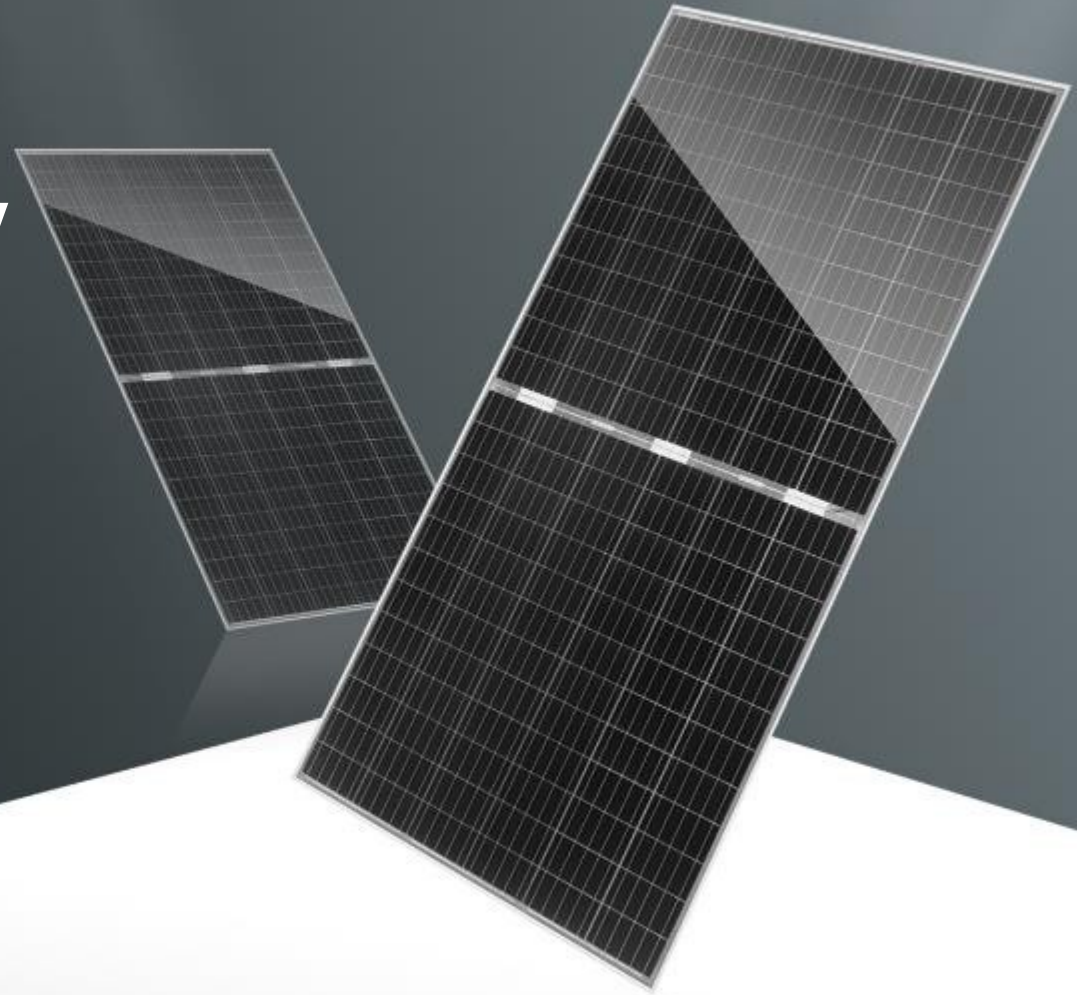


Technology Evolution of PV Modules JinkoSolar

Ricardo Garro

Head of Sales

Central America, Colombia and Caribbean

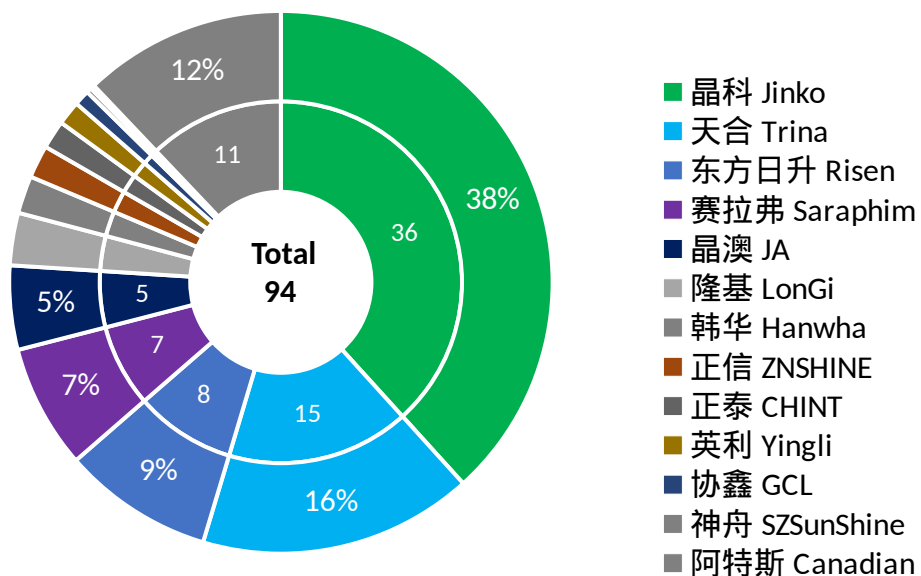


JinkoSolar Update 2019-2020

