Taiwan Technology

Taiwan PCB & Materials: Key takeaways from 2026 TPCA

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- CCL to remain undersupplied through 2029: AI demand outpaces capacity expansion amid material and equipment constraints
- Price hikes remain widespread, but sustainability across different segments remain key to watch
- Specification upgrades continue: M10/M11 CCL, PTFE & HC, HDI & mSAP

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We attended the TPCA Show 2026 in Taipei from 20 to 22 October, meeting CCL, substrate, PCB, glass fabric and copper foil companies and attending TUC's technical forum. The following summarises our key takeaways.

CCL to remain undersupplied through 2029: All CCL companies we met said demand was running ahead of supply, and none expected the market to balance before 2029. There was unanimous agreement that demand, particularly from AI, would remain strong, while shortages of critical materials such as glass fabric remain a supply bottleneck and, in some cases, have left CCL makers underutilised. In addition to glass fabric, tight supplies of high-end copper foil and long lead times for treatment-line and pressing equipment also limit the pace at which new capacity can come onstream. Against this constrained supply backdrop, customers continue to accept price increases, supporting our view that pricing power remains with incumbents that have secured inputs.

Cost pass-through remains the consensus across the value chain, but sustainability across different segments remain key to watch: Companies across the value chain intend to continue raising prices to pass through higher material costs. This view extends from upstream segments, including glass fabric, substrate core and CCL, to downstream segments such as PCB. It is also evident among companies with greater exposure to consumer products, not only those with higher AI exposure. While pricing power currently appears strong across the board, its sustainability requires monitoring, particularly for PCB makers with a higher consumer mix, given the much greater cost sensitivity of consumer products.

Material and design upgrades continue: The exhibition featured numerous examples of material and design changes intended to support rapid growth in AI, low-Earth-orbit satellites and optical applications. These included the expected ramp-up of HVLP5 in 2028; TUC's technical forum, which highlighted a shift in M10/M11-grade CCL towards hydrocarbon- and PTFE-based materials, with or without glass; 12-14-layer any-layer mSAP PCBs for 800G/1.6T transceivers; and CCL material upgrades for low-Earth-orbit satellite PCBs.

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Exhibit 1: Ratings and target prices

	Ticker	Currency	Current price	TP	Rating	Mkt Cap USDm
EMC	2383 TT	TWD	5,070	7,995	Buy	55,703
TUC	6274TT	TWD	1,420	3,000	Buy	13,038
ITEQ	6213TT	TWD	777	280	Hold	8,662
Unimicron	3037TT	TWD	1,085	1,130	Buy	54,602
Kinsus	3189TT	TWD	986	643	Buy	15,930
NYPCB	8046TT	TWD	1,265	1,890	Buy	25,063
Tripod	3044TT	TWD	556	725	Buy	8,960

Source: HSBC estimates, Bloomberg. Priced at close of 22 Oct 2026

The undersupply story: Price increases across materials, CCL and PCB

CCL demand is running ahead of supply, constrained by both the availability of material inputs and equipment, despite CCL makers' ongoing efforts to increase capacity. We summarise the key areas and bottlenecks discussed during our visits at TPCA.

Raw materials

- Glass fabric: tight until at least H2 2027, with little scope to shift capacity from higher- to lower-end products.
  - ITEQ: utilisation is capped at ~75% by insufficient glass fabric supply, versus more than 90% if supply were sufficient. It is qualifying more E-glass from mainland Chinese suppliers in the hope of securing adequate supply and will continue to pass through higher material costs as those vendors also continue to raise prices. The tightness is expected to persist until at least mid- to late 2027.
  - Kinsus: T-glass is the only product facing a genuine shortage, which is expected to persist through 2027. Kinsus also faces an E-glass shortage.
  - Nan Ya Plastic: E-glass is in very tight supply, and the company believes it is difficult to switch capacity between low-Dk glass and E-glass because their formulations and production processes differ. Although Nan Ya Plastic has an internal supply of glass fabric, the material is reserved for its own CCL production and is not sold externally.
  - Shengyi Electronics: glass fabric is the biggest bottleneck, owing to a shortage of Toyota loom equipment. Glass fabric suppliers prioritise high-end, low-Dk fabric, leaving the mid- to low-end segment in severe shortage. Loom equipment from mainland China continues to suffer from low yields caused by yarn breakage; Toyota's loom equipment therefore remains essential through at least 2027.

