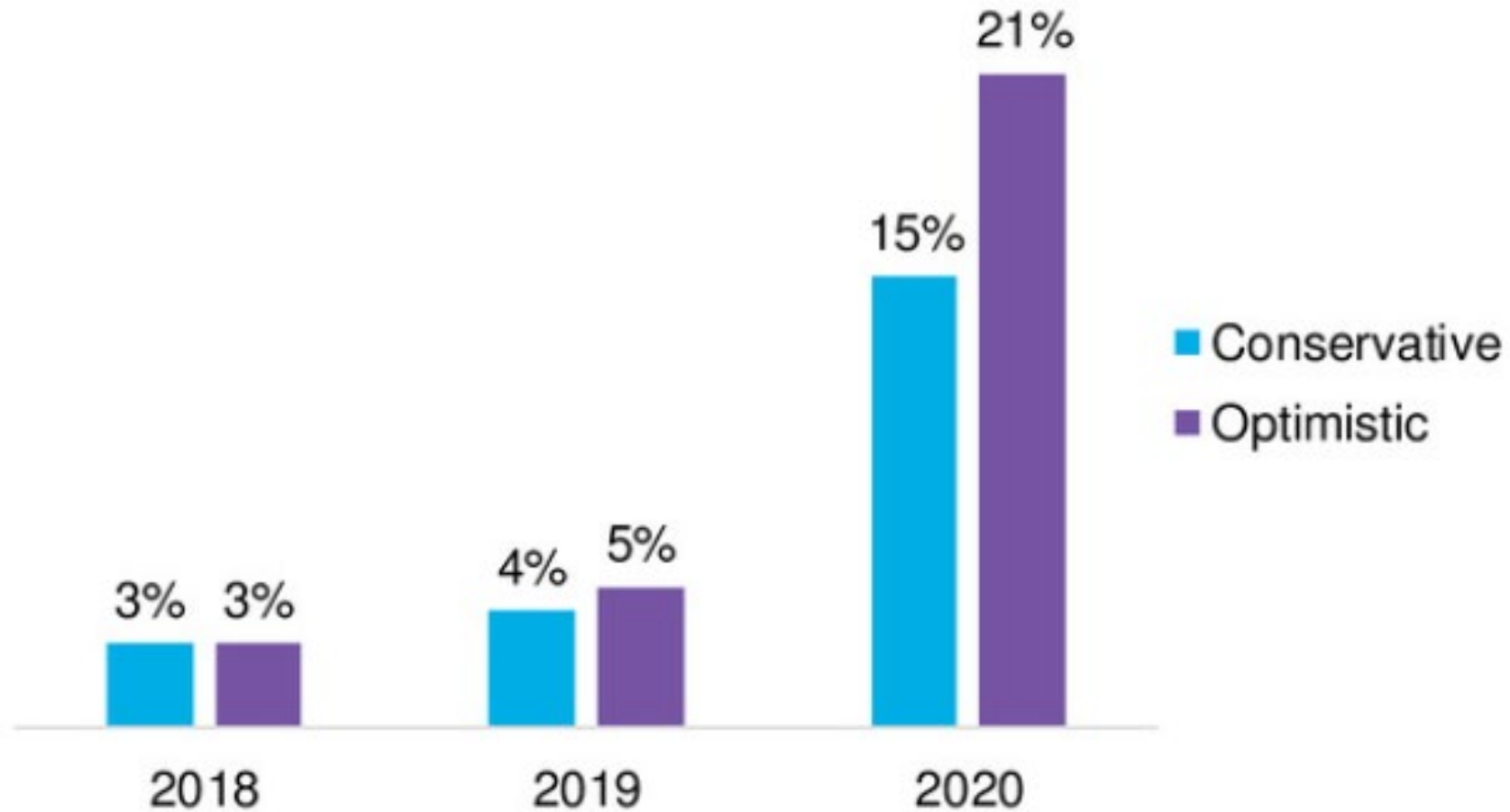




# Bifacial Technology



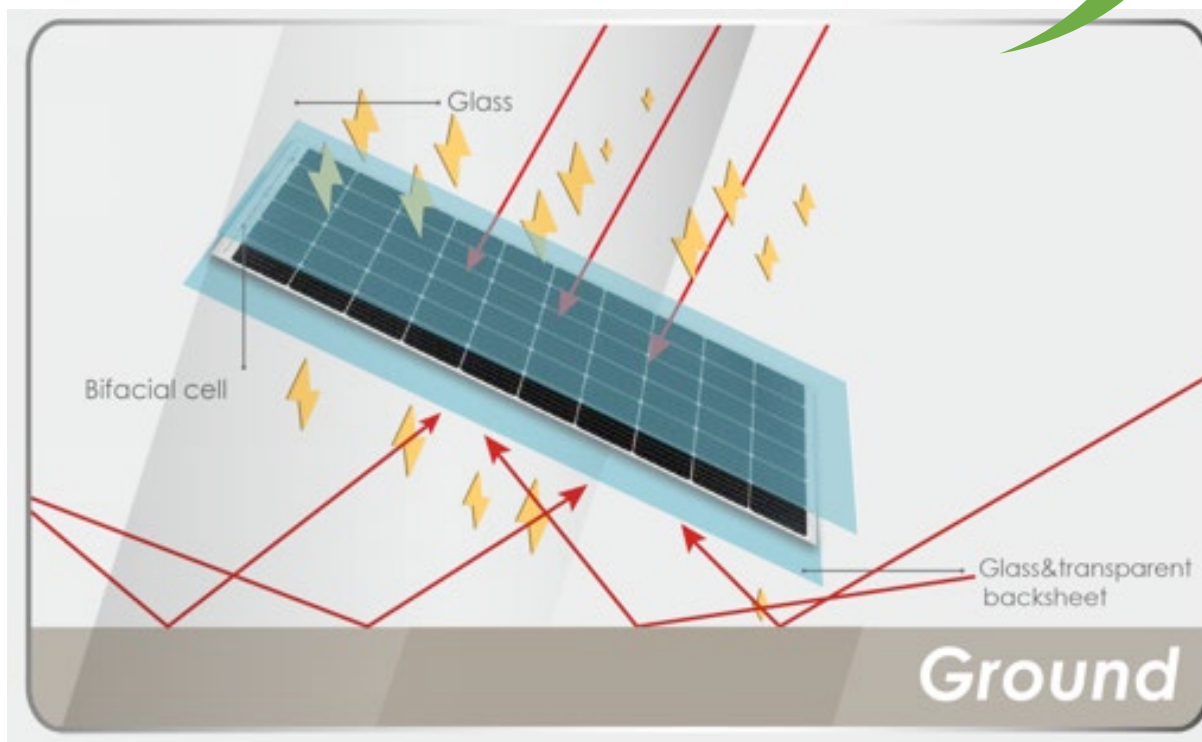
# Market Share Forecast of Bifacial Modules



