

Topic: Jinko mono PERC technical highlights

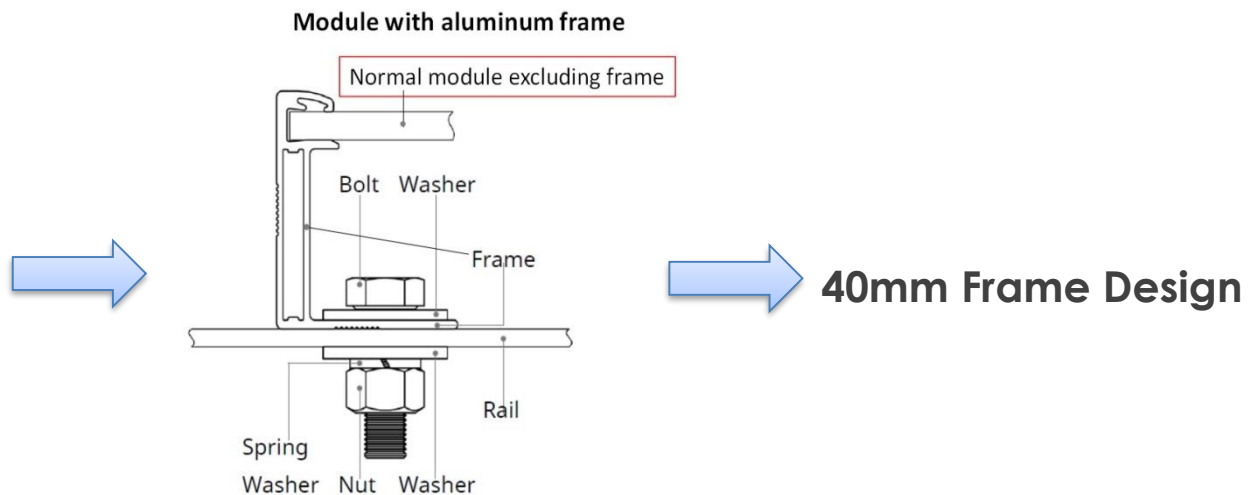
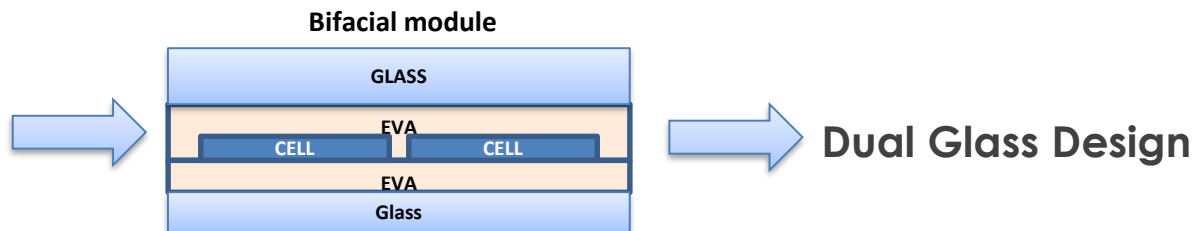
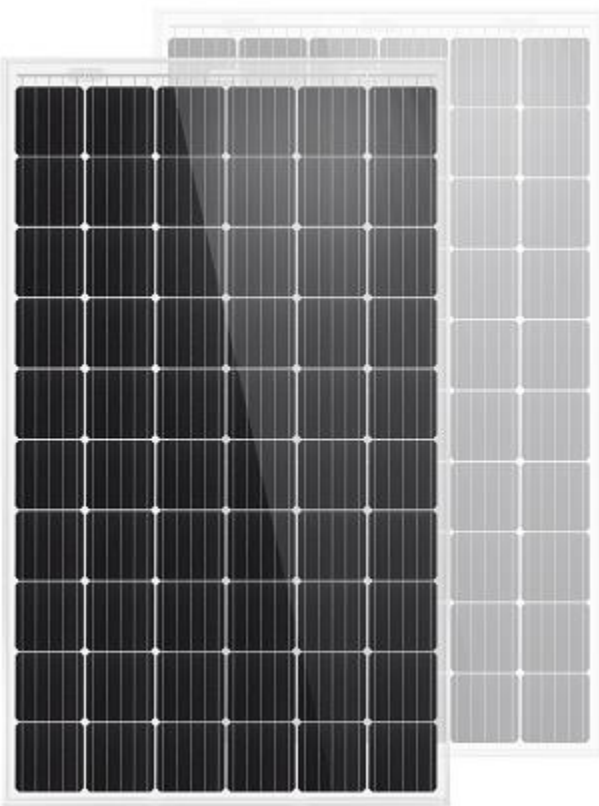
Date: July 2018

