

**Supply Chain Analysis**  
**20 October 2026**

# **PCB**

# **Shortage**

**How AI demand, the Iran war and trade policy  
have squeezed the circuit board supply chain**



Scope. This analysis covers the supply of printed circuit boards (PCBs) and the base materials they are built from, from late 2025 to 20 October 2026. It draws on company releases and filings, government and official publications, established news agencies and trade press, and recognised industry-intelligence services.

Each source is named and linked in the text where it is used, and all sources are listed at the end of the report.

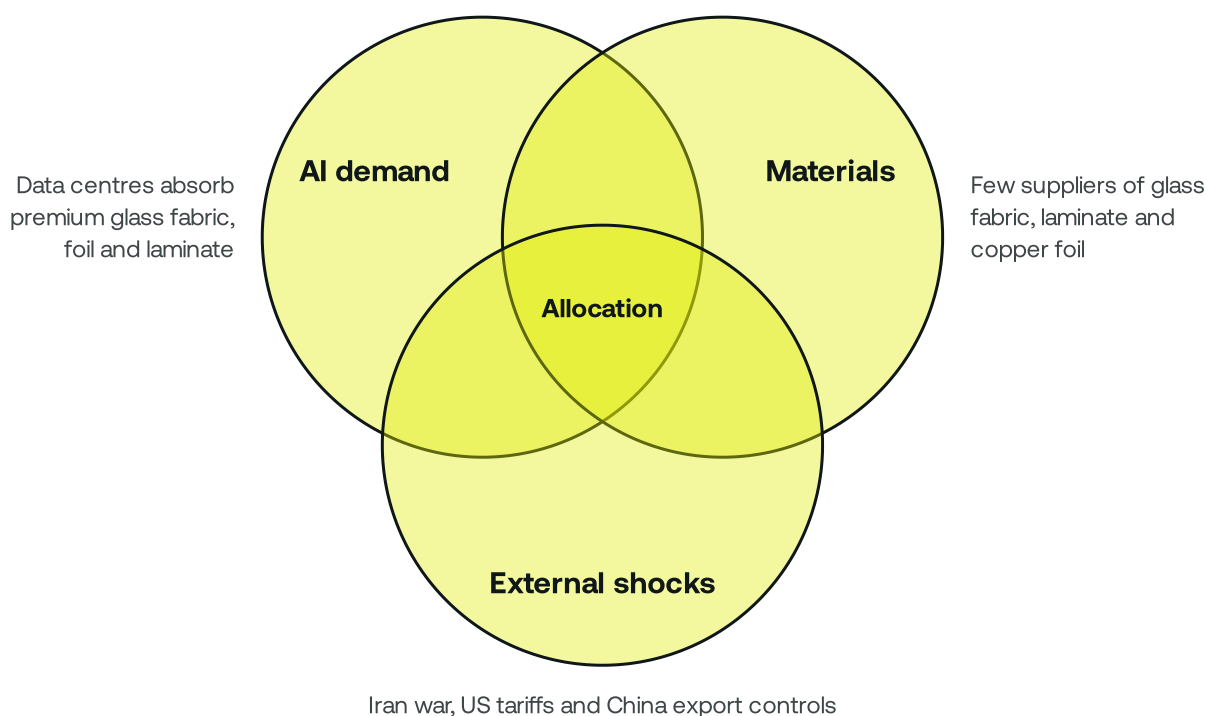
## ● Introduction

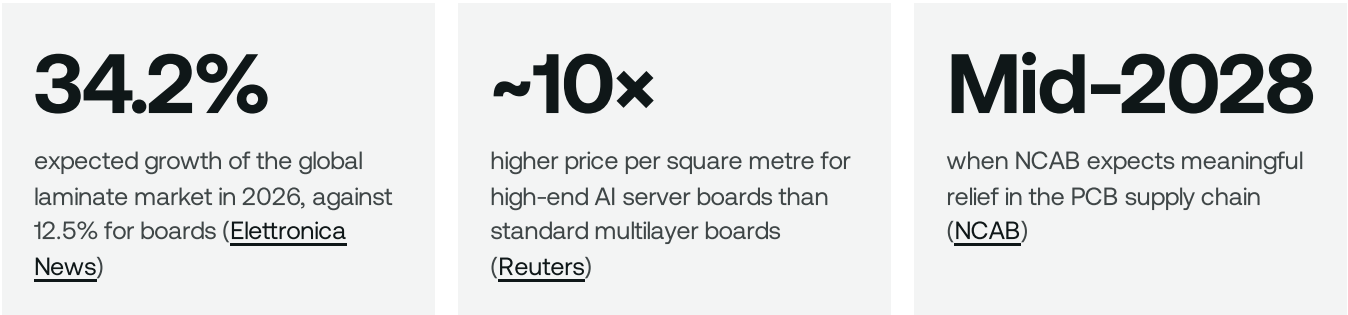
The circuit board supply chain has moved from a tight market to allocation, in which suppliers ration their output. Instead of filling every order, laminate makers now decide how much each customer gets, usually based on past volumes, long-term contracts or willingness to pay in advance. Suppliers are raising prices in repeated rounds and quoting lead times in months rather than weeks.

NCAB, one of Europe's largest PCB suppliers, describes the chain as "beyond stretched" and does not expect meaningful relief until mid-2028 ([NCAB](#)).

Three forces explain the shortage, and the chapters that follow take them in turn. AI data-centre demand is absorbing the specialised glass fabric, copper foil and laminate that high-layer server boards need (chapter 2). Those materials come from a small number of suppliers whose capacity takes years to expand, and the factories that make premium grades also make standard ones, so the squeeze spreads to ordinary boards (chapter 3). On top of this, the Iran war, US metals tariffs and the uncertain US–China truce on export controls add cost and risk (chapter 4). Each force would be manageable alone; together they leave little slack anywhere in the chain.

### Exhibit 1. Three forces behind the shortage

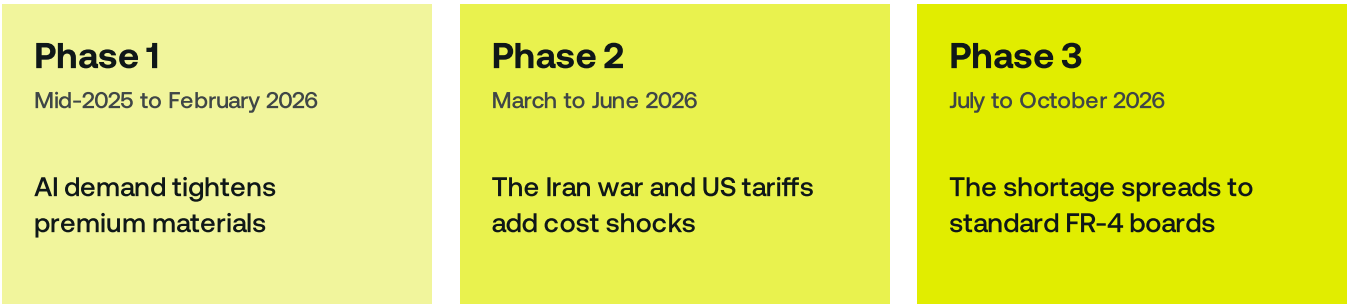




The shortage built in three phases:

- 1 AI demand tightened specialised materials through 2025.
- 2 The Iran war and a new round of US metals tariffs added cost shocks from March 2026.
- 3 From mid-2026 the tightness spread from premium grades into standard FR-4, and suppliers moved to allocation.