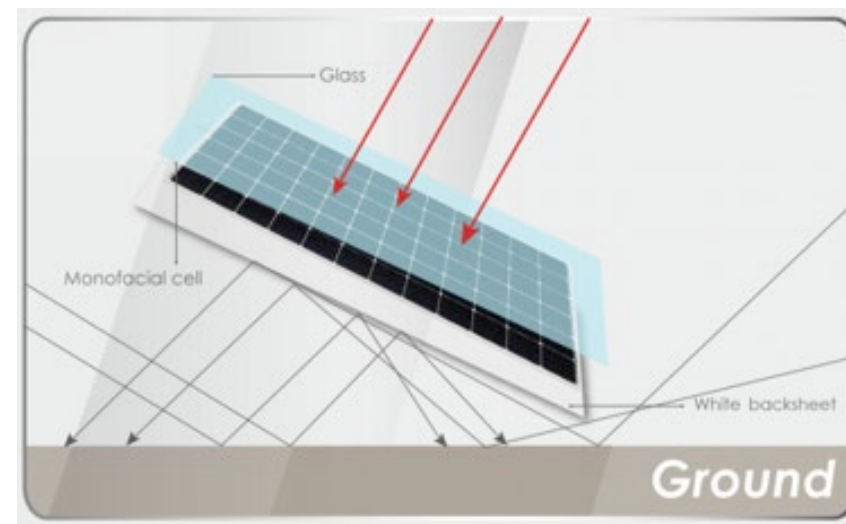
*Source: BloombergNEF Note: The middle scenario of global market size forecast is used to calculate the share.*

