

A large array of solar panels is shown from a low angle, receding into the distance. The sky is a mix of blue and orange, with the sun low on the horizon, creating a warm, golden glow. The panels are dark blue with a grid of silver lines.

# The New Era of PV: 600W+ Modules

Corrine Lin, Chief Analyst Sep. 9, 2020

## CONTENTS

As manufacturers formed alliances to advocate 182mm and 210mm formats, module makers were competing on ultra-high power modules rated at 600 W+ at SNEC 2020.

This year's product trends centered around increases in cell and module sizes, and before the next-generation size becomes certain, n-type cells and module assembly techniques were less discussed.

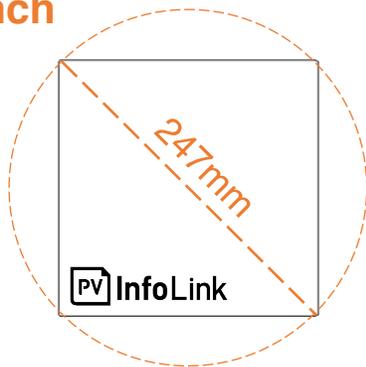
**PV InfoLink provides product and technology trends for your reference.**



# Establishment of 182mm / 600W+ alliances

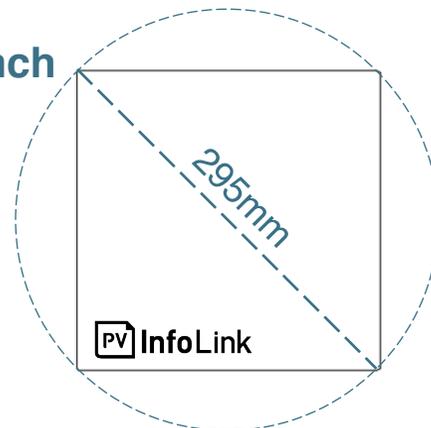
- Canadian Solar, Runergy, Solar Space, JA Solar, Jinko, Longi, and Lu'an announced on June 24 an initiative program to call for the standardization of M10 (182mm) format.
- This is followed by the establishment of the 600W+ Photovoltaic Open Innovation Ecological Alliance comprising Trina, Risen, JA Solar and Huansheng on July 9. This alliance includes a complete solar supply chain and module makers that promote 210mm format and 182mm format.
- The forming of the two alliances has established the trend for large format modules and higher power output, pushing power rating beyond 600W. This marked a milestone amid the rapidly developing solar sector, with module power output having jumped the most this year.

10 inch



**M10** (182mm)  
(330.15 cm<sup>2</sup>)

12 inch



**G12** (210mm)  
(440.96 cm<sup>2</sup>)

Company	Details
<b>182mm Alliance</b>	Canadian Solar, Runergy, Solar Space, JA Solar, Jinko, Longi, and Lu'an announced on June 24 to advocate 182mm format jointly, bringing the uncertainty over larger size to an end for now. As it will take a while for PV glass and major segments in the supply chain to expand capacity and modules to be certified, M6 is expected to remain mainstream in H2 through early 2021.
<b>600W+ Photovoltaic Open Innovation Ecological Alliance</b>	The 600W+ Photovoltaic Open Innovation Ecological Alliance formed on July 9 include manufacturing segments of wafer, cell, module, equipment, BOM, PV glass, backsheet, and inverter. The group is also joined by organizations across certification, design, construction, shipment, developers, and research centers. It's a comprehensive alliance that embodies manufacturers across the supply chain.