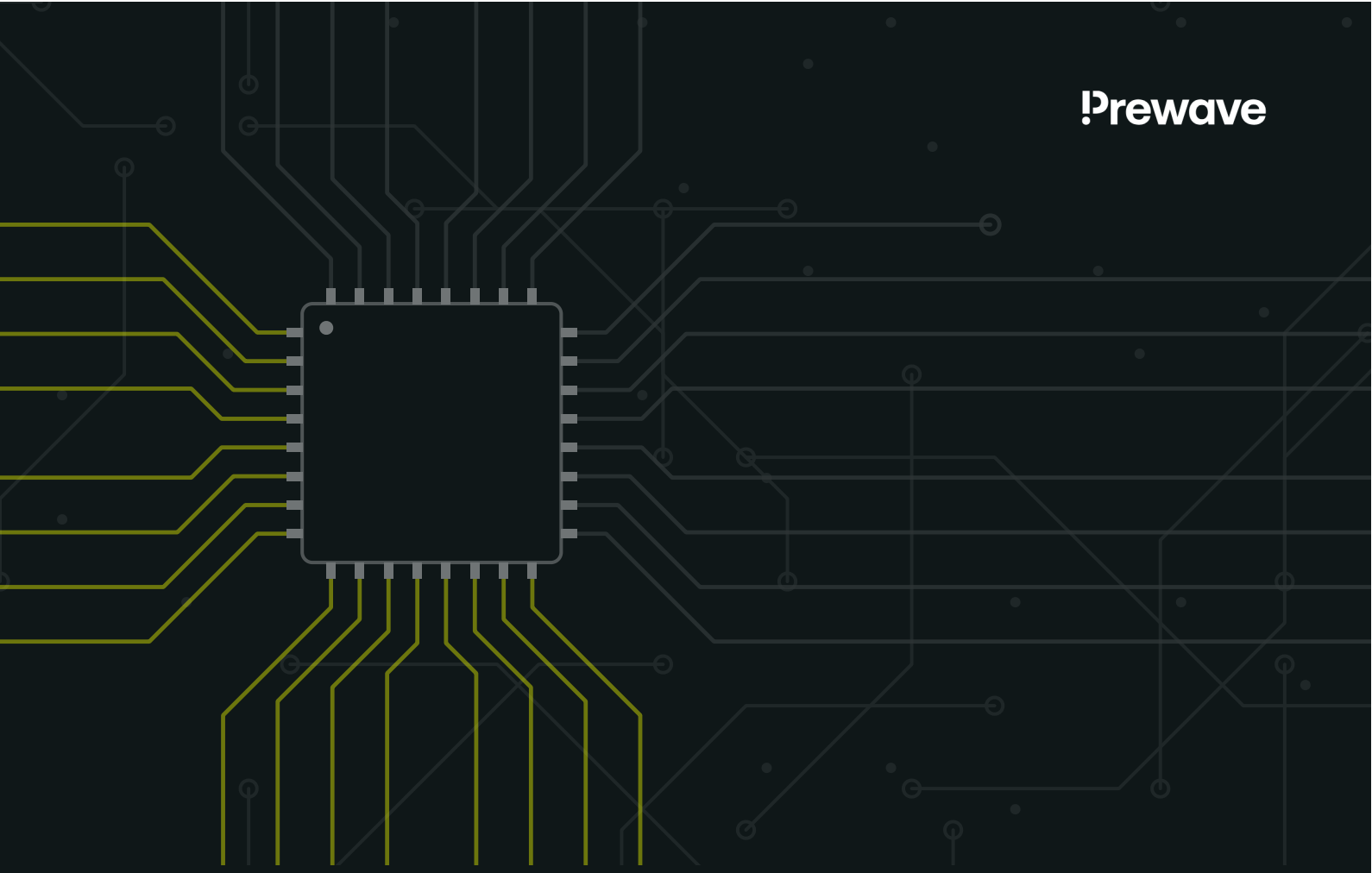
Exhibit 2. The shortage built in three phases



A dated record of the main events in each phase is in the appendix. Chapter 1 first explains how a board is made and who supplies its materials; chapters 5 and 6 set out what the shortage means for electronics, automotive and defence buyers, and what to watch through 2027.

### Key findings

- **AI demand is the primary driver.** Nvidia and the largest cloud companies have booked most premium glass cloth capacity for 2026 ([TrendForce, citing Nikkei](#)). Global laminate sales are expected to grow 34.2% in 2026, almost three times faster than PCB output ([Eletronica News, citing TPCA/ITRI and Prismark](#)).
- **Material bottlenecks turn that demand into a shortage.** Nittobo holds about 90% of low-expansion T-glass ([TrendForce](#)), and two suppliers control 80 to 90% of the smoothest copper foil ([Shanghai Metals Market, citing DIGITIMES](#)). As producers converted capacity to AI grades, the shortage spread to the standard E-glass fabric used in ordinary FR-4 boards ([Evertiq](#)). Most new capacity arrives from 2027.
- **External shocks raise costs more than they remove supply.** Sulfur, sulfuric acid, epoxy feedstocks and bromine all rose sharply after the Strait of Hormuz closed on 28 February, and a US decision on tariffs for refined copper is still pending ([Reuters via MINING.COM](#)). Reuters corrected its April report to remove the claim that the Iranian strike on Jubail halted SABIC's resin output ([Reuters via AJOT](#)).
- **Policy deadlines are close, but less final than they look.** US Treasury Secretary Scott Bessent says the US-China truce that pauses Beijing's October 2025 export controls now runs to 10 January 2027, but neither government has yet published the extension ([CNBC](#); [Mondaq](#)). The US ban on certain defence circuit boards from China takes effect in law on 1 January 2027, but covers only a narrow class of boards and its implementing rule has not yet been proposed ([Wiley](#)).



# 1

## How the PCB market works

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- 1.1 The anatomy of a board
- 1.2 Who supplies the materials, and who depends on them

A printed circuit board is the platform that every chip, sensor and connector is soldered onto.

The 2021 to 2023 chip shortage showed how a component worth a few dollars can halt a production line. Boards carry the same risk with less visibility: procurement teams buy modules, control units and finished assemblies, while the board and its materials sit one or two supplier tiers further up.

The market is large and growing quickly at the top end. Prismark estimates global PCB value rising from \$85.2bn in 2025 to \$95.8bn in 2026, up 12.5%, and to \$123.3bn by 2030, as reported by [Eletronica News](#).

That average hides two different markets. Boards for AI servers, data centres and high-speed networks are growing fast and rising in value per board. Everything else, including automotive, industrial and consumer boards, pays more for materials and waits longer for delivery.

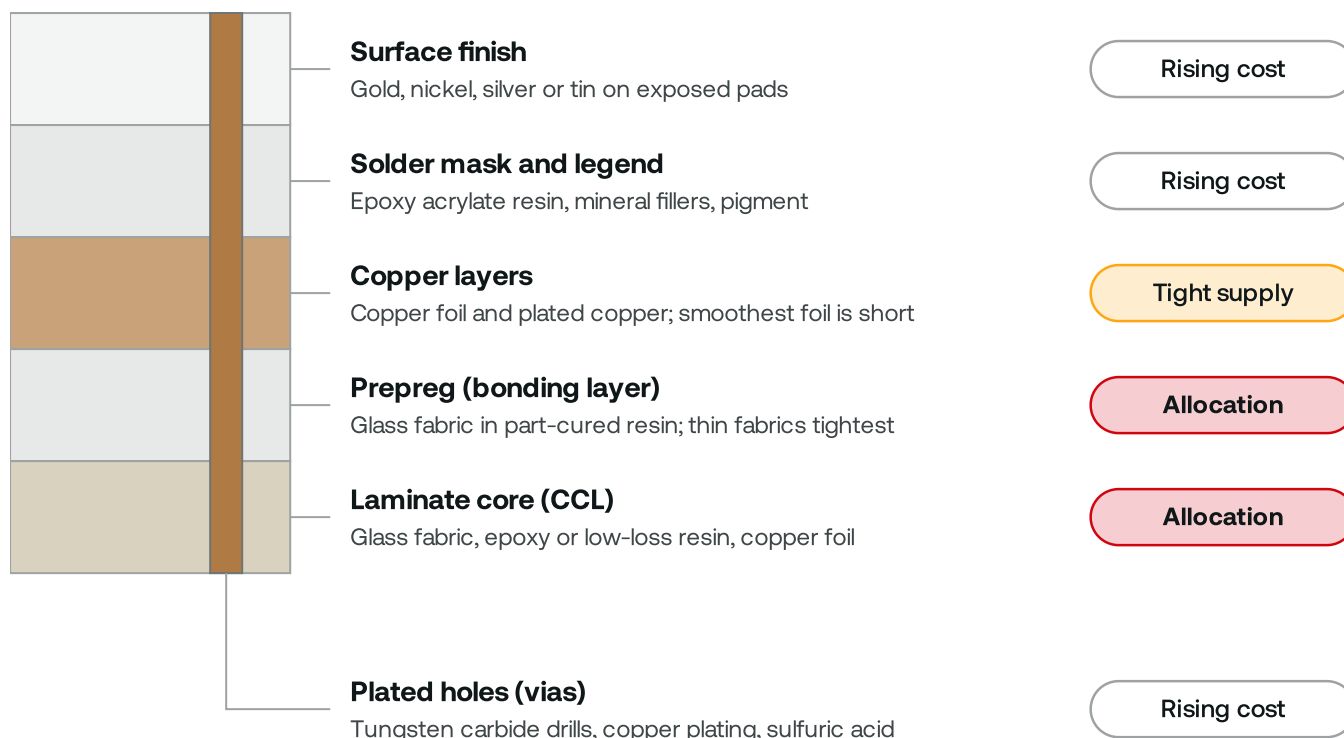
## ● 1.1 The anatomy of a board

A rigid board is a stack of insulating layers and copper layers, pressed together, drilled, plated and finished. Three base materials do most of the work. Woven **glass fabric** gives the board its strength and stability. **Resin** binds the fabric, insulates the copper layers and sets the board's electrical behaviour. **Copper foil** carries the signals and power. Pre-made sheets of fabric, cured resin and copper foil are sold as **copper-clad laminate (CCL)**, the board's core. Sheets of fabric soaked in partly cured resin, called **prepreg**, glue the cores together during pressing.

