



# ENERGYBIN

PV Hardware Trade Analysis

H1 2024



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# Key Findings

1. In H1 2024, modules represented 62 percent of the total PV hardware for sale on the EnergyBin trading exchange followed by inverters at 17 percent and electrical BOS components at 10 percent.
2. 80 percent of the total Want-to-Buy (WTB) posts on EnergyBin inquired about modules followed by inverters at 11 percent, and electrical BOS components at 10 percent.
3. 50 percent of WTB posts were submitted for the purpose of sourcing hardware for new projects, up from 41 percent in H2 2023. 80 percent of these quotes were for modules to build residential (23 percent), commercial (57 percent), and small-scale utility (20 percent) projects.
4. Nearly half of the buying inquiries noted the reason to buy as either looking for replacement parts (33 percent) or adding onto existing PV systems (14 percent) indicating a growing desire to extend the lifespan of PV systems.
5. The most common module brands in Want-to-Sell (WTS) posts were ZnShine, Canadian Solar, Trina Solar, QCells, Allesun, Mission Solar, and REC. WTS posts reported a grand total of 53 brands ranging from established major players to new market entrants to discontinued manufacturers.
6. The most common module brands in Want-to-Buy (WTB) posts were QCells, Panasonic, Trina Solar, REC, Silfab, Jinko, and Canadian Solar. Buyers are looking for top quality products and prefer Tier 1 brands. However, nearly 20 percent of WTB posts stated "Any" in the manufacturer field, which means compatibility often outranks brand name.
7. Of the total modules listed for sale, 97 percent were new with a power range from 150 to 655 watts and a panel efficiency range from 14.4 to 22.8 percent. Over 80 percent had efficiency rates of 19.0 percent or higher. 3 percent were used / refurbished modules with a power range from 165 to 405 watts.
8. At the close of the second quarter, prices for All Black and High Efficiency modules were listing at an average of \$0.190 and 0.236 per watt respectively, and Mainstream modules were at an average of \$0.204 per watt.
9. PV module supply listed for sale on EnergyBin increased by 67 percent since H2 2023. Yet, supply volume is down by 31 percent since H1 2023. Inventory turnover points to trade in a growing secondary market.
10. Secondary market volume may see another influx in the second half of 2024 as new bankruptcies occur and players exit the market, as evidenced by the closing of Stace, a Canadian manufacturer, and the subsequent spike in Low Cost modules for sale on EnergyBin in H1 2024

# About EnergyBin



EnergyBin is a global exchange for PV professionals to connect, access market intelligence, and buy & sell wholesale solar equipment.

The PV professionals who make up EnergyBin's membership represent the industry's downstream supply chain from manufacturers to lifecycle solutions providers (resellers, repairers, remanufacturers, recyclers, etc.). Members oversee projects in the residential, commercial, agricultural, industrial, and small-scale utility markets.



# About the report

The purpose of this report is to provide a sample of the market intelligence available via PV hardware trade activity on the EnergyBin exchange platform. Our goal is to contribute data to the solar industry that can be used to help make informed decisions about equipment trade in the secondary market.

This report analyzes data based on the following activities:

- Common reasons for buying and selling
- Product categories listed for sale
- Requests to buy products
- Major brands listed by sellers and requested by buyers
- Module availability
- Module pricing

The report timeline represents site activity from the first half of this year (H1 2024). It compares findings from EnergyBin's 2023 [PV Module Price Index Report](#) for c-Si module pricing and availability.

[Join EnergyBin](#) to access all data and customize data that's relevant to your business goals.



# Common reasons to buy and sell on EnergyBin

PV hardware traded on EnergyBin is considered to be **secondary market** goods. Smart businesses expand their footprint in a downstream market. Exchanges like EnergyBin bring secondary market players together to help them gain visibility and build relationships with each other. Many PV companies who are connecting on EnergyBin are acting as both buyers and sellers.