Jinko Bifacial Module Introduction

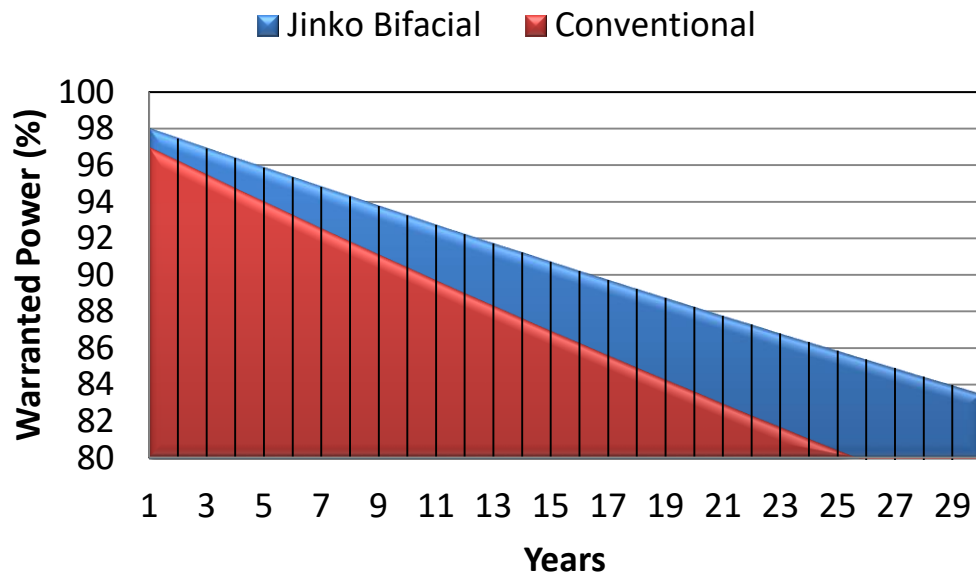
Outline:

- **Module structure**
- **Warranty**
- **Extra energy yield**

Jinko Bifacial Module Introduction – Module structure

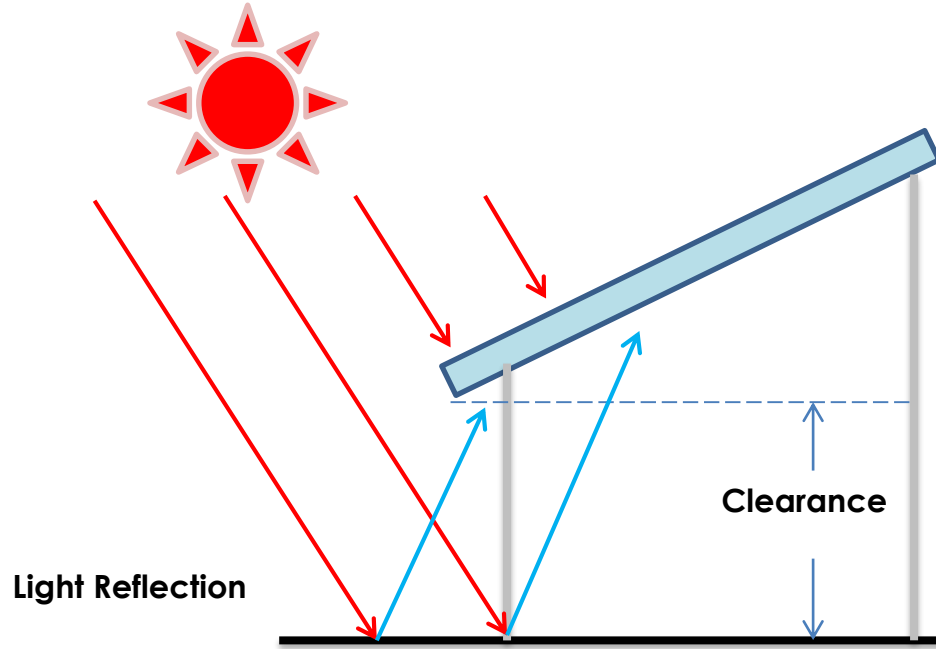


Jinko Bifacial Module Introduction – Warranty



Key Warranty Highlights	Standard Poly Module	Jinko BiFacial Module
Performance Warranty Duration	25 Years	30 Years
Warranted Degradation Rate	2.5% for the first year, 0.7% for 2 nd to 25 th year	2% for the 1 st year, 0.5% for 2 nd to 30 th year
Extra Warranted Energy Yield	N/a	Approximately 20% for the 30 year life span

