

# DIGITAL PRODUCT PASSPORT

The Definitive State of Play

**34.9%**  
DPP Market CAGR

**\$1.23B**  
Market Value by 2030

**Feb 2027**  
First Hard Deadline

Legislation · Timelines · Industry Impact · Supply Chain · Compliance Consequences · Data Washing · Global Adoption

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## SECTION I

## EXECUTIVE SUMMARY

**34.9%**

CAGR · DPP Market 2025–2030

Grand View Research

**\$1.23B**

Projected Market Value by 2030

USD

**Feb 2027**

First Hard Deadline

EV &amp; Industrial Batteries

**~50%**

Share Digital Product Data

German manufacturers only

**18%**

In Standardised Formats

Intereconomics 2025

**\$700B**

Circular Economy Opportunity

NRF · Full DPP adoption

The Digital Product Passport (DPP) is the most consequential product compliance transformation since CE marking. Mandated under the EU's Ecodesign for Sustainable Products Regulation (ESPR, Regulation EU 2024/1781), which entered into force on 18 July 2024, DPPs will become the non-negotiable gateway to the EU market across virtually every physical goods category - affecting manufacturers, importers, distributors, and retailers worldwide, regardless of their headquarters jurisdiction.

This report delivers what executives need: precise timelines, sector-by-sector obligations, a frank assessment of the supply chain data challenge, the emerging threat of data washing, the real cost of non-compliance, and the global adoption trajectory now accelerating far beyond EU borders. It is written for decision-makers.

*"Much like GDPR transformed data privacy, the ESPR is set to transform product data management. For any company selling physical goods in the EU, compliance is not optional."*

## SECTION II

## WHAT IS A DIGITAL PRODUCT PASSPORT?

A Digital Product Passport is a legally mandated digital record - attached to a physical product via a QR code, NFC chip, or RFID tag - that captures verified, machine-readable data about a product's origin, material composition, environmental footprint, reparability, recyclability, and end-of-life pathway. It is not a brochure. It is not a sustainability report. It is a structured system of record that must be accurate, updatable, and auditable across the entire product lifecycle.

The EU defines the DPP as 'a digital container of product-specific information that acts as a digital identity for a product.' Critically, the DPP is dynamic - it must be updated throughout the product's life: when ownership changes, when repairs are conducted, when recycling occurs. This is fundamentally different from any existing compliance documentation model.

## Mandatory Minimum Data Fields

While specific requirements vary by product category, all DPPs share a mandatory baseline:

Unique product identifier (EU registry-linked)	Carbon footprint by lifecycle stage
Manufacturer & importer details	Repairability score & instructions
Country of origin and manufacture date	Recyclability guidance
Material composition incl. substances of concern	Safety instructions & disposal guidance
Energy consumption data	Compliance documentation & certifications

### SECTION III

## THE LEGISLATIVE FRAMEWORK

The ESPR - Regulation (EU) 2024/1781 - entered into force on 18 July 2024, replacing the Ecodesign Directive 2009/125/EC and dramatically expanding scope from energy-related products to virtually all physical goods sold in the EU market. Only food, feed, and medicinal products are explicitly exempt. The ESPR operates through a tiered structure: the core regulation establishes the framework; delegated acts - secondary legislation adopted sector by sector - define specific technical and data requirements. This means compliance timelines differ by industry.

### KEY LEGAL PRINCIPLE: WHO IS RESPONSIBLE?

Under the ESPR, the 'economic operator' placing a product on the EU market - typically the manufacturer or importer - holds primary legal responsibility for DPP accuracy and completeness. Importers must maintain technical documentation for at least ten years. Distributors and retailers must verify compliant DPPs and halt sales if they are absent. There are no blanket SME exemptions, though some provisions may carry extended deadlines for smaller businesses.

