

PAPER

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The Great Plastics Reset

PART II OF II · THE RECKONING

Where the capital and value actually go, whether circularity holds against the numbers, and what the regulatory wall does.

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~60%

Asia-Pacific share of global petrochemical investment

9%

Share of global plastic waste actually recycled (OECD)

51%

True output of Germany's yellow bin (headline rate: 70%)

2030

PPWR recycled-content and recyclability mandates take effect

Companion paper — No. 30 · *The Great Plastics Reset, Part I: The New Map* — how overcapacity, energy and geopolitics are relocating production, region by region.

01 Executive Summary

Part I drew the map: production is re-basing to the Gulf and Asia, Europe is contracting, and North America is exporting its feedstock advantage rather than converting it. Part II asks the harder question the map raises - who actually profits, whether the industry's circular story is real, and what the regulatory wall does. Three findings define the reckoning.

Capital is following the map, and then some. Asia-Pacific absorbs close to 60% of global petrochemical investment; Gulf sovereign capital is consolidating champions; Western majors are in cash-conservation and divestment. But the more revealing capital story is the one not happening: the recycled-content economy that regulation is about to mandate is chronically undercapitalised, because the same virgin overcapacity glut from Part I makes recycled material uneconomic.

On circularity, the promise currently exceeds measured industrial reality. Globally, only about 9% of plastic waste is actually recycled and recycled material is roughly 6% of feedstock; even Germany's admired system recovers far less than its headline implies. Collection is not circularity. And on regulation, Europe is building the world's strictest packaging and chemicals wall - PPWR, a proposed EU-wide PFAS restriction, digital product passports - even as its own polymer production shrinks. Because those rules bind every import, they are also Europe's last real lever over the Gulf and Chinese exporters Part I described.

KEY FINDING

The reckoning is that the two halves of the industry's story contradict each other. A world awash in low-cost virgin resin cannot easily become a circular one, because cheap virgin is exactly what makes recycled material uneconomic. Regulation is the attempt to force the contradiction shut - written by a continent whose global production share is steadily shrinking.

Scope. Part II covers capital, circularity, regulation, technology and the implications by audience. Recycling figures mix scopes (waste recycled, recycled share of feedstock, national packaging rates) and are labelled where used; forward rules are dated and remain subject to implementing acts. Directional throughout. Figures current to mid-2026.

02 Where the Capital Goes

Capital has followed the map from Part I, and the direction is unambiguous. Asia-Pacific absorbs close to 60% of global petrochemical investment; the Gulf is consolidating - Borouge International, XRG's stated top-three ambition - with aggressive sovereign capital; and Western majors are in retreat, with Dow cutting capital spending and LyondellBasell selling four European sites to a private-equity buyer. The capital that is moving is either state-backed and feedstock-advantaged, or distressed and opportunistic - private equity buying European assets at the bottom of the cycle.

But the more consequential capital story is the one that is not happening. Regulation (Section 04) is about to mandate recycled content across European packaging, creating a large, guaranteed demand pool for recycled plastic. Capital should be pouring into recycling and circular capacity to serve it. It is not. In Europe, Cefic reports confirmed new chemical investment collapsing to near zero, with the shift running "from broad investment across... circular plastics... to barely one pilot." Globally, the OECD finds waste-prevention and recycling account for only about 1.2% of all plastics innovation.

The reason is the tension at the heart of the reckoning. The virgin overcapacity glut from Part I has pushed virgin-resin prices to multi-year lows, and recycled material - which requires collection, sorting, washing and reprocessing - frequently costs more than virgin resin sold at distressed prices. Recycling projects also carry risks conventional petrochemicals do not: fragmented and variable feedstock supply, still-uncertain regulatory treatment of recycled-content claims, and inconsistent quality specifications for the output. Higher cost and higher project risk, against a captive buyer that does not yet exist in law - capital, rationally, waits.

A further force is beginning to reshape the economics from a direction the polymer price alone does not capture: carbon. Scope 3 emissions reporting, customer decarbonisation commitments, the EU's Carbon Border Adjustment Mechanism and the prospect of wider carbon pricing increasingly weigh on virgin, fossil-based plastic - whose production accounts for the large majority of the sector's emissions - and tilt long-run economics toward recycled and renewable-feedstock material. It is not yet decisive. It is a thumb on the scale that grows heavier each year.

KEY FINDING

The capital map has two layers. Virgin capacity flows to feedstock-advantaged scale in the Gulf and Asia. Recycling capacity - the thing regulation is about to require - is undercapitalised, because low-cost virgin resin makes it uneconomic. The glut is not just a margin problem; it is the single biggest obstacle to circularity.

