Market evolution: Electronic valves and tubes (CN 8540) — 2015–2025

Introduction

This report analyses the evolution of extra-European Union trade in thermionic, cold cathode and photo-cathode valves and tubes (CN 8540) from 2015 to 2025. The product group spans legacy cathode-ray tubes for televisions and monitors, specialist microwave and magnetron tubes, image converters, and associated parts. In complete contrast to most manufactured goods, the headline values conceal a radical structural transformation: traded quantities have collapsed, unit prices have exploded, and the EU's domestic production base has all but disappeared. The bloc nevertheless remains a solid net exporter, thanks to its grip on a handful of high-value, technology-intensive segments.

The analysis draws exclusively on official trade and production statistics extracted from the EU Trade Dashboard.

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1. From mass-market CRTs to high-end microwave tubes: the price revolution

1.1. Export and import values grew while physical volumes more than halved

Total extra-EU export value rose from €267 million to €309 million (+15.8 %) between 2015 and 2025, while import value climbed from €172 million to €226 million (+31.2 %). These modest value gains, however, mask a dramatic volume contraction. Export quantity shrank from 620 tonnes to 394 tonnes (−36.6 %) and import quantity collapsed from 2 062 tonnes to 899 tonnes (−56.4 %). The discrepancy originated from an unprecedented repricing of the remaining trade flows.

Trade flow	Indicator	2015	2025	Change
Exports	Value (EUR)	266.7 M	308.7 M	+15.8 %
	Quantity (tonnes)	620.3	393.5	−36.6 %
	Unit price (EUR/t)	429 t	780 t	+81.8 %
Imports	Value (EUR)	172.4 M	226.1 M	+31.2 %
	Quantity (tonnes)	2 061.9	899.1	−56.4 %
	Unit price (EUR/t)	83.5 t	251.2 t	+200.8 %
Trade balance	(EUR)	+94.3 M	+82.6 M	−12.4 %

Source: EU trade overview

1.2. Unit values sky-rocketed, erasing low-value import flows

Import unit value more than tripled (+200.8 %), while export unit value almost doubled (+81.8 %). The swing was most extreme in imports, where a huge inflow of low-priced cathode-ray tubes virtually ceased. In 2017 the EU imported more than 16 000 tonnes of CRT-related products from the United States alone; by 2025 that volume had fallen to 46 tonnes, while the unit price surged by several thousand per cent. The net effect was that trade shifted from a bulk commodity logic to a niche, high-technology one.

1.3. The product mix confirms a decisive move to high-value tubes

A disaggregation by 8-digit sub-heading, available in the product segment comparison, shows that microwave tubes (8540 79) and magnetrons (8540 71) together account for the bulk of export value. In 2015 microwave tube exports were worth €103 million; by 2025 they stood at €94 million, still the largest segment. On the import side, magnetron purchases jumped from €39 million to €64 million, while television camera tubes and image converters (8540 20) remained stable at around €44–47 million. Colour CRT picture tubes (8540 11) have almost disappeared from trade, their import value falling from €2.6 million to €0.4 million. The market has been permanently re-oriented towards advanced electronic components that command five- or six-figure prices per tonne.

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2. Redrawn trade lanes and rising geographic concentration

2.1. The United States cements its role as the EU’s pre-eminent partner

The United States is now by far the largest extra-EU partner in this product group. EU exports to the US rose from €63 million to €103 million (+64.5 %) and imports from the US climbed from €54 million to €78 million (+45.4 %). The US accounted for 35.8 % of EU

exports and 34.5 % of imports in 2025. The top partners dashboard shows that no other country comes close.

2.2. China’s dual role: a shrinking export destination but a booming import source

Exports to China dropped from €33 million to €23 million (−29.6 %), while imports from China nearly tripled, from €10 million to €29 million (+184.7 %). The EU is increasingly buying, rather than selling, electronic tubes from China. Meanwhile, Japan’s position as a supplier slid (−31.2 %) and the United Kingdom became a much more important trade partner post-Brexit, with exports to the UK more than doubling (+110.2 %) and imports rising by half (+50.7 %).