## The ESPR Working Plan 2025–2030

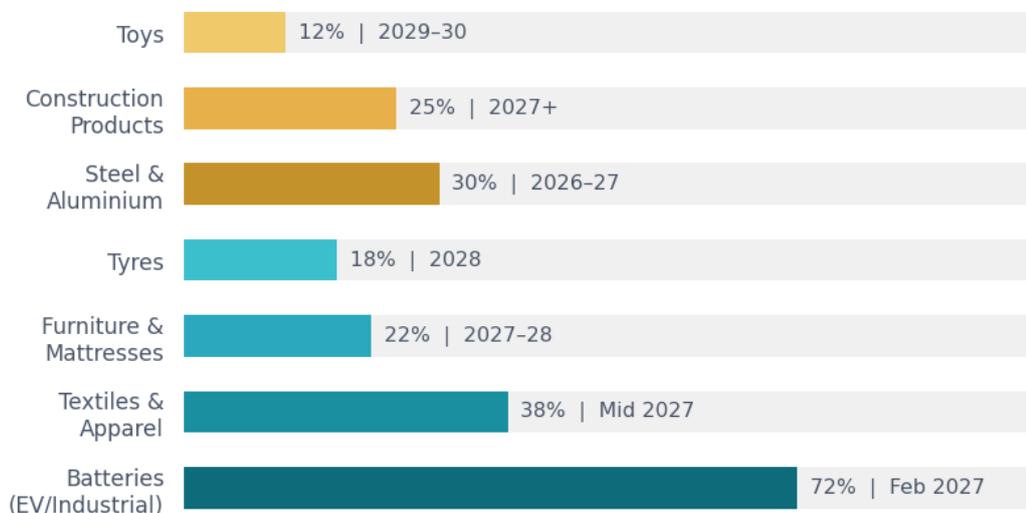
On 16 April 2025, the European Commission adopted the first ESPR Working Plan, confirming priority product groups and timelines. The plan prioritises six categories based on environmental impact, market scale, and circularity potential.

SECTOR / REGULATION	DPP MANDATORY FROM	KEY DATA REQUIRED
EU Battery Regulation (2023/1542) – EV, Industrial, LMT	Feb 2027	Chemical composition, carbon footprint by lifecycle stage, re-
ESPR – Textiles & Apparel (Highest priority sector – €78B EU market)	~Mid 2027	Fibre composition, country of manufacture, water & energy U
ESPR – Furniture & Mattresses	2027–2028	Material sourcing, disassembly instructions, recycled conten
ESPR – Tyres	2028	Material composition, rolling resistance, durability data, end-
ESPR – Steel & Aluminium	2026–2027	Material origin, recycled content, carbon footprint, circular d
Construction Products Regulation (EU 2024/3110)	Registry 2026–27; Mandatory 18mo after	Material composition, embodied carbon, reusability, end-of-
Toy Safety Regulation	2029–2030	Chemical compliance, conformity documentation, safety ce

Source: European Commission ESPR Working Plan 2025–2030; EU Battery Regulation 2023/1542; Construction Products Regulation EU 2024/3110

## Sector Readiness vs. Compliance Deadlines

### Sector Readiness vs. DPP Compliance Deadline



Source: Industry analysis and ESPR Working Plan 2025–2030. Readiness estimates based on sector surveys and pilot programme data.

## Connected Legislation: The DPP Ecosystem

DPPs are the connective tissue running through a wider web of EU legislation. The EU Green Claims Directive (adopted March 2024, enforcement from September 2026) prohibits vague environmental claims unless backed by DPP-grade evidence - with fines of up to 4% of annual turnover. The CSRD and CSDDD

require supply chain due diligence reporting that directly integrates DPP data. The Packaging and Packaging Waste Regulation (PPWR) applies from 12 August 2026. From 19 July 2026, the ESPR bans the destruction of unsold apparel and footwear.