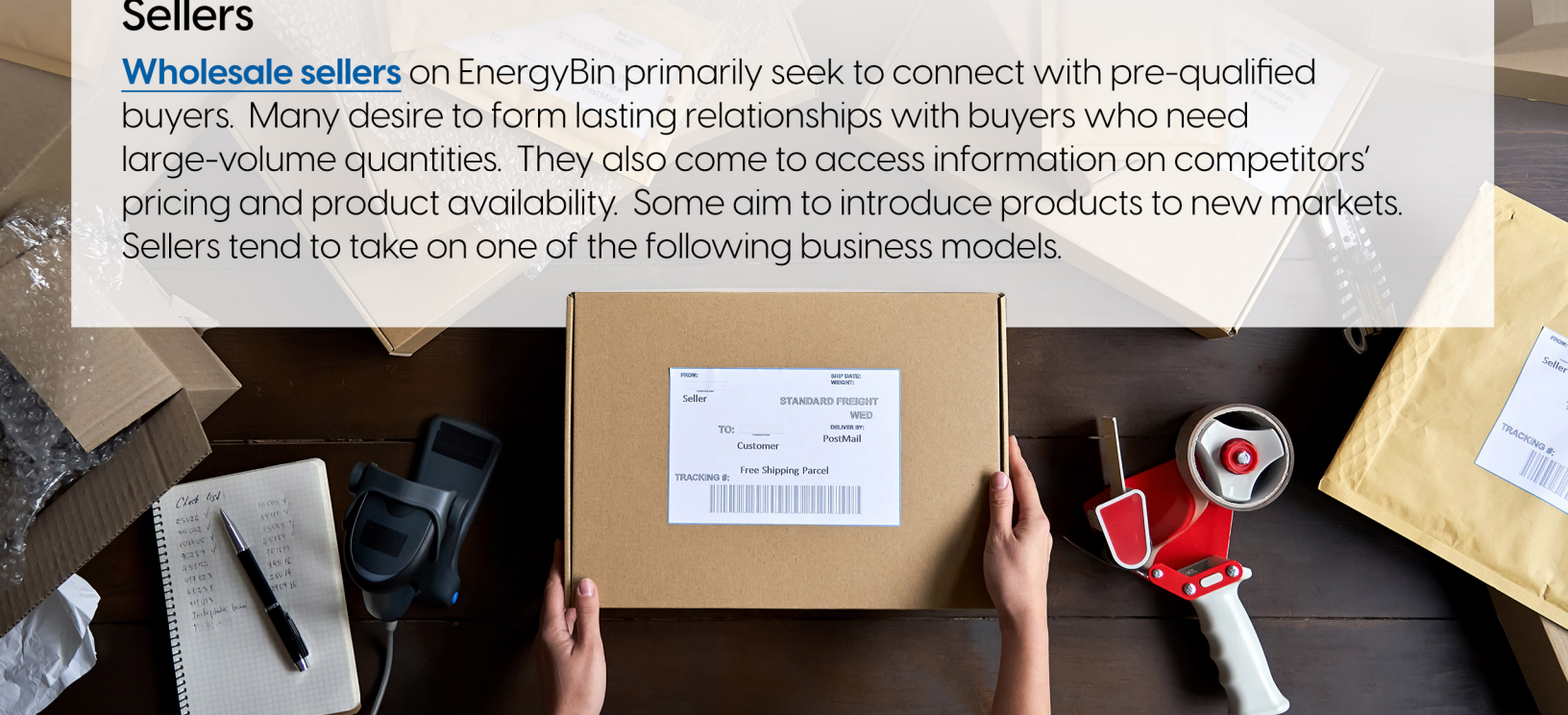
The secondary market consists of both new and refurbished PV hardware goods. On EnergyBin, 92 percent of the goods (modules, inverters, electrical & structural BOS parts, and storage/batteries) listed for resale in H1 2024 were new, while just 8 percent were refurbished.

The following scenarios explain where these goods are flowing from:

- Remarketed products that primary buyers aren't purchasing, including clearance, discontinued goods, close-outs, surplus, and miscellaneous one-offs
- Asset liquidations from company acquisitions and bankruptcies
- Leftover products (new with warranty, yet never installed) from bulk purchases and project installations
- Products for resale (new with warranty, yet never installed) resulting from project cancellations, project delays, and downsized projects
- Products for resale that are used, refurbished, or remanufactured and have no manufacturer warranty, but possibly have an assigned 3rd party warranty and/or service warranty

## Sellers

**Wholesale sellers** on EnergyBin primarily seek to connect with pre-qualified buyers. Many desire to form lasting relationships with buyers who need large-volume quantities. They also come to access information on competitors' pricing and product availability. Some aim to introduce products to new markets. Sellers tend to take on one of the following business models.



# Common reasons to buy and sell on EnergyBin

## **Merchant or Stocking Wholesaler**

Merchant wholesalers take title of the inventory. They may have multiple warehouses or one central storage facility. They stock many SKUs and brands.

## **Distributor**

Distributors are like merchant wholesalers except for one major difference. They choose to only represent a select number of brands. Distributors prefer to stock top brand names from manufacturers who have a stable track record and established bankability.

## **Agent Wholesaler**

Agent wholesalers don't take ownership of the inventory but rather represent manufacturers and other sellers. They facilitate transactions, including taking orders, negotiating contracts, scheduling delivery, and collecting payment.