Jinko Bifacial Module Introduction – Extra energy yield

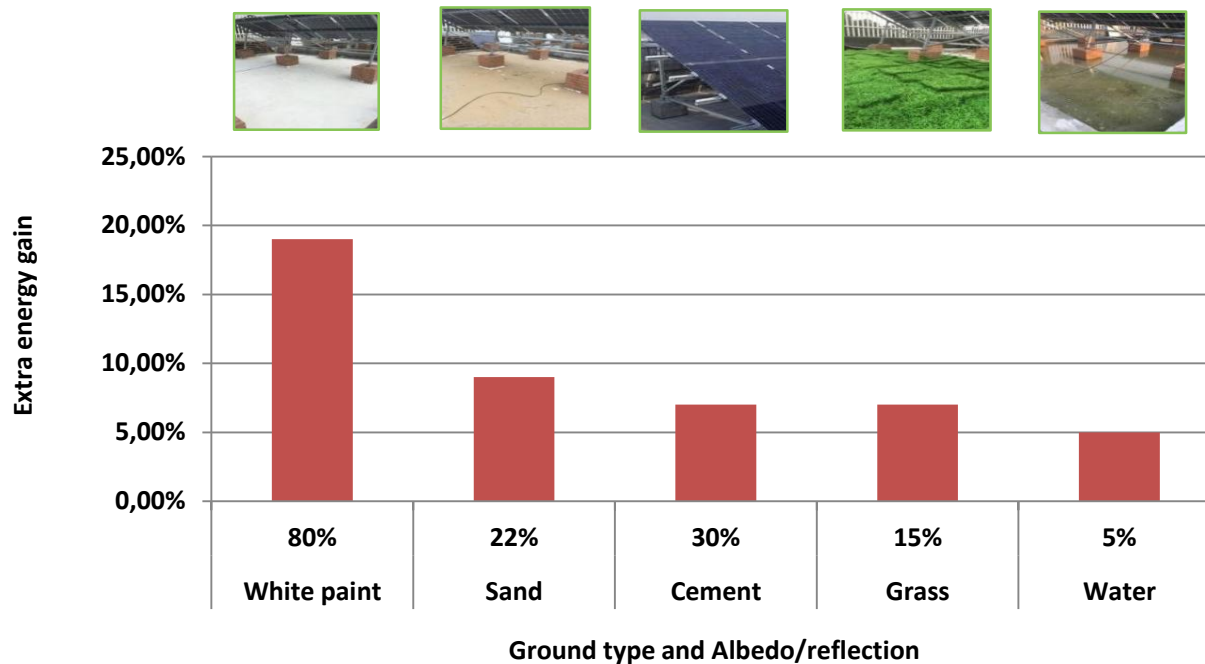


The rear energy gain depends on:

1. The ground clearance (at least 1 m is recommended)
2. The light reflection / albedo

Albedo – is the measure of the diffused reflection of solar radiation out of the total solar radiation received by an astronomical body

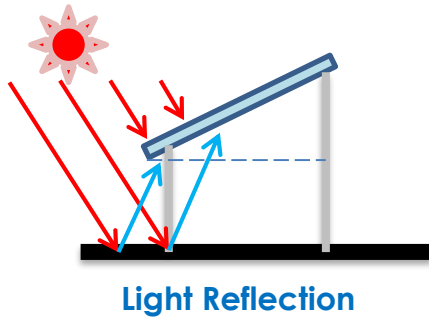
Jinko Bifacial Module Introduction – Extra energy yield



Experimental highlights:

- The extra energy gain depends on the albedo/reflection and this will change with the ground type