#### SECTION IV

## THE SUPPLY CHAIN CHALLENGE

*"The most time-consuming element of DPP compliance is not technical. It is the process of onboarding suppliers and remediating poor-quality data that originates deep within multi-tier supply chains."*

For most global manufacturers, DPP compliance is not primarily a technology problem. It is a data governance and supply chain coordination challenge of the first order. Industry analysts estimate a minimum 12–18 months lead time to establish the necessary data infrastructure – and that assumes active supplier cooperation. A typical automotive or electronics manufacturer sources from 500 to 5,000 direct suppliers across 30–50 countries. The DPP requires verifiable, machine-readable data from every meaningful link in that chain, and the economic operator placing goods on the EU market is legally accountable for data generated by suppliers they may never have directly audited.

### The Multi-Tier Visibility Gap

Supply Chain Data Readiness Gap (Germany, Intereconomics 2025)



Source: Intereconomics (2025). Data from German manufacturing sector – one of Europe's most digitally advanced manufacturing economies.

The data reveals a stark picture: only around 50% of German manufacturers currently share any digital product data with supply chain partners. Of those, only 18% do so in standardised formats. This gap widens dramatically as company size decreases - only 17% of firms with fewer than 50 employees share standardised data. DPP requirements frequently extend to tier-2, tier-3, and tier-4 suppliers who have neither the digital systems nor the commercial incentive to invest in data-sharing infrastructure at the pace regulators demand.

## Critical Supply Chain Actions

- Supplier contractual obligations: Update standard commercial contracts to require DPP-relevant data, specify acceptable evidence types, and establish consequences for non-delivery.
- Tier-n visibility: Visibility beyond tier-1 suppliers is essential for materials such as lithium, cobalt, organic cotton, and recycled polymers where provenance is legally required.
- Data standardisation: Suppliers using different ERP systems and measurement methodologies produce incompatible data. Normalisation requires dedicated integration middleware.
- Third-party audit infrastructure: For high-value claims - recycled content %, carbon footprint, restricted substances - independent verification against test reports and certifications is essential.
- SME supplier support: Many critical supply chain participants have no dedicated compliance resource. Brands that fail to actively support their supplier base face data gaps blocking EU market access.

### SECTION V

## THE DATA WASHING THREAT

DPPs are only as trustworthy as the data they contain. This is the central systemic vulnerability of the entire DPP framework - and one that regulators, industry bodies, and compliance professionals are increasingly focused on.

### What Is Data Washing?

Data washing in the DPP context refers to populating a Digital Product Passport with inaccurate, unverified, or deliberately misleading information in order to appear compliant or make sustainability claims that are not genuinely substantiated. It is the digital evolution of greenwashing - but with a technical veneer of credibility.

Unlike traditional greenwashing, which involves vague marketing language, data washing exploits the architecture of DPP systems. A product carrying a QR code linking to a technically-formatted passport may appear fully compliant while the underlying data is fabricated, outdated, or copied from a different product. Without robust verification, regulators and consumers cannot easily distinguish a genuine DPP from a cosmetically compliant one.

### THE DATA WASHING RISK SPECTRUM

Unintentional (poor supplier data quality, measurement inconsistencies) Selective disclosure (highlighting favourable metrics while omitting damaging ones) Deliberate falsification (fabricating material composition, recycled content %, or carbon footprint data to access premium markets or avoid penalties). The ESPR treats all forms as non-compliance. The EU Green Claims Directive criminalises intentional false environmental claims: fines up to 4% of annual turnover and public procurement exclusion for up to 12 months.

## Structural Vulnerabilities That Enable Data Washing

- Self-reported data: In early DPP phases, much underlying data is self-reported by manufacturers and suppliers without independent third-party verification at scale. Product volumes will quickly exceed verification capacity of any regulatory body.
- Supply chain complexity: When material data must travel through six or seven tiers before reaching the brand owner, opportunities for data degradation, substitution, or manipulation multiply at each handoff.
- Incentive misalignment: Suppliers under commercial pressure have financial incentives to report favourable sustainability data, particularly where verification is difficult or delayed.
- The QR code illusion: Consumer-facing implementations create a perception of verified transparency that may significantly outpace the actual integrity of the underlying data.