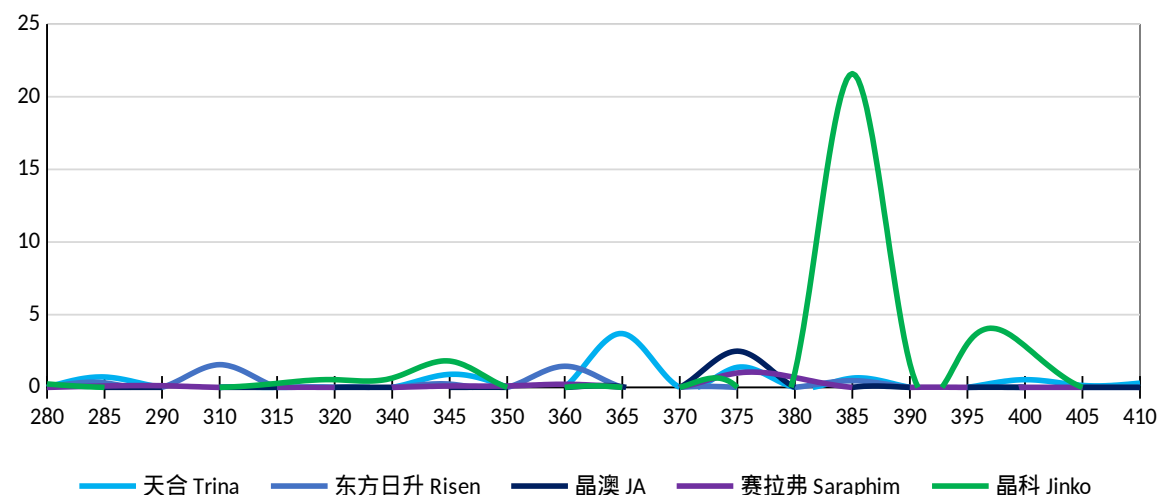


Export PV Modules from China to Colombia 2019

哥伦比亚 各企业出货量 [兆瓦] Shipment to Colombia by Company [MW]



哥伦比亚 TOP 5 企业单晶出货功率档分布 [兆瓦] Power Class Distribution of Mono Shipment from TOP 5 Companies in Colombia Market [MW]