COUNTERPOINT

Regulation could break the deadlock. Recycled-content mandates, virgin-plastic levies (several EU states already charge up to around 1,200 euro per tonne on non-recycled plastic), EPR fee modulation and carbon pricing are designed precisely to tilt the economics toward recycled material. If enforced, they turn an undercapitalised market into a captive one - which is why patient capital is beginning to position even while today's economics say wait.

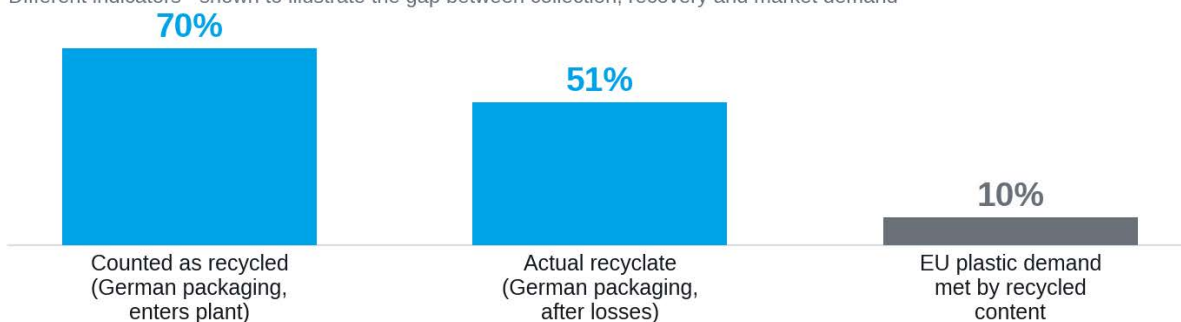
03 The Circularity Reckoning

The industry's answer to overcapacity, pollution and regulation is the same word: circularity. It is worth testing that word against the numbers, because the gap between the promise and the delivery is the largest in the sector.

Start globally. The OECD finds that, after accounting for losses, only about 9% of plastic waste is actually recycled; roughly 19% is incinerated and about half goes to landfill. Recycled, or secondary, plastic makes up only about 6% of total feedstock. The Circularity Gap Report finds global circularity is not rising but falling. The United States recycles only about 5 to 6% of its plastic (US EPA and independent analyses; the EPA's last official rate was 8.7% for 2018, before China stopped accepting scrap imports). These are not the numbers of a circular economy; they are the numbers of a linear one with a recycling garnish.

Collection is not circularity

Different indicators - shown to illustrate the gap between collection, recovery and market demand



Bases differ (German packaging vs EU-wide demand). Sources: UBA/ZSVR; independent analysis; Plastics Europe. Directional.

Germany is the instructive case, because it is held up as the model - and because it prompts the direct question about the yellow bin. The official figures (UBA and ZSVR, January 2026) are genuinely good and rising: the mechanical recycling rate for plastic packaging climbed from 42% in 2018 to over 70% in 2024, and the agencies rightly rebut the myth that everything is simply burned. But the headline overstates true circularity in three ways. First, the 70% counts material that enters the recycling plant, not what comes out; after washing and sorting losses, usable output is closer to 51%. Second, exports flatter the figure - Germany shipped about 732,000 tonnes of plastic waste abroad in 2024, mainly to South-East Asia, and these count toward the national rate. Exported waste may indeed be recycled, but verification and recovery quality vary substantially between destinations. Third, across all German plastic waste, not just packaging, about 64% is still incinerated.

So is the yellow bin a scam? No - that overclaims in the opposite direction. Germany really does collect and mechanically recycle a large and rising share of its packaging, and the sorting genuinely works. But the system recovers less than the headline implies, leans on incineration and export, and - across the EU - recycled plastic still meets only about 10% of demand. The honest verdict is not fraud. It is a system doing real work whose circularity is systematically overstated, on figures that count the wrong thing.

COUNTERPOINT

Where circularity genuinely works. The picture is not uniform failure. PET bottles already reach around 24% average recycled content in Europe; well-run deposit-return systems deliver clean, high-quality feedstock that recycles economically; and closed-loop systems for selected polymers - notably PET and HDPE - are already viable in several markets. AI-enabled sorting (Section 05) is lifting yields further. The gap between counted and circular can close for specific, well-collected streams - which is precisely why the broad-based failure is a question of economics and collection, not of impossibility.

[Remark] Recycling figures here mix scopes and definitions: global waste recycled (OECD, ~9%), recycled share of feedstock (~6%), the German packaging mechanical rate (gate ~70% versus output ~51%), the US rate (~5-6%), and EU demand met by recyclate (~10%). Each is labelled; they are not directly comparable and are used to show direction, not a single rate.

04 The Regulatory Wall

If economics will not deliver circularity, Europe intends to legislate it - building the most comprehensive packaging and chemicals wall in the world, even as its own polymer production shrinks. Three pillars matter.