## The Enforcement Context

European regulators are not waiting for DPP infrastructure to mature before acting. In July 2025, a company was fined €1.1 million under France's AGEC law (Anti-Waste Law for a Circular Economy) for failing to provide consumers with accurate environmental impact information - the first enforcement action of this scale in Europe. This case signals an enforcement environment that is accelerating rapidly.

Research underscores the consumer stakes: 53% of consumers cannot identify greenwashing claims, making them susceptible to data-washed products, while 60% of buyers report that sustainability influences purchasing decisions. The EU Green Claims Directive (enforcement from September 2026) prohibits vague environmental terms - 'eco-friendly,' 'natural,' 'carbon neutral' - unless backed by verified lifecycle assessment data.

## Building a Defensible DPP

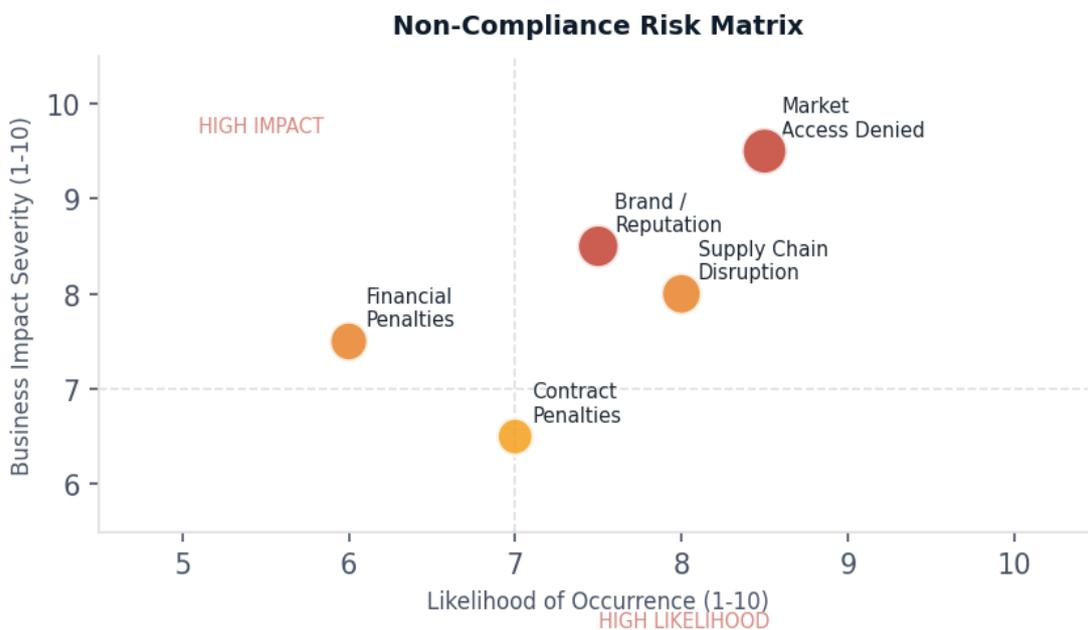
- Blockchain and cryptographic signing: Provide tamper-evident, immutable audit trails - making post-hoc manipulation detectable. Increasingly standard for battery passports and luxury goods.
- Third-party verification: Recycled content %, carbon footprint, and restricted substances should be validated against test reports or certifications - not solely supplier declarations.
- Role-based access control: Separate consumer-facing views from regulated evidence repositories accessible to market surveillance authorities.

- Version control and audit trails: Every change should be logged, timestamped, and attributable - creating a documented history regulators can interrogate.

