

Solar Energy – European Inverter and Energy Storage Market

2022 Outlook Strengthens Further

European string-inverter and microinverter 2022 sales/purchase growth expectations have improved since July, with low supply supporting 3Q22 price increases, and Enphase's microinverters gaining share because of its availability advantages.

- 3Q22 string inverter orders up 76%–81% yy, microinverter orders up 51%–56% yy, both boosted by anticipated orders by distributor sources, booming demand from distributed generation segment
- 2022 string inverter sales/purchases expected up 54%–59% yy, microinverter sales/purchases expected up 43%–48% yy (both improving vs. July forecasts)
- 3Q22 string inverter prices up 28%–33% yy, microinverter prices up 13%–18% yy (both improving vs. 2Q22); 4Q22 string inverter prices expected up 31%–36% yy, microinverter prices expected up 17%–22% yy
- ENPH, Huawei, Jinglong (300763 CH), Sungrow (300274 CH), GoodWe (688390 CH) expected to gain share during 2H22 on slight availability advantage; S92 GR, Fronius still expected to lose share on shortages
- Areas to Watch: 2022 energy-storage solution sales expected up 60%–65% yy; 3Q22 delivery times down qq for 3 of 6 sources; 4Q22 prices expected down yy for 2 of 6

KEY DATA

Inverter Sales/Purchase Outlook YY

(on average)

| | 2022 | | 2023 |
|-------------------|-------------------|-------------------|--------------------|
| | STRING INVERTERS | MICROINVERTERS | ALL INVERTER TYPES |
| Up 91%–100% | 2 | 1 | 2 |
| Up 71%–80% | - | 1 | - |
| Up 41%–50% | - | - | - |
| Up 31%–40% | 1 | - | - |
| Up 26%–30% | - | 1 | - |
| Up 21%–25% | 1 | - | - |
| Up 11%–15% | 1 | 1 | 1 |
| Up | 1 | 1 | - |
| Flat | - | 1 | 3 |
| Down | - | - | - |
| Average | Up 54%–59% | Up 43%–48% | Up 33%–38% |
| July expectations | Up 50%–55% | Up 29%–34% | - |

BY SYLVAIN GAVARD

SOURCES & BACKGROUND

6 sources in France and Germany, comprising 3 with solar installation, integration and development companies, and 3 inverter distributors, representing more than 2.7 GW of solar installations in Europe and worldwide in 2021

REPEAT SOURCES 5 from OTR Global's July report

INTERVIEWS Sept. 26 through Oct. 11

AVERAGES Straight

"I continue to preorder as much as possible and continue to have deliveries made by plane rather than by boat to be able to meet demand. Right now, inverter inventories are a strategic value. If you don't have enough on inventory, you might not survive because you just cannot answer skyrocketing demand."

European distributor

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Electricity Prices, Preorders Boost Demand

Three European sources said their 3Q22 orders for all inverter types were boosted by preorders (especially by the distributor sources) because of rising demand from all end markets, as well as long lead times for all inverter types. A large distributor said, “I continue to preorder as much as possible and continue to have deliveries made by plane rather than by boat to be able to meet demand. Right now, inverter inventories are a strategic value. If you don’t have enough on inventory, you might not survive because you just cannot answer skyrocketing demand.”

String Inverter Orders: Sources said their 3Q22 orders for string inverters (such as those produced by **SMA Solar Technology AG**) increased an average 76%–81% yy, boosted by demand especially from utility-scale solar PV installations in all countries. Orders also benefited from extremely strong demand from the distributed generation (DG) segment, which includes residential and small-scale solar installations.

Microinverter Orders: Orders for microinverters (such as those produced by **Enphase Energy Inc.**) increased an average 51%–56% yy during 3Q22, also boosted by solid demand from the DG segment, which is the only one for which microinverters are considered financially viable because of their high purchase prices. Sources also said their 3Q22 microinverter orders gained momentum qq because of slightly looser supply for Enphase’s microinverters qq, as well as growing quality recognition in the German market (historically less open to the microinverter technology than other European markets, such as Italy or the Netherlands). A large distributor said, “German [DG] installers and customers have now started to recognize Enphase’s ease of use, as well as their added value.”