Jinko Solar R&D

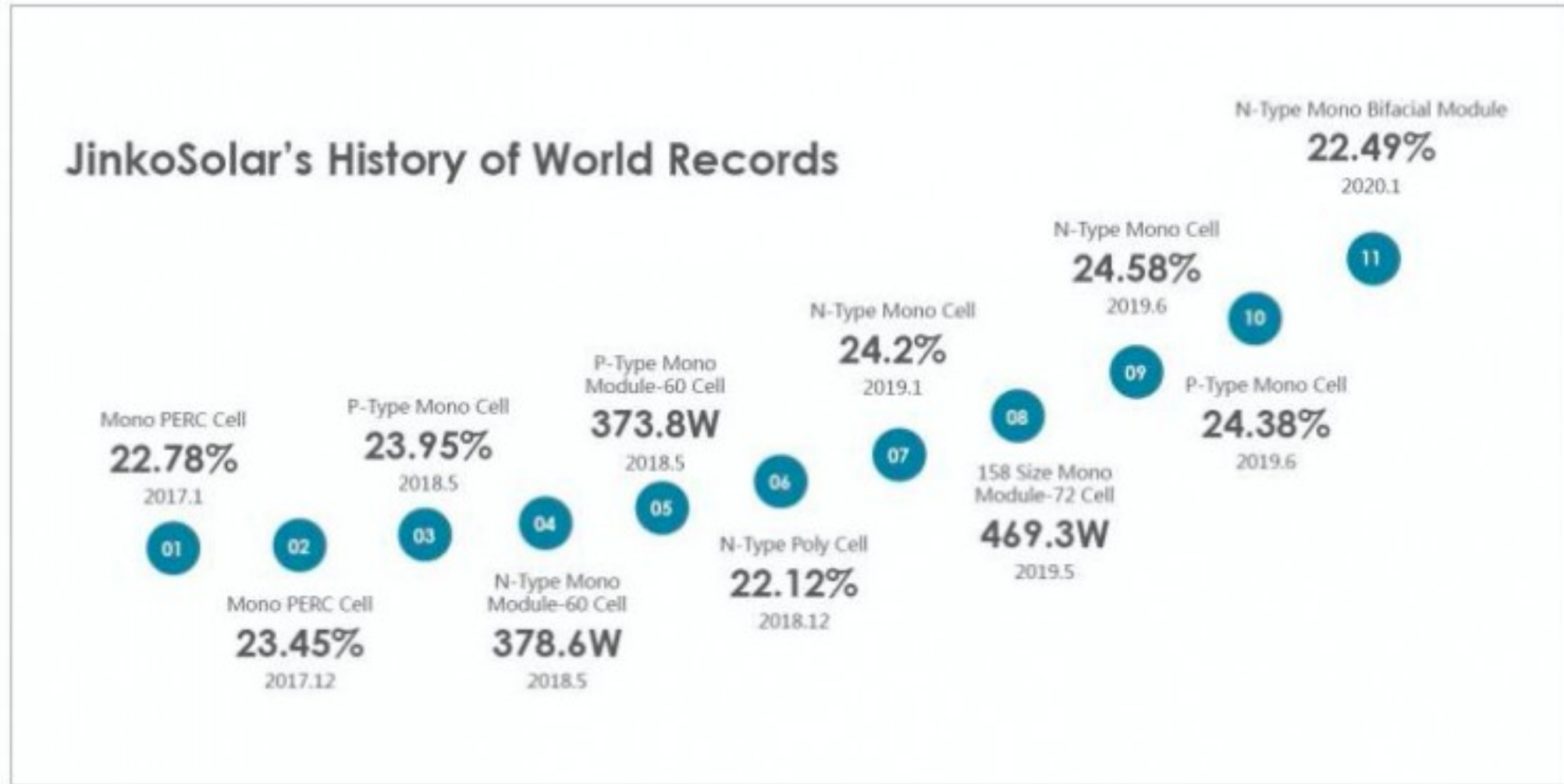


State Key Laboratory

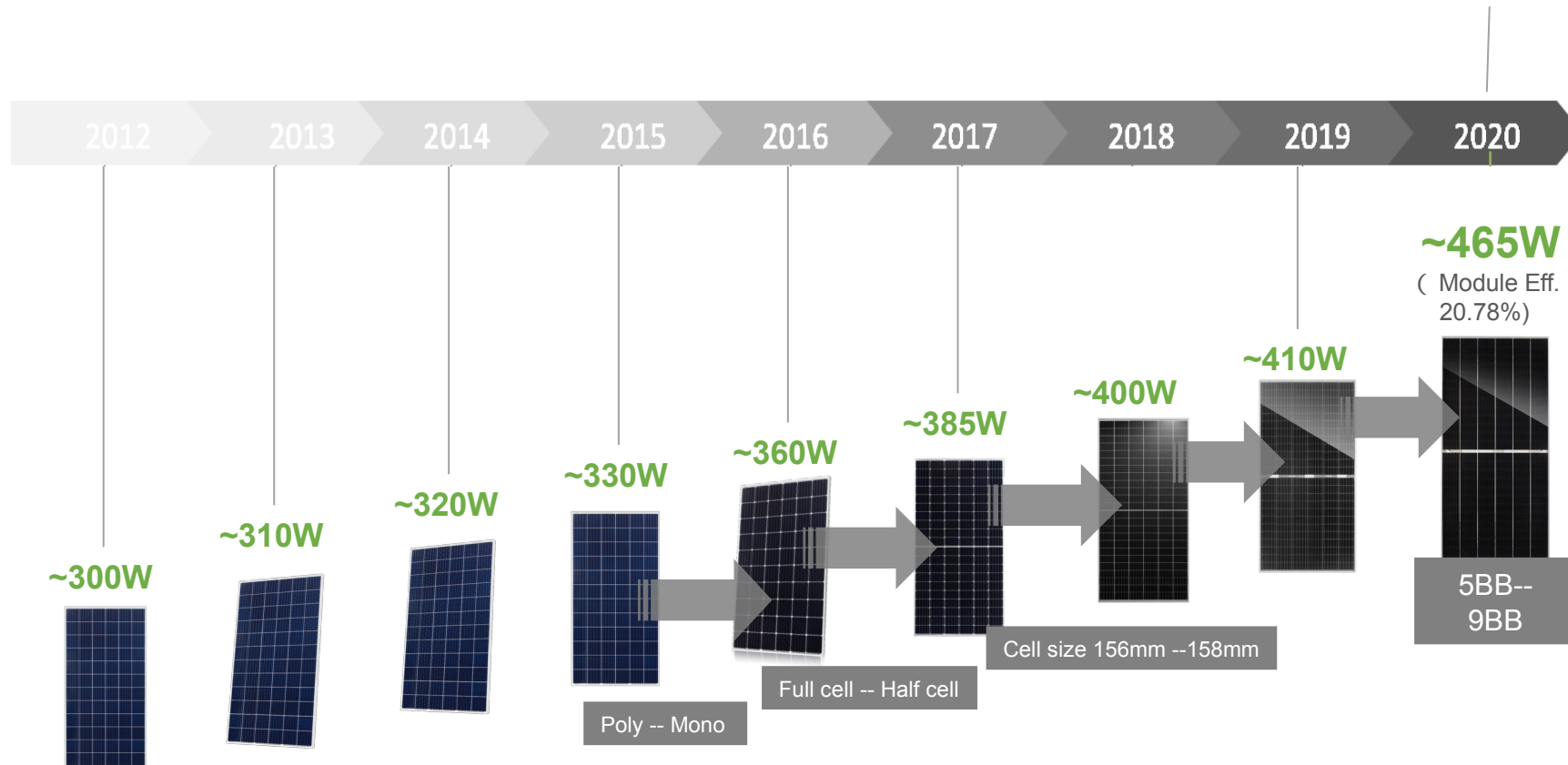
- Overall **400+** full-time technical staff
- In-house R&D Center for solar cell research: over **7,000 m²** with **7** separate laboratories and **100+** research equipments
- R&D Expenditure: **>141M USD**
- Research Partnerships with 12 Leading Universities, including Tsinghua University & UNSW
- Filed **1234 patents**, authorized 709 (Till 2018)
- **5 State-Programs** and 220+ New Product Province-Program
- Cooperating with **10+ 3rd Testing Institutes**



JinkoSolar History of World Records



JinkoSolar Technology Evolution



Mass-produced module power output has been increasing continuously, 10 W annually on average.