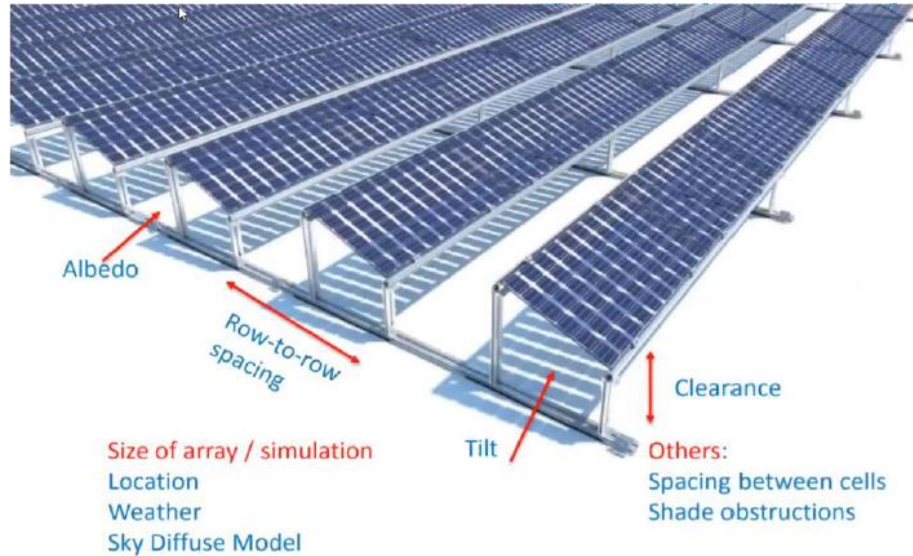
Jinko Bifacial Module Introduction – Reflectance Reference



Surface	Albedo	Expected yield gain
Fresh asphalt	<5%	<4%
Water	5-8%	4-6%
Bare soil	10-20%	6-8%
Green grass, gravel	15-25%	7-9%
Concrete / white gravel	25-35%	8-10%
Desert sand	35-45%	10-15%
High reflective roof coatings	80-90%	23-25%
Fresh snow	80-95%	25-30%

Source: Webinar: Bifacial modules – verifying quality and power output, July 2018, TÜV Rheinland

Jinko Bifacial Module Introduction – Pvsyst Simulation



The extra energy yield from bifacial depends on:

- The bifaciality factor (measured by 3rd party and embedded in PAN files)
- Ground clearance (project designed, modeled in Pvsyst)
- Reflectance (project design, modeled in Pvsyst as Albedo)

→Pvsyst example next page

Jinko Bifacial Module Introduction – PVsyst Simulation

Select the PV module

Available Now

Bifacial module

Jinkosolar

360 Wp 34V Si-mono JKM 360M-72-BDVP Since 2017 Manufacturer 2017

Use Optimizer

Sizing voltages : Vmpp (60°C) 33.9 V
Voc (-10°C) 53.1 V

Open

Orientation parameters

According to system :

Plane tilt 30.0

Plane azimuth 0.0

Sheds and ground parameter

Pitch 6.60 m

Shed total width 3.04 m

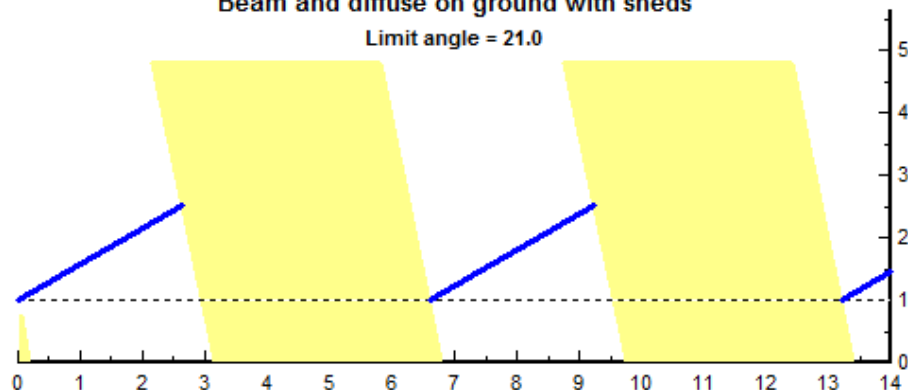
=> Profile angle limit 21.0 °

Height above ground 1.00 m

Ground albedo 22.0 %

Beam and diffuse on ground with sheds

Limit angle = 21.0



Module type	Conventional Mono PERC	Bifacial Mono PERC	Bifacial Mono PERC	Bifacial Mono PERC	Bifacial Mono PERC	Bifacial Mono PERC	Bifacial Mono PERC
Module Power(W)	360	360	360	360	360	360	360
Ground Clearance		1 m	1 m	1 m	1.25 m	1.25 m	1.25 m
Ground reflection		5%	20%	80%	5%	20%	80%
Ground Type	NA	Water	Sand	White Paint	Water	Sand	White Paint

Let's build the solar farm next page!