# Introduction to Bifacial Technology

Power generation gain up to  
**20%**

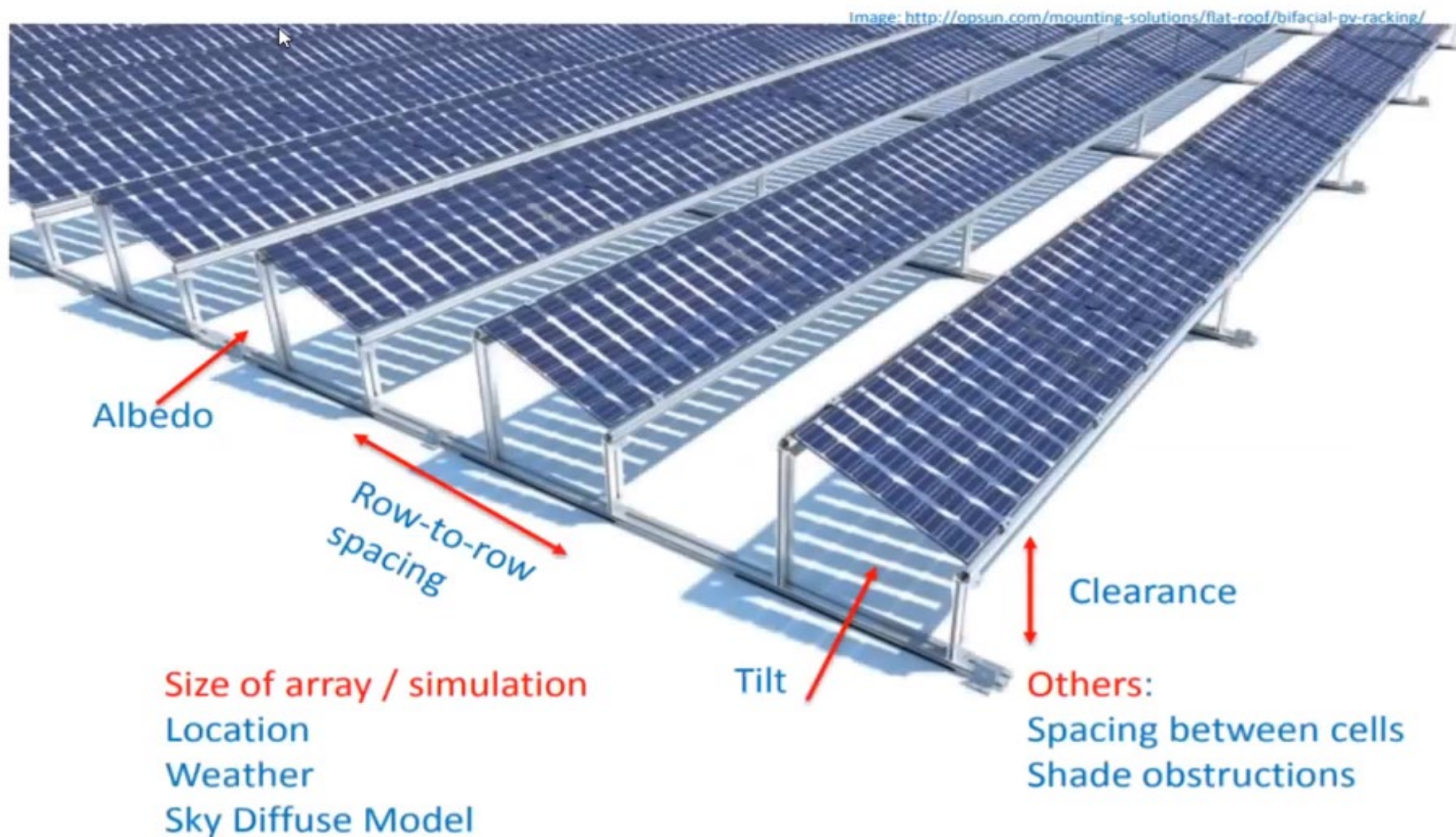


**Bifacial: Dual power generation**



**Monofacial: Single power**

# Rear Side Generation Main Contributors



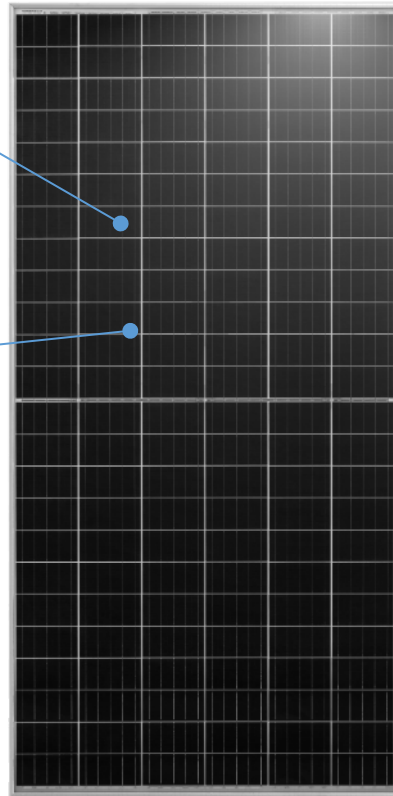


# Bifacial Module Options

Dual Glass  
Bifacial

Advanced **158.75 square cell**  
to achieve higher power and  
efficiency

**Combining with HC** to low  
risk of hot spot because of  
higher current

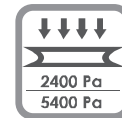
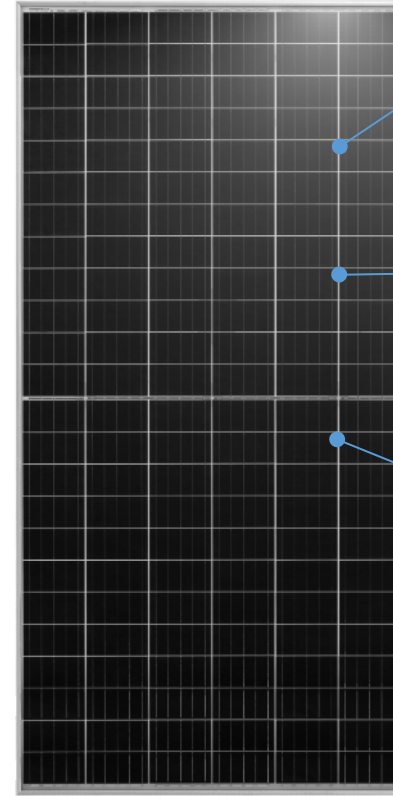