- Copper foil: a new bottleneck in 2027.
  - **Co-Tech:** HVLP4 capacity is expected to rise from 200 tonnes/month to 800 tonnes/month by October 2027 as Yunlin Plant 3 ramps. A 30,000-tonne plant in Malaysia (HVLP4/5) is scheduled to begin production in late 2028, with full completion by mid-2030. Customers are signing more long-term agreements from Q4 2026 to secure supply, as M8+HVLP4 has become standard for AI/ASIC servers. The high-end foil supply gap is expected to exceed 30%, with relief only around 2029. HVLP5 is slow to manufacture, with a yield of ~50-60%, and takes one to two years to qualify.
  - **ITEQ:** Only four suppliers globally can produce HVLP4+ (three Japanese and one Taiwanese), and supplier expansion is not keeping pace.
  - **Mitsubishi:** Copper foil supply is expected to tighten, although the company believes the shortage may be less severe than for glass fabric. It expects HVLP5 to ramp in 2028, while HVLP4 should remain the main growth driver through 2030.

Exhibit 2: Co-Tech expansion plans.

Unit: Tons	Dec-27	Dec-28	Dec-29
Total Capacity	25,000	35,000	45,000
HVLP3/4	10,000	20,000	30,000
HVLP2/RG	15,000	15,000	15,000

Source: Company data

Exhibit 3: Co-tech product roadmap

CCL Grade	Df	Protocols	Advanced RTF	HVLP
M4	~0.008-0.01	40G Ethernet; PCIe Gen 4	RG311	
M6	~0.0045-0.006	100G Ethernet; PCIe Gen 5	RG312	
M7	~0.003	NVLink 3.0/4.0; 400/800G Ethernet; PCIe Gen 6	RG313+	HVLP3
M8	~0.001	NVLink 4.0/5.0; 800G/1.6T Ethernet; PCIe Gen 7		HVLP4
M9/M10	~0.0005	Next Generation		HVLP4/5

Source: Company data

- CCL equipment.
  - **TUC:** Asia Metal (6727TT, CMP TWD433.50, not rated), an essential supplier of CCL treatment equipment, already has an order backlog through 2029, so new expansion plans may face difficulties in securing equipment.
  - CCL and PCB capacity: undersupplied through 2029-30.
  - ITEQ: expects CCL to remain undersupplied through 2029.
  - EMC: Lower-end CCL currently appears tighter than high-end CCL, and the shortage of lower-end CCL is likely to persist until the end of 2027.
  - Compeq: High-layer-count, thick HDI is likely to remain in short supply through at least 2028. All expansion is due to be completed by the end of 2028.
  - Shengyi Tech: Leading CCL makers have stopped supplying mid- to low-grade CCL (M6 and below), creating a price inversion in which FR4 can be more profitable than M6. Top-tier makers are protecting their high-end market share, creating opportunities for tier-2 players.
  - Pricing: continued price increases remain the consensus.
  - Resonac: Sees no sign that pricing adjustments will stop soon, as material prices continue to rise.
  - Unitech: Unitech did not raise prices until Q2 2026, when it could no longer absorb additional costs without incurring a loss. Customers have so far accepted the increases, even though many operate in consumer applications. Unitech was unsure how much further customers could absorb price increases, given the much lower ASPs of consumer end-products than of AI products; however, it currently has no intention of stopping price increases.
  - ITEQ: Prices of mid- and low-end grades will rise more than those of high-end grades; pricing follows mainland Chinese peers.
  - Kinsus: 2026 price increases (7-8% per quarter) are purely for cost pass-through. Premium pricing for high-layer-count, large ABF substrates is possible in 2027, but only if the T-glass shortage eases and substrate capacity becomes the binding constraint.

Spec upgrades remain necessary

CCL roadmap:

- EMC: M8 (892K) is the standard grade, shipping more than 1m sheets; M9 (896K3, Q-glass) is in production. M10 (898K4, Df ~0.0004) was sampled in May 2026, could qualify by end-2026 and ships from 2H27 into Rubin Ultra. M11 is in the lab for 2028. M7–M9 remain 2027's mainstream.
- ITEQ: M7, almost entirely for ASICs, is the 2027 driver. ITEQ sees higher gross margin in mid to low-end CCL and might produce more in the future.
- Nan Ya: M11 will use LDK2 glass; Nan Ya has no Q-glass of its own.
- TUC.
  - Class 10 (TU-963) is HC-based and Class 11 (TU-973) PTFE-based, each offered with LDK2, Q-glass or fabric-free film.
  - TU-963 delivers Dk/Df of 2.85-3.0/0.00039-0.0004 at 10GHz versus a competitor's 3.0/0.0005; samples are available, with production targeted for 2027.
  - TU-973 delivers Dk/Df of 2.7/0.00026-0.00029 versus 2.7/0.00037; samples are available, with production targeted for 2027-28.