Quotes

“Our orders for string inverters are up like crazy [yy]. ... Everybody runs to every wholesaler like us for anything he can find.” *European distributor*

“Microinverters are a growing market, especially for Enphase who still is able to deliver — but they’re starting from very low levels. Small balcony installations are booming because of the rising energy costs and fear of energy shortages.” *European distributor*

“Demand for microinverters and optimizers in Europe is growing, but it’s not as bullish as in the United States” *Global installer*

Already-Strong Outlooks Improve

2022 Outlook: European sources expect their 2022 sales/purchases of string inverters to increase an average 54%–59% yy (an improvement from expectations of up 50%–55% in OTR Global’s **July** note), and microinverter sales are expected to increase an average 43%–48% yy (an improvement from July expectations of up 29%–34%). All sources said their 2022 sales/purchase outlooks were only limited by manufacturers’ supply and installers’ lack of qualified installers to meet customer demand.

2023 Outlook: European sources expect their 2023 inverter sales/purchases (all types) to increase an average 33%–38% yy. However, several said they would not be able to grow more because of workforce shortages and the time needed to train new qualified technicians.

Quotes

“2022 will be very strong worldwide. The only limit seems to be availability of inverters, cables, mounting systems and technicians for the solar installations.” *European distributor*

“German [DG] installers and customers have now started to recognize Enphase’s ease of use, as well as their added value.”

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“All major [inverter manufacturers] say they’re warming up for exploding demand worldwide.”
European distributor

“We want to keep the same year-to-year growth rate in 2023 as in 2022. It would be hard to grow more, not because of demand, but because of the lack of workforce. It’s hard to hire qualified technicians and grow in a responsible manner for our customers.” *Regional installer*

“Growing again in 2023 is not possible — there are too many restrictions in workforce and components availability.” *Regional installer*

Strong Demand, Low Supply Drive Prices Up

Inverter Prices YY

(on average)

| | STRING INVERTERS | | MICROINVERTERS | |
|---------------------|-------------------|-------------|-------------------|-------------|
| | 3Q22 | 4Q22 (EST.) | 3Q22 | 4Q22 (EST.) |
| Average | Up 28%–33% | Up 31%–36% | Up 13%–18% | Up 17%–22% |
| 2Q22 average | Up 17%–22% | - | Up 10%–15% | - |

Sources said 3Q22 string inverter prices increased an average 28%–33% yy, an improvement from up 17%–22% in 2Q22, because of strong demand and low supply. Prices are expected to increase an average 31%–36% during 4Q22. Most sources referred to spot prices because of a lack of supply, while contract prices were up mid-single digits, sources said. Meanwhile, 3Q22 microinverter prices increased an average 13%–18% yy, an improvement from up 10%–15% in 2Q22. Prices are expected to increase an average 17%–22% yy during 4Q22. Sources said prices for microinverters were increasing more slowly than those of string inverters because of a higher price baseline, and microinverter manufacturers willing to be priced more competitively to gain share against string-inverter manufacturers in the DG segment.

Lead Times: Lead times for inverters in general increased qq for four of six sources during 3Q22. Most said all main players were sold out for 2022 delivery; however, two sources (a distributor and an installer) said Enphase still had some availability, one of whom said **SolarEdge Technologies Inc.** also still had some slots left for its inverters and optimizers.

Quotes

“If I order now [at the beginning of October], I will be delivered in December — if all goes well. The problems come from the high level of demand worldwide, but also production delays, as the Chinese factories are still not working at full speed because of the COVID lockdowns, as well as microchip shortages.” *European distributor*

“Contract prices for string inverters are stable to slightly up year to year, but most manufacturers are sold out. So, if you need an inverter fast, you have to go to the spot market, and what’s happening out there is kind of usury.” *European distributor*

“An Enphase IQ7 with a 72-cell microinverter costs €127. Its direct competitor, the **[Advanced Process Systems Corp.]**’s (265520 KS) DS3 — which can handle two panels, and with the same 20-year warranty — costs €156. So, it means you need two Enphase microinverters to do the same thing you do with one of AP System’s DS3. In addition, you need to add €50 for a solar installation with Enphase, as it requires a disconnection device. So, I clearly believe that Enphase is taking advantage of the situation and fattening.” *Regional installer*