## **Reseller**

A wholesale reseller is unique in the sense that they don't always follow a traditional vertical supply chain. Rather, they tend to acquire goods from a variety of supplier relationships like manufacturers, other wholesalers, liquidators, auction houses, and even developers, EPCs and contractors with excess and second-hand material. They may work with solar equipment brokers to buy and sell goods as well.

Additionally, sellers join EnergyBin to promote their value-added services. Some provide storage space to contractors and will drop ship equipment to project worksites. Some offer lines of credit. And some buy back excess and used equipment if the material has resale value. Several suppliers are dedicated to making wholesale buying possible and accessible to all kinds of installers and resellers, regardless of their size and capacity.

# Common reasons to buy and sell on EnergyBin

## Buyers

**Wholesale buyers** on EnergyBin come looking for an alternative sourcing solution. They seek to efficiently request price quotes from multiple vetted sellers. Many want access to bulk order discounts. Several need to locate hardware that their primary vendors either don't carry or don't have in stock. Others search EnergyBin for replacement parts and repair services. Some want to connect to recycling partners. Buyers who act as resellers to consumers aim to buy low on EnergyBin.

## Buyers = Sellers

As you review the report findings, don't presume that a member of EnergyBin is only a buyer or a seller. The EnergyBin platform exists to support wholesale **solar equipment brokering**. This means that you can buy and sell based on your customers' needs, which often change from one day to the next.

For example, a supplier who joins EnergyBin with the intention to sell may also take on a buying role for a customer in need of replacement modules or inverters that the supplier no longer stocks.

Or, an installer who joins EnergyBin to primarily buy equipment may have leftover equipment from a project that they then list for resale on the exchange. Furthermore, an installer may have a customer with an existing solar array who decides to upgrade their technology. The installer handles the decommissioning, determines that the used modules have resale value, and remarkets them on EnergyBin.

These scenarios are just a few opportunities that we observe EnergyBin members actively pursuing on our exchange.







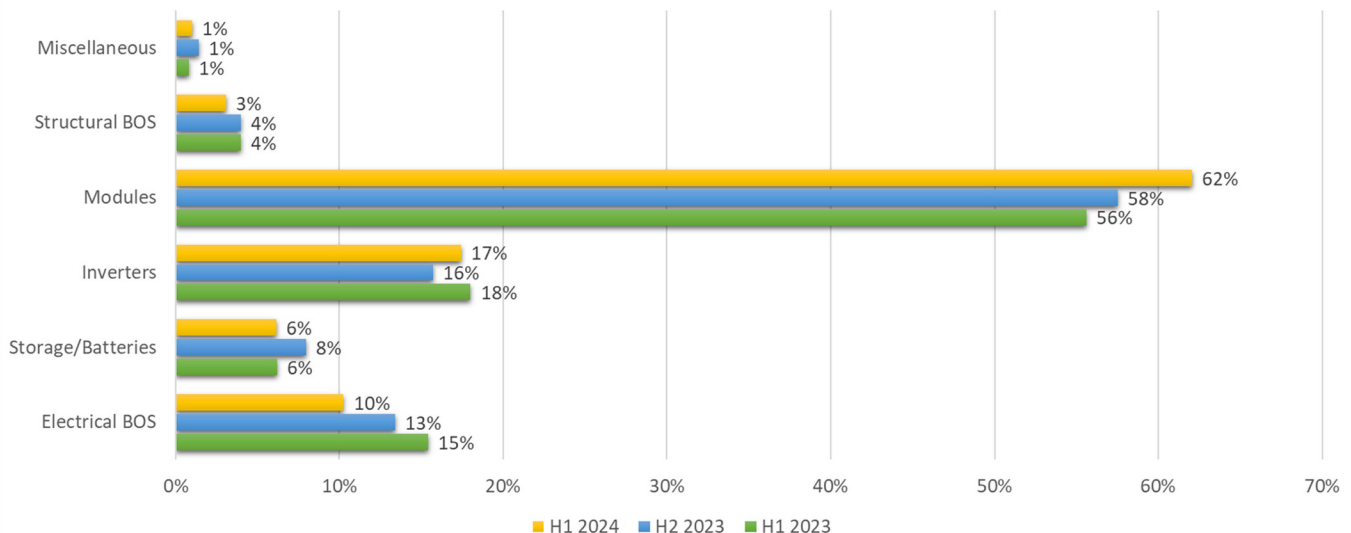
The report analyzed a sample of 1,350 Want-to-Sell (WTS) Broadcasts posted to the EnergyBin platform to determine product category breakdown.

In H1 2024, modules remained the dominant product category representing 62 percent of the total PV hardware for sale, up from 58 percent over the previous six months. Inverters represented 17 percent and electrical balance-of-system (BOS) components were 10 percent.

