



POLICY BRIEF

NETZERO PALLET FROM AGRIWASTE



1. INTRODUCTION

Pallets are a critical component of global logistics, serving as the base for transporting goods across supply chains. The **two most common types are wooden pallets** (typically made from pine or other softwoods) **and plastic pallets** (usually made from HDPE or polypropylene), which have shaped existing regulations on forestry, packaging waste, carbon emissions, and phytosanitary control

This policy brief uses wooden and plastic pallets as reference points to examine how current pallet-related policies operate, where they are effective, and where they fall short in addressing climate, circular economy, and trade objectives. Against this regulatory backdrop, the brief focuses on NetZero Pallet made from agricultural residues, a material category capable of fully substituting wood and plastic pallets while aligning more closely with emerging sustainability requirements.

The purpose of this brief is to map the current policy landscape at global and Vietnamese levels, identify regulatory gaps affecting agriwaste-based pallets, and propose targeted policy adjustments to enable their mainstream adoption in line with Vietnam's green growth, circular economy, and net-zero commitments.

2. CONTEXT AND IMPORTANCE OF THE PROBLEM

Pallets form a critical but largely unregulated layer of global logistics infrastructure. In fact, pallets underpin global logistics, **moving roughly 80% of goods** worldwide. With more than **5 billion pallets** in use—over **90% made from wood**—demand is set to rise rapidly as e-commerce volumes expand toward 200 billion shipments per year by 2030¹.

At this scale, pallet material choices carry non-trivial environmental and regulatory consequences. Most wooden pallets are cheap, single-use export pallets that are discarded after one trip. This linear model contributes to deforestation, **estimated by FAO² (2020) at approximately 10 million hectares of forest loss** per year and exacerbates climate change through carbon emissions associated with forest conversion. Plastic pallets, while more durable, are derived from fossil fuels and involve high production emissions, with end-of-life risks related to persistent plastic waste and microplastics. As a result, both dominant pallet materials pose structural sustainability challenges, increasingly at odds with global climate and circular economy priorities.

In Vietnam, the sustainability challenge is compounded by the scale of agricultural residues. The country generates approximately **150 million tons of agriwaste annually**³, much of which is openly burned or discarded due to limited reuse pathways, contributing to air pollution and greenhouse gas emission. At the same time, Vietnam's export-oriented supply chains continue to rely predominantly on wooden pallets, exposing exporters to rising compliance costs under phytosanitary controls, deforestation-related regulations, and packaging waste policies.

Against this backdrop, agriwaste-based NetZero Pallet emerge as a technically and environmentally viable alternative. However, despite their structural alignment with deforestation-free, low-carbon, and

¹ <https://www.industryresearch.biz/market-reports/pallets-market-102605>.

² FAO (2020). Global Forest Resources Assessment 2020: Key findings. Rome: Food and Agriculture Organization of the United Nations. DOI: 10.4060/ca8753en.

³ <https://en.nhandan.vn/forum-highlights-untapped-potential-for-viet-nams-circular-economy-post156807.html>.

circular economy objectives, **current policy and regulatory frameworks remain largely designed around wood and plastic pallets, offering no clear standards, classifications, or incentives for agriwaste-based pallets.** This policy gap underscores the need for a targeted review of existing pallet-related regulations and the development of enabling policies to support the mainstream adoption of agriwaste-based pallets.

3. GLOBAL POLICY DRIVERS AFFECTING PALLET MATERIAL CHOICES

As environmental and regulatory risks tied to conventional pallet materials intensify, policy frameworks are increasingly influencing pallet choices across global supply chains. While pallets are rarely regulated directly, climate, deforestation, waste, and circular economy policies are steadily bringing them into regulatory focus.

Across major markets, requirements on **traceability, recyclability, carbon disclosure, and producer responsibility** are imposing higher compliance burdens on wood- and plastic-based pallets, while creating structural opportunities for low-carbon, circular alternatives. The following sections examine how these policy drivers operate in key markets, including the **European Union, the United States, Australia, Singapore, Japan, and South Korea.**

3.1. European Union (EU):

The European Union sets the most advanced regulatory benchmark influencing pallet material choices, primarily through the **European Green Deal**. While pallets are not regulated as a standalone product, they are increasingly affected by a combination of deforestation, packaging waste, circular economy, and climate policies that impose material-specific compliance obligations. Regulations such as **EUDR, PPWR (including EPR), and CBAM** collectively raise requirements on traceability, reuse, recyclability, and carbon accountability, thereby increasing regulatory pressure on wood- and plastic-based pallets and reshaping material selection decisions across EU-bound supply chains.

