Policy Recommendation Proposal: "JW Eco-Technology as Climate Adaptation and Drivers for Ecological Entrepreneurship & Green Economy"

Author: Mr. Jui-Wen Chen

Submitted by: Ding Tai Co., Ltd.

Submitted to: Belém Mission to 1.5

Contact: Chairman Jui-Wen Chen | jw@jwprocess.com.tw

Foreword

Global warming has already surpassed 1.5°C. Crises such as extreme rainfall, urban heat island effects, droughts, and floods are frequently occurring worldwide. Countries urgently need substantive, direct "adaptation" physical solutions that can simultaneously create local green economies while resolving droughts, floods, environmental pollution, and urban heat island effects.

In the face of this test of the century, I, Jui-Wen Chen, as the inventor of JW Eco-Technology and Chairman of Ding Tai Co., Ltd., have a duty to participate in the policy recommendation proposal for the Belém Mission to 1.5, providing the comprehensive framework of the "JW Eco Smart Sponge City" as a model. Infrastructure is the locomotive driving global economic growth. This framework is not merely a disaster prevention solution; it offers a highly forward-looking blueprint for global low-carbon transition and green economic development.

"JW Eco-Technology" can directly align with 15 out of the 17 United Nations Sustainable Development Goals (SDGs) and support the remaining 2. It has accumulated solid scientific validation and global awards internationally:

- 2015 (COP21): Showcased at the Paris conference and hailed as a key technology for improving global warming.
- 2022: Officially announced by the UNFCCC Global Stocktake poster session as a "comprehensive solution for climate change adaptation and mitigation," and presented to the United Nations during COP27.
- 2023: Awarded the exclusive global 1st prize for "Climate Change

Technology and Solutions" at the UN LivCom Awards for SDGs.

- Global Practices: To date, over 1,000 physical projects have been implemented worldwide, with cooperation agreements signed with over 60 countries. Furthermore, I have been invited by Mr. Jonas Svensson, then Head of Innovation and Technology for Sustainable Infrastructure at the United Nations Office for Project Services (UNOPS), to participate in UNOPS global infrastructure technical cooperation, with the hope of assisting countries worldwide.

Based on these substantial empirical results, I hereby submit this proposal to the "Belém Mission to 1.5," titled: "JW Eco-Technology as Climate Adaptation and Drivers for Ecological Entrepreneurship & Green Economy."

This proposal fully aligns with the core scope of this call, aiming to comprehensively support all Parties in their strategic submission, ambition enhancement, and concrete fulfillment of Nationally Determined Contributions (NDCs) and National Adaptation Plans (NAPs). This project will systematically consider innovative solutions across key dimensions such as innovative technology, local practice, capital investment, and policy frameworks, thereby deepening international technical cooperation and injecting critical momentum into the efficient execution of NDCs and NAPs.

We earnestly call upon the international community to include JW Eco-Technology in the policy toolbox to jointly drive green economic innovation and on-site practice. Under the new climate normal of 1.5°C, let us join hands to build a more resilient, low-carbon, and sustainable future urban ecosystem.

I. Proposal Background

Global climate change is driving an increase in extreme weather events. In particular, intense rainfall, urban flooding, the urban heat island (UHI) effect, ecological imbalances, and public health risks resulting from traditional infrastructure are becoming increasingly severe. In highly urbanized areas, conventional concrete drainage facilities, extensive impermeable pavements, and the destruction of natural habitats have led to insufficient urban resilience.

This further exacerbates problems such as waterlogging, vector-borne breeding, heavy drainage loads, environmental pollution, high maintenance costs, and general unsustainability.

Currently, the infrastructure in most cities still relies heavily on energy-intensive, high-carbon "gray infrastructure," lacking integrated Nature-based Solutions (NbS) that simultaneously balance ecological restoration, climate adaptation, and socio-economic development.

Therefore, this proposal introduces **"JW Eco-Technology"**—a comprehensive solution for climate change—as a core climate adaptation strategy for ecological restoration, sustainable water circulation, urban resilience, and green economic development. This initiative aims to assist cities in establishing a future-proof, safely developing, and sustainable economic growth model characterized by low carbon emissions, resilience, ecological symbiosis, energy autonomy, and carbon sink economic returns.

II. Problem Description

(1) Climate Change Exacerbates Urban Disaster Risks

As global climate change intensifies, extreme weather events are no longer occasional "once-in-a-century" anomalies; they have become daily risks that threaten the survival of modern cities. When traditional engineering mentalities clash with the unpredictable forces of nature, existing urban infrastructure is pushed to the brink of collapse.

The impacts of climate change on cities are comprehensive and interconnected, manifesting in the following key areas:

1. Rapid Escalation of Flood Risks

- **Increased Frequency of Heavy Rainfall:** Global warming increases atmospheric moisture capacity, leading to more frequent "disaster-inducing rainfall" over short durations, which severely challenges urban flood control thresholds.
- **Overloaded Urban Drainage Systems:** Drainage networks designed

based on historical data are falling short when facing ultra-intense downpours, making it difficult to clear sudden, massive volumes of stormwater in real time.

- **Elevated Surface Runoff:** High levels of urban concretization (impermeable pavement) prevent rainwater from infiltrating the ground, converting it into massive surface runoff that rapidly floods low-lying areas and underground spaces.

2. Structural Degradation of the Urban Environment

- **Aggravated Urban Heat Island (UHI) Effects:** High temperatures and heatwaves continually accumulate in concrete jungles that lack green spaces. This causes temperatures in urban centers to be significantly higher than in suburban areas, severely impacting living quality and increasing energy consumption.
- **Insufficient Groundwater Recharge:** Most rainfall is lost through flash floods. Furthermore, artificial structures act as impermeable barriers, preventing precious groundwater resources from being effectively replenished. Over the long term, this triggers land subsidence and water shortage crises.
- **Intensified Water Pollution:** Rainstorms wash debris and chemical pollutants from city streets into water bodies. Combined with drainage system overflows, this leads to a sharp decline in water source quality.

3. Threat to Survival Resources and Public Health

- **Food Reduction and Unequal Distribution:** Climate fluctuations disrupt agricultural production around urban peripheries, making food supply chains fragile and exacerbating price volatility.
- **Environmental Degradation and Infectious Diseases:** Post-flood stagnant water coupled with high-temperature environments creates ideal breeding grounds for disease vectors and pathogens, significantly increasing the risk of outbreaks of infectious diseases such as dengue fever and intestinal tract illnesses.

The Limits and Transformation of Traditional Drainage Systems

For a long time, we have relied on traditional gray infrastructure (such as drainage ditches, pumping stations, and dikes) focused on "rapid discharge" to protect cities. However, in the face of modern climate risks, simply widening pipe diameters or raising dikes is no longer enough to counter the threat.

When rainfall far exceeds design benchmarks, the failure of a single system often leads to a systemic collapse. This serves as a stark reminder that modern cities urgently need to shift from simple "containment and blocking" to **"adaptation."** By introducing the concept of the **"JW Eco-Smart Sponge City"**—which integrates green spaces, permeable pavements, and multifunctional retention spaces—we can pave a path toward sustainable survival for cities amidst the waves of extreme climate change.

(2) Urban Ecological Imbalance and Public Health Crises

Public Health and Environmental Crises Driven by Urban Ecological Imbalances

In the trajectory of contemporary urbanization, excessive anthropogenic development frequently neglects the self-repairing capacity of natural ecosystems. When a city lacks comprehensive water adaptation mechanisms and integrated natural habitat systems, it loses the structural resilience required to buffer climate shocks. This deficiency triggers a cascade of ecological imbalances and public health crises.

First, fragmentation of the ecosystem directly impairs biological vector control. In the absence of habitats for natural predators, the ecological food chain fractures, causing vector insects, mosquitoes, and rodents to proliferate without natural checks, thereby escalating the risk of infectious disease outbreaks. Concurrently, built environments that lack adequate vegetation and natural metabolic cycles fail to filter particulate matter and process pollutants, which progressively exacerbates air and water pollution.