Packaging (PPWR). The Packaging and Packaging Waste Regulation, Regulation (EU) 2025/40, entered into force in February 2025 and applies from 12 August 2026. It is a regulation, not a directive - one text, all 27 member states, no national transposition - and its requirements ratchet up over more than a decade:

MILESTONE	WHAT TAKES EFFECT
Feb 2025	Regulation (EU) 2025/40 enters into force
Aug 2026	Applies EU-wide; PFAS banned in food-contact packaging (direct PPWR mandate); Declaration of Conformity; minimisation begins
2028	Harmonised recycling labelling; data carrier on packaging
2030	Design-for-recycling and grades A-C (below 70% barred); minimum recycled-content targets; single-use bans; reuse quotas; empty-space cap
2035	Packaging must be recyclable at scale through established infrastructure
2038	Only recyclability grades A-B permitted (below 80% barred)
2040	Higher minimum recycled-content thresholds apply

Two features matter beyond the timeline. First, PPWR is technology-neutral: it prescribes outcomes - recyclability, recycled content, reuse - not the method, leaving mechanical and chemical recycling to compete to meet them. Second, it applies to every package placed on the EU market regardless of where it was made. A polymer producer in the Gulf or China selling into Europe faces the same recyclability grades, recycled-content thresholds and PFAS limits as a European one. This is the cross-border reach Part I flagged: as Europe loses production, its regulation becomes its lever over the producers who replaced it.

Chemicals (the proposed PFAS restriction). Two distinct measures are often conflated, and the distinction matters. The immediate one is inside PPWR itself: intentionally added PFAS in food-contact packaging is banned from August 2026 - a direct, in-force mandate. The broader one is separate and still provisional: the proposed EU-wide restriction on more than 10,000 “forever chemicals” under REACH, which would reach the fluoropolymers used in engineering and automotive plastics - high-performance seals, coatings, and battery and thermal-management components. That restriction is not yet law. ECHA’s Risk Assessment Committee adopted its final opinion in March 2026; the socio-economic committee’s final opinion is expected by end-2026, with Commission adoption anticipated around 2027, an 18-month transition, and derogations of up to roughly 13.5 years for uses such as medical devices and semiconductors. In short: the packaging ban is fixed; the engineering and automotive bans are tethered to a REACH timeline that continues to move.

Traceability (Digital Product Passport). The third pillar is data. PPWR requires a data carrier on packaging from 2028 and a Declaration of Conformity from 2026, while the Ecodesign for Sustainable Products Regulation rolls out Digital Product Passports, with textiles and batteries first from 2027. Substance-level and recycled-content data become a permanent compliance asset - and a permanent cost.

KEY FINDING

Europe is regulating demand as its own production shrinks - and because the rules bind every import, regulation is the one lever it retains over the Gulf and Chinese producers now making the world's plastic. The wall is also a contradiction: PPWR mandates recycled content that, as Sections 02 and 03 show, the recycling system is neither funded nor built to supply.

COUNTERPOINT

The wall could over-reach. If mandated recycled content outruns available supply, the result is not circularity but shortage, non-compliance and cost - or a surge of imported recyclate of uncertain quality. The regulation assumes a recycling industry the economics have not yet built. Whether the wall forces that industry into being, or simply raises costs on a continent already losing production, is the open question of the decade.

05 Technology and Materials

Technology is advancing on several fronts - making production smarter, making plastics more recyclable, and wiring the whole system to the regulatory wall - but none is yet at the scale or economics to close the circularity gap this decade.

AI in production. On the factory floor, AI is moving from pilot to standard. Machine-learning process control and digital twins now optimise injection-molding parameters, cut scrap and stabilise quality - especially valuable when running variable recycled feedstock. Industry forecasts from the K-2025 trade fair expect about 40% of new injection-molding machines to feature AI-driven autonomy by 2028, alongside steady growth in all-electric machines. AI is also reshaping recycling itself: intelligent sensing - infrared, Raman and hyperspectral imaging - paired with machine-learning classifiers is pushing sorting accuracy toward 95%, the single biggest lever on recyclate quality.

Advanced recycling. Chemical, or advanced, recycling - depolymerisation back to monomer, and pyrolysis or gasification of mixed waste - is the industry's great hope for the material mechanical recycling cannot handle, and the capital behind it is real: Eastman, ExxonMobil, LyondellBasell, BASF and SABIC have all committed to advanced-recycling plants, and mass-balance certification (ISCC PLUS) now lets the recycled content be tracked and sold into premium contracts. But it remains marginal and unresolved. In Germany, chemical recycling plants currently process fewer than 26,000 tonnes per year - a rounding error against the millions of tonnes of mechanical throughput. It is more energy-intensive than mechanical recycling, its economics are undeveloped, and its regulatory status is unsettled: the EU has not yet formally incorporated chemical recycling into its Waste Framework Directive, the US often classifies pyrolysis as incineration, and mass-balance accounting itself remains contested.