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Enphase, Chinese OEMs Expected to Gain Inverter Share

Enphase was most frequently cited (five mentions) as an inverter manufacturer expected to gain share during 2H22 because of rising demand for microinverters, as well as slightly looser supply for microinverters than string inverters. Meanwhile, string-inverter manufacturers **Huawei Technologies Co. Ltd.** and **Ginlong Technologies Co. Ltd.**'s (300763 CH) Solis were cited as gaining share by four sources each, while **Sungrow Power Supply Co. Ltd.** (300274 CH) and **GoodWe Technologies Co. Ltd.** (688390 CH) were cited by three sources each because of better availability than Western manufacturers.

SMA and **Fronius International GmbH** topped the list of the inverter manufacturers expected to lose share in 2H22 (by four sources each), on lack of availability compared with other string-inverter manufacturers.

Quotes

“The Chinese will continue to gain share, as they have a direct grip on the semiconductors they need — if there is no other lockdown in winter. Also, Enphase seems to sell a lot and have supply, somehow. I don't know how.” *European distributor*

“All renowned suppliers are sold out. The first to be sold out was Sungrow. So, everyone turned to Huawei, but now they are sold out, too. ... The only one that can still deliver is GoodWe — call it a former tier-2 manufacturer. About their quality — I hope it's good... but what else can we do? ... Sungrow might gain again if they're able to deliver again in Q4.” *Global installer*

“Only some Chinese can sell, it seems. Tier-2 [Chinese] manufacturers also arrive. SMA and Fronius don't get the semiconductors they need, so they can't deliver. SolarEdge doesn't lose, they just also don't win as they can't deliver more due to shortages — especially concerning their optimizers, which contain a lot of smart electronics.” *European distributor*

Energy Storage Growing From Low Level

All six sources expect their 2022 sales for energy-storage solutions to increase yy, up an average 60%–65% on easy comparisons, and 2023 sales are expected to increase an average 20%–25% yy. Sources said their sales were boosted by increasing electricity prices, with increasing demand not only from the DG segment, but also from the utility segment. However, sources views on availability varied; German sources reported slightly decreasing delivery times qq, on improving cell availability, while French sources said delivery times remained extremely long and continued to hinder their sales.

Quotes

“Increasing electricity prices in Germany now also provide business cases for energy storage in utility-scale solar installations. The principle is to store electricity during the day, when you would get only small sales prices, and then resell the stored electricity during the night, at 70 euro cents/kW. Other countries, like the Netherlands, need energy storage solutions as buffer. ... Every country has different reasons, but demand for large-scale energy storage is ramping up dramatically about everywhere.” *Global installer*

“About every second new DG installation in Germany now comes with energy storage. Private use is paying off very well when electricity prices around us are rising. People, and also companies, are eager to get as much independence as possible.” *European distributor*

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“Availability is getting better. The cell shortages seem to be history now.” *Global installer*

“Our warehouse is full with energy storage equipment and solar PV panels. The bottleneck is only with inverters.” *European distributor*

Mixed Views on Energy Storage Prices

European sources said 3Q22 energy storage prices increased an average 16%–21% yy. However, 4Q22 prices are expected to increase only an average 6%–9% yy; two of six sources (both in Germany) expect slightly negative yy comparisons because of improving availability and strong competition. A distributor said, “Sooner or later, prices will have to start to decrease again. Competition in the field of energy-storage systems is huge.”

Chinese, German OEMs Expected to Gain

Chinese manufacturers topped the list of the OEMs expected to gain share during 2H22. Huawei, **BYD Co. Ltd.** (1211 HK) and **Pylon Technologies Co. Ltd.** (688063 CH) were each cited by two sources, because of availability advantage against their competitors. Enphase was also cited by two sources, because of its package including its microinverter and its new energy storage products. Meanwhile, German manufacturers are also expected to gain share during 2H22 because of availability and German-specific accreditation regulations that favor German manufacturers for energy storage on large-scale solar installations; SMA, **E3/DC GmbH**, **Fenecon GmbH**, **Intilion GmbH**, **RCT Power GmbH** and **Sonnen GmbH** each was cited once.

EnBW Energie Baden-Württemberg AG's Senec was cited by three sources as likely to lose share (consistent with July findings) because of the explosion of a battery energy storage system in an apartment building in southern Germany in March 2022.