Second, environmental degradation is acutely reflected in the severe contraction of biodiversity. Within concrete-confined urban spaces, impoverished soils and disrupted hydrological cycles make sustainable plant growth exceptionally

difficult. This not only impairs the city's carbon sequestration capacity but also continually degrades the environmental quality of local communities, rendering residential spaces increasingly arid, overheated, and devoid of ecological vitality. More critically, when cities rely excessively on groundwater extraction while lacking surface infiltration to replenish these aquifers, land subsidence manifests as an irreversible structural threat.

In summary, urban public health and ecological safety are no longer isolated environmental protection issues; they constitute indispensable, core mandates within climate governance. Re-establishing the nexus between urban infrastructure and nature—leveraging JW Eco-Technology and habitat restoration to fortify urban resilience—stands as a critical challenge that modern urban planners must directly confront.

(3) Deficiencies in Green Economy Pathways and Youth Entrepreneurship Opportunities

As nations worldwide aggressively advance climate policies, the green economy is widely recognized as a primary engine for future growth. However, existing transition frameworks still exhibit pronounced gaps. Consequently, the youth generation faces unequal resource distribution and a scarcity of opportunities when attempting to enter green industries. This deficit not only stifles innovation but also weakens the socio-political foundation necessary for effective climate governance.

At present, when climate policies intersect with economic realities, the most immediate obstacle is the acute lack of structural support for eco-entrepreneurship. While many young entrepreneurs possess innovative ideas for environmental remediation, they routinely lack dedicated financing channels, specialized incubators, or technical validation testbeds. This makes it exceedingly difficult to scale up grassroots initiatives that offer genuine ecological benefits. Furthermore, because industrial restructuring often fails to align with localized demands, domestic green employment grows slowly, preventing youth from pursuing sustainable careers in their home communities that balance both idealistic values and financial livelihoods.

Beyond insufficient economic incentives, structural frameworks lack effective participatory mechanisms. Current climate governance decisions are predominantly top-down, lacking robust governance platforms that enable deep institutional engagement by the youth—the very generation most profoundly impacted by long-term climate risks. This dynamic prevents them from translating their innovative capacities and values into policy execution. At the community level, the general absence of mature, sustainable economic models fails to sustain localized micro-entrepreneurship, leaving grassroots societies alienated from the dividends of the green transition.

To break this impasse, the public and private sectors must collaboratively engineer a green transition mechanism that harmonizes environmental conservation with economic profitability. This paradigm shift requires not only a comprehensive entrepreneurial incubation ecosystem but also the strategic repositioning of youth as primary agents of change. Through institutional empowerment and targeted resource injection, the green economy can transition from an abstract policy slogan into a highly actionable arena where the youth generation can simultaneously actualize environmental values and generate economic wealth.

III. Core Philosophy of JW Eco-Technology

(1) JW Eco-Technology as Revolutionary Infrastructure

JW Eco-Technology completely disrupts historical paradigms of global infrastructure design, offering a revolutionary, comprehensive, and highly efficient shortcut for climate change adaptation. In terms of utilizing infrastructure to execute environmental remediation, JW Eco-Technology operates without peer.

In an era of escalating climate risks, traditional gray infrastructure focused on containment and resistance can no longer sustain long-term urban safety. JW Eco-Technology champions a return to Nature-based Solutions (NbS) in engineering design. By replicating the natural water and air cycles of the earth (Appendix, p. 12) and integrating the philosophy of smart sponge cities, it delivers an integrated, sustainable solution for contemporary urban governance.

(2) JW Eco-Technology as Systemic Infrastructure

Traditional stormwater retention or storage facilities are typically designed as isolated, single-point structures, making it difficult for them to form a cohesive water resource network. In contrast, the JW Eco-Technology employs modular underground reservoirs combined with ecological permeable pavements to establish multi-point, interconnected water storage units across the urban landscape. By integrating directly with underground aquifers, these units form a highly synthesized "Urban Underground Reservoir Network." This systemic architecture not only enhances decentralized flood retention capacities but also optimizes water-use efficiency through smart dispatching and resource sharing. This ensures that cities retain superior climate resilience and self-regulating capacities when facing extreme weather anomalies such as prolonged droughts and torrential rainstorms.

(3) Nature-Based Transformation: Integrated Governance of Smart Sponge Cities Powered by JW Eco-Technology

The core of this governance model lies in the simultaneous execution of multi-dimensional adaptation and remediation. In terms of hydrological and climate adaptation, JW Eco-Technology restores the earth's natural capacity to breathe and absorb water, transforming the urban landscape into a massive water-storing sponge. This architecture significantly mitigates surface runoff generated by extreme precipitation and utilizes subterranean space for water regulation, effectively alleviating the urban heat island (UHI) effect. This hydrological cycle not only replenishes groundwater but also implicitly reconstructs fragmented natural habitats, achieving profound ecological restoration and allowing biodiversity to re-emerge within concrete jungles.

Beyond environmental dividends, JW Eco-Technology interfaces directly with public health and community livability. By eliminating surface water accumulation (Appendix, pp. 13–15) and improving soil micro-ecosystems (Appendix, pp. 19-20) (Fan, 2014), the technology suppresses the breeding of disease vectors at the source, thereby safeguarding urban public health. Concurrently, this disaster-resilient infrastructure substantially fortifies community resilience, ensuring that citizens enjoy a stable living environment

when confronted with natural hazards.

In terms of economic and agricultural transformation, this eco-method demonstrates immense latency. By engineering a mechanism that bridges environmental preservation with economic performance, it catalyzes new industrial supply chains and entrepreneurship channels within the green economy. Under extreme environmental conditions, it can even serve as the bedrock for "turning deserts into arable land," transforming barren wastelands into sustainable, secure, and productive terrains.

In conclusion, JW Eco-Technology is far more than a mere paving methodology; it represents a cross-disciplinary, integrated urban governance paradigm. By deeply embedding ecological logic into structural engineering, it safeguards human civilization while restoring a self-circulating, resilient, and sustainable future to Planet Earth.

(4)Proven Track Record of JW Eco-Technology

JW Eco-Technology has successfully deployed over 1,000 reference projects globally, demonstrating a proven capacity to resolve critical environmental issues through infrastructure development (Appendix, p. 23). Key representative milestones are outlined below:

1. Advancing "Sponge City" Infrastructure in Zhangjiakou City (Appendix, p. 18)

Located in a semi-arid region, Zhangjiakou City suffers from acute water scarcity, with an average annual rainfall of only 385 mm against an evaporation rate of 1,712 mm; its per capita water resources stand at less than one-fifth of the national average. Seizing the development momentum of the 2022 Winter Olympics, Zhangjiakou aggressively advanced its "Sponge City" initiatives by widely implementing JW Eco-Technology and permeable pavements to retrofit major arteries, secondary roads, sidewalks, and parking lots. Spanning a total surface area of 32,728 square meters, the project effectively regulates stormwater runoff across an expanded catchment footprint of nearly 2 million square meters. Adaptable to all classes of roadways, JW Eco-Technology has optimized local water resource management and ecological restoration,

securing stable water supplies for residents and agriculture while significantly bolstering drought mitigation and vegetation growth.

2. Liming High School: Overcoming Flood and Drought Disasters (Appendix, pp. 14-16)

Liming High School long suffered from chronic flooding during heavy rainstorms due to its campus terrain sitting lower than the adjacent municipal roadways. To resolve this structural vulnerability permanently, the institution became the world's first campus to fully adopt JW Eco-Technology paving. Across its 38,000-square-meter campus, 8,000 square meters were retrofitted with JW ecological pavement, allowing the school to completely seal its legacy open drainage ditches. This successfully birthed the "LM & JW Eco-Green School"—a campus completely devoid of traditional drainage ditches.

The subgrade beneath the campus roadways and plazas was converted into a massive underground reservoir network, leaving all surface facilities fully functional. During the 100-year flood event in Southern Taiwan in 2018, which brought 600 mm of torrential rain within 24 hours, Liming High School not only remained completely flood-free but successfully retained and stored over 20,000 tons of stormwater for on-site water recycling, vividly proving the technological superiority of JW Eco-Technology (Chen et al., 2019).