Copper-clad laminate accounts for 30 to 60% of the cost of making a board, according to Prismark data cited by the German trade journal [PLUS](#). Copper alone makes up around 60% of a board maker's raw-material costs, according to Victory Giant, a major Chinese supplier to Nvidia, quoted by [Reuters](#). All three base materials have been short at the same time in 2026.

### Exhibit 3. What a board is made of, and where the pressure sits

Main layers of a rigid multilayer board (half the stack shown), their inputs and 2026 supply status



Colours of the stack are schematic. Copper layers shown in copper tone, glass and resin layers in grey.

Board structure from NCAB, Würth Elektronik and PLUS; supply status as assessed in chapter 3.

## 1.2 Who supplies the materials, and who depends on them

A board passes through several supplier markets before it reaches a finished product. Glass fabric, resin and copper foil producers supply the laminate and prepreg makers, which in turn supply the factories that press, drill and plate the boards. Many buyers do not deal with those factories directly. They source boards through managed supply companies such as NCAB, one of Europe's largest PCB suppliers, which places customers' orders with a network of manufacturing partners ([NCAB](#)). ICAPE Group, Fineline Global and Confidee work in a similar way.

Each layer inherits the constraints of the one above it. A board ordered through NCAB or any other supplier depends on the factory that makes it; the factory depends on the laminate it has qualified; and that laminate depends on a specific glass fabric, resin and foil. The pressure points in Exhibit 3 therefore reach buyers wherever they sit in the chain.

#### Exhibit 4. Who supplies the constrained materials, and who depends on them

| Supply-chain layer            | Major players and specialists                                                                                                                              | Connection to the pressure points                                                                                                  |
|-------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|
| <b>Glass fabric</b>           | Nittobo · Nan Ya Plastics · Taiwan Glass · Grace Fabric Technology                                                                                         | Used in prepreg and laminate cores. Specialty low-loss and thin fabrics face the most pressure.                                    |
| <b>Resins</b>                 | Nan Ya Plastics · SABIC · Mitsubishi Gas Chemical                                                                                                          | Used in prepreg and laminate cores. Constraints depend on the resin chemistry and the grade required.                              |
| <b>Copper foil</b>            | Mitsui Kinzoku · Co-Tech · JX Advanced Metals · Nan Ya Plastics                                                                                            | Used in copper layers and copper-clad laminate. Ultra-smooth foil for high-speed boards is a bottleneck of its own.                |
| <b>Laminates and prepregs</b> | Kingboard Laminates · Shengyi Technology · Nan Ya Plastics · Elite Material (EMC) · ITEQ · Taiwan Union Technology · Panasonic Industry · Resonac · Doosan | Combine the upstream materials. A missing input can hold up the finished laminate or prepreg.                                      |
| <b>PCB factories</b>          | Zhen Ding · Unimicron · DSBJ · Mektec · Shennan Circuits · TTM · Compeq · Tripod · WUS · Kinwong · AT&S                                                    | Turn these materials into boards. Exposure depends on the board design, the materials specified and available factory capacity.    |
| <b>Managed PCB supply</b>     | NCAB · ICAPE Group · Fineline Global · Confidee                                                                                                            | Manage customers' supply through manufacturing networks. Their orders inherit the material dependencies of the factories they use. |

Selected major and specialist suppliers; not a ranking, and not a statement that every listed company is experiencing shortages. Market shares and capacity plans are given in chapter 3.

# 2

## Demand

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- 2.1 Data centres
- 2.2 Why AI boards consume so much more material
- 2.3 Where the money is flowing
- 2.4 How much of the demand is real?

**~\$725bn**

2026 capital spending planned by Amazon, Microsoft, Alphabet and Meta ([AI Weekly](#))

**+91%**

growth in TTM's data-centre and networking revenue, Q2 2026 ([Elettronica News](#))

**~1/3**

of NCAB's Q2 order growth reflected genuinely new demand ([Elettronica News](#))

AI data centres are the largest single reason the board supply chain is short.

They do not just add volume: they buy the most complex boards, specify the scarcest materials and pay prices other industries cannot match. The result is a market where the marginal buyer is largely price-insensitive.

## ● 2.1 Data centres

**The spending.** The four largest US cloud companies, Amazon, Microsoft, Alphabet and Meta, plan to spend around \$725bn on capital expenditure in 2026, up from about \$410bn in 2025, according to a Financial Times tally of company guidance reported by [AI Weekly](#). Most of that money goes into servers, networking and the buildings that house them. Each guidance revision this year has moved upwards.

**The boards.** AI hardware turns that spending into unusually heavy material demand. Section 2.2 explains why. The shift to Nvidia's Rubin generation adds larger chip substrates and new midplane and backplane boards that replace internal cables ([TrendForce](#)). More layers mean more laminate, more prepreg, more copper foil and more drilling per server.

**The buyers move upstream.** The biggest buyers are no longer waiting for board makers to secure materials on their behalf. Nikkei reports, citing a board executive, that Nvidia, Microsoft, Google and Amazon have already booked most of Nittobo's premium glass cloth capacity for 2026 ([TrendForce](#), citing Nikkei).

DIGITIMES reports that Nvidia is bypassing laminate makers to lock up foil and glass fabric capacity more than a year ahead, and pressing Google, AWS and Meta to coordinate their purchasing ([Shanghai Metals Market](#), citing DIGITIMES; DIGITIMES).

**The pricing power.** Goldman Sachs analysts, cited by [Reuters](#), said cloud service providers are willing to accept further price increases because they expect demand to outstrip supply for years. [NCAB](#) describes the base-material market as one where "cash is king" in deciding who gets supplied.

## ● 2.2 Why AI boards consume so much more material

AI servers use far more board, and far better board, than conventional hardware.

Würth Elektronik reports that boards in AI servers carry three to five times more layers than conventional designs. Boards for Nvidia's GB300 platform need 28 to 34 layers, and the next Vera Rubin generation needs more than 40, according to PLUS.

Every extra layer adds another core or prepreg sheet, more copper and more drilling. These boards also need premium grades of each material: low-loss resins that keep fast signals clean, ultra-smooth copper foil, and special glass fabrics that barely expand when heated.

Those premium grades come from a handful of suppliers, and the factories that make them often make standard grades too. **As capacity shifts to premium products, standard products become scarcer.**

The economics explain where capacity goes first. Victory Giant quotes standard multilayer boards at around 1,394 yuan (\$204) per square metre and high-end AI server boards at around 13,475 yuan (Reuters).

#### Exhibit 5. AI boards against the rest of the market

##### Price per square metre, yuan

Standard multilayer board

1,394

High-end AI server board

13,475

Ratio, AI board to standard board: about 10 to 1

##### Growth, year on year

Global PCB market, 2026 forecast

+12.5%

Global laminate market, 2026 forecast

+34.2%

TTM, total revenue, Q2 2026

+37%

TTM, data centre and networking, Q2 2026

+91%

Victory Giant via Reuters (price per m<sup>2</sup>); Prismark and TPCA/ITRI via Elettronica News (market forecasts); TTM Q2 2026 results via Elettronica News.

A board maker earns roughly ten times more per square metre on AI work, and the businesses tied to AI are growing several times faster than the board market as a whole. That mechanism links an AI server in Virginia to a delayed control board for a European machine builder.

## 2.3 Where the money is flowing

The board makers serving data centres are reporting record growth, according to company results compiled by Elettronica News. TTM Technologies' Q2 revenue reached \$1bn, up 37%, driven by its data-centre and networking segment, which grew 91% and now makes up 40% of revenue.

Austria's AT&S grew revenue for the first quarter of its 2026/27 financial year (April to June 2026) by 37.5% to €548.7m and expects full-year growth of 45 to 55%. Taiwan's Zhen Ding reported record August revenue of NT\$20.67bn, up 41%.

The price effect is visible further up the chain. TPCA and ITRI expect the global laminate market to grow 34.2% in 2026, from \$16.02bn to \$21.5bn, against 12.5% growth for boards ([Elettronica News](#)). Laminate is growing almost three times faster than the product it goes into, a gap that reflects higher prices as much as higher volumes.

## ● 2.4 How much of the demand is real?

Not all of the order growth reflects new end demand. NCAB's Q2 orders rose 58% in US dollars at constant scope. Chief executive Peter Kruk attributed about 20 points to market price increases and almost as much to customers buying early to avoid running short, leaving genuinely new demand at about a third of the increase ([Elettronica News](#)). French distributor ICAPE reported an order backlog 133% higher year on year at 25 September, while its first-half operating margin stayed at 4.1%.