SECTION VI

# CONSEQUENCES OF NON-COMPLIANCE

Non-compliance with DPP requirements is not a grey area. It carries direct, quantifiable consequences across four dimensions. Executives who frame this as a 'compliance project' for legal teams misunderstand the business risk. This is a market access question.



Non-compliance risk matrix: illustrative assessment of business impact severity vs. likelihood of occurrence for DPP-regulated companies.

MARKET ACCESS DENIAL	FINANCIAL PENALTIES
<p>Products without compliant DPPs will not be permitted for sale in the EU market. They may be blocked at the border. Market surveillance authorities across all 27 member states have legal authority to require product withdrawals and market bans. For non-EU manufacturers - US, Asian, South American - this represents an existential commercial risk for any business with EU revenue.</p>	<p>The EPR enables member states to set penalty frameworks. The EU Green Claims Directive authorises fines up to 4% of annual turnover and exclusion from public procurement - a €1.8 trillion annual market - for up to 12 months. The precedent: France's July 2025 €1.1M fine under AGEC law signals enforcement intent. GDPR-level enforcement is the regulatory reference point.</p>

<p><b>BRAND &amp; REPUTATIONAL RISK</b></p> <p>DPP enforcement is inherently public. Product withdrawal notices and greenwashing enforcement actions are documented by national authorities. The cases of H&amp;M, Volkswagen, Coca-Cola, and Starbucks illustrate the lasting brand damage that follows sustainability credibility failures. DPPs create a permanent, auditable record – companies that have made claims outpacing verifiable data are exposed to retrospective accountability at unprecedented scale.</p>	<p><b>SUPPLY CHAIN DISRUPTION</b></p> <p>Products without compliant DPPs cannot be processed or sold by distributors and retailers who face their own ESRP obligations – creating cascade effects. Major EU retail and manufacturing partners are now inserting DPP data-provision requirements directly into supplier contracts. Non-compliant suppliers face delisting, not just regulatory penalty. The minimum 12–18 month implementation lead time means companies already behind schedule face the highest risk.</p>
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SECTION VII

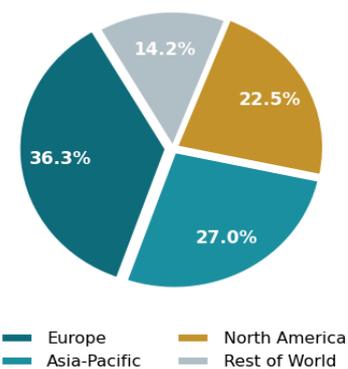
# THE GLOBAL DIMENSION

While the EU holds the world's only comprehensive, legally binding DPP mandate, the global picture is rapidly evolving. The EU's ESRP applies to all products sold in the EU market, irrespective of where they are manufactured – the so-called 'Brussels Effect.' Any company wanting access to EU consumers must comply, making EU DPP standards a de facto global requirement for internationally operating businesses.

Global DPP Market Trajectory 2024-2030



DPP Market Share by Region (2024)



Sources: Grand View Research (2024 market valuation & CAGR); Fortune Business Insights (2034 projection); MarketsandMarkets (regional shares, 2024).

## Country-by-Country Status

JURISDICTION	STATUS	KEY DEVELOPMENT
European Union	<b>MANDATORY</b>	Full ESRP framework in force. Battery Passport mandatory Feb 2027. Working Plan 2025–2030

<b>China</b>	<b>ACTIVE DEVELOPMENT</b>	CAICT published national DPP roadmap April 2025. 3-layer national architecture (national r
<b>United Kingdom</b>	<b>PILOT PHASE</b>	Product passport policy framework proposed under waste & resource strategy. Fashion sec
<b>United States</b>	<b>NO FEDERAL MANDATE</b>	FAS calls for national DPP initiative. California supply chain transparency acts create analog
<b>Japan</b>	<b>COMPLIANCE-DRIVEN</b>	Toyota and major automakers implementing EV battery lifecycle tracking systems driven b
<b>South Korea</b>	<b>COMPLIANCE-DRIVEN</b>	Hyundai Motor Group developing battery passports for EU compliance. Government studyin
<b>Turkey / Vietnam</b>	<b>STUDYING</b>	Both nations actively studying EU DPP regulation and planning national initiatives. Export de
<b>India</b>	<b>OPPORTUNITY</b>	Government has identified DPP as a strategic software industry opportunity. Early-stage po

Sources: European Commission; China Academy of Information and Communications Technology (CAICT) April 2025; OpenText; Renoon; FAS July 2025.