Electrical BOS components include optimizers, rapid shutdown devices, cables, wiring, switches, gateways, adaptors, connectors, transformers, monitoring devices, and communications devices. Structural BOS comprises all hardware components related to racking and tracking. Miscellaneous materials for sale on EnergyBin ranged from drones to EV residential chargers.

Storage and batteries represented 6 percent of the total products for sale, down from 8 percent in H2 2023. This change is by no means an indicator of demand. But it may suggest that energy storage system sales in general have slowed, especially in the California market since the state revised its net metering policy. According to the Solar Energy Industries Association, under 12 percent of all new distributed solar capacity in 2023 was paired with storage. That percentage probably hasn't deviated much in the past six months. The market is small, and those products that end up in the secondary market are likely flowing from cancelled projects.

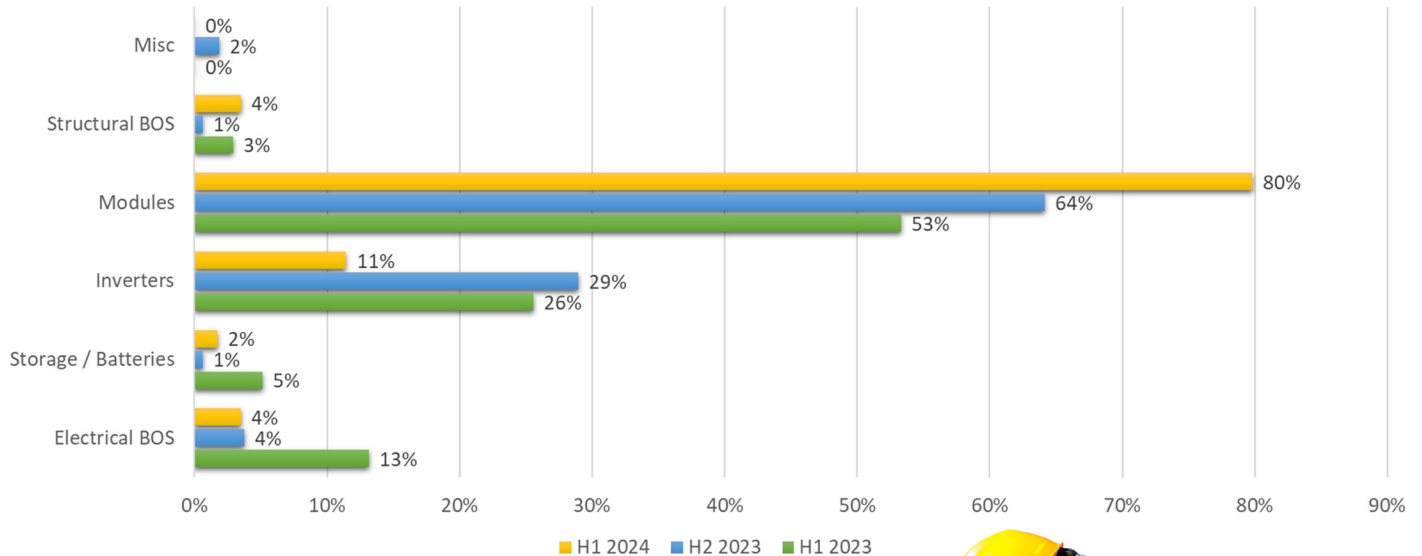
**WANT-TO-SELL (WTS) BROADCASTS  
POSTED ON ENERGYBIN H1 2023 - H1 2024**



The report analyzed a sample of 415 Want-to-Buy (WTB) Broadcasts posted to the EnergyBin platform to assess buyer needs by product category breakdown. Like sales posts, requests for modules represented the largest category at 80 percent followed by inverters at 11 percent.