Product Portfolio 2020

Cheetah FC	Cheetah HC	Swan Bifacial DG	Swan Bifacial TB	Tiger Monofacial	Tiger Bifacial TB
<ul style="list-style-type: none">• 400Wp• Efficiency 20.17%• PID resistant• 25 Year Linear Power Warranty	<ul style="list-style-type: none">• 410Wp• Efficiency 20.38%• PID resistant• 25 Year Linear Power Warranty	<ul style="list-style-type: none">• 400Wp(front only)• Efficiency 19.54%• PID resistant• 30 Year Linear Power Warranty	<ul style="list-style-type: none">• 400Wp(front only)• Efficiency 19.54%• PID resistant• 30 Year Linear Power Warranty• Lower weight	<ul style="list-style-type: none">• 465Wp• 9BB• Efficiency 20.71%• PID resistant• 25 Year Linear Power Warranty	<ul style="list-style-type: none">• 460Wp(front only)• 9BB• Efficiency 20.21%• PID resistant• 30 Year Linear Power Warranty
					
Cheetah		Swan		Tiger	

TIGER · 465W

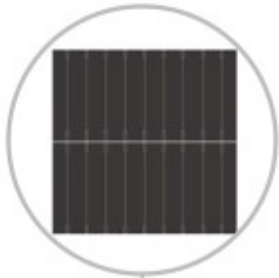
Tiger Module Launch



Tiger Modules

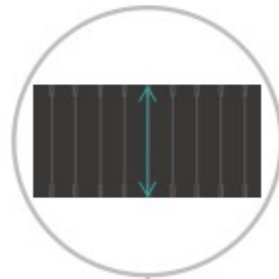
9 Bus Bar

Decrease power loss effective



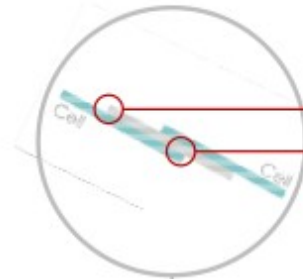
HC technology

Improve shading tolerance because of splitting a full-cell into half



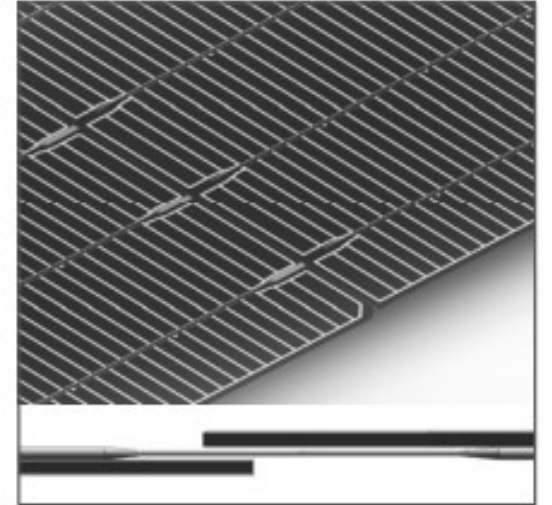
Tiling Ribbon (TR)

Eliminate cell gap to increase module efficiency significantly.