Jinko Bifacial Module Introduction – PVsyst Simulation

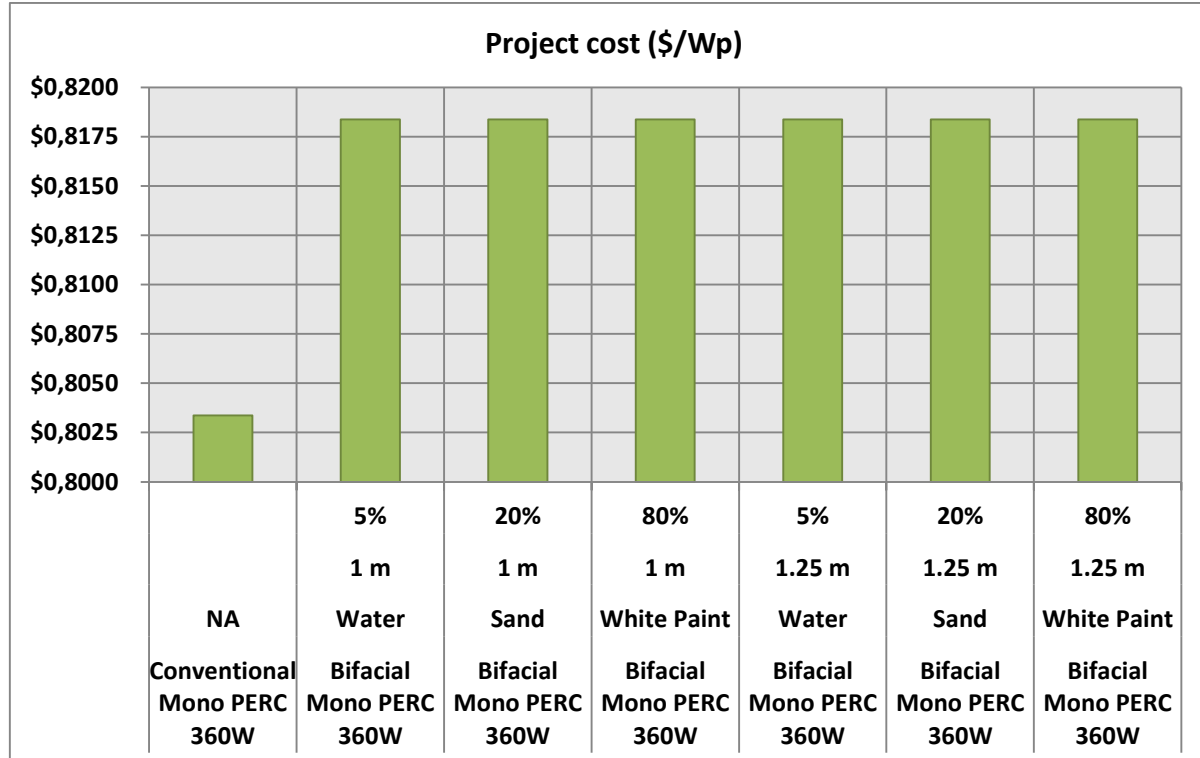
SYSTEM COST BREAKDOWN CALCULATION				
Module cost Total	Central Inverter Stations, DCCBs	Mounting	DC componnets	AC Components
Module cost	Inverter Stations, AC boards	Standard Mounting structure	Solar cables	HV-MV equipment, Substation
Logistic	Installation and commissioning Inverter Stations	Installation Standard Structure	Trenches + conduits + Installation Solar cables	Monitoring and communications System
Assembly of solar modules	DCCB (/DCCB)	Next Tracker Option	DC main cables	Engineering Consultants and Designers
	Installation and commissioning DCCB		Trenches + Installation DC main cables	CCTV Security system
				Roads
				Supply construction site equipment and temporary installations
				Supply and Installation Security fence and security gate
				Earthing System
				Logistic, Test, insurance, Metering etc.