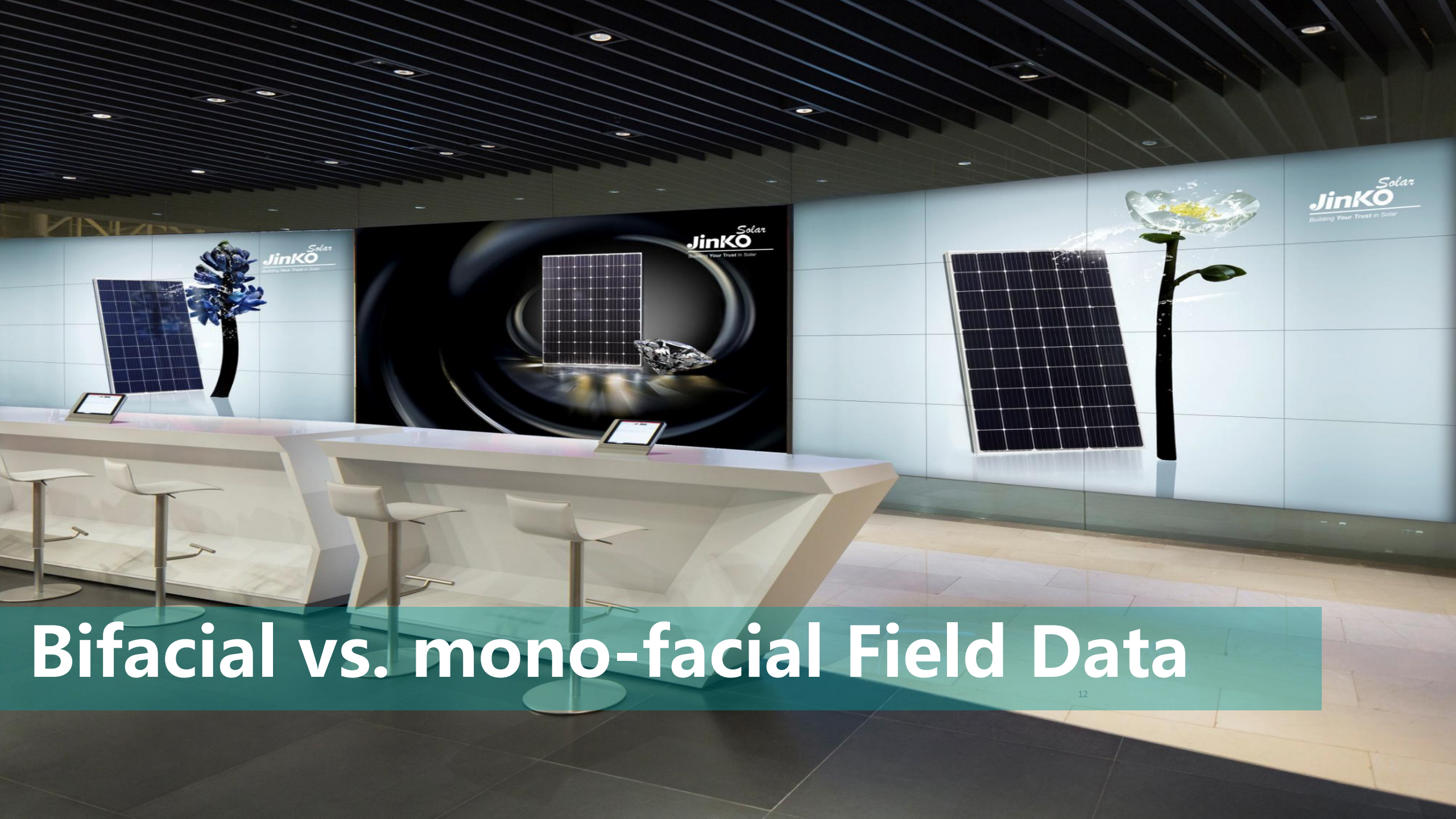
Transparent Back Sheet  
Bifacial

Also **Gain 5-25% more energy**

Keep **almost same weight** with  
normal module

Reliable and easy to  
clean with **Tedlar film**





# Bifacial vs. mono-facial Field Data

# Bifacial Field Test Project

Location	Test Performer	Types of Ground	Type of Installation	Module Type	Test Type	Test Duration	Bifacial Gain
Haining, Zhejiang province, China	Chinese Academy of Sciences	White paint	Fixed (Module elevation: 1.2m, Tilt:30°)	Bifacial with dual glass Monofacial with dual glass	Module level	2018.5.23-2019.1.17	<b>16%</b>
		Sand	Fixed (Module elevation: 1.2m, Tilt:30°)	Swan bifacial with transparent backsheet Cheetah Monofacial Module	Module level	2019.2.1~2019.12.05	<b>10.22%</b>
		Cement	Fixed (Module elevation: 0.7m, Tilt:30°)	Swan bifacial with transparent backsheet Cheetah Monofacial Module	String level	2019.8.2~2019.12.2	<b>9.74%</b>
Qionghai, Haining province, China	China Quality Certification Centre (CQC)	Sand	Tracking (Module elevation: 2.7m, 2P tracker)	Swan bifacial with transparent backsheet Cheetah Monofacial Module	String level	2019.10.23~2019.11.29	<b>16.66%</b>
Fremont, CA, USA	NEXTRACKER	Gravel	Tracking (Module elevation: 1.5m, 2P tracker)	Swan bifacial with transparent backsheet Cheetah Monofacial Module	String level	2019.8.22~2019.10.30	<b>8.34%</b>