Furthermore, during winters when the region suffers from prolonged droughts, the integrated wetland-reservoir system beneath the pavement facilitates on-site collection, purification, and cyclical re-use of both rainwater and graywater. This framework saves the school over NT$10 million annually in combined water and electricity utilities, vastly outpacing the initial capital expenditure. Even during Taiwan's severe historic drought of 2021, the campus maintained an uninterrupted water supply. Through the deployment of JW Eco-Technology, Liming High School has thoroughly solved its dual crises of flooding and water scarcity, establishing itself as a premier global benchmark for environmental sustainability and offering invaluable pedagogical capital for environmental education worldwide.

(5)Global Recognition of JW Eco-Technology

1. International Cooperation

The global deployment footprint of JW Eco-Technology has exceeded 1,000 cases, with contractual agreements spanning over 60 countries worldwide (Appendix, p. 38). In 2020, the inventor of JW Eco-Technology was officially invited by the United Nations Office for Project Services (UNOPS) to apply for UN Global Membership to jointly combat climate change.

2. Climate Adaptation Frameworks

JW Eco-Technology has been systematically incorporated into the formal policies, strategic frameworks, and master plans of numerous countries and regions:

- **Ministry of Housing and Urban-Rural Development, China:** Formally included JW Eco-Technology into the *Practical Technical Handbook for Sponge City Construction*, establishing it as a key technical indicator for sponge city construction. Consequently, reference projects have become exemplary highlights within China's national sponge city planning (Appendix, p. 32).
- **Fujian Province, China:** Formally integrated into the *Cross-Strait Technical Standard for Permeable Pavement Engineering in Sponge Cities*, serving as an authoritative design metric (Appendix, p. 32).
- **Climate Change Adaptation Manuals:** Designated as an essential global reference for climate change adaptation interventions and engineering measures (Appendix, p. 33).

Notably, in 2022, JW Eco-Technology was selected for the **UNFCCC Global Stocktake (GST)** solutions portal (Appendix, p. 37) and was featured prominently at the **COP27 Climate Change Conference**. The objective of this inclusion was to assess the collective global progress on climate adaptation and mitigation actions, thereby advising the United Nations on leveraging JW Eco-Technology as an all-encompassing Nature-based Solution (NbS) to execute concrete, highly effective climate action strategies and technologies.

The aforementioned milestones conclusively validate the immense value and efficacy of the JW Eco-Technology in addressing the dual challenges of global climate change and rapid urbanization.

3. Prestigious Awards and Accolades

- **Global Infrastructure and Environmental Honors:** JW Eco-Technology has secured numerous international awards recognizing its innovation and sustainability profile. Most notably, it was awarded the sole **First Prize at the Global Road Achievement Awards (GRAA) in 2017**, consecutively won the **Energy Globe Award in 2018 and 2019**. It has also garnered multiple invention gold medals and grand prizes, signaling deep institutional endorsement across the environmental protection, civil engineering, transport infrastructure, hydrology, and technological innovation sectors (Appendix, p. 34).
- **UN LivCom Awards for SDGs:** In 2023, JW Eco-Technology was honored as the **sole global first-place winner** in the *Technology and Solutions for Overcoming Climate Change* category (Appendix, p. 35). It has also recently been recognized by the prestigious **International Green Apple Environment Awards** in the UK.
- **Asian Development Bank (ADB) Platforms:** Special Invitee to the Asian Development Bank's **AWUF 2025** Innovation Solutions Platform and Technology Presentation, where it was honored by the ADB with the **"Best Innovation Award"** (Appendix, p. 39).

IV. Policy Objectives

(1) Enhance Urban Climate Resilience

The world has entered a climate emergency era where climate change is aggressively destabilizing water security. Globally, while annual precipitation trends are on the rise, rainfall distribution has become severely polarized. The increased frequency of torrential downpours is accompanied by prolonged periods of drought, creating a paradoxical crisis where cities simultaneously face the challenges of having "too much water," "too little water," and "too dirty water."

Against this backdrop, JW Eco-Technology introduces an innovative analogy: if water is viewed as financial capital, the JW water system acts as a specialized **"Water Bank System."** It captures torrential rainfall (analogous to a massive influx of cash) and stores it on-site (similar to a demand deposit account), before systematically recharging it into the ground as groundwater (resembling a fixed-term deposit).

The JW water bank system enables water to be purified on-site, stored locally, and dispatched on demand. When water is abundant, it is banked for future use and can be immediately drawn upon during droughts or emergencies. Because the water is utilized on-site, it significantly reduces the overall water footprint and achieves highly flexible management and sustainable utilization of water resources—serving as a smart, dual-action solution that bridges climate adaptation with resilient infrastructure.

In addressing the challenges of urban expansion and the expanding global "water storage gap," the JW Water Bank system goes beyond simple on-site retention to pioneer an entirely new paradigm: the **"On-site Water Circulation"** (Appendix, p. 12). This concept completely revolutionizes conventional water management models by achieving permeability, storage, and purification simultaneously, thereby enabling immediate, localized flood mitigation and a closed-loop water circulation.

(2) Advance Nature-based Solutions (NbS)

Objective: Substitute energy-intensive, high-emission gray infrastructure with JW Eco-Technology to minimize environmental impacts and slash long-term maintenance expenditure.

Synergizing the Advantages of Gray and Green Infrastructure

While gray and green infrastructure have historically been viewed as mutually exclusive paradigms, JW Eco-Technology ingeniously synthesizes the strengths of both. It delivers the high structural strength characteristic of gray engineering while fully achieving the vegetation symbiosis and natural water management systems sought by green infrastructure.

Emulating the mechanics of nature, JW Eco-Technology re-engineered road

design around the principles of natural circulation and co-prosperity with water. It merges transport infrastructure with water infrastructure, transforming the surface into a functional roadway capable of supporting rich vegetation growth to provide food and combat desertification, while utilizing the subsurface to house an interconnected network of reservoirs and wetland systems.

This structural design ensures that infrastructure development satisfies both human and environmental demands. Rather than causing ecological degradation, it actively drives environmental remediation. Notably, the concrete surface layer provides robust structural protection (Appendix, p.24), guaranteeing climate resilience and long-term durability.

The projected operational lifespan of JW Eco-Technology exceeds 30 years. According to Life Cycle Costing (LCC) assessments, the total capital and maintenance costs of JW Eco-Technology amount to a mere 10% to 20% of conventional pavements. This long-term durability is backed by over a decade of successful, real-world deployments (Appendix, pp. 25–26), which have demonstrably increased safety for road users, reduced environmental pollution, and conserved substantial public funds.

(3) Foster Eco-Entrepreneurship and Green Employment

As sustainable development cements itself as the core driver of global industry, JW Eco-Technology—backed by profound commercialization latency and broad applicability—has emerged as a foundational technological driver for the green economic transition. From a practical standpoint, any site requiring urban infrastructure, outdoor civil engineering, or hydraulic construction represents a viable deployment space for JW Eco-Technology. Its structural architecture is highly adaptive, allowing it to seamlessly interface with new construction projects or optimize and retrofit legacy sites to meet diverse development mandates.

To date, JW Eco-Technology has amassed a proven track record of over 1,000 reference projects worldwide (Appendix, p. 23). Its application footprint spans the private sector—including residential communities, industrial plants, landscaped gardens, and agricultural facilities—and extends into public works,

such as campus master plans, public parks, urban roadways, river basin management, hillside soil and water conservation, and building green energy systems. These diverse milestones confirm that the technology is highly replicable and scalable, representing a mature, market-ready solution for urban resilience construction.

In fostering eco-entrepreneurship and employment, JW Eco-Technology serves as the locomotive for the broader eco-industry supply chain. By forging a comprehensive green industry pipeline, the technology incentivizes youth to spearhead ecological engineering technical services and drives material innovation through sustainable applications. Particularly within the realm of waste recycling and circular re-utilization, JW Eco-Technology embeds resource circularity directly into engineering practices, fostering diversified, community-based green economic models that translate environmental action into tangible economic profitability, thereby opening a socially responsible career track for the new generation.