Quotes

“For large-scale energy storage solutions, Germans prefer local players like Intilion because of safety regulations that are very special here. Meanwhile, the Dutch prefer **Tesla [Inc.]** and Britons prefer BYD — it's very different. As for energy-storage solutions for the DG segment, as far as I know, the market is about empty — it's about who's got availability.”
Global installer

“Those who will gain are those who can deliver in the critical ranges, say between say 10kW and 20 kW: Enphase, Fenecon, Pylon Tech, Sonnen, RCT Power and **[Tsingshan Holding Group Co. Ltd.]** Fox ESS.” *European distributor*

“Enphase has a great easy-to-use package including storage — this in my eyes makes them a real share winner, especially when all individual buyers face shortages.” *Regional installer*

“Senec's fire problems are still in the heads of many installers.” *Regional installer*

Contributors: Alex Georgalas and Miriam Leunissen

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1. Did market conditions and demand in the solar industry in your region improve, remain the same or deteriorate in 3Q22 qq?

| | |
|--------------------|---|
| Improved: | 1 |
| Remained the same: | 5 |
| Deteriorated: | - |

2. Did 3Q22 lead times for solar inverters (all categories) increase, remain the same or decrease qq?

| | |
|--------------------|---|
| Increased: | 4 |
| Remained the same: | 2 |
| Decreased: | - |

3. Did your 3Q22 string inverters and microinverter orders increase, remain the same or decrease yy?

| | STRING | MICRO |
|--------------------|-------------------|-------------------|
| Up more than 100%: | 1 | - |
| Up 91%–100%: | 1 | 2 |
| Up 41%–50%: | 1 | 1 |
| Up 21%–25%: | 1 | - |
| Up 11%–15%: | 1 | 1 |
| Up: | 1 | 1 |
| Flat: | - | 1 |
| Down: | - | - |
| Average: | Up 76%–81% | Up 51%–56% |

4. What factors do you expect to have a positive or negative effect your 2H22 inverter orders (all types)?

POSITIVE

| | |
|-----------------------------|---|
| Climate goals: | 5 |
| Electricity prices: | 4 |
| Anticipated orders: | 3 |
| DG installations: | 2 |
| Fear of gas power outages: | 2 |
| Foreign demand: | 2 |
| Utility size installations: | 2 |

NEGATIVE

| | |
|------------------------|---|
| Lack of technicians: | 5 |
| Lack of components: | 4 |
| Increasing lead times: | 2 |
| Other: | 3 |

Note: Some sources gave more than one answer while others did not respond.

5. Do you expect your 4Q22 string inverter and microinverter orders to increase, decrease or stay the same yy?

| | STRING | MICRO |
|--------------------|-------------------|-------------------|
| Up more than 100%: | 1 | - |
| Up 91%–100%: | 1 | 2 |
| Up 51%–60%: | - | 1 |
| Up 41%–50%: | 2 | - |
| Up 11%–15%: | 1 | 1 |
| Up: | 1 | 1 |
| Flat: | - | 1 |
| Down: | - | - |
| Average: | Up 81%–86% | Up 53%–58% |

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6. Do you expect your 2022 string inverter and microinverter purchases/sales to increase, remain the same or decrease yy?

| | STRING | MICRO |
|---------------------------|-------------------|-------------------|
| Up 91%–100%: | 2 | 1 |
| Up 71%–80%: | - | 1 |
| Up 31%–40%: | 1 | - |
| Up 26%–30%: | - | 1 |
| Up 21%–25%: | 1 | - |
| Up 11%–15%: | 1 | 1 |
| Up: | 1 | 1 |
| Flat: | - | 1 |
| Down: | - | - |
| Average: | Up 54%–59% | Up 43%–48% |
| July expectations: | Up 50%–55% | Up 29%–34% |

7. Do you expect your 2023 inverter purchases/sales (all types) to increase, remain the same or decrease yy?

| | |
|-----------------|-------------------|
| Up 91%–100%: | 2 |
| Up 11%–15%: | 1 |
| Flat: | 3 |
| Down: | - |
| Average: | Up 33%–38% |

