

宜蘭縣政府 × 生森木 × 循環經濟：7噸海廢變再生資源，智慧轉型打造2座淨零公廁

引言：海廢的轉生之旅 by SSBTi.org March 2025 <https://www.1.5c.ssbti.org/netzero-restrooms-area>

在宜蘭縣大溪漁港的海風中，每年都有數以噸計的海洋廢棄物被海浪沖上岸邊。這些廢棄物，包括寶特瓶（PP）、瓶蓋（PE）和保麗龍（PS），若不加以處理，將成為海洋生態的隱形殺手。然而，這些看似無用的廢棄物，卻在生森木團隊的巧手下，迎來了全新的生命。透過循環再生技術，這些海廢被轉化為防水、防潮、防腐蝕的高性能環保建材，成為宜蘭縣政府推動永續發展的重要助力。

1. 大溪漁港的海廢現況

大溪漁港的環保艦隊每年回收7噸海洋廢棄物，其中包括：

- **171公斤** 可回收垃圾（寶特瓶、瓶蓋、保麗龍）
- **1315公斤** 廢棄漁網

這些海廢主要來自漁民使用的飲料瓶、塑膠漁具，以及沙灘垃圾和農業廢棄物。未經妥善處理的海廢不僅污染海洋，還對海洋生物構成威脅，影響漁業資源的永續發展。

2. 每年7噸海廢，成就2座淨零公廁

每年回收的7噸海廢，經過生森木的循環再生技術處理，可以轉化為足夠建造2座淨零公廁的建材。這不僅解決了海廢處理的難題，更為宜蘭縣的公共設施注入了永續的生命力。每一座公廁都是海廢轉生的見證，讓遊客在使用時親身體驗「海廢變黃金」的循環經濟模式。

3. 政策背景與機會

宜蘭縣政府致力於推動永續發展與碳中和目標，本案與以下政策高度契合：

- **2050淨零碳排政策**
- **環保署公廁改善計畫**
- **綠色建築推動計畫**

透過本案，宜蘭有機會成為全台首創「海廢再生公廁示範縣市」，展現資源循環利用與淨零環保價值，並吸引更多環保相關企業與觀光投資。

4. 生森木技術：將海廢轉化為耐候建材

生森木技術將海廢塑料升級再造，轉化為適合高濕度環境的耐用建材，提升公廁的耐久性，減少維護成本。

- **PP（寶特瓶）** → 防潮板材
- **PE（瓶蓋）** → 防水地板
- **PS（保麗龍）** → 高強度複合板

生森木材料的優勢：

- **防水、防潮、防腐蝕**，適合濕氣重的漁港環境
- **高耐用度**，減少公廁長期維護成本
- **環保低碳**，減少新塑料製造，降低碳排放
- **美學與環保兼具**，打造具有教育意義的示範公廁

5. 結合智慧永續技術，打造2座淨零公廁

此次公廁設計將搭配智慧永續技術，進一步落實低碳排放與循環資源利用。

- **太陽能發電系統**，減少電力依賴
- **自然光導**，減少照明需求，降低能耗
- **再生水系統**，回收雨水降低水資源浪費
- **微型儲能系統**，提升能源使用效率
- **智慧節能玻璃**，提升公廁內部舒適度

6. ESG三大價值

- **環境 (E - Environment)**
 - 海廢回收減塑，降低海洋污染
 - 透過太陽能、微電網技術，降低公廁碳排
 - 建材至少50%以上回收塑料，落實循環經濟
- **社會 (S - Social)**
 - 提升公廁衛生與耐用性，打造乾淨舒適的公共場所
 - 環境教育示範，透過設計讓旅客直觀感受「海廢變黃金」的理念
 - 創造在地就業機會，支持宜蘭當地綠色產業發展
- **公司治理 (G - Governance)**
 - 與政府合作，共同推動永續建設，強化政策落地
 - 提升企業ESG表現，促進民間參與環保公建
 - 量化影響力，透過碳足跡計算與建材回收數據，提供透明報告