# Large format mono modules

- Modules unveiled at this year's SNEC mostly feature cells measuring 182mm or 210mm to increase power output. Several manufacturers even showcased ultra-high power modules rated at 600W, 700W, and even 800W. Taking into account the limitation in module size and PV glass, most new products applied narrowed-spacing or tiling techniques to drive up module power rating. Moreover, added-cell modules have become a standard this year's SNEC show. Companies are competing to produce high power modules with applications of larger cells and different layouts at the show.
- Comparing to SNEC 2019 where paving, narrowed-spacing, tiling, and plate-coupling techniques were introduced, there was no new assembly technique this year. Most modules exhibited this year applied the aforementioned techniques and coupled with different sizes and numbers of cells. However, applications of technologies have become more mature with Trina and Jinko's high-density modules entering commercial production this year. Most manufacturers exhibited modules assembling larger cells that applied high-density techniques.
- In terms of power rating of modules exhibited at the show, 182-mm modules mostly feature 590W, 78-layout, 550W with 72-layout and peaks at 600W. 210mm-modules are either in a 1/3 or half-cut cell configuration and they come with a variety of cell numbers. JA Solar brought its modules to 800W by applying an 80-cell format in a 1/3 cut cell configuration. Trina achieved 660W by using a 66-cell format. Overall, most manufacturers adopted 50 to 60-cell layout regardless the number of cut-cells due to limitation in module lengths and they can achieve a power output as high as 615W, which is slightly higher than 182-mm modules.