Regulation	Policy Pillar	Core Objective	Legal Status & Timeline	Implications For Pallets
EUDR (EU Deforestation Regulation – Regulation (EU) 2023/1115)	EU Biodiversity Strategy 2030; EU Forest Strategy for 2030	Prevent products linked to deforestation from entering the EU market (e.g. wood)	Adopted 2023; Applies from 30 Dec 2025 (large firms) / 30 Jun 2026 (SMEs)	Wooden pallets must prove deforestation-free and legally harvested timber; requires due diligence, traceability, and geolocation data
PPWR (Packaging & Packaging Waste Regulation)	Circular Economy Action Plan	Reduce packaging waste and mandate reusable/recyclable packaging	Entered into force Feb 2025; Key obligations from Aug 2026	Pallets classified as B2B transport packaging; reuse required by 2030; recycled-content and recyclability requirements apply
CBAM (Carbon Border Adjustment Mechanism)	Carbon pricing and industrial reform	Prevent carbon leakage by pricing embedded emissions of imports	Transition phase Oct 2023–Dec 2025; Full implementation Jan 2026	Does not directly regulate pallets, but increases importance of embedded carbon accounting and Scope 3 emissions
EPR (Extended Producer Responsibility – Under PPWR)	Circular Economy Enforcement Mechanism	Assign financial responsibility for packaging waste management	Mandatory under PPWR from Aug 2026	Does not regulate pallets, but exporters (including non-EU) must pay for collection, recycling, or reuse of pallets placed on EU market

3.2. United States:

The United States does not regulate pallet materials through a single federal framework; instead, pallet choices are increasingly influenced by a combination of state-level packaging policies, federal phytosanitary rules, and industry standards. Key policy drivers affecting pallets in the U.S. include:

1. Extended Producer Responsibility (EPR)

- As of mid-2025, seven U.S. states (including Maine, Oregon, Colorado, California, Minnesota, New Jersey, Washington) have enacted Extended Producer Responsibility (EPR) laws for packaging.
- These laws apply eco-modulated fees that favor reusable, repairable, and recyclable packaging, indirectly increasing costs for one-way wooden and plastic pallets.

2. Recycled content mandates

- States such as California, Washington, and New Jersey require minimum post-consumer recycled content in plastic packaging, encouraging greater use of recycled resin in plastic pallets.

3. Phytosanitary and food safety requirements

- **ISPM-15**, enforced by USDA, mandates heat treatment or fumigation for wood pallets in international trade.
- **FDA and USDA** food safety rules indirectly influence pallet choice in food and pharmaceutical supply chains, often favoring hygienic or closed-loop pallet systems.

In contrast to the EU's command-and-control regulatory framework, the United States relies on a **decentralized, market- and state-driven approach** to environmental governance, with sustainability outcomes shaped more by **economic incentives and corporate requirements** than by comprehensive federal mandates.

3.3. Australia:

Australia regulates pallet materials primarily through timber legality, traceability, and circular economy policies, rather than through explicit deforestation bans. The central regulatory instrument is the **Illegal Logging Prohibition Rule 2014**, replacing the previous **Illegal Logging Regulation 2012**, which prohibits the import of illegally harvested timber and requires importers to conduct due diligence to verify the legal origin of wood products, including wooden pallets. Under **Illegal Logging Prohibition Rule 2014**, wooden pallets used in export and import supply chains fall under biosecurity and timber legality scrutiny, increasing traceability and compliance costs for wood-based pallets.

In parallel, Australia promotes packaging circularity through the **National Packaging Targets 2025**, implemented via the Australian Packaging Covenant Organisation (APCO). The targets require:

- 100% of packaging to be reusable, recyclable, or compostable
- 70% of plastic packaging to be recycled or composted
- 50% average recycled content across packaging, and
- Phase-out of problematic and unnecessary single-use plastics

In practice, these targets strongly favour reusable pallet systems, which already account for a large share of packaging waste avoidance in Australia.

Finally, Australia's policy direction increasingly relies on eco-modulated fees, mandatory participation, and potential transition from voluntary to regulatory enforcement, as voluntary targets alone have proven insufficient. This trajectory favours pallet solutions that are durable, reusable, low-carbon, and easy to recover at end-of-life. While wooden and plastic pallet pools partially meet these requirements, **agriwaste-based pallets align structurally with Australia's reuse, waste-reduction, and biosecurity objectives, yet remain unrecognised under existing pallet standards**, highlighting a regulatory gap similar to that observed in other jurisdictions.