That matters for the outlook. Buying ahead is rational for each customer, but when everyone does it orders run ahead of real consumption and the shortage feeds on itself. If early buying unwinds while new capacity arrives in 2027, the market could loosen faster than current lead times suggest. If AI demand keeps absorbing the new capacity, the extra orders simply become the new baseline.

# 3

## Material bottlenecks

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- 3.1 Chokepoint 1: specialty glass fabric
- 3.2 Chokepoint 2: copper-clad laminate and prepreg
- 3.3 Chokepoint 3: copper and copper foil

**~90%**

Nittobo's share of the market for low-expansion T-glass ([TrendForce](#))

**6–8 wks**

standard FR-4 lead times by August, up from 2 to 3 weeks ([Electronics Weekly](#))

**\$6.51/lb**

LME copper on 2 October; the 2026 average is 40.55% higher than in 2025 ([Redimin](#))

Three material chains turn AI demand into a shortage:

- Specialty glass fabric
- Copper-clad laminate and prepreg
- Copper and copper foil

Each section below answers the same questions: what the material is, how and where it is made, why boards cannot do without it, and what has changed in 2026.

The three are connected. Laminate is made from glass fabric, resin and copper foil, so a shortage in any one of them caps laminate output. And because the same factories and looms make both premium and standard grades, a squeeze at the top of the market spreads to the bottom. The resins and chemicals affected by the Iran war are covered in chapter 4.

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Because the same factories make premium and standard grades, a squeeze at the top of the market spreads to the bottom.

## ● 3.1 Chokepoint 1: specialty glass fabric

### Key facts

- Nittobo holds about 90% of the market for low-expansion T-glass and 60 to 70% for second-generation low-loss glass ([TrendForce](#))
- Significant new capacity arrives from 2027; industry experts expect noticeable relief only from 2028 ([All-Electronics](#))

**What is it?** Glass fabric is a fine woven cloth made from glass fibres a few thousandths of a millimetre thick. It is the reinforcement inside every rigid board: soaked in resin and pressed, it gives the board its strength, keeps it flat and holds its dimensions when it heats up. Most boards use standard electronic-grade E-glass, sold in weave styles such as 7628 (heavy), 2116 (medium) and 1080 (thin). AI hardware also uses specialty glasses. Low-expansion glass, known as T-glass, barely grows when heated, which stops large chip substrates warping under a hot processor ([CompositesWorld](#)). Low-dielectric glass lets very fast signals pass with less loss.

**How is it made?** Glass fabric is made in two stages. First, a glass maker melts a precise mix of minerals in a furnace and draws the molten glass through platinum-alloy plates called bushings into continuous filaments, which are gathered and twisted into yarn. Second, a weaver aligns thousands of yarns on a loom, weaves them into cloth, burns off the processing size and coats the surface so resin will bond to it, as described in a [US patent](#) for glass cloth. Both stages are capital-heavy and slow to expand: a furnace runs for years once lit, and looms for fine cloth take months to deliver and set up. China Jushi's latest expansion is expected to take about 18 months to build ([CompositesWorld](#)).

**Where is it made?** Standard electronic glass is concentrated in China. China Jushi alone holds about 23% of the global electronic glass fibre market and expects to reach 28% once its Huai'an plant, opened in March 2026 with capacity for 100,000 tonnes of yarn and 390 million metres of cloth a year, runs at full rate ([Yicai Global](#)). Kingboard has commissioned a 70,000-tonne yarn line in Shaoguan, with an adjacent cloth project of 108 million metres a year due in Q3 2026 ([CompositesWorld](#)). Specialty glass is far more concentrated. Japan's Nittobo dominates, with Taiwan Glass emerging as a second source and Nan Ya Plastics agreeing in 2025 to weave a share of Nittobo's specialty fabrics ([CompositesWorld](#)).

**Why does it matter?** China Jushi describes the performance of electronic glass fibre as directly determining a board's electrical properties, thermal expansion and reliability ([Yicai Global](#)). There is no practical substitute in rigid boards: a laminate maker that cannot get the specified fabric cannot make the specified laminate, and a board designed for one fabric style cannot always switch to another without requalification.

**What has changed in 2026?** Demand for specialty glass has run far ahead of supply. Nittobo expected capacity to rise only 10 to 20% in its fiscal 2026 and to double in fiscal 2027 ([CompositesWorld](#)). In August it told investors that even a tripling of capacity by the year to March 2029, backed by a JPY 80bn investment programme in Japan and Taiwan, may still fall short ([TrendForce, citing Nikkei](#)). [TrendForce](#) does not expect new Nittobo capacity before mid-2027 at the earliest.

The shortage then spread to standard fabric. Producers expanding AI-grade output did so by converting capacity away from conventional weave styles, according to Confidee ([Evertiq](#)). Thin fabrics are the tightest: [Würth Elektronik](#) names 1080 and 2116 prepreg among the materials under most pressure, and Kingboard's October price increase applies specifically to laminate and prepreg made with 2116 or thinner fabric ([Best PCBs](#)). Thin fabrics matter most for multilayer and high-density boards, which is exactly where automotive and industrial electronics are heading.

## ● 3.2 Chokepoint 2: copper-clad laminate and prepreg

### Key facts

- Kingboard, the largest maker of standard laminate, had issued four price increase letters by July, totalling 53% according to China Merchants Securities, and raised prices again in October ([BigGo Finance](#); [Best PCBs](#))
- Standard FR-4 lead times have moved from two to three weeks to six to eight weeks; advanced low-loss laminates take 14 to 18 weeks ([Electronics Weekly](#))

**What is it?** Copper-clad laminate is the ready-made core of a board: one or more sheets of glass fabric impregnated with cured resin, with copper foil bonded to one or both faces. Prepreg is the same fabric impregnated with resin that has been only partly cured, so that it melts and flows when a board maker presses layers together. Most boards use FR-4, a flame-retardant epoxy laminate. High-speed and high-frequency boards use low-loss grades built on specialty resins such as polyphenylene ether (PPE) or hydrocarbon blends, and specialty glass.

**How is it made?** A laminate maker runs glass fabric through a bath of resin varnish, then through an oven that partly cures it into prepreg. Sheets of prepreg are stacked with copper foil and pressed under heat and pressure until the resin cures into a solid laminate. The process itself is well understood. The constraint is the inputs: a laminate line produces nothing without fabric, foil and resin of the right grade, and each laminate grade is a qualified recipe that board makers and their customers have tested and approved.

**Where is it made?** Laminate production is concentrated in China, Taiwan, Japan and South Korea. The large standard-grade producers include Kingboard and Shengyi Technology in China and Nan Ya Plastics in Taiwan. High-end producers include Elite Material (EMC), ITEQ and Taiwan Union Technology (TUC) in Taiwan, Panasonic, Resonac and Mitsubishi Gas Chemical in Japan, and Doosan in South Korea. EMC is expanding across several countries towards 9.45 million sheets a month by 2027, and Taiwan's Fulltech is building a THB3.1bn plant in Thailand as laminate production moves south ([DIGITIMES](#)).

**Why does it matter?** Laminate is the single largest input into a board, and switching between laminates is slow. A board approved for one supplier's material usually needs testing, and often customer sign-off, before another can be used. That makes laminate shortages stickier than their size suggests: a buyer cannot simply move to whichever supplier has stock.

**What has changed in 2026?** Laminate makers have raised prices repeatedly and moved to allocation. Resonac raised laminate and prepreg prices by 30% from 1 March, and Mitsubishi Gas Chemical followed from 1 April ([Elettronica News](#)).

Kingboard raised all laminate and prepreg prices by 10% in April, laminates by 10% and prepreg by 20% on 27 May, and selected FR-4 products by up to 15% on 6 July, citing copper and glass fabric costs ([BigGo Finance](#)). On 13 October it added a further 15% on laminate and prepreg made with 2116 or thinner fabric, according to trade reports ([Best PCBs](#)).

Lead times have stretched across all grades. In March, German board maker ILFA reported lead times up to 140 days for advanced materials, standard FR-4 lead times up from a few days to around four weeks, order backlogs of three to four months at material suppliers and price increases of 20 to 30% in some segments, with allocation quotas ([Evertiq](#)). By August, [Electronics Weekly](#) reported standard FR-4 at six to eight weeks and advanced low-loss laminates at 14 to 18 weeks.

The commercial terms have shifted too. Laminate prices are increasingly set when the material is delivered rather than when it is ordered ([Evertiq](#)), which moves price risk from the laminate maker to the board maker and, in turn, to its customers. Annual price agreements that assumed stable material costs no longer hold.