7. 深耕宜蘭，扶助當地創生

生森木不僅致力於環保建材的研發，更積極投入宜蘭當地的永續創生。透過與總設計師Jacky高的合作，結合SSBTi（供應鏈科學減碳目標倡議聯盟）的永續技術資源，生森木將在宜蘭開展永續設計師培訓計畫。這項計畫旨在培養當地永續設計人才，讓宜蘭的青年學子有機會參與到循環經濟的實踐中，成為未來永續發展的中堅力量。

8. 觀光經濟 × 環境教育：讓公廁成為綠色地標

宜蘭每年吸引大量觀光客，而公廁是最直接的公共基礎設施。透過本案，公廁將不再只是必需品，而是：

- **環境教育場域**：設置「海廢變黃金」互動展示，讓旅客了解海廢回收的過程與影響
- **綠色觀光亮點**：成為宜蘭循環經濟示範景點，吸引對ESG與環保議題有興趣的遊客

9. 預期影響與未來發展

本提案將帶來以下具體效益：

- 回收7噸海廢，減少海洋汙染
- 全台首創海廢再生淨零公廁
- 提升公廁耐用性，降低長期維護成本
- 落實ESG，帶動觀光與地方經濟
- 建構循環經濟示範，助宜蘭成為「永續縣市」標竿

結語：開啟海廢變資源的新未來

這2座示範公廁不僅是一項環保建設，更是一場城市轉型的革新。透過這項計畫，我們希望開啟海廢變資源、廢塑變景觀的新未來，讓資源循環成為宜蘭的一張永續名片。每一塊由海廢轉化而成的建材，都在訴說著一個關於再生與希望的故事，讓宜蘭的每一寸土地都充滿永續的氣息。結合生森木的永續設計師培訓計畫，我們期待宜蘭的青年學子能夠成為未來永

續發展的領航者，共同為這片土地注入更多的綠色能量。

Yilan County Government × GreenWood × Circular Economy: Transforming 7 Tons of Marine Waste into Recycled Resources, Smart Transformation to Build 2 Net-Zero Public Restrooms

By SSBTi.org March 2025

Introduction: The Rebirth of Marine Waste

Along the shores of Daxi Fishing Port in Yilan County, tons of marine waste wash ashore each year. These wastes, including PET bottles (PP), bottle caps (PE), and polystyrene foam (PS), if left untreated, become invisible killers of marine ecosystems. However, through the ingenuity of the GreenWood team, these seemingly useless wastes are given a new lease on life. Using circular regeneration technology, marine waste is transformed into high-performance, eco-friendly building materials that are waterproof, moisture-resistant, and corrosion-resistant, becoming a vital force in Yilan County's push for sustainable development.

1. Current Status of Marine Waste at Daxi Fishing Port

The environmental fleet at Daxi Fishing Port collects 7 tons of marine waste annually, including:

- **171 kg** of recyclable waste (PET bottles, bottle caps, polystyrene foam)
- **1,315 kg** of discarded fishing nets

These wastes primarily come from fishermen's beverage bottles, plastic fishing gear, beach litter, and agricultural waste. Improperly handled marine waste not only pollutes the ocean but also poses a threat to marine life, impacting the sustainability of fishery resources.

2. 7 Tons of Marine Waste Annually, Building 2 Net-Zero Public Restrooms

Each year, the 7 tons of collected marine waste are processed through GreenWood's circular regeneration technology, transforming them into enough building materials to construct 2 net-zero public restrooms. This not only addresses the challenge of marine waste disposal but also injects sustainable life into Yilan County's public infrastructure. Each restroom stands as a testament to the rebirth of marine waste, allowing visitors to experience the "Marine Waste to Gold" circular economy model firsthand.

3. Policy Background and Opportunities

Yilan County Government is committed to promoting sustainable development and carbon neutrality goals. This project aligns closely with the following policies:

- **2050 Net-Zero Carbon Emissions Policy**
- **Environmental Protection Agency Public Restroom Improvement Plan**
- **Green Building Promotion Plan**

Through this project, Yilan has the opportunity to become Taiwan's first "Marine Waste Recycled Public Restroom Demonstration County," showcasing resource recycling and net-zero environmental values, while attracting more eco-friendly businesses and tourism investments.