Exhibit 4: TUC and competitor comps (for M10 and above)

	Class	Resin	Glass fabric	Dk (10GHz)	Df (10GHz)	T288	Td 5% (°C)
TUC-TU963Q	M10	HC	Q-glass	3.0	0.0004	Pass	420 °C
TUC-TU963F	M10	HC	Non-glass	2.85	0.00039	Pass	410 °C
Nanya Plastic	M10	Did not disclose	Q-glass	3.0	0.00045	Pass	430 °C
TUC-TU973Q	M11	PTFE	Q-glass	2.7	0.00029	Pass	550 °C
TUC-TU973F	M11	PTFE	Non-glass	2.7	0.00026	Pass	550 °C
Nanya Plastic	M11	Did not disclose	Low Dk2	3.8	0.00035	Pass	Under development

Source: Company data

- More highlights from TUC's technical forum: PTFE and hydrocarbon.
- TUC on PTFE: PTFE requires lamination at 380°C (versus ~220°C today), for more than six hours and at ~600 psi, so an all-PTFE board would exhaust available capacity. Its preferred hybrid design keeps HC on the outer layers with PTFE inside; the reverse configuration (PTFE on the outer layers) could damage the HC inside because PTFE requires a much higher pressing temperature. Loss at 26.56GHz ranges from 0.37-0.40 dB/in (all-PTFE) to 0.43-0.47 dB/in (all-HC).
- Unlike some peers, TUC believes it can manufacture its own PTFE. However, customers will ultimately decide whether TUC supplies both the PTFE core and prepreg or only one of the two.

Glass: Q-glass or none, but no downgrades

- Nan Ya, Kingboard, Co-Tech: customers will not step back to lower-grade fabric. Fabric itself aids signal transmission, so top-grade foil will not be paired with low-grade fabric.
- Co-Tech: Given potentially limited supply from only two Q-glass suppliers, some customers may instead prefer entirely fabric-free designs, another direction that Co-Tech says its customers are pursuing.
- Kinsus: Qualifying a hybrid T-glass and E-glass core with NVIDIA as a workaround for T-glass shortages.

HDI and mSAP could drive the next leg of AI content growth

Optical interconnect is bringing HDI and mSAP into AI data centres, while PCB content per link increases as optics move closer to the ASIC—from today's pluggable modules to NPO (~150 mm from the ASIC) and CPO (~50 mm)

Optical module PCB: the new battleground

- Compeq: 400G, 800G and 1.6T are all in production, with 800G accounting for the largest volumes this year and 1.6T scaling towards the end of 2027. The step from 400G to 800G/1.6T entails a shift from 3+4+3 HDI on M6 to 12-14L any-layer mSAP on M7N. NPO optical engines use 12L any-layer boards, with 18L in development.
- ZDT: 800G and 1.6T optical module capacity is sold out for 2026-27 and continues to expand. A decade of mSAP experience with a US consumer customer has enabled it to ramp yields quickly. ZDT management said the company sources from numerous CCL suppliers, securing its material supply.

Exhibit 5: Compeq product roadmap

Product	Stack-up	CCL grade	Thickness (mm)	Finish	mSAP	Cavity	Coin	Gold Finger	Blind via A/R
6.4T NPO	7+2+7	M7N	1.2	ENEPIG	V	-	-	-	-
1.6T Transceiver	14L-anylayer	M7N	1.0	ENEPIG	V	V	V	V	0.8
800G Transceiver	12L-anylayer	M7N	1.0	ENEPIG	V	V	V	V	0.8
800G LRO	12L-anylayer	M6	1.0	ENEPIG	V	V	V	V	0.8
800G LPO	3+4+3 HDI	M7N	1.0	ENEPIG	-	-	-	V	0.9
400G Transceiver	3+4+3 HDI	M6	1.0	ENEPIG	-	-	V	V	-

Source: Company data

HDI: increasing layers and thickness

- ZDT: Although attention often focuses on the number of HDI layers a supplier can manufacture, the company believes board thickness is another key consideration. Legacy HDI boards are generally 2-3mm thick, while AI-related HDI increasingly requires thicknesses of 3-5mm or more, increasing manufacturing difficulty.