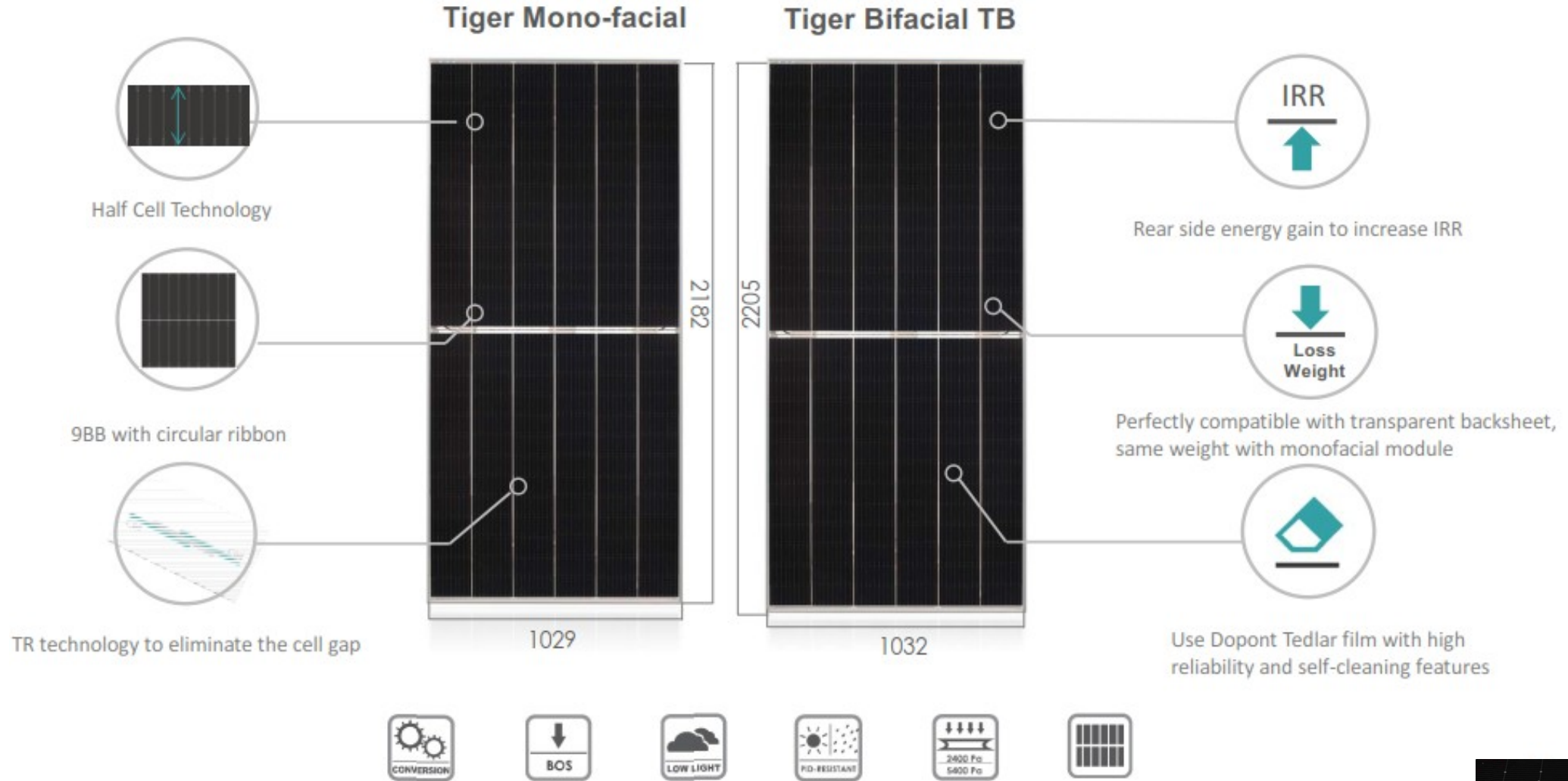


Using circular ribbon

Overlap on each cell to eliminate the gap



Tiger Modules



TIGER · 465W
Tiger Module Launch

LCOE Improvement

$$\text{LCOE} \downarrow = \frac{\text{Initial Cost (EPC Cost included)} + \sum_{n=1}^{25} \frac{L_n + M_n}{(1+r)^n} + IS_n - TS_n + \sum_{n=1}^{25} I_n - \frac{RV}{(1+r)^n}}{\sum_{n=1}^{25} \frac{E_n}{(1+r)^n} \uparrow}$$

Assumption: the result of IRR and LCOE is floating with the green below parameter changes and other all the parameters in Financial Model remain the same in one cell. There is no effect between two cells.

<p>EPC COST reduce 1%,</p> <p>Then, the LCOE % reduce from 0.72% ↓</p> <p>IRR % increase from 0.93%</p>	<p>O&M reduce 2% each year,</p> <p>then the LCOE % reduce from 0.57% ↓</p> <p>IRR % increase from 0.37%</p>	<p>Land saved from 1%</p> <p>then the LCOE % reduce from 0% ↓</p> <p>IRR % increase from 0%</p> <p><small>Mark: In Australia, the land lease is cheap at 16,435 USD per year for 164MW land. And the result is not remarkable</small></p>
<p>Yield Generation increase from 1%,</p> <p>Then the LCOE % reduce from 1.08% ↑</p> <p>IRR % increase from 1.22%</p>		

N-Type Modules

Linear power Warranty

1st year: **1%**
2-30 years: **0.4%**



Lower Working Temp.