Furthermore, the highly transferable nature of JW Eco-Technology makes a measurable contribution to local economic value capture. The resources required to execute the JW Eco-Technology are readily accessible; for instance, it combines recycled polypropylene (PP) plastics with conventional cement concrete and can directly engage local construction labor forces for execution. This low-barrier, high-efficiency technology adoption model lowers transportation and material overheads while effectively boosting localized employment rates and green GDP, engineering a true win-win scenario for sustainable infrastructure and regional prosperity.

(4) Safeguard Urban Public Health

Objective: Leverage JW Eco-Technology to advance water adaptation cycles and environmental self-repair, thereby suppressing vector-borne breeding vectors and mitigating public health liabilities.

Within the scope of urban public health remediation, JW Eco-Technology serves as a critical transformative agent. Through its unique water adaptation cycles, JW Eco-Technology enables the surrounding environment to initiate self-repair

mechanisms, resolving urban waterlogging and soil degradation at their root causes. This systematically suppresses the breeding grounds of disease vectors and significantly reduces latent public health hazards, securing a healthier, safer habitat for urban residents.

The advent of JW Eco-Technology completely disrupts traditional paradigms throughout the history of human infrastructure design. Far more than a mere engineering technique, it represents a revolutionary, comprehensive pathway toward global climate change adaptation. When measured by the yardstick of environmental remediation capacity embedded within structural infrastructure, JW Eco-Technology operates virtually without peer in the contemporary engineering domain, standing out as the most direct and high-velocity shortcut to counter climate-driven disasters.

The environmental restoration capabilities unlocked by this technology are not only globally leading but currently stand as the world's only solution capable of achieving a sustainable, closed-loop cycle without inducing environmental side effects. Against the backdrop of escalating global environmental degradation, JW Eco-Technology operationalizes the macro-vision of **"a roadway on the surface, a reservoir in the subsurface."** Whether delivering cooling dividends in tropical zones, facilitating snowmelt in sub-zero regions, harvesting precious freshwater for island nations, or generating water to create green oases in arid deserts, JW Eco-Technology demonstrates boundless potential in safeguarding the global environment and solving deep-seated ecological crises.

V. Policy Recommendations

(1) Establish a "Policy for Climate Adaptation and Ecological Infrastructure Powered by JW Eco-Technology"

Confronted with an escalating global climate crisis, governments worldwide urgently require engineering paradigms that are both forward-looking and highly actionable. Accordingly, we formally recommend that governments position the JW Eco-Technology as the foundational cornerstone of national infrastructure frameworks. This can be operationalized through three strategic pathways designed to fortify macro climate resilience:

1. Institutionalize the JW Eco-Technology into National Adaptation Plans (NAPs)

The critical impact of the JW Eco-Technology has been thoroughly demonstrated on the international stage. During the United Nations Climate Change Conference in Bonn, Germany (SB62) in 2025, the JW expert team co-hosted an international high-level panel with UN agencies to anchor the necessity of **"Integrating Water Resources into Nationally Determined Contributions (NDCs) and National Adaptation Plans (NAPs)."**

This milestone proves that JW Eco-Technology serves as an exceptionally potent vehicle for driving environmental mitigation and resilience architectures. National governments should codify this technology into formal statutory frameworks, transforming it into a core instrument for fulfilling international climate pledges and executing localized adaptation mandates.

2. Engineer Nature-Based, Sustainable JW Water Resource Cycling Systems

Traditional civil engineering projects frequently sever the critical ecological nexus between water and the earth. Governments must aggressively pivot toward implementing natural circulation networks engineered via the JW Eco-Technology, which deliver infiltration and subsurface storage capacities that surpass even undeveloped natural terrains.

This network not only buffers the flood shocks of extreme precipitation events but also safeguards stable water supplies during prolonged arid spells—effectively transitioning urban areas from net "water drainers" into active "water retainers" and establishing a closed-loop, sustainable water resource model.

3. Prioritize the Deployment of JW Urban Eco-Mechanisms for Systemic Self-Repair

Modern urban governance must transcend simple hardware-focused civil construction and evolve toward optimizing ecosystem health. Prioritizing the deployment of the JW Eco-Technology injects ecological vitality back into concrete-choked cities.

By leveraging its specialized air-permeable, water-permeable, and moisture-

retaining structural matrix, the technology reconstructs damaged soil micro-ecosystems and subterranean habitats (Appendix, pp. 19–20). By triggering a systemic, urban eco-self-repair mechanism, governments can secure far higher levels of ecological safety and citizen well-being while drastically lowering long-term infrastructure maintenance budgets.

(2) Implement the "Urban Pilot Project for Nature-based Solutions (NbS) in JW Ecological Remediation"

Framework for Collaboration between Local Governments and Communities:

- Establish dedicated pilot zones.
- Pioneer ecologically sustainable water resource cycling systems.
- Construct low-carbon (carbon-sequestering) resilient communities.
- Serve as a global benchmark for international case studies and knowledge exchange.

To operationalize the vision of resilient cities, it is highly recommended that local governments forge deep collaborative partnerships with grassroots communities, positioning JW Eco-Technology as the core engine to drive NbS-oriented pilot projects. Through these physical interventions, abstract climate policies can be translated into tangible ecological dividends for residents, thereby forging a high-impact benchmark case study on the international stage.

1. Establish Dedicated Pilot Zones and Localized Implementations

Select representative urban spaces, community alleyways, or public facilities to serve as dedicated pilot zones. By deploying JW Eco-Technology, closed and impermeable surfaces can be transformed into living, breathing, and functional ecological pavements. These installations will not only serve as hands-on educational demonstration hubs for site visits but will also enable community residents to witness firsthand the concrete dividends of eco-engineering in flood mitigation, temperature reduction, carbon sequestration, and environmental aesthetics—thereby building a solid community consensus around the green transition.

2. Pioneer Ecologically Sustainable Water Resource Cycling Systems

The pilot initiatives should be dedicated to engineering a comprehensive subterranean water adaptation network. Leveraging the high-velocity infiltration and storage matrix unique to the JW Eco-Technology, rainwater can be systematically recharged directly into underground aquifers rather than simply being drained into legacy stormwater gutters. This biomimetic circulation network effectively buffers urban waterlogging, sustains soil moisture levels, and optimizes vegetation growth during dry spells, achieving true closed-loop sustainability in water resource utilization.

3. Construct Low-Carbon (Carbon-Sequestering) Resilient Communities

Reshaping community habitats through an NbS lens effectively dampens the urban heat island (UHI) effect and scales down air-conditioning power consumption, thereby achieving aggressive carbon reduction targets. Simultaneously, by protecting and restoring soil micro-ecosystems, this framework reinforces the land's intrinsic carbon sequestration (carbon banking) capacity. Synchronizing green space design with this eco-method constructs a self-regulating, high-stress-tolerant resilient community that comprehensively upgrades local adaptability against climate shocks.

4. Build a Global Benchmark for International Case Studies and Knowledge Exchange

Systematically document the monitoring data and empirical milestones generated across these pilot zones to build a portfolio of highly referenceable international case studies. These success stories will not only catalyze domestic replication and application across other municipal regions but will also serve as vital currency for diplomatic and technical exchange at high-level international summits, including the United Nations Climate Change Conferences (COP) and the World Urban Forum (WUF)—vividly showcasing to the global community the capacity and contribution of localized innovation in tackling global climate emergencies.

(3) Establish a Green Entrepreneurship Support Framework for JW Eco-Technology

To accelerate the green transition and unlock highly competitive employment pathways for the next generation, establishing a comprehensive entrepreneurial support ecosystem is paramount. Synthesizing the technical capabilities of the JW Eco-Technology with the innovative energy of youth will not only solve localized environmental issues but will also ignite a new wave of the green industrial revolution. Priority should be given to driving the following institutional mechanisms:

1. Optimize the Financing and Resource Integration Architecture

It is recommended that public and private entities collaboratively launch the dedicated **"JW Eco-Technology Venture Capital Fund"** to specifically finance startups leveraging the JW Eco-Technology as their core technical framework. By offering specialized low-interest loans, startup grants, and venture capital matching mechanisms, this fund will assist innovators in overcoming initial financial barriers related to equipment procurement and technical validation, ensuring that grassroots, eco-beneficial business concepts successfully cross the chasm to market deployment.