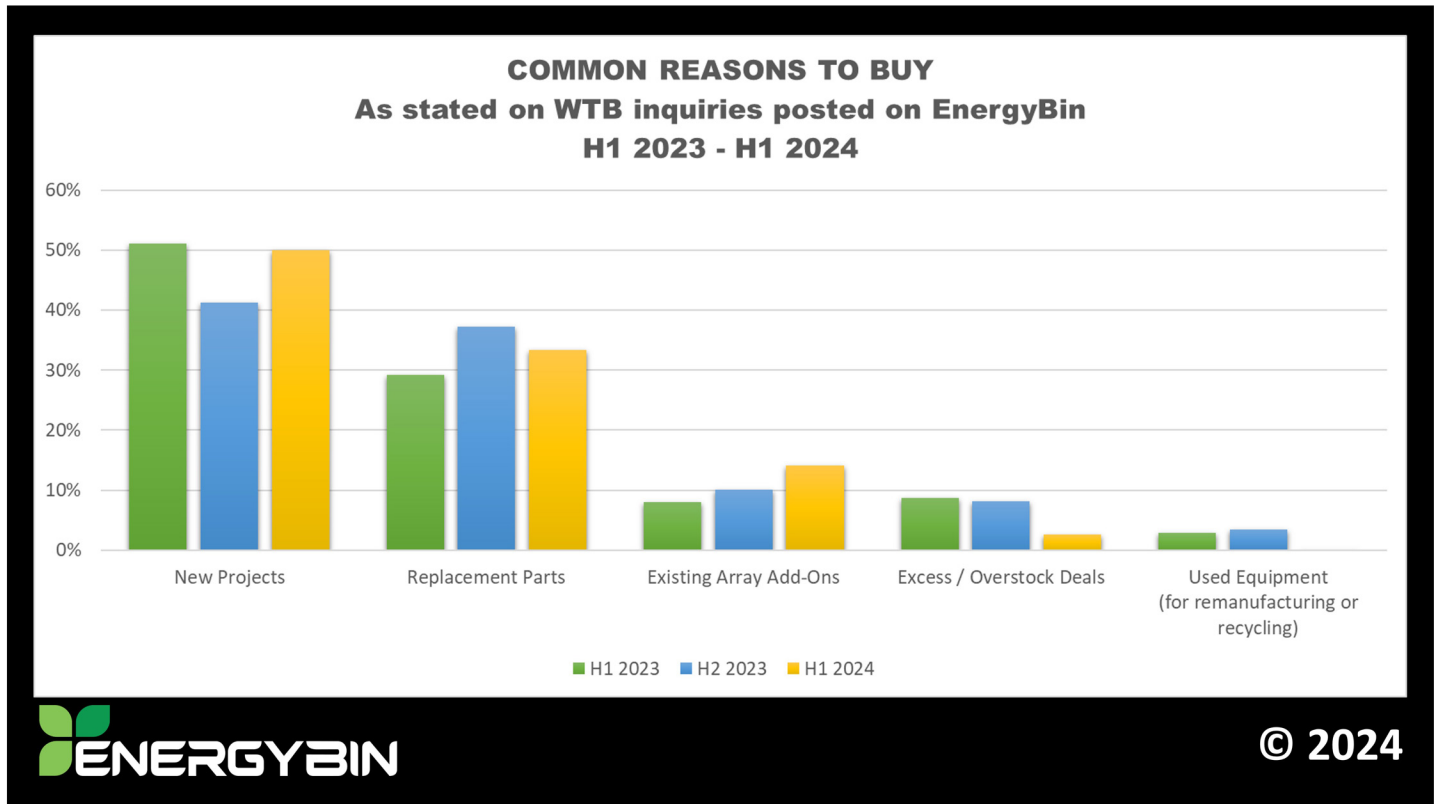
Note that it's common for buyers to conduct searches on the platform and contact sellers directly rather than posting a WTB Broadcast. Therefore, it should not be assumed that there are fewer buyers than sellers on EnergyBin. Furthermore, many members dually buy and sell on the exchange.

## WANT-TO-BUY (WTB) BROADCASTS POSTED ON ENERGYBIN H1 2023 - H1 2024





Of the total WTB Broadcasts, buying inquiries noted these common reasons to buy:



What's clear in this report's findings is that volume buyers are accessing EnergyBin to source PV hardware. 50 percent requested quotes for new projects, and 80 percent of the quotes were specifically for modules. 57 percent were sourcing for commercial projects of all sizes (up to 1 megawatt). 23 percent were sourcing for residential projects, and 20 percent were sourcing for small-scale utility projects (1 – 5 megawatts).

Aside from new project hardware quotes, the number of WTB Broadcasts attributed to finding replacement parts and add-ons to existing arrays were the next two common reasons representing 47 percent. These upward trends indicate a growing desire to extend the lifespan of PV systems rather than resort to new technology upgrades. Prematurely repowering may not be as feasible to the bottom line nor as friendly to the environment.

## Brands in demand

Both sales listings and buying requests shed light on module and inverter brands in demand. WTS posts reported a total of 53 brands and WTB posts listed a total of 35 brands. Brands ranged from established major players to new market entrants to discontinued manufacturers. Due to the nature of the secondary market, product availability is always in flux.

Buyers are looking for top quality products and tend to prefer Tier 1 brands. However, nearly 20 percent of WTB posts stated “Any” in the manufacturer field, which means they aren’t always limited to purchasing specific brand names as they are concerned with compatibility.