Trina 210 mm (66pcs)  
12BB+HC 660W



Jinko 182mm  
610W



JA 210mm (80pcs)  
11BB+1/3 800W

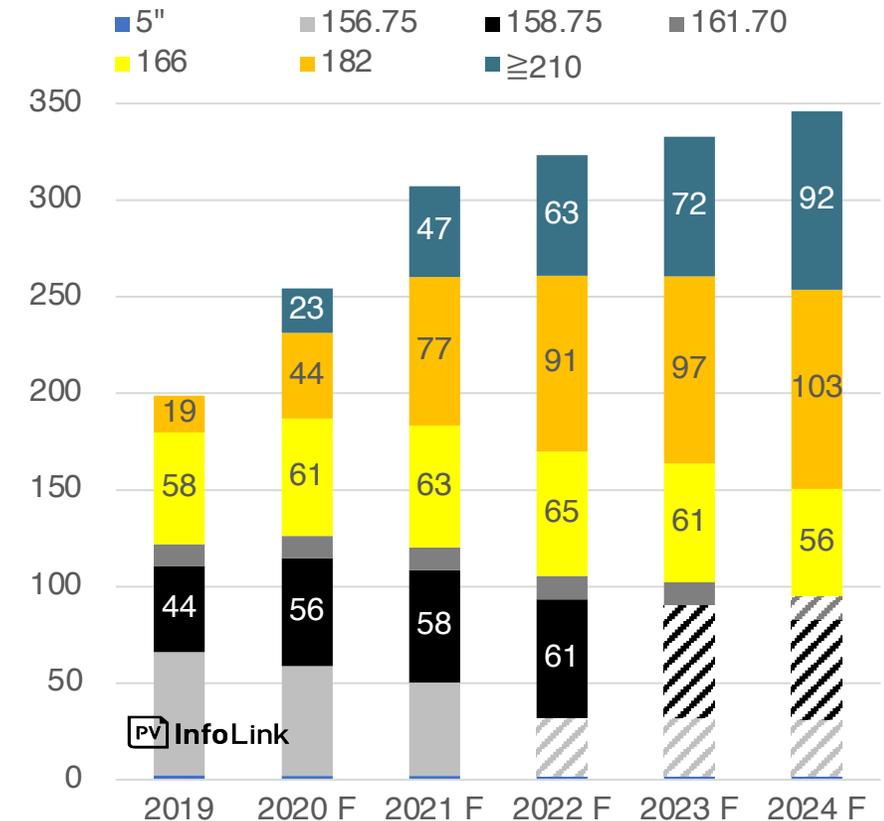


Risen 210 (60pcs)  
12BB+HC 615W

# Development of capacity for large format products

- As large format market is advancing faster than expected, leading cell manufacturers have installed lines that are compatible with size up to 210mm this year to meet demand for different size variants in the future, while module makers would choose format depends on the development of the alliance they take side with. However, as the industry has witnessed rapid shifts in sizes over the past two to three years, module makers started requiring equipment suppliers to provide machines that are compatible with 217-220mm at SNEC this year to gear up for changes in the future.
- Tier-1 vertically integrated companies and leading cell manufacturers have large scale capacity expansion plans this and next year, which will bring the total capacity of cell and module of 182mm and 210mm to exceed 100 GW next year. Capacity additions will surpass 50 GW at the end of this year. Since it's not difficult for wafer makers to adjust lines to accommodate larger formats, there's no barrier in wafer, cell, and module segments for the development of large format modules.
- To achieve 600W+, 182mm- and 210mm-modules need to assemble six cell strings that will increase module width to beyond 1100mm. Therefore, issues related to applications of module bill of materials, PV plant installation, and product deliveries remain to be solved. At present, inverter suppliers are offering solutions to high power modules and transports of containers. **As PV glass requires longer time to expand capacity and pass environmental assessment, it will become the bottleneck in the development of large format modules this and next year.**
- Most of the existing glass production lines can manufacture glasses with width below 1100mm. While the industry shifts to larger formats, glass manufacturers' capacity expansion plans for this year are only designed for 1200-1300mm. **Against this backdrop, the real production of 210mm-modules featuring five cell strings and 500W, which can keep the module width within what glass suppliers can offer currently, will be higher than the 182/210mm-modules featuring six cell strings and 580-600W over this year to the beginning of 2021.**

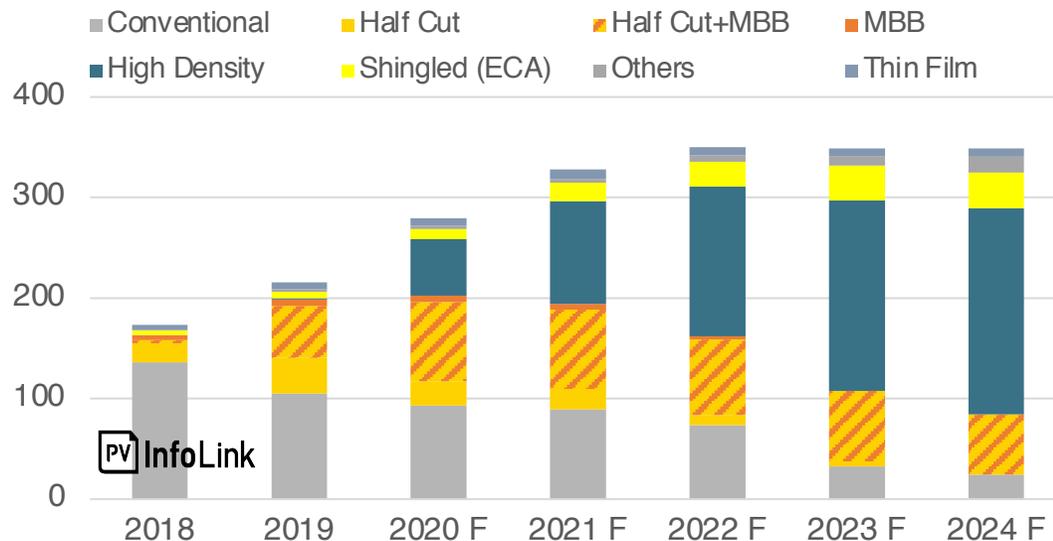
Changes to cell capacity by size, Unit: GW