3.4. Singapore:

Singapore advances a circular economy through the **Resource Sustainability Act 2019** and the **Zero Waste Masterplan**, which indirectly shape pallet usage through packaging and waste regulations. Since 2020, **Mandatory Packaging Reporting (MPR)** requires medium and large companies to report the amount of packaging they place on the market and their reduction plans. Crucially, **bulk transport packaging and reusable packaging that companies take back for reuse are exempt from reporting**, explicitly incentivizing closed-loop systems such as pallet return and pooling programs.

Singapore is also introducing **Extended Producer Responsibility (EPR)** for packaging, beginning with the **Beverage Container Return Scheme**, a deposit-return scheme for beverage containers from 2026. While pallets are not yet directly regulated under EPR, tertiary packaging that enters the waste stream could be captured in future phases. Given Singapore's severe landfill constraints and its goal to extend the life of Semakau Landfill beyond 2035, policies strongly favor waste prevention through reuse. In practice, this has accelerated adoption of shared pallet pools and "as-a-service" logistics models, structurally favoring reusable pallets over one-way options.

3.5. Japan:

Japan operates one of the world's longest-standing packaging EPR systems under the **Act on the Promotion of Sorted Collection and Recycling of Containers and Packaging (Act No. 112 of 1995)**, which requires businesses to finance packaging waste recycling. A key feature is **cascade recycling**, whereby post-consumer plastic packaging is commonly recycled into durable products such as plastic pallets, rather than back into packaging. **Japan's Resource Circulation Strategy for Plastic (2019)** sets clear national targets of 60% reuse or recycling of plastic packaging by 2030 and 100% effective utilization of used plastics by 2035, encouraging investment in durable, reusable, and recyclable pallets supported by mature pooling systems.

Additionally, Japan imposes the **Green Procurement Law (2000)** and the **Clean Wood Act (CWA) (2016)**, promoting legally harvested and certified timber, with **Forest Stewardship Council (FSC)** and **Programme for the Endorsement of Forest Certification (PEFC)** certification favored in public procurement. Combined with ISPM-15 requirements for imported wooden pallets, this framework steers pallet users toward closed-loop reuse systems rather than outright material bans.

3.6. South Korea:

South Korea has one of the most stringent resource-circulation and climate policy frameworks in Asia, anchored in the **Korean Green New Deal (2020)** and the **2050 Carbon Neutral Strategy**, both of which identify material recycling and circularity as key pathways to decarbonization. These strategies are operationalized through the **Framework Act on Resource Circulation (2018)**, which sets a national

objective to eliminate the landfilling of recyclable waste by 2025, significantly tightening controls over material-intensive products.

Within this framework, pallets was previously considered outside the core scope of packaging or product regulation, but are now explicitly regulated under **Extended Producer Responsibility (EPR)**. In 2021, the Ministry of Environment of Korea (MOE) clarified that pallet producers and importers are subject to mandatory annual recycling targets, requiring them to recover and recycle a defined proportion of pallets placed on the market. As a result, disposable pallets face higher end-of-life costs, while durable, reusable, and recyclable pallet systems are structurally favored. South Korea combines EPR obligations, landfill restrictions, and carbon neutrality goals, which strongly incentivize closed-loop pallet systems.

3.7. Other international regulations & standards:

- Forest Stewardship Council (FSC): A globally recognized certification system for wood products, widely required by multinational buyers and public procurement to demonstrate responsible forest management, effectively shaping market access for wooden pallets.
- ISPM-15 (International Phytosanitary Standard): A mandatory global trade standard requiring heat treatment or fumigation of wooden packaging used in international shipments, increasing cost and compliance burdens for wooden pallets while not applying to non-wood or processed agriwaste materials.

4. VIETNAM'S POLICY FRAMEWORK: IS IT SUFFICIENT?

Vietnam has established a clear strategic direction toward green growth, circular economy transition, and net-zero emissions, creating an increasingly relevant policy environment for logistics materials such as pallets. While pallets are not regulated as a standalone product category, multiple national policies indirectly influence pallet material choices through requirements on carbon reduction, waste recovery, and producer responsibility.