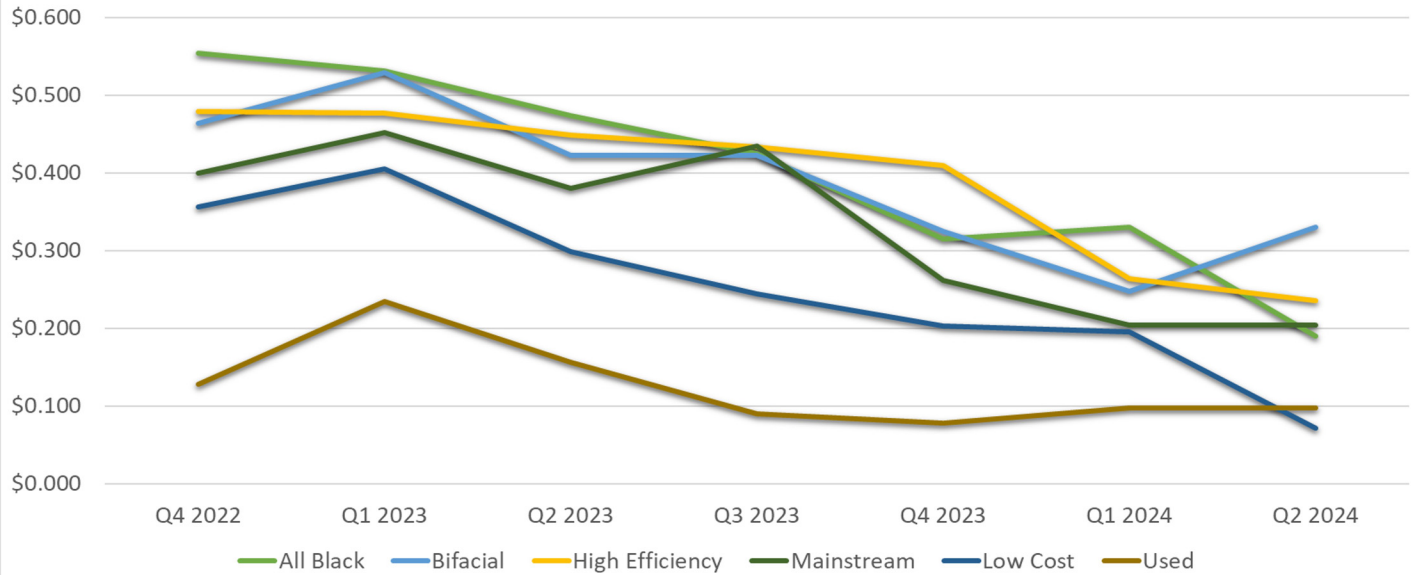
This is likely related to locating replacement parts, particularly when original brands in older PV systems may no longer be available in the market. To respond to maintenance and operations demand of older systems, some secondary market players have expanded their service offerings to include repair and remanufacturing solutions. As more systems age, these opportunities will increase.

### Top Brands Named by Buyers & Sellers As posted on the EnergyBin trading exchange

Modules		Inverters	
WTB	WTS	WTB	WTS
1. QCELLS	1. ZnShine	1. SMA	1. SMA
2. Panasonic	2. Canadian Solar	2. CPS	2. SolarEdge
3. Trina Solar	3. Trina Solar	3. Huawei	3. Enphase
4. REC	4. QCELLS	4. Enphase	4. Victron Energy
5. Silfab	5. Allesun	5. SolarEdge	5. SOLED
6. Jinko	6. Mission Solar	6. NEP	6. TIGO
7. Canadian Solar	7. REC		



**U.S. Spot Market PV Module Prices by Technology (\$/Wp)**  
As listed by seller on the EnergyBin trading exchange



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## H1 2024 Averages and Power Ranges

As listed for sale on the EnergyBin exchange

Module Class	PPW Range (\$/Wp by pallet)						Wattage		H1 2024 Efficiency	
	H2 2023			H1 2024			Average	Range	Average	Range
	Low	Average (Weighted)	High	Low	Average (Weighted)	High				
All Black	\$0.200	\$0.370	\$0.960	\$0.080	\$0.269	\$0.713	400	325-530	20.20%	19.2% - 21.0%
Bifacial	\$0.216	\$0.374	\$0.730	\$0.147	\$0.259	\$0.410	485	220-655	20.60%	19.2% - 21.0%
High Efficiency	\$0.190	\$0.417	\$1.110	\$0.148	\$0.241	\$0.470	530	380-655	21.42%	21.1% - 22.8%
Mainstream	\$0.140	\$0.348	\$0.664	\$0.175	\$0.204	\$0.290	420	370-490	20.17%	19.1% - 21.0%
Low Cost	\$0.199	\$0.223	\$0.670	\$0.070	\$0.074	\$1.100	315	150 - 410	17.60%	14.4% - 18.9%
Used	\$0.010	\$0.084	\$0.630	\$0.025	\$0.098	\$0.200	285	165-405		