## ● 3.3 Chokepoint 3: copper and copper foil

### Key facts

- The 2026 average LME price to early October was \$6.10 per pound, 40.55% above the same period of 2025 ([Redimin, Cochilco data](#))
- Two suppliers, Mitsui Kinzoku and Taiwan's Co-Tech, control 80 to 90% of effective supply of the smoothest high-end foil ([Shanghai Metals Market, citing DIGITIMES](#))

**What is it?** Copper enters a board in two forms. Copper foil, bonded to the laminate, is etched into the circuit pattern. Electroplated copper lines the drilled holes that connect layers and builds up the outer layers. Foil comes in grades defined by thickness and surface roughness. Standard foil has a deliberately rough surface so it grips the resin. High-speed boards need very low-profile foil, sold as HVLP, whose smoother surface reduces signal loss at high frequencies, according to Frost & Sullivan data in a [US securities filing](#).

**How is it made?** Copper travels a long chain before it reaches a board. Mines produce ore, which is concentrated and smelted, or leached with sulfuric acid, and then refined into high-purity cathode. Foil makers dissolve copper in sulfuric acid to make a copper sulfate solution, then electroplate it onto a slowly rotating drum and peel it off as a continuous sheet, which is surface-treated and cut. The smoothest grades depend on specialised drums, electrolyte chemistry and treatment know-how, which is why only a few producers can make them at commercial yields ([Shanghai Metals Market, citing DIGITIMES](#)). Sulfuric acid appears at both ends of this chain, which links copper to the sulfur disruption covered in section 4.1.

**Where is it made?** Chile is the largest mine producer. Cochilco, Chile's state copper commission, expects global refined supply of 23.5 million tonnes in 2026, against demand of 27.8 million tonnes, of which China consumes 57.6% ([Reporte Minero](#)). Foil production is concentrated in Asia. China accounted for 60% of global PCB-grade copper foil sales volume in 2025, the United States for 4% and Europe for 2.3% ([US securities filing, citing Frost & Sullivan](#)). The high-end grades come mainly from Japan and Taiwan.

**Why does it matter?** Copper is the largest single raw-material cost in a board, so its price passes quickly into laminate and board quotes. Kingboard and other laminate makers cited copper in their 2026 price notices ([BigGo Finance](#)).

**What has changed in 2026: price.** Copper closed at \$6.51 per pound (\$14,355 per tonne) on 2 October. Its 2026 average to date of \$6.10 per pound already exceeds Cochilco's full-year forecast of \$5.95 ([Redimin](#)). Cochilco expects refined supply to grow just 0.2% this year, held back by the slow recovery of Indonesia's Grasberg mine, problems at Kamo-a-Kakula in the Democratic Republic of Congo and lower output at Codelco, Escondida and Spence ([Reporte Minero](#)). Copper foil prices had already risen as much as 30% by April ([Reuters](#)).

**What has changed in 2026: high-end foil.** The smoothest foil is now a bottleneck of its own. Industry sources cited by DIGITIMES put the 2026 supply gap for HVLP4 foil, the grade used in the newest AI boards, at about 1,500 tonnes, widening to 2,500 tonnes in 2027, and report that laminate makers have moved to quota-based allocation for these grades ([Shanghai Metals Market](#)).

US tariffs on copper, and their effect on where metal is stored, are covered in section 4.2.

# 4

## External shocks

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- 4.1 The Iran war: petrochemicals, sulfur and shipping
- 4.2 US copper tariffs
- 4.3 China's export controls: what is and is not happening

**\$400/t**

sulfuric acid on the US Gulf Coast in May, against \$155 before the Iran war ([S&P Global](#))

**~\$400/t**

US copper premium over London in June as metal moved into US warehouses ([ING](#))

**10 Jan**

2027: when the US–China truce on export controls is due to end, according to the US ([Mondag](#))

Three outside shocks sit on top of the demand and capacity squeeze. The Iran war has raised the cost of resins, chemicals and shipping. US tariffs have pulled copper into US warehouses, and a decision on refined copper is still open. The US–China truce that pauses Beijing's latest export controls runs only to January. None of these has yet cut board supply directly; each raises costs or the risk of a wider disruption.

## ● 4.1 The Iran war: petrochemicals, sulfur and shipping

### Key facts

- The Strait of Hormuz has been largely closed since the Iran war began on 28 February, and Iranian attacks on shipping reached their highest level of the war in early October ([Kpler](#); [Al Jazeera](#))
- Sulfuric acid on the US Gulf Coast cost \$400 per tonne in May, against \$155 before the Iran war ([S&P Global](#))
- Reuters withdrew its report that the Iranian strike on Jubail halted SABIC's PPE resin production; no confirmed loss of PPE output has been reported since ([Reuters](#))

**What is it?** The Gulf does not make circuit boards. Its role is upstream: it supplies petrochemical feedstocks for resins, sulfur for acid, and energy for Asian chemical plants. Four chemical chains matter for boards. Epoxy resin is the binder in FR-4 laminate. Bromine is the active ingredient in the flame retardants that make FR-4 boards safe. Polyphenylene ether (PPE) is a specialty resin with very low electrical loss, used in laminates for AI servers, 5G base stations and automotive radar. Sulfuric acid is used to leach copper from ore, to make the solution from which copper foil is plated, and in the baths that plate holes and surfaces.

**How and where are they made?** Epoxy is made by reacting bisphenol A with epichlorohydrin, both derived from oil-based chemicals such as benzene and propylene; for FR-4, a brominated form adds flame resistance. Bromine is extracted from brines, and the Dead Sea is the world's main source: the [US Geological Survey](#) estimates 2025 output at about 200,000 tonnes in Israel, 110,000 tonnes in Jordan and 90,000 tonnes in China, out of a world total of roughly 430,000 tonnes excluding the United States.

Israel exported 56% of its bromine to China in 2024 ([US Geological Survey](#)), where most flame retardants are made. SABIC's NORYL SA9000 is a leading PPE grade for laminates, and SABIC announced further capacity for it in December 2025 ([SABIC](#)), building on earlier expansions in Asia, including India ([Plastics Technology](#)). Most sulfur is a by-product of refining oil and gas, which is why the Middle East normally accounts for nearly half of seaborne sulfur exports; China is the largest exporter of sulfuric acid, at about 4.6 million tonnes in 2025 ([S&P Global](#)).

**Why do they matter?** None of these chemicals can be swapped out quickly in a qualified laminate. A change of resin or flame retardant changes the laminate's electrical and safety properties, which means retesting. And because these chains run through Asian chemical plants that depend on Middle Eastern feedstocks and energy, a disruption in the Gulf reaches boards several tiers later, mostly as cost.

### What has changed in 2026:

- **Epoxy resin.** The Iran war raised the cost of every step. [ICIS](#) reports that crude, benzene and propylene prices have all risen sharply since the Iran war began, and US producer Olin raised epichlorohydrin prices in March. Japan's DIC raised prices for epoxy resins, including brominated flame-retardant grades used in electronics, from 15 April, citing Middle East disruption to naphtha and other feedstocks ([DIC](#)). By late April, a senior executive at South Korean board maker Daeduck Electronics told [Reuters](#) that waiting times for epoxy resin had stretched from three weeks to fifteen.
- **Bromine.** Chinese bromine prices passed RMB 70,000 per tonne in mid-April, up 76% in a month, after output cuts in Israel during the Iran war and flood damage at Jordan's main producer, according to price reporter [SunSirs](#). Prices eased from May, but the episode shows how a regional conflict can reach boards through a minor-sounding chemical.
- **PPE resin and the Jubail claim.** On 7 April the IRGC said it had attacked the Jubail petrochemical complex in Saudi Arabia, and AFP reported a fire at SABIC plants there ([Reuters via Jerusalem Post](#); [AFP via TRT World](#)). Reuters reported on 27 April that the strike had halted SABIC's PPE output, citing one source, and that SABIC held about 70% of global high-purity PPE supply. On 11 May Reuters corrected the story, deleting the paragraphs that said the attack halted SABIC's PPE production ([Reuters](#)). The original claim, including the 70% figure, continues to circulate in trade press and supplier blogs, for example in [Electronics Weekly](#). The evidence supports a tight market for low-loss resin driven by AI demand; it does not show a loss of PPE production caused by the Iran war.

- **Sulfur and sulfuric acid.** Two shocks hit acid supply in quick succession. The closure of Hormuz cut Gulf sulfur shipments, and China restricted acid exports from 1 May. Platts assessed acid delivered to the US Gulf at \$400 per tonne on 6 May, against \$155 before the Iran war, and sulfur at \$1,060 per tonne ([S&P Global](#)). China's ban exempts electronic-grade acid, which limits the direct effect on board plating lines. The larger effect runs through copper: Chile buys more than a million tonnes of Chinese acid a year, and about a fifth of its copper output relies on acid-based processing ([Bloomberg via SupplyChainBrain](#)).

**Where this leaves the Gulf channel.** The Strait remains effectively closed. For boards, the Iran war's main effects are higher resin, chemical and energy costs for Asian material producers and a further push on copper. These raise prices and lengthen lead times, but the binding constraint on board supply remains glass fabric, high-end foil and AI demand.