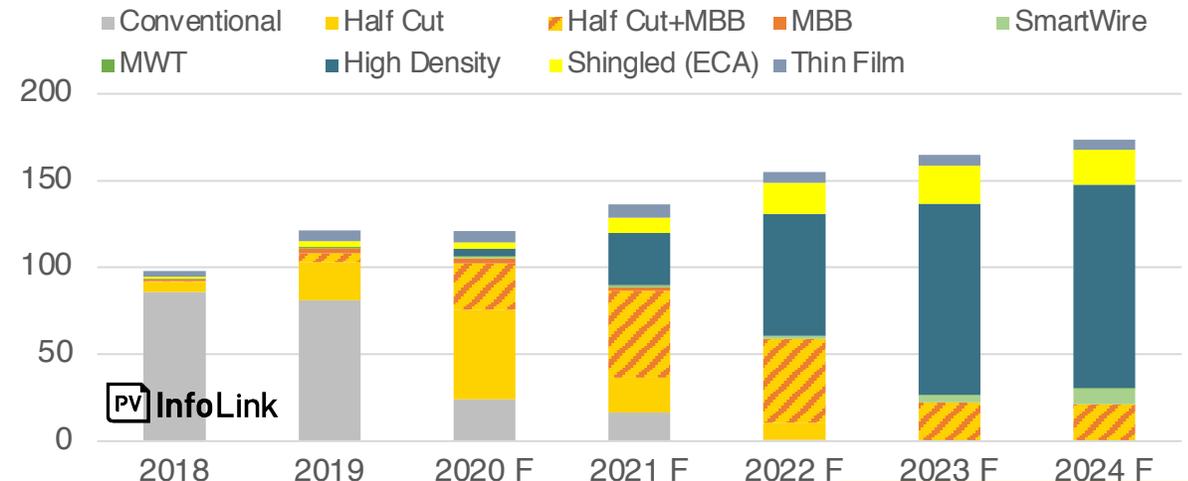
# Module technology trends

- Module manufacturers mostly installed new production lines for half-cut + MBB in previous years. This year they started added new capacity for large format and high-density modules. In the short term, China's exports of half-cut + 5BB modules are still 2-3 times higher than half-cut + MBB modules, whereas large format, high-density modules are still in the pilot phase; only Trina and Jinko have shipped noticeable volume of such modules.
- With the rise of string weld, high-density modules this year, not much discussion is going on around shingled modules with conductive adhesive and paved modules.
- **Half-cut + MBB + narrowed-spacing layout has become a common combination for large format modules recently.** Many manufacturers have announced capacity expansion plans recently. It's expected that production of large format modules will start increasing markedly in the second half of 2021. As cell surface area increase, large format modules are expected to assemble HC+MBB cells to minimize power losses and hot spot, thereby increasing module power output.
- **Assembly techniques aside, the most noticeable thing this year is the significant growth of bifacial market share.**