Materials. The most consequential shift is mono-material design - replacing hard-to-recycle multi-layer composites with single-polymer structures that PPWR's recyclability grades effectively demand. Alongside it sit bio-based polymers, enzymatic recycling, and chain-extender additives that restore the quality of recycled resin. These are the tools that could, over time, make recycled content both available and compliant.

Where technology meets the wall. The clearest convergence is data. The Digital Product Passport and PPWR's data-carrier and recycled-content rules demand material-level traceability, and AI-enabled material tracking - reading, tagging and verifying composition through the chain - is becoming the tool that makes compliance auditable and recycled content sellable at a premium. The passport is the regulatory instrument; the AI that populates and verifies it is the technology that makes it work. Here, for once, regulation and technology pull in the same direction.

COUNTERPOINT

Technology is necessary but not sufficient. Every advance here meets the same wall as the rest of the reckoning: as long as low-cost virgin resin from the Part I glut is cheaper than the recycled or redesigned alternative, better technology improves what is possible without changing what is profitable. Technology sets the ceiling; economics and regulation decide whether anyone reaches it.

06 What It Means, by Audience

The reset is not an abstraction; it lands differently on each part of the value chain.

AUDIENCE	WHAT THE RESET MEANS
Chemical producers	Commodity margins stay thin under the glut; value shifts to feedstock-advantaged scale, specialties and compliant recycled grades. Western commodity assets face rationalise-or-exit.
Converters	Rising import dependence (Europe), compliance cost and mono-material redesign for PPWR grades; recyclate sourcing risk as material stays scarce and dear. No import loophole: PPWR binds every package regardless of origin, so buying cheap pre-converted packaging from lighter-regulated regions offers no escape.
Automotive / OEMs	The proposed REACH restriction reaches fluoropolymers in seals, coatings, battery and thermal-management parts - watch the derogations and the shifting timeline; plus recycled-content and DPP traceability duties and lightweight mono-material pressure.
Packaging	PPWR is existential: recyclability grades, recycled content, reuse, PFAS-free, labelling. First-movers on mono-material design and secured recyclate supply win - and because PPWR applies wherever the package was made, there is no offshore escape.
Retail / brand owners	The main force behind recycled-content demand: Nestle, Unilever, Coca-Cola, PepsiCo, P&G and peers set voluntary targets that pull recyclate through the chain and carry the shelf-facing risk of non-compliance. Their commitments increasingly set the market above what regulation alone requires.
Investors	Aggressive capital is sovereign and feedstock-advantaged; distressed capital is buying European assets; the mandated-but-unbuilt recycled-content market is a structural opportunity with broken economics until virgin normalises, carbon pricing bites, or policy forces it.

Across all of them, one logic holds. The virgin world of Part I and the circular ambition of Part II are in tension, and low-cost virgin resin is the hinge. Whoever controls feedstock-advantaged scale wins the virgin game; whoever solves recycled-content supply at an acceptable cost - through secured feedstock, mono-material design, advanced recycling that finally pencils, or the regulation and carbon pricing that force the economics - wins the circular one. Europe's commodity production is shrinking; its leverage is now the rule-book it applies to everyone else's.

The Great Plastics Reset is two things at once: a geographic re-basing of who makes plastic, and a reckoning over whether the industry's circular promise is real. The map has moved to the Gulf and Asia. The circular economy remains, on the numbers, only partially realised at industrial scale. And the regulation meant to bridge the two is being written by the continent whose own production is shrinking fastest - betting that rules can do what economics, so far, will not. Whether that bet pays is the question the next decade answers.

Methodology & Sources

This paper synthesises published third-party research and does not report proprietary IMP data. Principal sources: the OECD Global Plastics Outlook and the Circularity Gap Report for global recycling and circularity; the US EPA (with independent analyses) for the US recycling rate; the German Environment Agency (UBA) and Central Agency Packaging Register (ZSVR), with independent analysis, for German packaging recycling, output losses and exports; Plastics Europe for EU demand and PET recycled-content context; the European Commission and EUR-Lex for the PPWR (Regulation (EU) 2025/40); ECHA for the proposed PFAS restriction and its RAC and SEAC opinions; ESPR and Digital Product Passport guidance; ISCC for mass-balance certification; Cefic and S&P Global for investment and capital flows; and the K-2025 trade fair reporting with peer-reviewed literature for AI, advanced recycling and materials. Recycling figures mix scopes (waste recycled, recycled share of feedstock, national packaging rates, share of demand) and are labelled where used; they are not directly comparable. Forward rules and dates are as announced and subject to implementing and delegated acts. Points resting on a self-reported dataset, a single provider or a forward estimate are marked [Remark]. Companies are named only as matters of public record and industry structure; no assessment of any IMP client is expressed or implied. All figures are from public sources and current to mid-2026. Not investment advice.