## ● 4.2 US copper tariffs

Since 1 August 2025, the US has charged a 50% Section 232 tariff on semi-finished copper. From 6 April 2026 the regime was restructured: 50% on the full value of semi-finished copper and 25% on copper-intensive derivative products, falling to 10% where nearly all the metal is US-sourced ([Congressional Research Service](#)). A June proclamation lowered that domestic-content threshold from 95% to 85% and fixed the regime until 31 December 2027 ([US Customs and Border Protection; Sandler, Travis & Rosenberg](#)).

Refined copper, the cathode that foil and wire makers buy, is still exempt. The administration asked Commerce Secretary Howard Lutnick to report by 30 June on whether to impose 15% from 1 January 2027, rising to 30% in 2028. The White House confirmed it received the update but has made no decision, and sources told Reuters that concern about affordability ahead of November's midterm elections has stalled the plan ([Reuters via MINING.COM](#)). The uncertainty itself moves metal: traders have shipped copper into US warehouses ahead of a possible tariff, keeping US prices at a premium of around \$400 per tonne over London in June and leaving less metal available elsewhere ([ING](#)).

## ● 4.3 China's export controls: what is and is not happening

**What was agreed?** In October 2025 China announced a broad expansion of its export controls, covering more rare earths, battery materials, superhard materials and an extraterritorial rule reaching products made abroad with even 0.1% Chinese rare earth content.

After Presidents Trump and Xi met in Busan on 30 October 2025, China agreed to defer those controls for a year ([Al Jazeera](#)). MOFCOM formally suspended the package until 10 November 2026 ([GvW](#)). In return, the US suspended its Bureau of Industry and Security (BIS) "Affiliates Rule", which extends US export restrictions to companies majority-owned by blacklisted entities ([Mondaq](#)).

**What changed at the September Washington summit?** On 23 and 24 September 2026, as President Xi began a state visit to Washington, Treasury Secretary Scott Bessent said the truce would be extended by two months, to 10 January 2027 ([CNBC](#)). Many had expected a six-month extension ([CNBC](#)).

**What is not yet confirmed?** The extension rests on Bessent's statement. Beijing's readout referred only to a "new joint arrangement" on trade, without a date ([CNBC](#)). The White House had not officially documented the extension ([Yahoo Finance](#)), and BIS had not published a notice formally extending its own suspension ([Mondaq](#)).

No MOFCOM notice extending the suspension was found at the time of writing. 10 November is therefore no longer the expected cliff, but it remains the date on which the suspension lapses on paper unless China publishes an extension.

**What is not changing?** The truce pauses only the October 2025 package. China's earlier licensing requirements stay in force, and the summit produced no jointly documented settlement on critical minerals ([BIS](#)). The European Chamber of Commerce in China notes that extending the truce does not fix the lack of a standard way to apply for rare earth export licences ([CNBC](#)). China's sulfuric acid export restrictions, covered in section 4.1, are separate from the truce ([S&P Global](#)).

**Why does it matter for boards?** Directly, not much: the October package targets rare earths, battery materials and superhard materials, not glass fabric, laminate or copper foil. The risk is indirect. Reinstated controls would add licensing friction across electronics supply chains that also buy boards, and a breakdown of the truce would raise the odds of wider US–China measures in a sector where China makes most of the world's boards.

# 5

## Industry impact

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- 5.1 Electronics manufacturing
- 5.2 Automotive
- 5.3 Defence

**4%**

US share of global board supply,  
down from about 30% ([CNBC](#))

**6%**

of global defence-related boards  
are made in Europe ([Global  
Electronics Association](#))

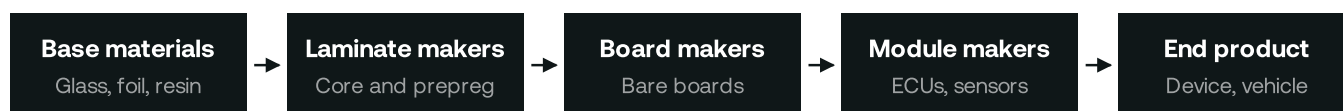
**70%**

of Europe's automotive suppliers  
expect profits below sustainability  
thresholds ([Automotive News](#))

The shortage reaches each industry at a different tier and through a different mix of price, lead time and qualification risk. Data-centre buyers deal with materials directly and pay for priority.

Most other manufacturers buy boards, modules or complete control units, so the constraint sits one to three supplier tiers away from their own purchasing.

#### Exhibit 6. How the shortage reaches each industry



#### Electronics manufacturing



Price rounds and allocation reach it within one tier of the laminate maker.

#### Automotive



A laminate change needs requalification; suppliers on fixed contracts absorb price rises first.

#### Defence



From 1 January 2027 a US rule limits where certain boards may come from; materials stay global.

Supply chain structure as described in chapters 1 and 5.

The further an industry buys from the laminate maker, the later it sees the shortage and the less visible its cause is.

## ● 5.1 Electronics manufacturing

For electronics makers the shortage is a two-speed market. Board makers serving AI are growing at 37 to 91% in their data-centre segments; everyone else pays more for the same materials and waits longer ([Elettronica News](#)). TTM told [CNBC](#) in June that it was raising prices by 5 to 25%, and Goldman Sachs analysts estimated that board prices rose by as much as 40% from March to April alone ([Reuters](#)).

Distributors are seeing the pressure in their order books rather than their margins. NCAB's Q2 book-to-bill ratio reached 1.34, meaning orders ran a third ahead of deliveries, while ICAPE's first-half operating margin stayed at 4.1% despite a backlog up 133% year on year ([Elettronica News](#)).

Higher prices are swelling order books without fattening profits. Value is moving towards whoever controls capacity: distributors backed by their own factories can promise volumes and delivery dates that others cannot.

Europe's own production base is shrinking just as access to Asian capacity becomes harder. European PCB output grew 2.4% in 2025, against more than 11% globally, and the number of European board makers fell from 179 to 168; Data4PCB estimates the number could halve by 2035 if current trends continue ([Elettronica News](#)).

A model by Strategy&, the German electrical industry association ZVEI and FME suggests European PCB demand could more than double by 2040, and ZVEI and German board maker ILFA have called for an expanded European Chips Act that covers boards, substrates and base materials ([All-Electronics](#)).

## ● 5.2 Automotive

Most vehicle electronics run on standard FR-4 boards, so automotive is exposed mainly through price and lead time rather than outright unavailability. German trade press reports longer lead times, rising prices and growing planning pressure along the supply chain for both industrial and automotive customers ([All-Electronics](#)). That exposure is growing as vehicles adopt more multilayer and high-density boards for driver-assistance systems, central computers and battery management, which use the thin glass fabrics now under most pressure.

Three features make automotive more vulnerable than the board volumes suggest.

**Qualification.** Automotive boards are built to approved material specifications, and a change of laminate generally requires testing and customer approval. When a specified laminate is on allocation, the board supplier cannot simply switch to another brand that has stock. A shortage of one laminate grade can therefore hold up a control unit even when the wider market has material.

**Hidden material dependencies.** Some automotive boards carry the same specialty materials as AI hardware. [SABIC](#) markets its low-loss NORYL SA resins for the circuit boards and antennas in driver-assistance radar.

A vehicle maker buying a radar sensor can therefore depend on a low-loss laminate, competing with data-centre demand, without ever buying resin or boards directly.

**Supplier finances.** The electronics suppliers that sit between vehicle makers and board makers are under strain. [Automotive News](#) reports that 70% of Europe's suppliers expect profits below sustainability thresholds, and Bosch, ZF and Aumovio are cutting tens of thousands of jobs.

As laminate prices are increasingly set on delivery rather than on order ([Evertiq](#)), suppliers on fixed annual contracts absorb the difference until they can renegotiate. Smaller suppliers with thin margins are least able to carry that cost.

## ● 5.3 Defence

Defence faces a tight market and a US sourcing deadline at the same time, but the deadline is narrower than it is often described.

**What does the US law say?** From 1 January 2027, the Department of War (DoW) may not acquire a "covered printed circuit board" from a covered nation, defined as China, Russia, Iran or North Korea ([US Code, 10 U.S.C. 4873](#)).

The ban was first enacted in section 841 of the fiscal 2021 National Defense Authorization Act. Section 851 of the fiscal 2022 Act pushed its start date back from 2023 to 2027 and allowed commercial products to be exempted through regulation ([Defense Acquisition Regulations System](#)). The prohibition applies to boards from entities located in or controlled by those countries ([Inside Defense](#)).

**Which boards does it cover?** Not all of them. A covered board must be a "specified type", one that routes, connects, transmits or secures data and is commonly connected to a network. It must also either perform a mission-critical function in a product that is not commercial, or form part of a defence security system ([Wiley](#)). Purchases below the micro-purchase threshold are excluded ([US Code](#)). The department has said its proposed framework is not a blanket prohibition on commercial or off-the-shelf products ([Inside Defense](#)). The definition concerns the boards themselves, not the laminate, foil or glass fabric they are made from.