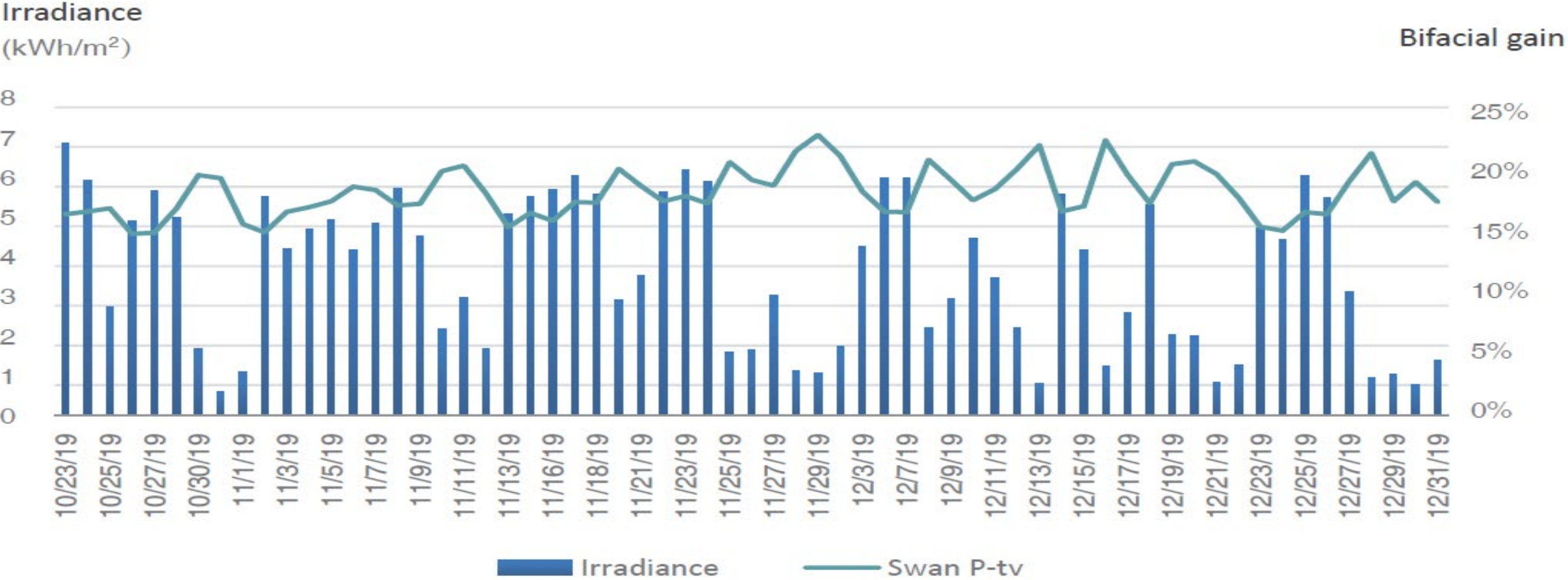


# Qionghai Project

Located in Hainan province in China

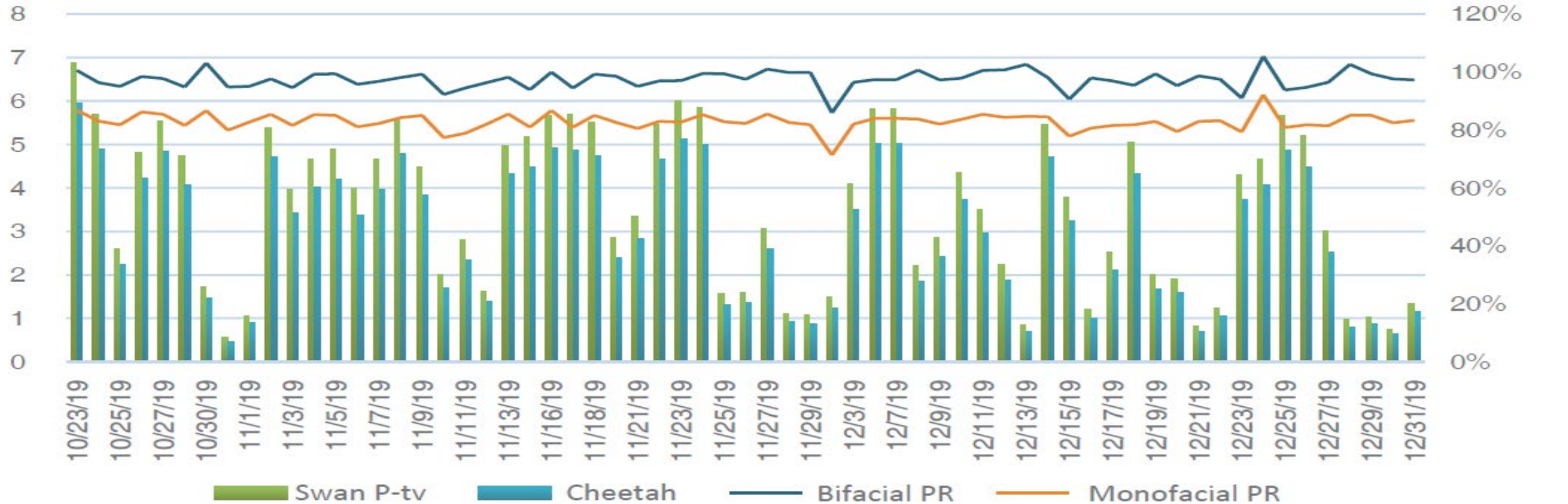
High temperature and humidity across the year

2P Tracker with 2.7m ground clearance and ground albedo is 20%



# Qionghai Project

Daily yield per watt  
(kWh/kW)