4.1. National Green Growth Strategy 2021–2030 (Decision 1658/QĐ-TTg)

Vietnam's **National Green Growth Strategy 2021–2030 (Decision 1658/QĐ-TTg)**⁴ and its **COP26 commitment** to achieve net-zero emissions by 2050 signal a long-term shift toward low-carbon production and logistics. Although pallets are not explicitly mentioned, these frameworks implicitly favor pallet systems that reduce life-cycle emissions, including reusable and low-carbon alternatives. As Vietnam advances carbon accounting and disclosure mechanisms, pallet choices will increasingly affect corporate Scope 3 emissions and export competitiveness.

4.2. National Action Plan on Circular Economy (Decisions 687/QĐ-TTg and 222/QĐ-TTg)

The National Action Plan on Circular Economy (Decisions 687/QĐ-TTg and 222/QĐ-TTg) promotes waste reduction, recycling, and valorization of agricultural residues and industrial by-products. This policy direction aligns strongly with agriwaste-based pallets as a form of material substitution and industrial symbiosis. However, while the framework supports the concept of converting waste into industrial

⁴ <https://thuvienphapluat.vn/van-ban/EN/Tai-nguyen-Moi-truong/Decision-1658-QD-TTg-2021-National-green-growth-strategy-for-2021-2030-period/504659/tieng-anh.aspx>

inputs, it lacks specific technical standards, product classifications, or procurement guidance for agriwaste-based pallets, limiting practical adoption.

4.3. Extended Producer Responsibility (EPR)

Vietnam's **Extended Producer Responsibility (EPR)** framework is established under the **Law on Environmental Protection 2020**, and operationalized through **Decree No. 08/2022/NĐ-CP** and **Decree No. 05/2025/NĐ-CP** (amending Decree 08), with detailed guidance provided by **Circular No. 02/2022/TT-BTNMT**⁵. Together, these instruments define producer obligations, recycling targets, financial contributions to the Vietnam Environmental Protection Fund, and implementation timelines for packaging EPR.

Recent Government guidance stresses that EPR implementation must be flexible and adapted to Vietnam's technical and market conditions, prioritizing reuse and take-back solutions over rigid recycling mandates. While this approach structurally favors reusable pallet systems, the current EPR framework does not differentiate pallet materials nor recognize waste valorization, bio-based inputs, or deforestation avoidance as compliance-relevant benefits. As a result, agriwaste-based pallets remain governed by generic packaging rules, limiting their ability to fully benefit from the policy flexibility explicitly endorsed by the Government.

5. POLICY GAPS AND REGULATORY MISALIGNMENT

Despite Vietnam's strong strategic commitments to green growth, circular economy development, and net-zero emissions, the current regulatory framework governing pallets exhibits several structural gaps and misalignments.

First, pallets remain an “implicit” regulatory object. Existing regulations governing packaging, waste, timber legality, and phytosanitary control were designed around wooden and plastic pallets, with **no formal recognition of agriwaste-based pallets as a distinct material category**. As a result, innovative pallets made from agricultural residues **are regulated by default under rules intended for solid wood pallets**, even where those rules are technically inapplicable or unnecessary (e.g. fumigation).

Second, circular economy policies lack operational instruments. While Vietnam's circular economy action plans explicitly promote waste valorization and the use of agricultural residues as secondary raw materials, these policies stop at the strategic level. There are **no technical standards, conformity assessment procedures, or public procurement criteria** that would enable agriwaste-based pallets to be recognized, certified, and adopted at scale within logistics and export supply chains.

Third, EPR incentives remain largely material-neutral. Vietnam's EPR framework prioritizes reuse and take-back outcomes, rather than the environmental characteristics of specific materials. While this approach structurally favors reusable pallet systems, it does not explicitly recognize or differentiate environmental benefits such as deforestation avoidance, bio-based material substitution, or avoided agricultural residue burning. As a result, agriwaste-based pallets—despite aligning strongly with EPR objectives—are not distinctly incentivized relative to conventional wood or plastic pallets.

Finally, export compliance burdens are asymmetrically applied. Wooden pallets face growing compliance pressure from ISPM-15 requirements and deforestation-related regulations in export markets,

⁵ <https://baohinhphu.vn/thuc-thi-epr-can-phu-hop-voi-cac-dieu-kien-cua-viet-nam-102250325213917227.htm>

while agriwaste-based pallets are inherently ISPM-15 exempt and deforestation-free. However, the absence of explicit regulatory clarification means that customs authorities in Vietnam and some importing markets continue to require fumigation by default. This ambiguity leads to unnecessary treatment, added costs, and shipment delays, creating uncertainty for exporters and logistics providers and weakening the practical advantages of agriwaste-based pallets.