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### PV Module Prices by Technology (\$/Wp)

As listed by seller on the EnergyBin trading exchange

	All Black	Bifacial	High Efficiency	Mainstream	Low Cost	Used
Q4 2022	\$0.554	\$0.464	\$0.479	\$0.400	\$0.356	\$0.128
Q1 2023	\$0.531	\$0.529	\$0.477	\$0.452	\$0.405	\$0.234
Q2 2023	\$0.474	\$0.422	\$0.448	\$0.380	\$0.299	\$0.156
Q3 2023	\$0.425	\$0.422	\$0.433	\$0.434	\$0.244	\$0.090
Q4 2023	\$0.315	\$0.325	\$0.409	\$0.262	\$0.203	\$0.078
Q1 2024	\$0.330	\$0.248	\$0.264	\$0.204	\$0.195	\$0.098
Q2 2024	\$0.190	\$0.330	\$0.236	\$0.204	\$0.071	\$0.098

#### Module Class Description

All Black	Module types with black backsheets, black frames, and a minimum module efficiency of 19.0 percent
Bifacial	Modules with bifacial cells, transparent backsheets, or double-glass, framed or unframed, and with module efficiencies up to 21.0 percent
High Efficiency	Crystalline modules with module efficiencies higher than 21.0 percent and either built with mono or bifacial HJT, n-type, TOPCon, or BC cells, or a combination thereof, or high wattage mono PERC modules
Mainstream	Standard modules with module efficiencies between 19.0 and 21.0 percent and typically built with mono p-type or n-type PERC, HJT, or TOPCon cells
Low Cost	Legacy or lower wattage modules in new condition, with module efficiencies below 19.0 percent, made with p-type mono or poly cells, and include a full, limited, or no warranty
Used	Modules that have been decommissioned, refurbished or not, tested, appraised for resale value, and include a limited or no warranty

The price per watt (PPW) is based on spot prices by the pallet of c-Si PV modules listed for sale on the EnergyBin wholesale exchange. Prices are quoted by sellers for the U.S. market. The PPW is represented as the weighted average per module class per quarter.



[Download](#) the 2023 PV Module Price Index for a more detailed analysis of module prices and supply, including historical numbers dating back to December 2021.

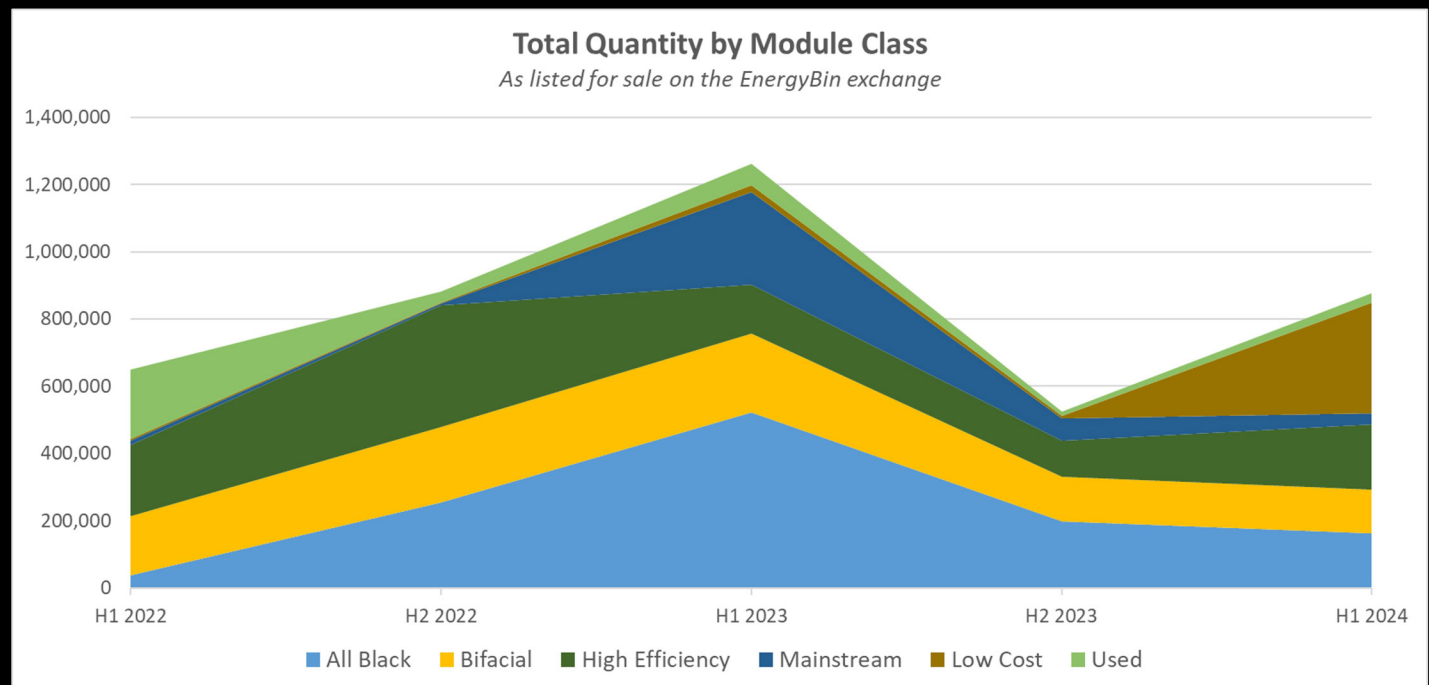
At the close of H1 2024, prices for All Black, High Efficiency, Mainstream, and Low Cost technology classes decreased since H2 2023. Bifacial prices declined in Q1, but then increased to \$0.330 in Q2, up from \$0.248 in Q1, likely due to the [U.S. policy announcement](#) in May that these modules would no longer be exempt from import duties. Used module prices have remained relatively stable since Q3 2023.