Note:

- Sub-station cost is not considered in this calculation.
- All component price is referenced from Europe.

→ Analysis results next page

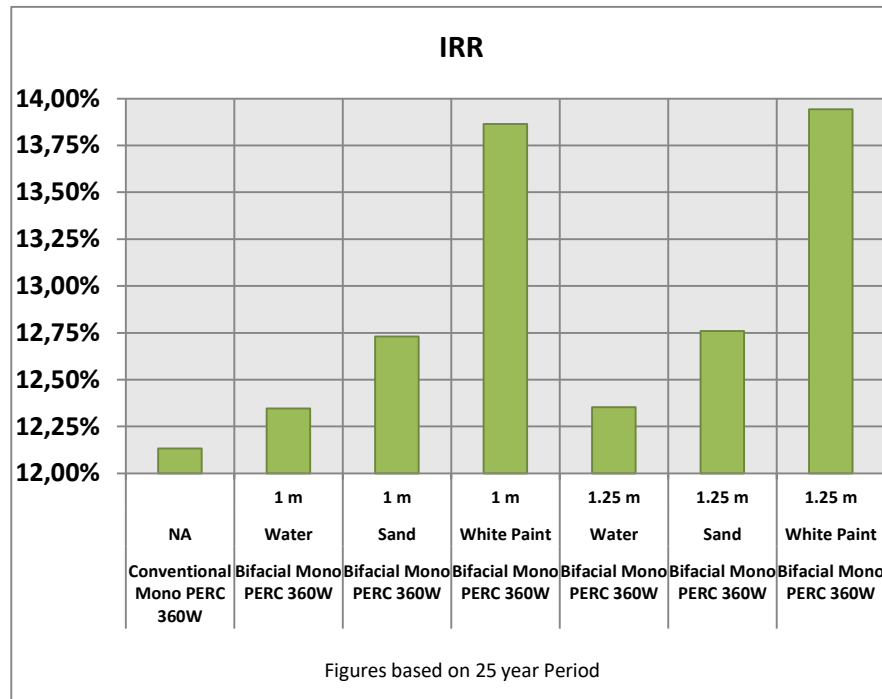
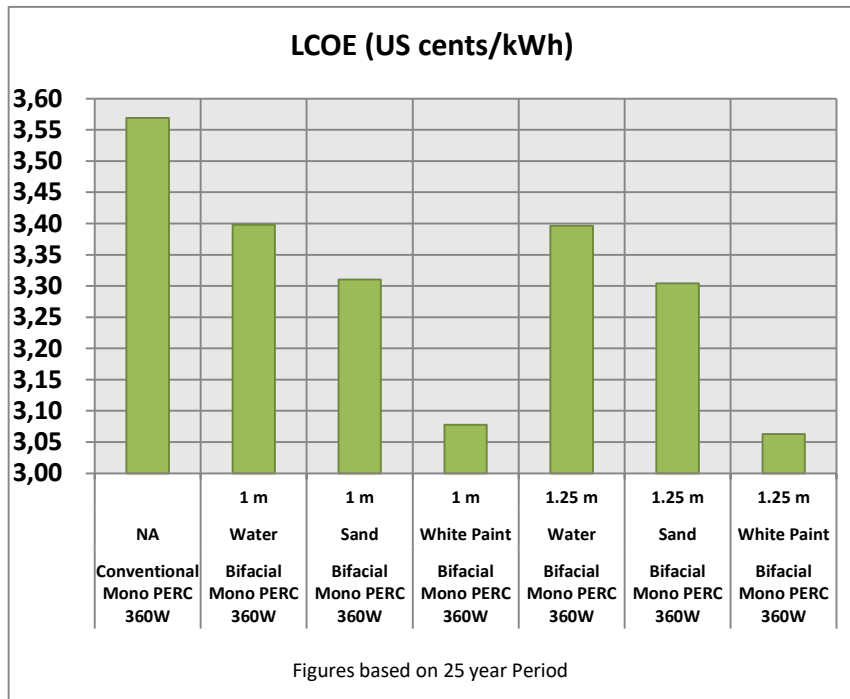
Jinko Bifacial Module Introduction – Extra energy yield



Assume that Bifacial is priced 5% extra than the conventional mono PERC

→ Financial analysis results (LCOE and IRR) available next page

Jinko Bifacial Module Introduction – Extra energy yield



The End