2. Construct Youth Green Innovation and Incubation Platforms

- **The JW Youth Green Innovation Platform:** Design a digital and physical ecosystem that aggregates technical consulting, experiential knowledge sharing, and business matchmaking. By hosting innovation hackathons and technical workshops, this platform will ignite the imagination of the youth generation regarding ecological infrastructure, aligning their creative outputs directly with real-world market demands.
- **Climate Tech Incubation Centers:** Formulate specialized incubation testbeds that provide professional legal counsel, intellectual property layout planning, and business model acceleration. This framework will empower young innovators to seamlessly translate the core philosophy of JW Eco-Technology into highly profitable Climate Tech products or services.

3. Incentivize Youth Integration into Crucial Strategic Industries

Through targeted policy steering and resource injection, incentivize the youth generation to build careers across four pivotal sectors to complete a robust green industrial ecosystem:

- **Ecological Engineering:** Engaging in frontline design and structural execution, applying the JW Eco-Technology to complex remediation projects across urban, rural, and delicate natural habitats.
- **Environmental Technology:** Deploying artificial intelligence (AI) alongside JW Eco-Technology systems to engineer smart telemetry monitoring networks, automated maintenance systems, or real-time water quality optimization technologies.
- **Sustainable Materials:** Researching and expanding the application of more localized, eco-friendly base materials to upgrade the durability and lower the overall carbon footprint of infrastructure engineering components.
- **Circular Economy:** Pioneering innovative closed-loop models for utilizing local waste streams, thereby strengthening the circular loop from raw material recycling and processing to structural engineering application.

Through this comprehensive support architecture, we can transform JW Eco-Technology into a primary arena for the youth generation to actualize their ideals—ensuring that environmental mandates and economic prosperity advance in lockstep, while injecting sustainable, innovative vitality into the broader green transition.

(4) Advance International Technical Cooperation on JW Eco-Technology

Within the landscape of global climate action, technology sharing and capital injection represent the dual engines for driving large-scale systemic transformation. Deploying the internationalization strategy of the JW Eco-Technology enables us to not only contribute revolutionary ecological wisdom to the global community but also guide international capital into infrastructure

characterized by superior climate resilience, cultivating a global win-win paradigm for both environment and economy.

1. Deepen Technology Transfer and Support for Developing Nations

For developing countries that bear the brunt of climate change vulnerabilities, target-driven technology transfers and international best-practice exchanges should be leveraged to assist them in engineering low-cost, high-resilience JW ecological infrastructure models.

- **Localized Adaptation:** Maximize the utilization of localized recycled materials and regional labor forces. Capitalizing on the straightforward, high-efficiency execution traits of the JW Eco-Technology drastically curates down dependencies on cost-prohibitive imported engineering materials.
- **Resilience Empowerment:** Enhance the capacities of local engineering personnel in practicing Nature-based Solutions (NbS) through systematic training modules and site visitations—fundamentally augmenting their baseline defense infrastructure against the structural shocks of extreme precipitation and severe drought anomalies.

2. Channel International Green Funds and Showcase Empirical Milestones

To amplify global impact and elevate institutional standing, it is critical to proactively showcase the empirical milestones of the JW Eco-Technology to international investors and funding institutions.

- **Escalate Project Attractiveness:** The JW Eco-Technology introduces a revolutionary climate resilience and adaptation solution to civil infrastructure. In an era where international capital intensely scrutinizes Environmental, Social, and Governance (ESG) criteria, projects offering verified sustainability alongside quantifiable ecological dividends emerge as premier investment targets for international green funds and sovereign wealth funds.
- **Consolidate International Standing:** Presenting empirical data and success stories across United Nations side events and international

infrastructure forums proves that the JW Eco-Technology slashes long-term maintenance overheads while systematically expanding facility life expectancies—thereby attracting robust capital endorsements from major multilateral funding agencies.

3. Engineer a Revolutionary Class of Investment Asset

Redefine the baseline definition of civil infrastructure via JW Eco-Technology—transforming roads from mere transport channels into multi-functional, compound facilities that simultaneously execute water harvesting, climate cooling, and ecological remediation. This cross-disciplinary, integrated solution represents a highly competitive, high-social-impact Climate Tech investment vehicle in contemporary capital markets, providing a pragmatic and sustainable economic shortcut to global environmental challenges.

(5) Establish a Global Multi-Stakeholder Governance Platform Administered by the United Nations

Climate change is a cross-border challenge that defies isolated national or sectoral interventions. Accordingly, we formally recommend that the United Nations spearhead an initiative to invite the founder of JW Eco-Technology to join as a UN Global Member to collaboratively establish a **"Global Multi-Stakeholder Governance Platform,"** technically underpinned by the JW Eco-Technology. This framework will leverage deep cross-disciplinary integration to operationalize highly effective climate adaptation initiatives and advance Sustainable Development Goals (SDGs).

1. Deploy Global-Scale Carbon Sink Projects and Drive Economic Transformation

Leverage the platform to consolidate global resources and launch macro-scale ecological restoration initiatives, translating environmental dividends directly into economic growth engines:

- **Construct High-Efficiency Carbon Capture Models:** Utilizing the specialized breathing function unique to the JW Eco-Technology (Appendix, p. 27) alongside urban greening and subsurface water adaptation management allows for the engineering of a **"Sponge City**

Carbon Sink Model" (Appendix, p. 30) (Liu et al., 2012). Beyond transforming the hydrological cycle, this architecture optimizes the soil micro-ecosystem and surrounding vegetation habitat to catalyze a robust, nature-based carbon capture mechanism.

- **Interface with the Global Carbon Market:** The platform will actively assist member projects in securing international carbon sink certifications (such as the *Gold Standard* or *Verra*). This mechanism enables carbon credits generated via the JW Eco-Technology to participate seamlessly in global carbon trading schemes, not only multiplying localized economic yields but securing a self-sustaining, long-term funding stream for ecological infrastructure development.

2. Synchronize and Integrate Global Stakeholders

To ensure that global climate governance remains comprehensively inclusive and equitable, the platform must exercise a robust integrative function to drive unified participation across all social tiers:

- **Policy and Execution Tiers:** Align sovereign nations and public departments to institutionalize JW Eco-Technology into mainstream civil infrastructure building codes and statutory engineering regulations.
- **Knowledge and Technical Support:** Partner with academic institutions to drive continuous empirical data monitoring, while leveraging the grassroots capabilities of NGOs to facilitate localized promotion and structural oversight.
- **Industry and Innovation Engines:** Incentivize the private sector to inject green capital and technical services, while providing dedicated governance platforms for youth organizations to unlock the creative, disruptive energy of the next generation.
- **Grassroots and Localized Implementation:** Empower community residents to participate directly in local planning decisions, ensuring that sustainable governance paradigms are deeply embedded into daily community life.

By establishing this global platform under the stewardship of the United Nations, the JW Eco-Technology can be elevated into a vital nexus that harmonizes global ecology, economy, and social governance—marking a decisive, historic step forward in constructing a resilient planet.

VI. Anticipated Benefits

(1)Environmental Benefits of JW Eco-Technology

- Achieve comprehensive urban hydrological regulation and water adaptation.
- Minimize the occurrence of flood/drought disasters and water pollution.
- Enhance localized biodiversity and habitat restore.
- Alleviate urban air pollution and ambient particulate matter.
- Modulate urban microclimates.
- Alleviate the urban heat island (UHI) effect.

Confronted with extreme weather events driven by climate change, cities urgently require infrastructure frameworks capable of achieving symbiosis with nature. Through its unique structural architecture, the JW Eco-Technology upgrades the ecological resilience of diverse urban environments. It not only neutralizes immediate disaster threats but also injects critical momentum into the self-repair mechanisms of local ecosystems.

1. Multi-Dimensional Optimization of the Environment

The systematic deployment of the JW Eco-Technology optimizes urban livability and ecological safety across multiple vectors:

- **Advanced Hydrological Regulation:** Leveraging an exceptional water infiltration capacity exceeding **12,500 mm per hour** (Appendix, p. 13), the technology significantly curtails the frequency and severity of both floods and droughts (Appendix, pp. 14-15), while naturally filtering surface runoff to mitigate water pollution (Appendix, pp. 16–17).