4. GreenWood Technology: Transforming Marine Waste into Weather-Resistant Building Materials

GreenWood technology upgrades and recycles marine waste plastics into durable building materials suitable for high-humidity environments, enhancing the longevity of public restrooms and reducing maintenance costs.

- **PP (PET bottles) → Moisture-resistant panels**
- **PE (Bottle caps) → Waterproof flooring**
- **PS (Polystyrene foam) → High-strength composite boards**

Advantages of GreenWood materials:

- **Waterproof, moisture-resistant, and corrosion-resistant**, ideal for the humid environment of fishing ports
- **High durability**, reducing long-term maintenance costs for public restrooms
- **Eco-friendly and low-carbon**, reducing the need for new plastic production and lowering carbon emissions
- **Aesthetic and eco-friendly**, creating demonstration restrooms with educational value

5. Integrating Smart Sustainable Technology to Build 2 Net-Zero Public Restrooms

The design of these restrooms incorporates smart sustainable technologies to further achieve low-carbon emissions and circular resource utilization.

- **Solar power systems**, reducing reliance on electricity
- **Natural light guidance**, reducing lighting needs and energy consumption
- **Recycled water systems**, collecting rainwater to minimize water waste
- **Micro energy storage systems**, improving energy efficiency
- **Smart energy-saving glass**, enhancing indoor comfort

6. ESG Triple Value

- **Environment (E - Environment)**
 - Marine waste recycling reduces plastic pollution
 - Solar and microgrid technologies lower carbon emissions from public restrooms

- Building materials contain at least 50% recycled plastics, realizing circular economy principles
- **Social (S - Social)**
 - Improves restroom hygiene and durability, creating clean and comfortable public spaces
 - Environmental education through design, allowing visitors to experience the "Marine Waste to Gold" concept
 - Creates local job opportunities, supporting Yilan's green industry development
- **Governance (G - Governance)**
 - Collaborates with the government to promote sustainable construction and strengthen policy implementation
 - Enhances corporate ESG performance, encouraging private sector participation in eco-friendly public infrastructure
 - Quantifies impact through carbon footprint calculations and recycled material data, providing transparent reporting

7. Deepening Roots in Yilan, Supporting Local Revitalization

GreenWood is not only dedicated to the development of eco-friendly building materials but also actively invests in Yilan's local sustainable revitalization. Through collaboration with Chief Designer Jacky Gao and leveraging SSBTi (Science-Based Targets initiative) sustainable technology resources, GreenWood will launch a sustainable designer training program in Yilan. This program aims to cultivate local sustainable design talent, giving Yilan's youth the opportunity to participate in the practice of the circular economy and become future leaders in sustainable development.

8. Tourism Economy × Environmental Education: Turning Restrooms into Green Landmarks

Yilan attracts a large number of tourists each year, and public restrooms are essential infrastructure. Through this project, restrooms will no longer be just a necessity but also:

- **Environmental education hubs:** Featuring interactive "Marine Waste to Gold" displays, allowing visitors to learn about the marine waste recycling process and its impact
- **Green tourism highlights:** Becoming demonstration sites for Yilan's circular economy, attracting tourists interested in ESG and environmental issues

9. Expected Impact and Future Development

This proposal will bring the following concrete benefits:

- Recycling 7 tons of marine waste, reducing ocean pollution
- Taiwan's first marine waste recycled net-zero public restrooms
- Enhancing restroom durability, lowering long-term maintenance costs
- Implementing ESG principles, boosting tourism and local economy
- Establishing a circular economy demonstration, helping Yilan become a benchmark "Sustainable County"

Conclusion: Opening a New Future for Marine Waste as Resources

These 2 demonstration restrooms are not just an eco-friendly construction project but a transformative initiative for the city. Through this project, we hope to open a new future where marine waste becomes resources and discarded plastics turn into landscapes, making resource recycling a sustainable hallmark of Yilan. Every piece of building material transformed from marine waste tells a story of regeneration and hope, filling every inch of Yilan's land with a sustainable spirit. Combined with GreenWood's sustainable designer training program, we look forward to Yilan's youth becoming future leaders in sustainable development, collectively infusing this land with more green energy.