Forecast for module capacity trends, Unit: GW



Module shipment volumes by technology, Unit: GW

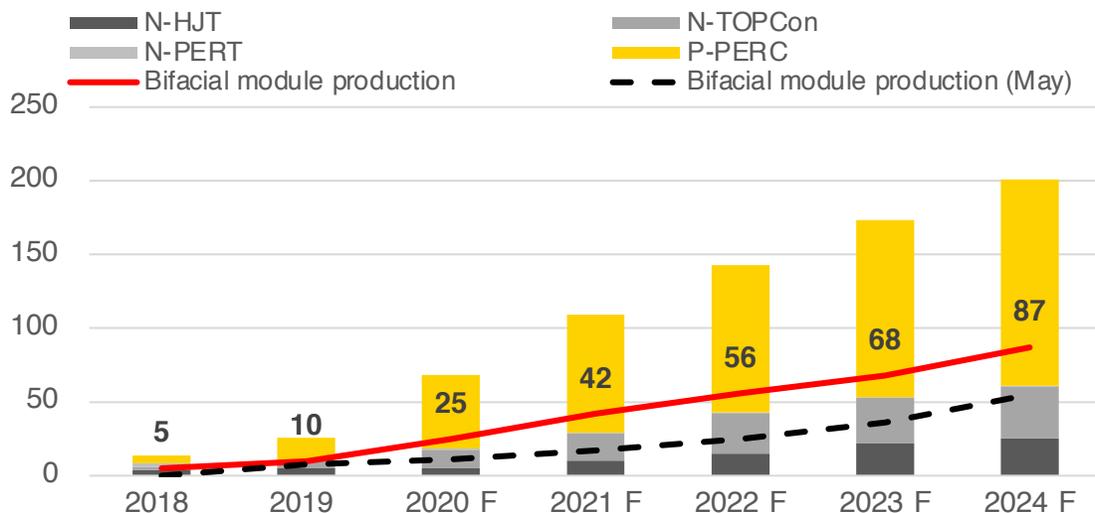


04

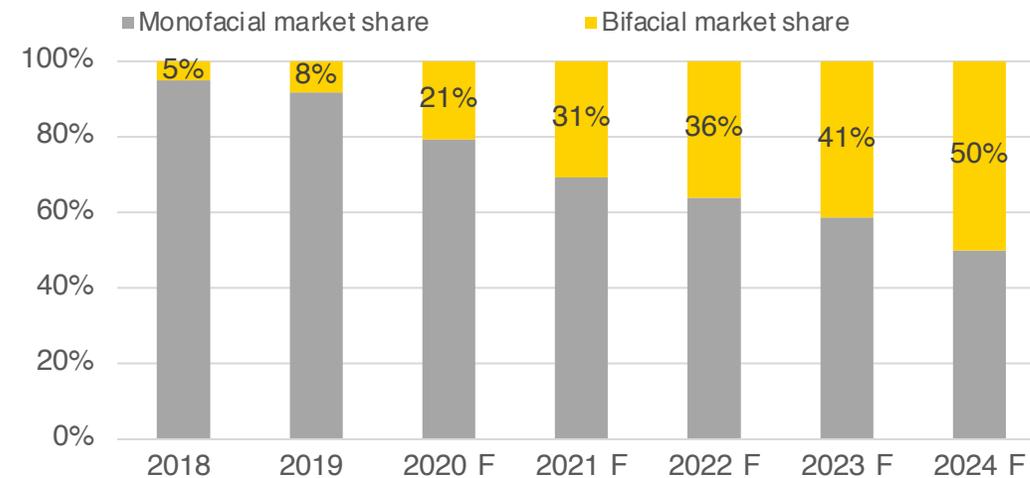
# Bifacial product trends

- Demand for bifacial modules has been rising after prices for monofacial and bifacial cells became identical. With little difference in prices and advantage of bifacial gains, quite a few utility scale projects in China will use bifacial modules this year.
- Tier-1 cell and module makers continue to promote bifacial modules, and more and more test results of bifacial modules have met the standard of end users. As a result, bifacial modules have seen significant growth in demand and market share this year.
- **PV InfoLink has learned that bifacial modules accounted for more than 30% of the module shipments by each of China's top five largest module suppliers in the first half of the year.** As more than 30% of China's utility-scale projects in the second half use bifacial modules, the above manufacturers' shipments of bifacial modules are expected to account 35-60% of total shipments in the second half.
- Overseas markets also saw an increase in bifacial projects, with many of them coupling with trackers to optimize energy gains. Moreover, US demand for bifacial modules will continue to rise as they remain excluded from the Section 201 tariffs.
- PV InfoLink has recently revised up forecast for bifacial market share to 20% for 2020. The share is expected to reach 50% in 2024.