Better Temp.
Coefficient
-0.34%

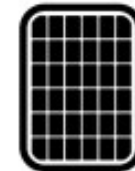


Product Warranty

Black backsheet: **25** years
White backsheet: **15** years



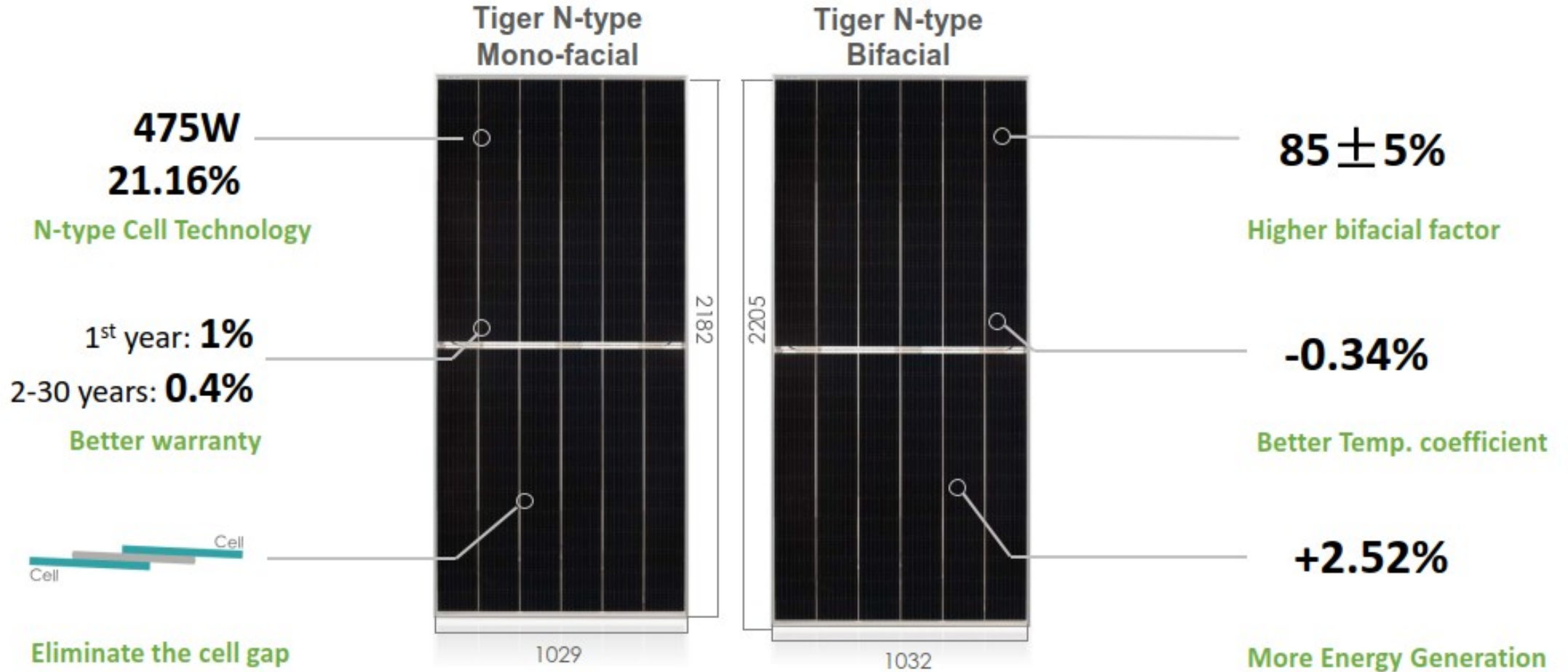
Higher Module Efficiency
Up to **21.16%**