Average bifacial gain reached 16.66% compared to mono-facial module

Average PR for bifacial module is 97.31% and mono-facial module is 82.82%



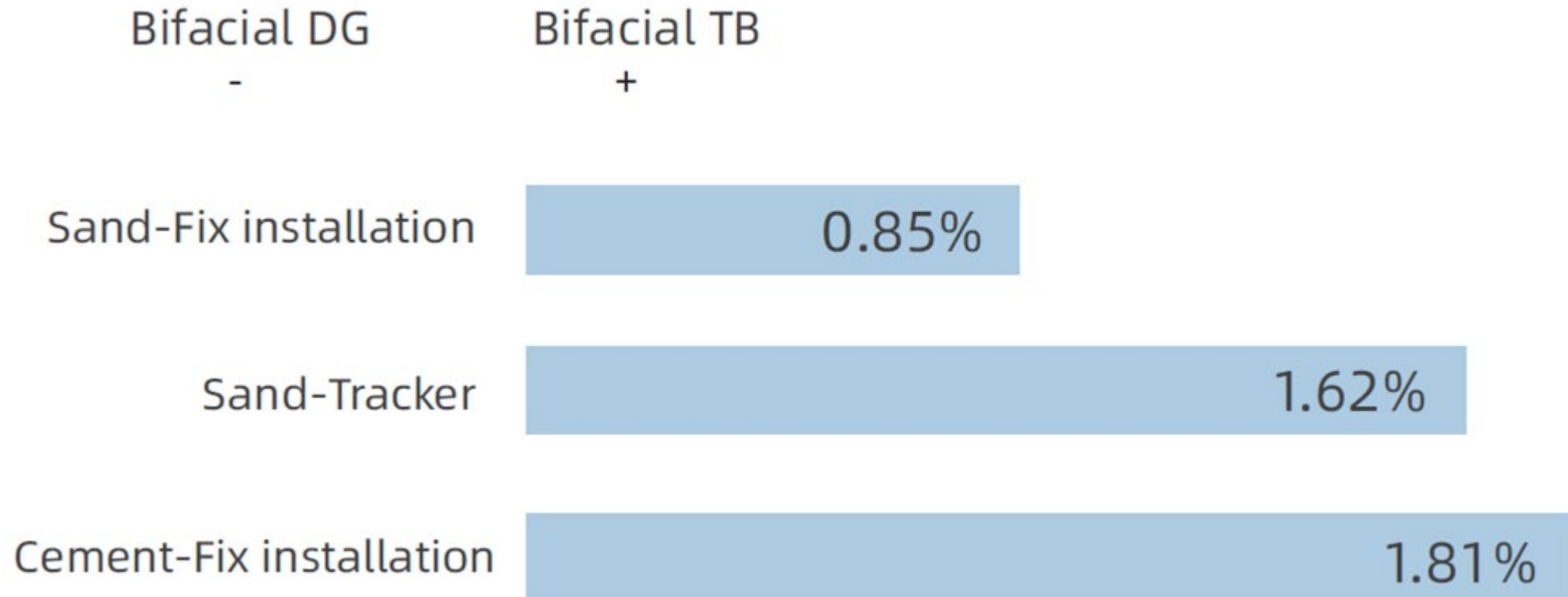


# Transparent Backsheet vs Dual Glass

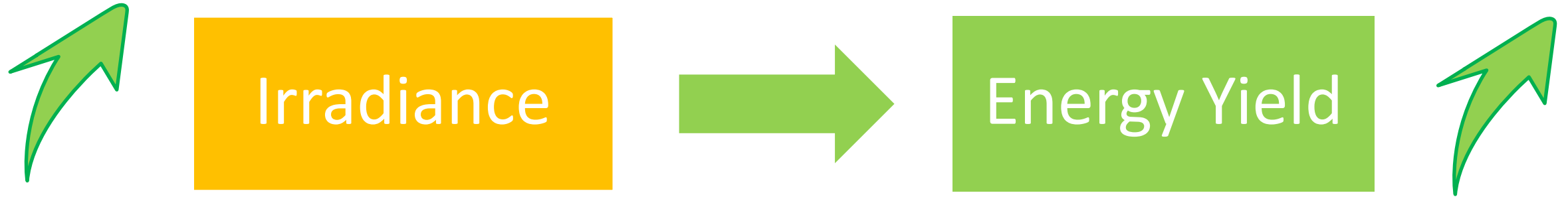