- **Remediating Ecological and Air Quality:** JW Eco-Technology expands localized biodiversity (Appendix, pp. 19–20), unlocking essential breathing space for fragmented urban habitats, while concurrently accelerating the dry deposition of airborne particulate matter to improve general air quality (Appendix, p. 30).
- **Microclimate Modulation and UHI Alleviation:** Powered by the surface's air-permeability and the subterranean moisture evapotranspiration cycle, the technology regulates urban microclimates, significantly cooling stifling urban heat island anomalies (Appendix, pp. 27–28) (Lee & Cheng, 2004).

2. A Revolutionary Paradigm Shift in Water-Use Efficiency

The foundational technical superiority of the JW Eco-Technology lies in its capacity to maximize land water-use efficiency. It pioneers an **"On-site Water Circulation"** model within the construction matrix (Appendix, p. 12), empowering every square inch of paved ground to actively process and transform water assets:

- **Multi-Source Water Synthesis and Treatment:** The network processes stormwater, domestic graywater, and external water inputs, channeling them through nature-based filtration systems before returning them safely to the subterranean aquifers or retaining them within dedicated subsurface storage layers.
- **Operationalizing "A Roadway on the Surface, a Reservoir in the Subsurface":** Beyond mere stormwater retention, this philosophy systematically recharges deep groundwater tables to guarantee long-term hydrological sustainability. This highly efficient, cyclical re-utilization framework equips modern cities with superior defensive capabilities against prolonged droughts, delivering a smart, highly modernized approach to water resource governance.

Through this technological revolution spanning from the surface to the subsurface, the JW Eco-Technology is guiding global cities toward a cooler, cleaner, and more vibrant sustainable future.

(2)Social Benefits of JW Eco-Technology

- Safeguard and improve urban public health.
- Upgrade the environmental and aesthetic quality of local communities.
- Reinforce the climate resilience of urban citizens.
- Shield public health from environmental liabilities.

The JW Eco-Technology transcends the boundaries of standard environmental technology, yielding deep and lasting positive impacts across the societal matrix. By translating abstract sustainability mandates into highly tangible infrastructure components, JW Eco-Technology establishes an ironclad link between economic efficiency, community liveability, and public safety.

1. Economic and Safety Dividends of Sustainable Infrastructure

JW Eco-Technology completely redefines the longevity and cost-efficiency parameters of public works. Empirical field data coupled with Life Cycle Costing (LCC) assessments reveal unparalleled performance metrics:

- **Substantial Economic Dividends:** Engineered with a projected operational life expectancy exceeding **30 years**, its combined capital expenditure and maintenance overheads amount to only **10% to 20%** of conventional paving methods—conserving immense volumes of public financial resources for governments and communities.
- **Empirically Proven Durability:** Backed by over a decade of successful global implementation case studies (Appendix, pp. 25–26), the technology has demonstrated exceptional structural stability and structural resistance to damage (Appendix, p. 24). This profile not only upgrades transit safety for road users but substantially reduces construction-driven pollution and societal overheads triggered by frequent public works repairs.

2. Safeguarding Public Health and Community Well-Being

Through micro-environmental remediation, the JW Eco-Technology interfaces directly with and protects the physical health of community residents:

- **Public Health Optimization and Disease Mitigation:** Eliminating surface water logging and toxic silt accumulation systematically obliterates the preferred breeding grounds of disease vectors and harmful bacteria, neutralizing public health liabilities at their root source.
- **Shielding Human Health:** By dampening extreme urban heat island temperatures and suppressing ambient dust accumulation, the technology delivers cooler, cleaner outdoor public spaces—shielding human respiratory and cardiovascular systems from heat stress and fine particulate pollution.

3. Fortifying Community Resilience and Liveability

High-quality public infrastructure serves as the bedrock of community cohesion and climate adaptability:

- **Upgrading Community Environmental Quality:** Pavements featuring advanced breathing functions paired with a flourishing, self-sustaining green habitat render neighborhoods inherently more liveable, beautiful, and vibrant—measurably boosting citizen life satisfaction.
- **Reinforcing Citizen Climate Resilience:** When a community is anchored by robust on-site water retention and natural cooling capabilities, its citizens possess far higher levels of physical adaptability and psychological security when confronted with sudden climate-driven shocks, such as cloudbursts or protracted heatwaves.

In conclusion, by employing a smarter, more cost-efficient architecture, the JW Eco-Technology transforms finite public infrastructure budgets into a long-term social safety net, ensuring that every citizen can enjoy a healthy, safe, and sustainable quality of life in a climate-uncertain future.

(3)Economic Benefits of JW Eco-Technology

By positioning the JW Eco-Technology as a disruptive, sustainable technology, this framework evolves standard engineering methodologies into an economically compelling, highly bankable financial model, constructing an ironclad value system for sustainable infrastructure:

1. Localization and Transformation of Labor and Resources

- **Technical Accessibility and Job Creation:** The JW Eco-Technology intentionally utilizes local construction labor and readily accessible regional resources—such as locally recycled polypropylene (PP) plastics, glass, and crushed construction debris—serving as the cornerstone of its technical adaptability in international development cooperation. Instead of relying on cost-prohibitive, imported precision machinery, the technology roots its engineering know-how directly into local communities. It effectively upskills traditional construction laborers into certified **"Green Artisans,"** generating tangible, high-value green employment.
- **Circular Economy Value Realization:** By seamlessly integrating recycled materials with structural concrete, the framework successfully achieves resource recovery from waste. This closed-loop approach drastically minimizes virgin raw material costs while compressing and de-risking the industrial supply chain.

2. Financial Dividends Triggered by Climate Resilience

- **Attracting Multilateral Green Capital:** Modern global financial markets and institutions—such as the Asian Infrastructure Investment Bank (AIIB) and the Green Climate Fund (GCF)—now place immense strategic weight on climate "Adaptation" infrastructure. JW Eco-Technology delivers far more than a standard roadway; it creates a multi-functional, climate-resilient asset that executes water harvesting, natural cooling, and carbon reduction simultaneously. This multi-layered dividend profile makes such assets highly competitive in global Environmental, Social, and Governance (ESG) ratings.
- **Catalyzing Public-Private Partnerships (PPP):** Deploying the PPP model effectively diffuses the upfront investment risks typically associated with civil infrastructure. Utilizing the verified technical superiority of the JW Eco-Technology to capture the backing of international development finance institutions (DFIs) offers a pragmatic solution to the chronic fiscal

budget constraints faced by Global South governments.

3. Asset-Class Transformation: Reshaping "Deserts" into Premium Assets

- **The "Oasis Economy" and Real Estate Premium:** In regions plagued by climate extremes, the baseline capacity for local water management directly dictates property and land valuation. Converting harsh, climate-vulnerable environments into thriving "ecological oases" directly translates ecological remediation into real estate value appreciation and enhanced industrial carrying capacity. In arid climate zones or large-scale Sponge City developments, this capability serves as a premier incentive for commercial developers.
- **Systematic Reduction in Long-Term Maintenance:** Conventional asphalt pavements are notoriously susceptible to thermal degradation, rutting, and the urban heat island effect, requiring constant public funding for repairs. In contrast, the proven structural durability of JW Eco-Technology paired with its natural groundwater recharge capability drastically curtails a municipality's recurring operational expenditures on stormwater drainage networks and asphalt patching.

4. The Carbon Sink Economy: Pioneering Emerging Revenue Streams

- **Carbon Credit Monetization:** Throughout its deployment lifecycle, the JW Eco-Technology drastically slashes the high carbon footprint associated with traditional paving materials. When paired with its subsequent microclimate regulation and vegetation enhancement capabilities, the technology possesses immense potential to be verified and converted into tradeable international carbon credits.
- **Empirical Landmark (The Pingtan Island Model):** The Pingtan Island demonstration project serves as a textbook alignment of international eco-tourism and low-carbon civil engineering. This integrated approach proves that a infrastructure network can be packaged into a high-yielding green asset portfolio, unlocking self-sustaining carbon credit revenues that extend far beyond traditional tourism ticketing fees.