**How far has the rule got?** Only to its first step. On 2 July 2026 the department published an advance notice of proposed rulemaking (ANPR), which invites comment before a rule is drafted. It sets out how waivers might work, through an independent hardware assurance framework based on ISO/IEC 20243, IPC-1782 traceability data and IPC-1791 testing, with traceability expected from every supplier in the chain ([Crowell & Moring](#)). It also asks whether a phase-in should run 12, 18 or 24 months ([GovConFeed](#)).

The proposed and final rules have not yet been published. The industry body ITI has asked for a clear commercial exemption in the final rule ([ITI](#)), while the Printed Circuit Board Association of America (PCBAA) has criticised the notice as backpedalling on removing Chinese boards from the defence industrial base ([PCBAA](#)) and urged the Pentagon not to delay ([Electronics Weekly](#)).

**What does that mean for supply?** The statutory date stands whether or not the rule is final, so 1 January 2027 matters, but mainly for boards inside defence systems that handle data, not for every board a defence contractor buys. The bigger effect may be the paperwork: suppliers of covered boards will need to prove where and by whom boards were made. The domestic base that would replace Chinese boards is small. PCBAA says the US share of global board supply has fallen from about 30% to 4% and that six in ten boards are now made in mainland China ([CNBC](#)).

A US official told [Inside Defense](#) that the domestic board supply chain is less than 20% self-sufficient. And the same high-layer capacity that defence radar and electronic warfare systems need is being booked by AI customers: TTM sends 71% of output from its California plant to aerospace and defence ([CNBC](#)), while its data-centre business grows fastest.

**What about Europe?** Only about 6% of global defence-related boards are made in Europe, while electronics are expected to make up 25% of the value of defence equipment by 2035 to 2040 ([Global Electronics Association](#)). The European Defence Industry Programme (EDIP) has opened a call that directs €122m to defence electronics, including boards and IC substrates, closing in February 2027 ([Global Electronics Association](#)). Even domestic board makers in Europe and the US still buy laminate, foil and glass fabric from Asia, and tungsten carbide for drill bits, itself under supply pressure ([Würth Elektronik](#)). Moving board fabrication onshore does not remove the upstream material dependency.

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Moving board fabrication onshore does not remove the upstream material dependency.

# 6

## Outlook: watchlist and scenarios to 2027

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- 6.1 Forward watchlist
- 6.2 Scenarios

The next three months bring a dense run of decisions and capacity milestones. Policy deadlines cluster between November and January; new glass fabric and laminate capacity arrives mostly from 2027. NCAB expects conditions to ease somewhat through the second half of 2027, with meaningful relief possibly not until mid-2028 ([NCAB](#)).

## ● 6.1 Forward watchlist

| Date                          | Event                                                                                                                                                                                                           | What it signals                                                                                                                |
|-------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|
| <b>23 October 2026</b>        | NCAB Q3 results ( <a href="#">Elettronica News</a> )                                                                                                                                                            | A book-to-bill ratio still above one with less early buying would point to genuine demand rather than pull-forward             |
| <b>Late October 2026</b>      | Q3 results and 2027 capital spending guidance from Amazon, Microsoft, Alphabet and Meta                                                                                                                         | Any slowdown in data-centre spending is the single largest lever on material availability                                      |
| <b>By 10 November 2026</b>    | Original expiry of China's suspension of its October 2025 controls; watch for a MOFCOM notice formalising the extension Bessent announced ( <a href="#">GvW</a> ; <a href="#">CNBC</a> )                        | Whether the extension to 10 January 2027 is confirmed by Beijing                                                               |
| <b>10 to 13 November 2026</b> | electronica trade fair, Munich ( <a href="#">Elettronica News</a> )                                                                                                                                             | First direct read from European board makers on whether lead times are turning                                                 |
| <b>Pending</b>                | US decision on a refined copper tariff of 15% from 1 January 2027, rising to 30% in 2028 ( <a href="#">Reuters via MINING.COM</a> )                                                                             | A tariff would keep pulling metal into the US and support global copper prices; a clear rejection would release US stocks      |
| <b>Q4 2026 to 2027</b>        | New glass yarn and cloth capacity ramps at Kingboard and China Jushi ( <a href="#">CompositesWorld</a> ; <a href="#">Yicai Global</a> )                                                                         | Standard E-glass is the first constraint likely to ease                                                                        |
| <b>1 January 2027</b>         | US statutory ban on covered defence boards from China, Russia, Iran and North Korea takes effect; the proposed and final rules are still to be published ( <a href="#">Wiley</a> ; <a href="#">GovConFeed</a> ) | Extra demand for non-Chinese capacity for data-handling boards in defence systems, and traceability demands on their suppliers |
| <b>10 January 2027</b>        | Extended US–China truce due to end, according to Bessent ( <a href="#">CNBC</a> )                                                                                                                               | Renewal, a longer deal, or reinstatement of the October 2025 controls                                                          |
| <b>February 2027</b>          | EDIP call for defence electronics, including boards and substrates, closes ( <a href="#">Global Electronics Association</a> )                                                                                   | Scale of European public investment in board capacity                                                                          |
| <b>Mid-2027</b>               | Earliest new specialty glass capacity from Nittobo ( <a href="#">TrendForce</a> )                                                                                                                               | Relief for AI-grade laminate, freeing capacity for other grades                                                                |

| Date             | Event                                                                                                                                                                            | What it signals                                          |
|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------|
| Ongoing          | Iranian attacks on shipping in the Strait of Hormuz ( <a href="#">Al Jazeera</a> ); Chinese sulfuric acid export restrictions ( <a href="#">Bloomberg via SupplyChainBrain</a> ) | Direction of resin, chemical and copper processing costs |
| 31 December 2027 | Adjusted Section 232 metals tariff regime is due to expire ( <a href="#">US Customs and Border Protection</a> )                                                                  | Next decision point for US copper import costs           |

## ● 6.2 Scenarios

**Best case: AI spending plateaus and new capacity lands on time.** Hyperscaler guidance for 2027 shows slower growth, and early buying unwinds as customers stop ordering ahead. New E-glass lines in China ramp on schedule and Nittobo's first new capacity arrives in 2027. Shipping through Hormuz resumes as the Iran war de-escalates, the US–China truce is formalised and extended beyond January, and the US leaves refined copper untaxed. Standard FR-4 lead times begin to return towards a few weeks in the first half of 2027, while AI-grade materials stay tight through 2027.

*Indicators:* NCAB and ICAPE book-to-bill ratios falling towards one; laminate makers pausing price notices; copper easing as US stocks are released.

**Base case: AI absorbs new specialty capacity; standard grades ease slowly.** AI demand keeps pace with new specialty glass and foil capacity, so premium materials stay on allocation through 2027. New standard glass fabric capacity gradually relieves FR-4, but laminate makers keep pricing on delivery and favour high-margin grades. Copper stays elevated on tight mine supply. Hormuz remains disrupted by the Iran war, keeping resin and chemical costs high without cutting board output. The US–China truce is rolled over in short increments. This matches NCAB's view of some easing in the second half of 2027 and meaningful relief from mid-2028 ([NCAB](#)).

*Indicators:* continued but smaller price rounds; standard FR-4 lead times stable at several weeks; capacity announcements focused on AI grades.

**Worse case: policy and conflict shocks compound the AI squeeze.** The US–China truce lapses on 10 January 2027 and China reinstates its October 2025 controls, adding licensing friction across battery, rare earth and superhard materials. The US imposes a refined copper tariff from January 2027, pulling more metal into US warehouses. Iranian attacks in and around Hormuz escalate further, prolonging feedstock and energy disruption for Asian chemical producers. New glass capacity slips, and the US defence rule adds demand for the limited non-Chinese board base. Allocation spreads from premium grades across the market and lasts into 2028 or beyond.

*Indicators:* no MOFCOM notice formalising the extension; a White House copper proclamation; Kingboard and peers issuing further price rounds on standard grades; Nittobo or China Jushi reporting ramp delays.

# 7

## Appendix: timeline of events

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- A.1 Phase one: AI demand tightens premium materials (mid-2025 to February 2026)
- A.2 Phase two: the Iran war and US tariffs add cost shocks (March to June 2026)
- A.3 Phase three: the shortage spreads to standard boards (July to October 2026)

The tables below record the main events in each of the three phases described in the introduction, with the supply each one affected.