# TB Vs. DG Performance

3 different field tests, 2 on sand (fixed, tracker) and 1 on cements (fixed)



# Bifacial field test project

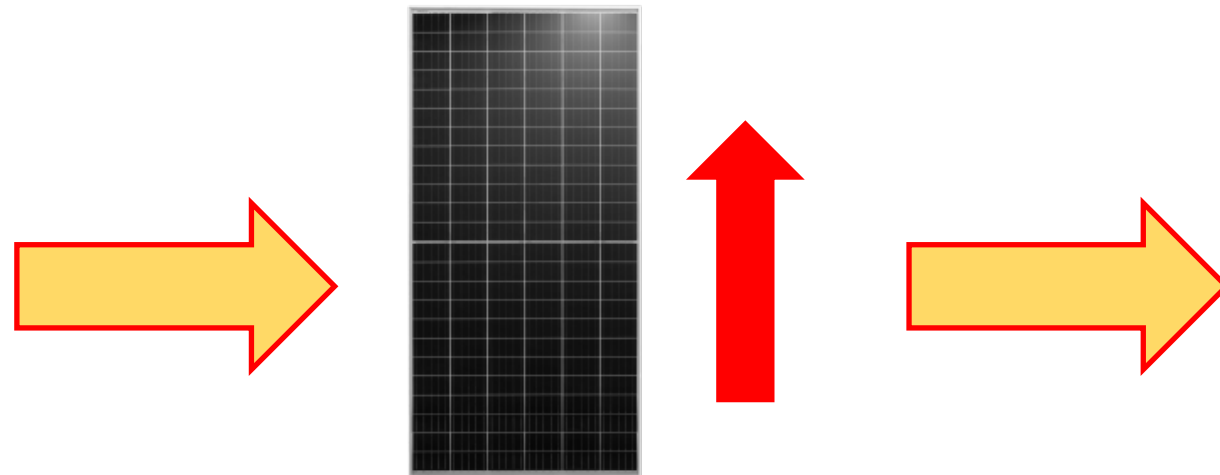


TB has lower operating temperature than DG due to heat dissipation property of TB

Ambient temperature

Structure

Module components  
(frame, glass ..)