VII. Alignment Between JW Eco-Technology and the UN Sustainable Development Goals (SDGs)

Detailed Mapping to Specific SDG Targets

Goal 1: End poverty in all its forms everywhere

- **Target 1.5:** By 2030, build the resilience of the poor and those in vulnerable situations and reduce their exposure and vulnerability to climate-related extreme events and other economic, social, and environmental shocks and disasters.

Goal 2: End hunger, achieve food security and improved nutrition and promote sustainable agriculture

- **Target 2.4:** By 2030, ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters and that progressively improve land and soil quality.
- **Target 2.a:** Increase investment, including through enhanced international cooperation, in rural infrastructure, agricultural research and extension services, technology development and plant and livestock gene banks in order to enhance agricultural productive capacity in developing countries, in particular least developed countries.

Goal 3: Ensure healthy lives and promote well-being for all at all ages

Goal 4: Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all

Goal 5: Achieve gender equality and empower all women and girls

Goal 6: Ensure availability and sustainable management of water and sanitation for all

- **Target 6.1:** By 2030, achieve universal and equitable access to safe and affordable drinking water for all.

- **Target 6.3:** By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally.
- **Target 6.4:** By 2030, substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity.
- **Target 6.5:** By 2030, implement integrated water resources management at all levels, including through transboundary cooperation as appropriate.
- **Target 6.6:** By 2020, protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes.
- **Target 6.a:** By 2030, expand international cooperation and capacity-building support to developing countries in water- and sanitation-related activities and programmes, including water harvesting, desalination, water efficiency, wastewater treatment, recycling and reuse technologies.
- **Target 6.b:** Support and strengthen the participation of local communities in improving water and sanitation management.

Goal 7: Ensure access to affordable, reliable, sustainable and modern energy for all

Goal 8: Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all

- **Target 8.4:** Improve progressively, through 2030, global resource efficiency in consumption and production and endeavour to decouple economic growth from environmental degradation, in accordance with the 10-Year Framework of Programmes on Sustainable Consumption and Production, with developed countries taking the lead.

Goal 9: Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation

- **Target 9.1:** Develop quality, reliable, sustainable and resilient infrastructure, including regional and transboundary infrastructure, to support economic development and human well-being, with a focus on affordable and equitable access for all.
- **Target 9.a:** Facilitate resilient and sustainable infrastructure development in developing countries through enhanced financial, technological and technical support to African countries, least developed countries (LDCs), landlocked developing countries (LLDCs) and small island developing States (SIDS).

Goal 10: Reduce inequality within and among countries

Goal 11: Make cities and human settlements inclusive, safe, resilient and sustainable

- **Target 11.2:** By 2030, provide access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and older persons.
- **Target 11.b:** By 2020, substantially increase the number of cities and human settlements adopting and implementing integrated policies and plans towards inclusion, resource efficiency, mitigation and adaptation to climate change, resilience to disasters, and develop and implement, in line with the Sendai Framework for Disaster Risk Reduction 2015–2030, holistic disaster risk management at all levels.
- **Target 11.c:** Support least developed countries, including through financial and technical assistance, in building sustainable and resilient buildings utilizing local materials.

Goal 12: Ensure sustainable consumption and production patterns

- **Target 12.2:** By 2030, achieve the sustainable management and efficient use of natural resources.

- **Target 12.5:** By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse.

Goal 13: Take urgent action to combat climate change and its impacts

- **Target 13.1:** Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries.
- **Target 13.2:** Integrate climate change measures into national policies, strategies and planning.
- **Target 13.b:** Promote mechanisms for raising capacity for effective climate change-related planning and management in least developed countries and small island developing States, including focusing on women, youth and local and marginalized communities.

Goal 14: Conserve and sustainably use the oceans, seas and marine resources for sustainable development

- **Target 14.1:** By 2030, prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution.
- **Target 14.5:** By 2020, conserve at least 10 per cent of coastal and marine areas, consistent with national and international law and based on the best available scientific information.

Goal 15: Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss

- **Target 15.1:** By 2020, ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests, wetlands, mountains and drylands, in line with obligations under international agreements.
- **Target 15.3:** By 2030, combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land degradation-neutral world.

Goal 16: Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels

Goal 17: Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development

- **Target 17.3:** Mobilize additional financial resources for developing countries from multiple sources.

VIII. Conclusion

JW Eco-Technology is far more than a conventional civil engineering methodology; it represents an advanced paradigm of sustainable governance that fully harmonizes climate adaptation, ecological remediation, public health security, and green economic development.

Confronted with the compounding threats of the global climate crisis, nations must decisively shift toward embracing Nature-based Solutions (NbS) and ecological infrastructure frameworks. Through cross-sectoral collaboration and green technological innovation, we can construct future-proofed cities characterized by structural resilience, low carbon footprints, and genuine ecological symbiosis.

This proposal formally advocates for the advancement of multi-lateral technical cooperation, structural policy exchanges, and high-impact pilot initiatives under the **“Belém Mission to 1.5” framework**, collaboratively driving the localized realization of global climate change adaptation and United Nations Sustainable Development Goals.

Ⅸ Reference

CMLiu, JWChen, JHTsai, WSLin, MTYen, & TH.Chen. (2012). Experimental studies of the dilution of vehicle exhaust pollutants by environment-protecting pervious pavement. J Air Waste Manag Assoc., 62(1):92-102.

FanF., Wang, S. F., Chen, C. P., Hsieh, H. L., Chen, J. W., Chen, T. H., & Chao, W. L..L. (2014). Microbial community structure and activity under various

pervious pavements. Journal of Environmental Engineering, 140(3)04013012.

李維峰；鄭瑞濱. (2004). JW 防災空調導水舖面工法之各項性能．臺灣營建研究院.

陳瑞文等. (2019). JW 生態工法打造防洪、永續水資源新模式-以全球第一座無排水溝校園的黎明中學為例．第二十三屆海峽兩岸水利科技交流研討會.

Disclaimer

All contents of this document and its attached presentations are for policy recommendations and technical descriptions reference only for this proposal, and do not constitute the basis for any specific functions or technical specifications.

Given the environmental differences of various sites and variations in actual applications, please be sure to consult the JW Eco-Technology team for individual project applications to obtain official technical assessments and written authorization.

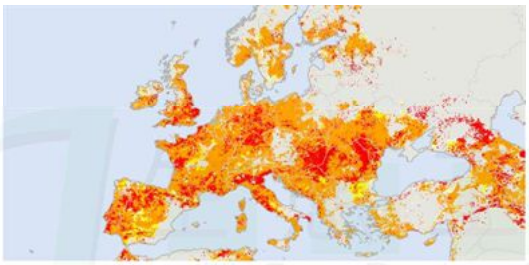
Our company assumes no liability for any direct or indirect losses and legal responsibility caused by unauthorized reference to this document.

UNFCCC "Belém Mission to 1.5" Policy Recommendations

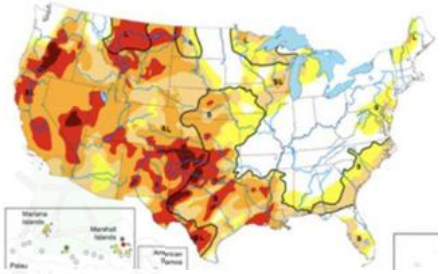
JW Eco-Technology as Climate Adaptation and Drivers for Ecological Entrepreneurship & Green Economy (APPENDIX)

Extreme Climate Ravages the Globe

China: Poyang Lake dries up – worst drought in a century



Europe: Two-thirds of land affected by drought – worst in 500 years



United States: Millennium drought

China: Southern floods forced 100,000 evacuations

United States: A millennium storm triggering catastrophic flooding in Death Valley

Pakistan flood disaster: One-third of the country submerged

Sources: BBC, EU, U.S. Drought Monitor, (AFP), Merit Times , Haike News

We Need Holistic Solutions for These Disasters!