Together, these gaps result in a regulatory environment that is **directionally supportive but operationally incomplete**, slowing the adoption of agriwaste-based pallets despite their alignment with international and Vietnam's stated policy objectives.

6. POLICY RECOMMENDATIONS

6.1. Policy Recommendations

To address the identified regulatory gaps and enable the mainstream adoption of agriwaste-based pallets, the following targeted policy actions are recommended:

a. Establish formal regulatory recognition of agriwaste-based pallets

Competent authorities should introduce a clear legal classification for pallets manufactured from processed agricultural residues within packaging and logistics regulations. This would prevent the automatic application of solid-wood-specific requirements and provide regulatory certainty for manufacturers, exporters, and customs authorities.

b. Develop technical standards and conformity frameworks for agriwaste-based pallets

Relevant ministries should promulgate national technical standards (TCVN) and conformity assessment procedures covering performance, safety, durability, and hygiene requirements for agriwaste-based pallets. These standards should be integrated into public procurement and logistics practices to facilitate market acceptance and scale-up.

c. Incorporate material differentiation within EPR implementation

The EPR framework should be implemented with material-sensitive mechanisms, allowing differentiation based on environmental attributes such as reuse potential, bio-based content, and waste valorization. This may include eco-modulated fees or compliance credits to reflect the environmental performance of agriwaste-based pallets.

d. Issue explicit guidance on phytosanitary treatment exemptions

Regulatory authorities should issue binding guidance clarifying ISPM-15 exemption for pallets made from processed agricultural residues. Such clarification would eliminate unnecessary fumigation, reduce compliance costs, and improve export efficiency, while maintaining biosecurity objectives.

6.2. Implementation actors in Vietnam

Implementation of the above policy recommendations would require coordination among several key actors within Vietnam's regulatory and industrial ecosystem.

At the regulatory level, the Ministry of Industry and Trade (MOIT) plays a central role in shaping industrial standards, logistics practices, and export-related regulations. The Ministry of Natural Resources and Environment (MONRE) is responsible for circular economy policies, waste management, and EPR implementation. Meanwhile, the Ministry of Agriculture and Rural Development (MARD) oversees agricultural residue management and biomass valorization, which are directly linked to feedstock supply for agriwaste-based materials.

In parallel, industry organizations such as the Vietnam Logistics Business Association (VLA) and sectoral export associations (e.g., coffee, agriculture, and seafood associations) can facilitate the adoption of sustainable pallet solutions across supply chains. Major exporters, logistics providers, and multinational companies operating in Vietnam also play a critical role in accelerating market uptake by integrating sustainable pallet systems into their procurement and logistics standards.

6.3. Industry engagement and NetZero Pallet's contribution

Beyond policy discussions, industry actors have already begun demonstrating the feasibility of circular pallet systems in Vietnam. NetZero Pallet, a Vietnamese climate-tech company, has pioneered the development and commercialization of pallets manufactured from agricultural residues such as coconut husks, coffee husks, and sugarcane bagasse.

Through commercial deployment with more than 100 companies, including multinational supply chains, NetZero Pallet has demonstrated that agriwaste-based pallets can meet industrial logistics requirements while reducing costs and environmental impact. The company has also worked with farmer cooperatives in the Mekong Delta and Central Highland to source agricultural residues, creating additional income streams for rural communities while diverting biomass from open burning.

In addition to market deployment, NetZero Pallet has actively participated in national policy dialogues and international innovation platforms related to circular economy and climate solutions, including engagements with international development partners and public-private platforms aimed at advancing sustainable materials in logistics systems. These efforts contribute to raising awareness among policymakers and industry stakeholders about the potential of agricultural-waste-based pallets as a viable circular logistics solution.

7. CONCLUSION

Agriwaste-based pallets are technically viable, environmentally aligned, and consistent emerging global sustainability frameworks, including Vietnam's green growth, circular economy, and net-zero commitments. However, without **targeted regulatory recognition, standards, and implementation guidance**, their adoption will remain constrained by frameworks designed for wood and plastic pallets.

Timely regulatory clarification and targeted policy adjustments can unlock agriwaste-based pallets as a scalable, low-carbon logistics solution and **position Vietnam as a regional leader in circular supply chains**.