20 ~ 30 degrees above ambient temperature

TB allows more heat to be emitted from the rear side compared to DG

# Conclusion

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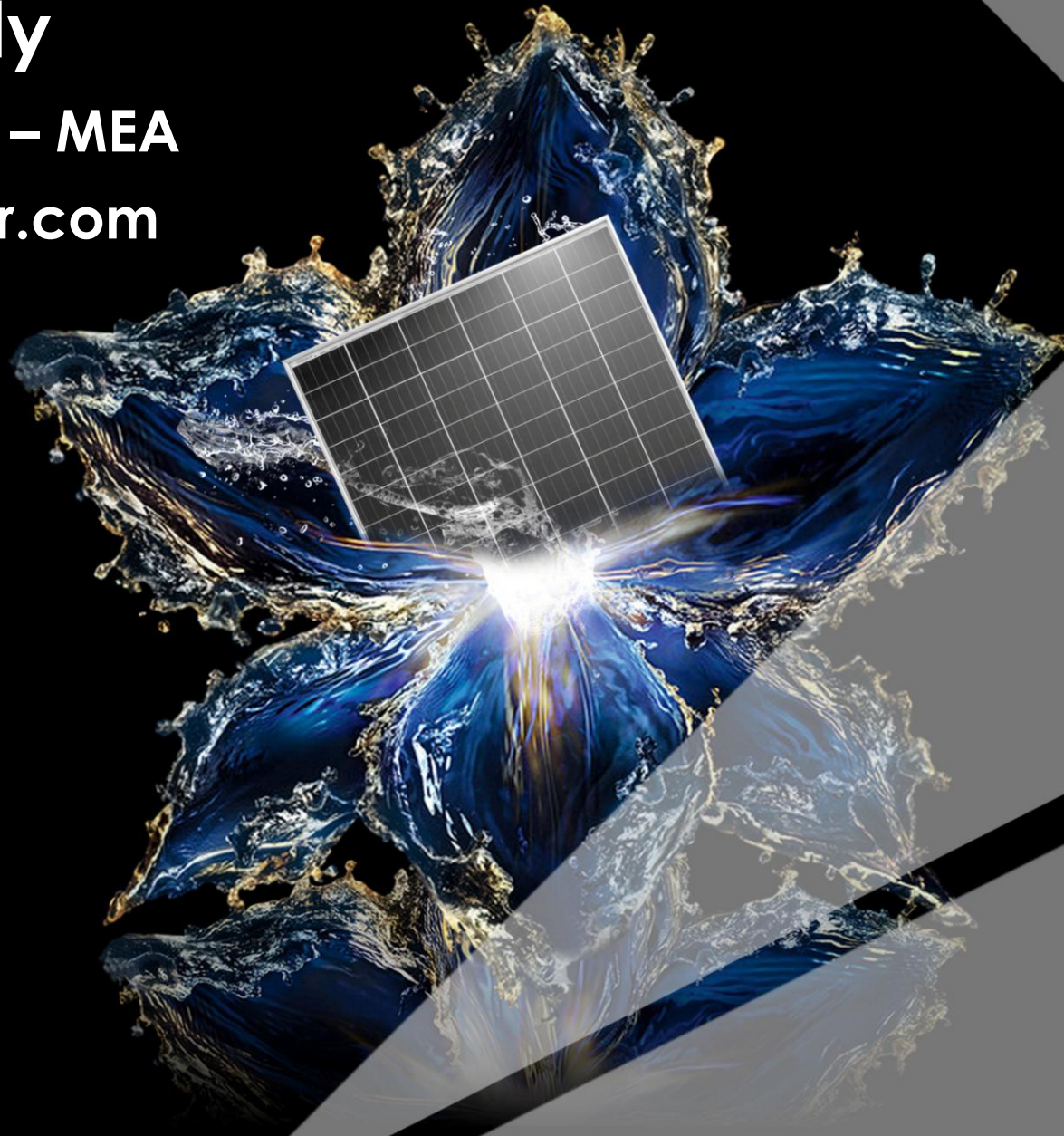
- Bifacial modules has gained more market share in 2019 and expected to gain more in the coming years.
- The energy yield of the rear side depends on many factors including ground clearance, pitch and ground albedo.
- The estimated rear side generation for sand is 10~16%.
- Bifacial modules are offered in two options: transparent backsheet (TB) and dual glass (DG)
- Bifacial module with TB shows better performance than dual glass due to heat dissipation property.



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# Thank You