## ● A.1 Phase one: AI demand tightens premium materials (mid-2025 to February 2026)

PCB prices were already rising before the Iran war, driven by demand for AI servers ([Reuters](#)). Glass fabric for chip substrates and server boards was the first material to run short, and copper climbed towards record levels.

| Date            | Event                                                                                                                                       | Supply affected                                     |
|-----------------|---------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------|
| 30 July 2025    | US imposes a 50% Section 232 tariff on copper and copper derivatives through Proclamation 10962 ( <a href="#">Thompson Hine</a> )           | Semi-finished copper into the US                    |
| August 2025     | Nittobo announces a new factory to triple T-glass capacity ( <a href="#">CompositesWorld</a> )                                              | Low-expansion glass fabric                          |
| 30 October 2025 | Presidents Trump and Xi agree a one-year trade truce in Busan; China defers its October 2025 export controls ( <a href="#">Al Jazeera</a> ) | Rare earths and other controlled materials          |
| 7 November 2025 | China's Ministry of Commerce (MOFCOM) formally suspends the October 2025 package until 10 November 2026 ( <a href="#">GvW</a> )             | Rare earths, battery materials, superhard materials |
| December 2025   | SABIC announces further PPE resin capacity for AI and 5G boards, due in H2 2026 ( <a href="#">SABIC</a> )                                   | Low-loss laminate resin                             |
| January 2026    | LME copper sets an all-time high of \$14,527 per tonne ( <a href="#">Tech Times</a> )                                                       | Copper foil and plating                             |

## ● A.2 Phase two: the Iran war and US tariffs add cost shocks (March to June 2026)

The closure of the Strait of Hormuz on 28 February, after US and Israeli strikes on Iran, cut Gulf exports of sulfur, petrochemicals and fuels ([Kpler](#)).

The Iran war did not hit board factories directly, which sit mainly in China, Taiwan, Japan, South Korea and Southeast Asia. It reached them through the price and availability of chemical inputs, through freight, and through the copper chain.

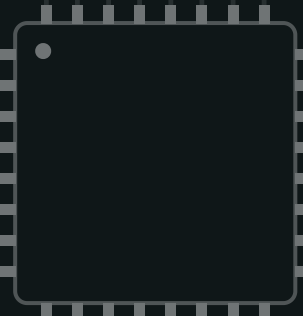
| Date        | Event                                                                                                       | Supply affected               |
|-------------|-------------------------------------------------------------------------------------------------------------|-------------------------------|
| 28 February | Hormuz closes to commercial dry bulk traffic after US and Israeli strikes on Iran ( <a href="#">Kpler</a> ) | Sulfur, petrochemicals, fuels |

| Date     | Event                                                                                                                                                                                                                                      | Supply affected                  |
|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|
| 1 March  | Resonac raises laminate and prepreg prices by 30%; Mitsubishi Gas Chemical follows from 1 April ( <a href="#">Elettronica News</a> )                                                                                                       | High-end laminate                |
| 6 March  | German board maker ILFA reports base-material lead times up to 140 days, with standard FR-4 lead times up from a few days to about four weeks ( <a href="#">Evertiq</a> )                                                                  | Laminate, all grades             |
| March    | DIGITIMES reports laminate lead times reaching six months and quota systems for customers ( <a href="#">DIGITIMES</a> )                                                                                                                    | Laminate                         |
| 6 April  | US restructures Section 232: 50% on semi-finished copper, 25% on copper-intensive derivatives, on full value ( <a href="#">Congressional Research Service</a> )                                                                            | Copper products into the US      |
| 7 April  | Iran's Islamic Revolutionary Guard Corps (IRGC) says it attacked the Jubail petrochemical complex in Saudi Arabia ( <a href="#">Reuters via Jerusalem Post</a> ); AFP reports a fire at SABIC plants ( <a href="#">AFP via TRT World</a> ) | Saudi petrochemicals             |
| 7 April  | DIC raises epoxy resin prices from 15 April, citing disruption to Middle East feedstocks during the Iran war ( <a href="#">DIC</a> )                                                                                                       | Epoxy and flame-retardant resins |
| 10 April | China signals a halt to sulfuric acid exports from May ( <a href="#">Bloomberg via SupplyChainBrain</a> )                                                                                                                                  | Sulfuric acid                    |
| April    | Kingboard Laminates raises all laminate and prepreg prices by 10% ( <a href="#">BigGo Finance</a> )                                                                                                                                        | Standard laminate                |
| 27 April | Reuters reports PCB prices up as much as 40% from March, citing Goldman Sachs, and epoxy lead times stretched from three to fifteen weeks ( <a href="#">Reuters</a> )                                                                      | Finished boards                  |
| 1 May    | China's sulfuric acid export restrictions take effect; electronic-grade acid is exempt ( <a href="#">S&amp;P Global</a> )                                                                                                                  | Sulfuric acid                    |
| 11 May   | Reuters corrects its April report, deleting the claim that the Iranian attack on Jubail halted SABIC's PPE resin production ( <a href="#">Reuters</a> )                                                                                    | Record correction                |
| 27 May   | Kingboard raises laminates by a further 10% and prepreg by 20% ( <a href="#">BigGo Finance</a> )                                                                                                                                           | Standard laminate                |
| 1 June   | New proclamation adjusts Section 232 metals tariffs, effective 8 June 2026 to 31 December 2027 ( <a href="#">US Customs and Border Protection</a> )                                                                                        | Copper products into the US      |
| 11 June  | DIGITIMES reports Nvidia moving upstream to secure high-end copper foil directly ( <a href="#">DIGITIMES</a> )                                                                                                                             | Premium copper foil              |
| 30 June  | Deadline for a Commerce update on refined copper passes; the White House confirms receipt but announces no decision ( <a href="#">Reuters via MINING.COM</a> )                                                                             | Refined copper                   |

### ● A.3 Phase three: the shortage spreads to standard boards (July to October 2026)

By late summer the constraint had moved down the quality ladder. Glass fabric makers converted looms to AI grades, laminate makers prioritised high-margin products, and buyers of ordinary FR-4 boards began to see allocation and repeated price notices.

| Date                       | Event                                                                                                                                                                                                         | Supply affected            |
|----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|
| 2 July                     | US Department of War (DoW) publishes an advance notice of proposed rulemaking on restricting certain defence circuit boards from China, Russia, Iran and North Korea ( <a href="#">Crowell &amp; Moring</a> ) | Defence boards             |
| 6 July                     | Kingboard raises selected FR-4 and other products by up to 15% ( <a href="#">BigGo Finance</a> )                                                                                                              | Standard laminate          |
| Early August               | Nittobo raises its forecasts and says its planned tripling of T-glass capacity may still fall short ( <a href="#">TrendForce, citing Nikkei</a> )                                                             | Low-expansion glass fabric |
| 19 August                  | Norwegian supplier Confidee reports the shortage has spread to standard FR-4 and thicker laminates ( <a href="#">Evertiq</a> )                                                                                | Standard laminate          |
| 23 to 24 September         | As President Xi arrives in Washington, Treasury Secretary Bessent says the US–China truce will be extended to 10 January 2027 ( <a href="#">CNBC</a> )                                                        | Chinese export controls    |
| 29 September               | NCAB's quarterly outlook expects some easing in H2 2027 and meaningful relief only from mid-2028 ( <a href="#">NCAB</a> )                                                                                     | Whole chain                |
| 28 September to 14 October | Iranian attacks on Hormuz shipping reach their highest level of the war: Kpler counts 10 tankers struck in one week, and UKMTO records 15 further attacks ( <a href="#">Al Jazeera</a> )                      | Gulf shipping              |
| 2 October                  | LME copper closes at \$6.51 per pound (\$14,355 per tonne); the 2026 average to date is 40.55% above the same period of 2025 ( <a href="#">Redimin, Cochilco data</a> )                                       | Copper                     |
| 13 October                 | Kingboard announces a further 15% increase on laminate and prepreg made with 2116 or thinner glass fabric, according to trade reports ( <a href="#">Best PCBs</a> )                                           | Thin-fabric laminate       |



# 8

## Methodology and sources

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8.1 Methodology

8.2 Sources: all 69 sources cited in this report, listed alphabetically by publication

## ● 8.1 Methodology

**Source standard.** This analysis reflects information available on 20 October 2026. Sources are, in order of preference: official bodies (US Code, US Congressional Research Service, US Customs and Border Protection, US Geological Survey, the Defense Acquisition Regulations System, Cochilco); company releases, filings and results statements; established news agencies and broadcasters (Reuters, AFP, Bloomberg, Al Jazeera, CNBC); established trade journals (DIGITIMES, Electronics Weekly, Evertiq, CompositesWorld, Elettronica News, All-Electronics, PLUS); and recognised price-reporting and industry-intelligence services (S&P Global Platts, ICIS, TrendForce, Kpler, Shanghai Metals Market). Where a Reuters or Bloomberg report is paywalled, a syndicated copy is cited and the original agency named. Law firm, think-tank and trade-association analyses are used for regulatory detail. Each source is named and linked where it is used.

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