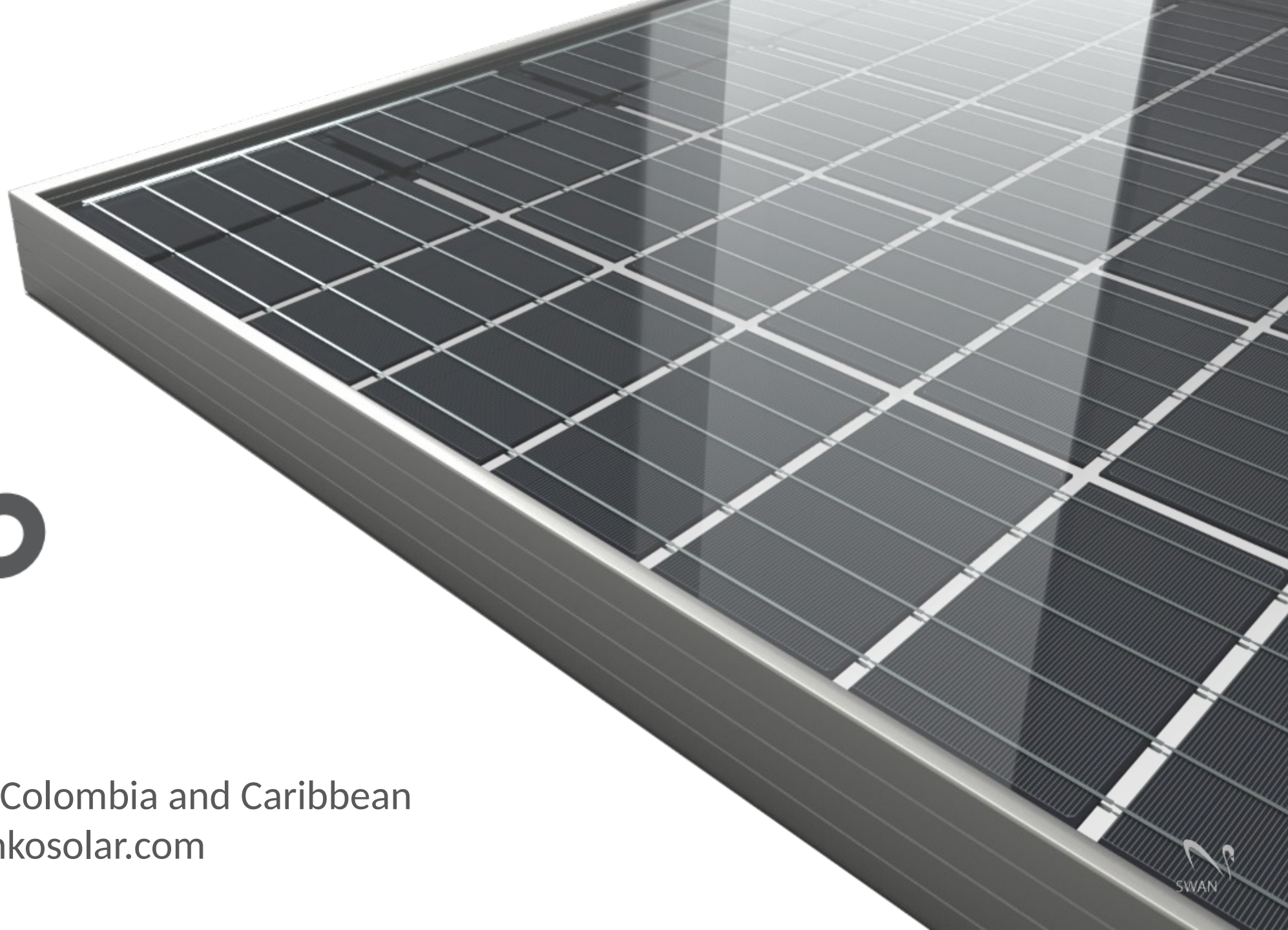
All Black appearance

N-type

N-Type Tiger Modules



N-type



Jinko

Ricardo Garro

Head of Sales

Central America, Colombia and Caribbean

ricardo.garro@jinkosolar.com