8. Did 3Q22 string inverter and microinverter prices increase, remain the same or decrease yy?

| | STRING | MICRO |
|----------------------|-------------------|-------------------|
| Up 51%–60%: | 1 | 1 |
| Up 41%–50%: | 1 | - |
| Up 31%–40%: | 1 | - |
| Up 26%–30%: | 1 | - |
| Up 6%–10%: | 1 | 2 |
| Up 1%–5%: | 1 | 1 |
| Flat: | - | 1 |
| Down: | - | - |
| Don't know: | - | 1 |
| Average: | Up 28%–33% | Up 13%–18% |
| 2Q22 average: | Up 17%–22% | Up 10%–15% |

9. Do you expect 4Q22 string inverter and microinverter prices to increase, remain the same or decrease yy?

| | | |
|-----------------|-------------------|-------------------|
| Up 51%–60%: | 1 | 1 |
| Up 41%–50%: | 1 | - |
| Up 31%–40%: | 1 | - |
| Up 16%–20%: | 1 | - |
| Up 11%–15%: | - | 1 |
| Up 6%–10%: | 1 | 1 |
| Up: | 1 | 1 |
| Flat: | - | 1 |
| Down: | - | - |
| Don't know: | - | 1 |
| Average: | Up 31%–36% | Up 17%–22% |

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10. Which inverter manufacturer do you expect to gain or lose share in 2H22?

GAIN

| | |
|------------------|---|
| Enphase: | 5 |
| Ginlong's Solis: | 4 |
| Huawei: | 4 |
| Sungrow: | 3 |
| GoodWe: | 3 |
| Other: | 1 |

LOSE

| | |
|----------|---|
| Fronius: | 4 |
| SMA: | 4 |
| Other: | 5 |

Note: Some sources gave more than one answer while others did not respond.

11. Do you expect your 2022 and 2023 sales of energy storage solutions to increase, remain the same or decrease yy?

| | 2022 | 2023 |
|-----------------|-------------------|-------------------|
| Up 91%–100%: | 2 | - |
| Up 41%–50%: | 1 | 1 |
| Up 26%–30%: | 2 | - |
| Up 16%–20%: | - | 1 |
| Up 6%–10%: | - | 2 |
| Up: | 1 | - |
| Flat: | - | - |
| Down: | - | - |
| Don't know: | - | 2 |
| Average: | Up 60%–65% | Up 20%–25% |

12. What factors do you expect to have a positive or negative effect your 2H22 energy storage solutions sales?

POSITIVE

| | |
|--------------------------|---|
| Electricity prices: | 6 |
| EV cars demand booming: | 2 |
| Government subsidies: | 2 |
| Fear of power shortages: | 2 |

NEGATIVE

| | |
|----------------------|---|
| Long lead times: | 3 |
| Economic conditions: | 2 |

Note: Some sources gave more than one answer while others did not respond.

13. Did 3Q22 lead times for energy storage solutions increase, remain the same or decrease qq?

| | |
|--------------------|---|
| Increased: | 2 |
| Remained the same: | 1 |
| Decreased: | 3 |

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14. Did 3Q22 energy storage solution prices increase, remain the same or decrease yy? Do you expect 4Q22 prices to increase, remain the same or decrease yy?

| | 3Q22 | 4Q22 |
|-----------------|-------------------|-----------------|
| Up 41%–50%: | 1 | - |
| Up 21%–25%: | 1 | 1 |
| Up 16%–20%: | 1 | - |
| Up 11%–15%: | - | 1 |
| Up: | 1 | 2 |
| Flat: | 1 | - |
| Down 1%–5%: | 1 | 2 |
| Average: | Up 16%–21% | Up 6%–9% |

15. Which energy storage provider do you expect to gain or lose share in 2H22?

GAIN

| | |
|-------------|---|
| Enphase: | 2 |
| Pylon Tech: | 2 |
| Huawei: | 2 |
| BYD: | 2 |
| Other: | 2 |
| SMA: | 1 |
| E3/DC: | 1 |
| Fenecon: | 1 |
| Intilion: | 1 |
| RCT Power: | 1 |
| Sonnen: | 1 |

LOSE

| | |
|--------|---|
| Senec: | 3 |
| Other: | 3 |

Note: Some sources gave more than one answer while others did not respond.

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