Partner	2015 Imports (EUR)	2025 Imports (EUR)	Change	2015 Exports (EUR)	2025 Exports (EUR)	Change
United States	53.6 M	77.9 M	+45.4 %	62.7 M	103.1 M	+64.5 %
China	10.1 M	28.6 M	+184.7 %	32.8 M	23.1 M	−29.6 %
United Kingdom	33.4 M	50.3 M	+50.7 %	19.8 M	41.6 M	+110.2 %
Japan	46.8 M	32.2 M	−31.2 %	7.6 M	11.8 M	+55.4 %
Korea, Republic	0.6 M*	0.7 M*	–	28.8 M	19.0 M	−34.1 %

*Korea not in top-7 imports; figure from detailed data.

2.3. New intra-EU champions emerge as France’s export dominance collapses

The top EU member state reporters reveal a dramatic re-balancing within the bloc. France, historically the largest extra-EU exporter, saw its shipments fall from €132 million to €56 million (−57.6 %). Germany took the top spot, with exports growing from €56 million to €93 million (+65.6 %), while the Netherlands expanded from €44 million to €77 million (+77.5 %). The most striking development is Austria, which went from a negligible player (€0.2 million exports) to a €21 million exporter (+8870 %), and also became a major importer (from €0.7 million to €27 million). Belgium and Sweden likewise recorded exponential growth.

2.4. Export concentration among member states has increased markedly

The Herfindahl-Hirschman Index for extra-EU exports rose from 1 085 to 1 528 (+40.8 %), signalling that a smaller number of countries now dominate exports. This is corroborated

by the specialisation data: in 2025 only three member states—France (RSCA 0.68), Latvia (0.57) and the Netherlands (0.45)—displayed a revealed symmetric comparative advantage in these products. Most other EU27 economies have become net importers or are only marginally involved. The concentration dashboard shows that while import concentration remained broadly stable (HHI ≈ 2 100), export concentration grew continuously, raising dependency on a handful of specialised production clusters.

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3. Vanishing domestic production and the paradox of a strengthening net trade position

3.1. EU production of valves and tubes has virtually disappeared in volume terms

According to EU production statistics, the volume of valves and tubes manufactured inside the EU fell from 37.5 million units in 2003 to just 1.4 million units in 2024 (−96.3 %). Even within the recent decade, production more than halved, from 3.3 million pieces in 2015 to 1.4 million in 2024. The value of production also shrank from €3.0 billion to €0.7 billion. The EU is essentially exiting the mass production of CRT and generic tubes, retaining only high-technology niches such as magnetrons, microwave tubes and specialised image intensifiers.

3.2. Despite the production collapse, the EU has deepened its net exporter status

Paradoxically, the EU's net import reliance has become more negative, moving from −5.4 % in 2015 to −15.2 % in 2024 (−183.8 % change). A negative figure means the bloc is a net exporter relative to its own consumption. Export propensity edged up from 42.9 % to 45.4 %, and trade intensity remained high at around 59 %. The EU has achieved this by concentrating its remaining production on segments for which it holds a technological lead, exporting high-value goods while importing lower-priced replacements for sectors where manufacturing has ceased. This is a classic "quality ladder" effect, but it also means that the EU's trade surplus depends on a shrinking, highly specialised industrial base.

3.3. Trade shocks and price volatility expose the fragility of the high-value niche model

The volatility and shocks dashboard records several extreme events. The most disruptive was a price shock on US imports in 2019–2020, when the unit value jumped by more than 10 000 % from its baseline, accompanied by a collapse in volume. At the same time, a supply shock hit Pakistan-bound exports, where quantities fell by 99.7 % after 2019,

completely erasing a temporary trade spike. Export prices to Singapore, India, Korea and the United Arab Emirates also experienced double- or triple-digit surges in single years. Such instability is typical of a market dominated by a few producers serving narrow, technology-specific demand. With EU production capacity now focused in a handful of member states and the US being the dominant customer, any disruption—whether geopolitical, regulatory or related to critical raw materials—could rapidly alter the trade balance.

Conclusion

EU trade in electronic valves and tubes between 2015 and 2025 tells a story of an industry that has shed its mass-market past. Quantities have plummeted, unit values have soared, and production has retreated to a few high-tech niches. The United States has become the indispensable trade partner, while new intra-EU champions (Austria, the Netherlands, Belgium) have filled the gap left by France's decline. The EU remains a net exporter, but this position rests on a very narrow base: three member states hold all the comparative advantage, and the product range is increasingly confined to microwave tubes, magnetrons and imaging devices. The extreme price and supply shocks observed during the decade underline the vulnerability of such a concentrated system. As the technology continues to evolve—think quantum-enabled sensors or next-generation radar—the EU will need to safeguard the few production clusters it still possesses.