The global DPP market, valued at approximately USD 294 million in 2025, is projected to reach USD 4.5 billion by 2034 - a CAGR of 35.6% (Fortune Business Insights). Early surveys indicate that 89% of global stakeholders believe governments should adopt unified DPP standards - signalling broad market readiness for regulatory convergence. Full DPP adoption could unlock USD 700 billion in circular-economy revenue globally through authenticated resale markets, lifecycle services, repair and refurbishment programmes, and premium positioning for verified sustainable products (National Retail Federation).

SECTION VIII

# STRATEGIC EXECUTIVE ACTION FRAMEWORK

DPP compliance is not a one-time project. It is a permanent operational capability - as enduring as quality management or financial reporting. The organisations that emerge as competitive leaders will be those that treat it as such today.



<ul style="list-style-type: none"> <li>• Regulatory mapping: identify product categories under existing delegated acts</li> <li>• Supply chain data audit: gap analysis across tier-1 and tier-2 suppliers</li> <li>• Legal &amp; contractual review: update supplier contracts with DPP data obligations</li> <li>• Technology assessment: evaluate PLM/ERP for DPP data readiness</li> <li>• Green Claims audit: review all environmental marketing claims against GCD standard</li> </ul>	<ul style="list-style-type: none"> <li>• DPP platform build: governed system with structured data, role-based access, audit trails</li> <li>• Supplier onboarding programme: invest in tier-2/3 supplier capability and data templates</li> <li>• Battery Passport compliance: mandatory before 18 February 2027 – non-negotiable</li> <li>• Circular business model development: use DPP infrastructure for premium resale and authentication</li> <li>• EU digital registry registration (operational July 2026)</li> </ul>	<ul style="list-style-type: none"> <li>• Global capability integration: expand DPP infrastructure to satisfy Chinese, UK, and North American requirements</li> <li>• EU green public procurement: qualifying with verified DPPs for €1.8T annual government market</li> <li>• Circular economy monetisation: authenticated secondary markets, repair economies, material recovery</li> <li>• Competitive differentiation: DPP data as basis for premium pricing and institutional investor confidence</li> </ul>
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## SECTION IX

## CONCLUSION: THE WINDOW IS NOW

The Digital Product Passport is not a future regulatory event. It is a present operational priority. The legal framework is in force. The first hard deadline – the Battery Passport – arrives in February 2027. Textiles and furniture follow closely. The data infrastructure that must underpin compliant DPPs takes 12–18 months to build when supply chains are fully cooperative – and significantly longer when they are not.

*"The organisations that will struggle are those that treat DPP as a regulatory checkbox. The organisations that will lead are those that understand DPPs as the infrastructure layer of a fundamentally more transparent, more circular, and more data-driven economy."*

The opportunity embedded in that infrastructure is substantial: USD 700 billion in circular-economy revenue. Premium market access. Consumer trust at a time when 53% of buyers cannot identify greenwashing. Verified sustainability claims that translate directly into pricing power, investor confidence, and retail partner preference. Access to €1.8 trillion in EU annual public procurement for qualifying, DPP-compliant suppliers.

The window between now and mandatory enforcement is not a grace period. It is a competitive advantage waiting to be claimed. The organisations that move now will define the standards, build the ecosystems, and capture the markets.

The passport has been issued. The question is whether your organisation chooses to lead with it – or be blocked by it.

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