Forecast for bifacial cell capacity and real demand, Unit: GW



Market share of monofacial, bifacial modules, Unit: %

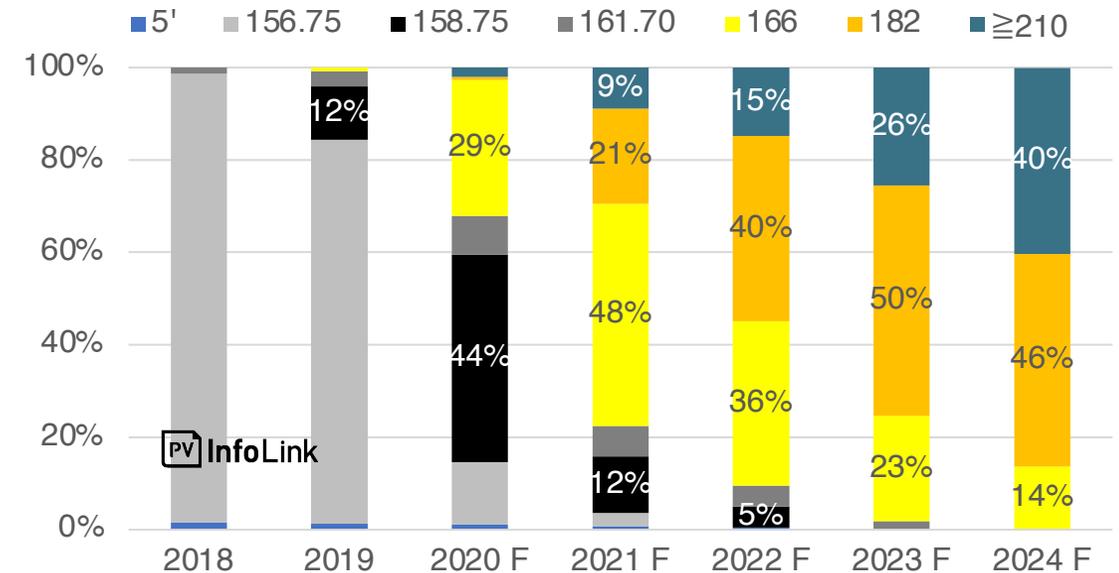


# Conclusion

- As capacities across the supply chain continue to ramp up and wafer sizes are shifting rapidly, it's difficult for older cell and module production lines to accommodate size larger than M6 through modification or upgrades; these lines will be gradually wiped out. Manufacturers focusing on M4/M4+ may start upgrading to larger sizes next year, while G1 format will slowly withdraw from the market. The market share of wafers smaller than M2 will mainly be sustained by multi-Si products.
- The market will see two to three mainstream sizes in 2020 through the two to three years to come. G1 and M6 will exist as the mainstream throughout 2020. From 2021 onwards, G1 will gradually be phased out and replaced by 166mm. Meanwhile, 182mm and 210mm will be on the rise and each occupies a certain market share in 2024. Moreover, the next-generation 217mm wafer Zhonghuan unveiled on July 16 points to the possibility of even larger formats in the future. However, the short-term development of 182mm and 210mm is more certain with manufacturers forming alliances. Therefore, size larger than 210mm is less discussed although some Tier-1 manufacturers start paying attention to formats beyond 210mm. It's expected that the market share of 210mm will reach 15-20% next year.

- People involved in the PV sector are discussing whether it's necessary for modules to size up and when will the large format become optimized and standardized.
- PV InfoLink reckons that larger modules help optimize system cost and the reduced cost per wattage of module BOM can bring further reductions in costs and pricing after market share expands. Therefore, the end market acceptance of large format modules is growing faster than prediction made last year.

Forecast for changes to wafer market share by size





# ABOUT US

---

PV InfoLink is a provider of solar PV market intelligence focusing on the PV supply chain. We provide accurate quotes, reliable PV market insights, and global PV market supply & demand database, as well as market analysis and forecast. We also offer professional advice to firms to help them stay ahead of competition in the market.

Our team comprises well qualified analysts with over 5 years of experience in the solar industry and have kept on improving through our in-house training program. The analysts also actively attend solar energy events, conferences, and trade fairs for delivering the most reliable market information and trend analysis.

Since our establishment, we have built a client base encompassing top-tier companies across the supply chain, who use our accurate price quotes updated on our website, WeChat, and Twitter account every Wednesday as their index for price negotiation. We also partner with regional research firms, exhibit service companies, and consulting firms to strengthen our offering.

If you have any question concerning this report, please contact



[service@pvinfoLink.com](mailto:service@pvinfoLink.com)

---

[www.pvinfoLink.com](http://www.pvinfoLink.com)