Averages on EnergyBin are in line with the overall U.S. market, where the [national average](#) was \$0.29 per watt at the end of Q1. At the close of H1 2024, prices for All Black and High Efficiency modules were listed at an average of \$0.190 and 0.236 per watt respectively, and Mainstream modules were at an average of \$0.204 per watt.

It appears tariffs are working to incubate the U.S. market from ridiculously low global prices. According to Wood Mackenzie, the new low is [\\$0.08 per watt](#). At this price, some suppliers may choose to import Chinese modules subject to up to 250 percent duties, which would still secure a price of \$0.200 per watt, roughly 30 percent lower than the national average. However, analysts don't foresee this low price to last in the long term and expect prices to stabilize in the second half of this year.

On EnergyBin, price ranges were widely skewed throughout the six-month duration. This fluctuation is common within the secondary market and likely correlates to available supply for any given month. For example, Low Cost modules were priced at an average of \$0.195 per watt in Q1, but then in Q2, supply increased tenfold driving the average down to \$0.071 per watt. The Q2 average price was lower than the Used category, of which supply amounted to just 3 percent of the total modules listed for sale.

Regarding Used modules, the average resale value increased slightly to \$0.098 per watt from H2 2023. The price range varied from \$0.025 to \$0.200 per watt. [Resale value](#) depends on several factors, including demand, their age, wattage, quantity, condition, and testing performance. Therefore, the spot prices listed in this report should be considered a reference point, not a universal measure. Because no global baseline price exists for used modules, prices remain rather subjective.



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Overall module supply posted for sale on EnergyBin increased by 67 percent since H2 2023 but decreased by 31 percent since this time last year. This may be due to the stall in procurement as the U.S. market seeks to assess the ramifications of the [Department of Commerce's determination](#) on Southeast Asian imports. As a result, project timelines are being pushed back.

Also, fluctuations in supply volume show that trade is taking place in the secondary market. The ups and downs are indicators of inventory turnover, as wholesale buyers and sellers connect to fulfill immediate needs.

However, the secondary market could be poised to see more volume soon. [Clean Energy Associates](#) estimates 35 GW of modules being stored in warehouses in the U.S. and expects them to stay put through the end of the year. They are primarily being held for delayed projects. Yet, if these projects are renegotiated or cancelled, this supply will likely be remarketed, or posted for resale via EnergyBin and other secondary market sales channels.

Another market condition that affects supply on EnergyBin is bankruptcies. That is the reason behind the spike in Low Cost modules. A reseller posted 300,000 [Stace modules](#) after the Canadian manufacturer went bankrupt in February. The steep price declines may force more players out of the market in months to come.





# Conclusion

The findings in this report support the business case for a robust and sustainable secondary market for PV hardware reuse, resale, and recycling. Using the EnergyBin trading exchange as a gauge for this case, we see a network that is growing as smart companies seek to expand their business in the secondary market. Opportunities to invest in asset recovery and remarketing, especially for excess modules stored in warehouses are widely available to the savvy reseller.

Additionally, EnergyBin is a resource for market intelligence with respect to pricing and availability of PV hardware that has fallen out of traditional distribution channels. This report concludes that there is an expanding secondary market for both new and used PV hardware.



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