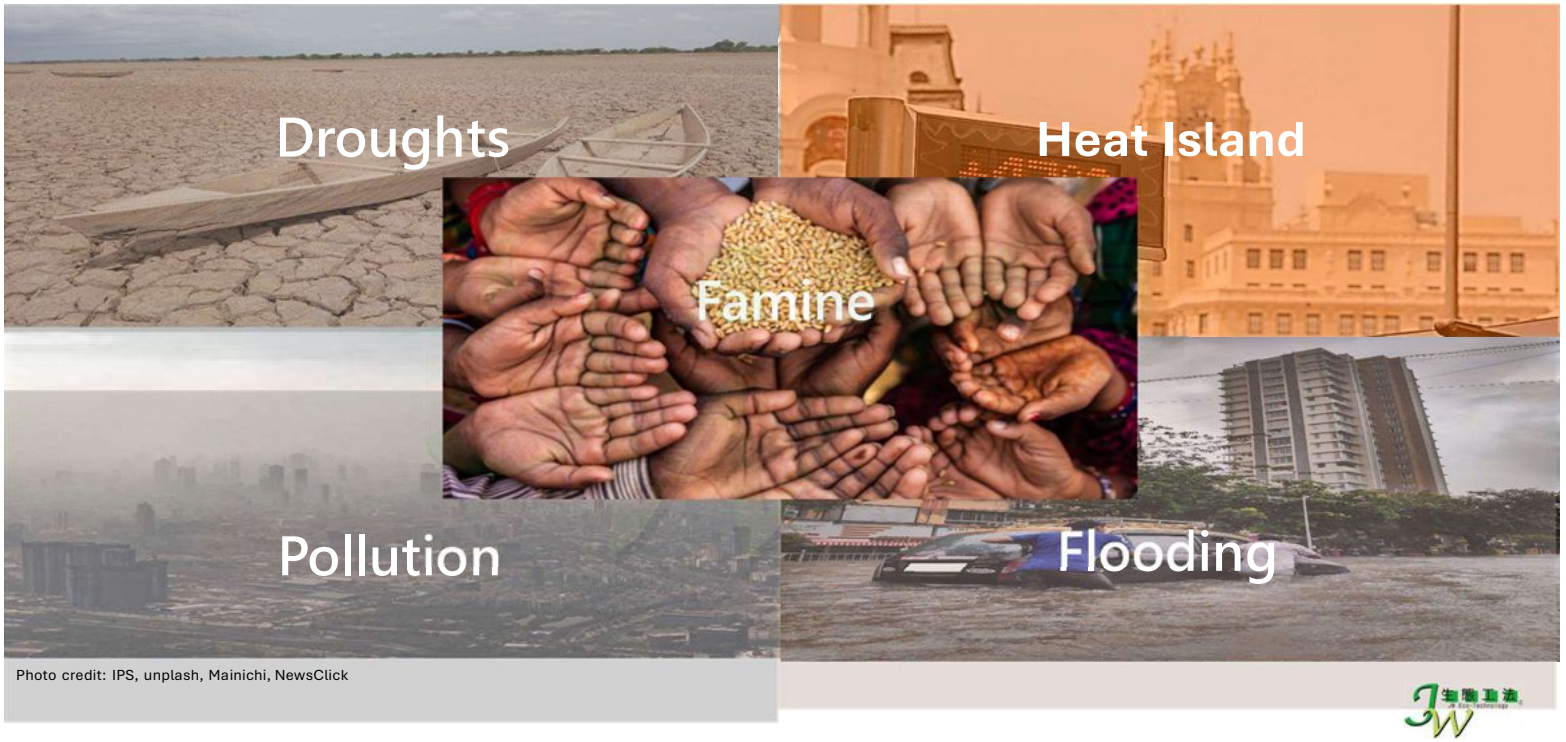


Photo credit: IPS, unplash, Mainichi, NewsClick

“The world is waiting anxiously for a durable and

economically feasible solution

to the pressing issue of climate change”

Then UN Secretary-General Ban Ki-moon in COP14

17 Years Between COP 14 and COP 31

The Climate Catastrophe: A Long-Ignored, Urgent Crisis

- "COP21: Nearly 200 countries signed the Paris Climate Agreement, yet concrete action remains elusive.

10 Years Between COP 21 and COP 31

Global Temperature Rise Breaches 1.5°C Threshold

- Patricia Espinosa, the former UN Climate Change Executive Secretary. : "The world has entered a climate emergency"

Urban Survival under Extreme Climate: Challenges & Transformation

1. Flood Pressure & Drainage Limits

Frequent Catastrophic Rainfall: Intense storms challenge the limits of urban flood control.
Overloaded Drainage Systems: Legacy pipelines fail to handle sudden, massive stormwater inflows.
Increased Surface Runoff: Impermeable pavements prevent infiltration, flooding low-lying areas.

2. Environmental Degradation & Ecological Crises

Aggravated Urban Heat Island (UHI): Concrete jungles lacking green spaces drive city temperatures up.
Insufficient Groundwater Recharge: Artificial structures block infiltration, risking land subsidence and water scarcity.
Escalating Water Pollution: Stormwater runoff and sewage overflows severely threaten water quality.

3. Resource Risks & Public Health Threats

Unstable Food Supply: Climate fluctuations disrupt agriculture, causing supply chain and price volatility.
Vector-Borne Disease Outbreaks: Post-flood stagnant water significantly increases epidemic risks.
Infrastructure Transformation: Cities must shift from traditional resistance to **JW Eco Sponge City** resilient adaptation.

Ideal vs. Reality: Houston & Berlin LID Dilemma

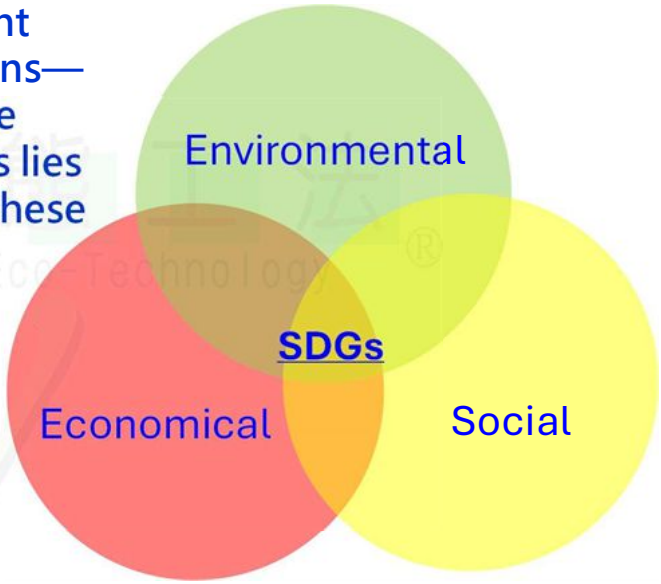
- **The Gold Standard of LID:** Houston is a prime US example of Low Impact Development (LID). The city's infrastructure manual serves as a global blueprint for LID design.

- **The 2017 Reality Check:** Despite these advanced strategies, Houston suffered unprecedented, catastrophic flooding during Hurricane Harvey in 2017.

Source:TVBS

Challenges and Solutions for the UN Sustainable Development Goals (SDGs)

- Challenges: The Sustainable Development Goals (SDGs) encompass three dimensions—economic, social, and environmental. The greatest difficulty in promoting the SDGs lies in effectively balancing and integrating these three major aspects.



Sustainable Development Goals & Infrastructure

The Solution: Adopt eco Infrastructure construction methods to benefit society, minimize economic impacts, and drive the green economy.

UNOPS Report ("Infrastructure for Sustainable Development"): Infrastructure underpins the vast majority of the SDGs.
The Economist (The New Climate Economy): Investing in sustainable infrastructure is key to three core global challenges:

- Reigniting growth
- Delivering on the SDGs
- Reducing climate risks (Paris Agreement)

IMF: Inefficiency wastes ~1/3 of global infrastructure spending (exceeding 50% in low-income countries).
The Maintenance Challenge: Poor infrastructure management threatens urban sustainability. Lack of effective maintenance strategies leads to systemic collapse and skyrocketing costs.

Environmental Benefits of JW Eco-Technology

1. Comprehensive Environmental Optimization

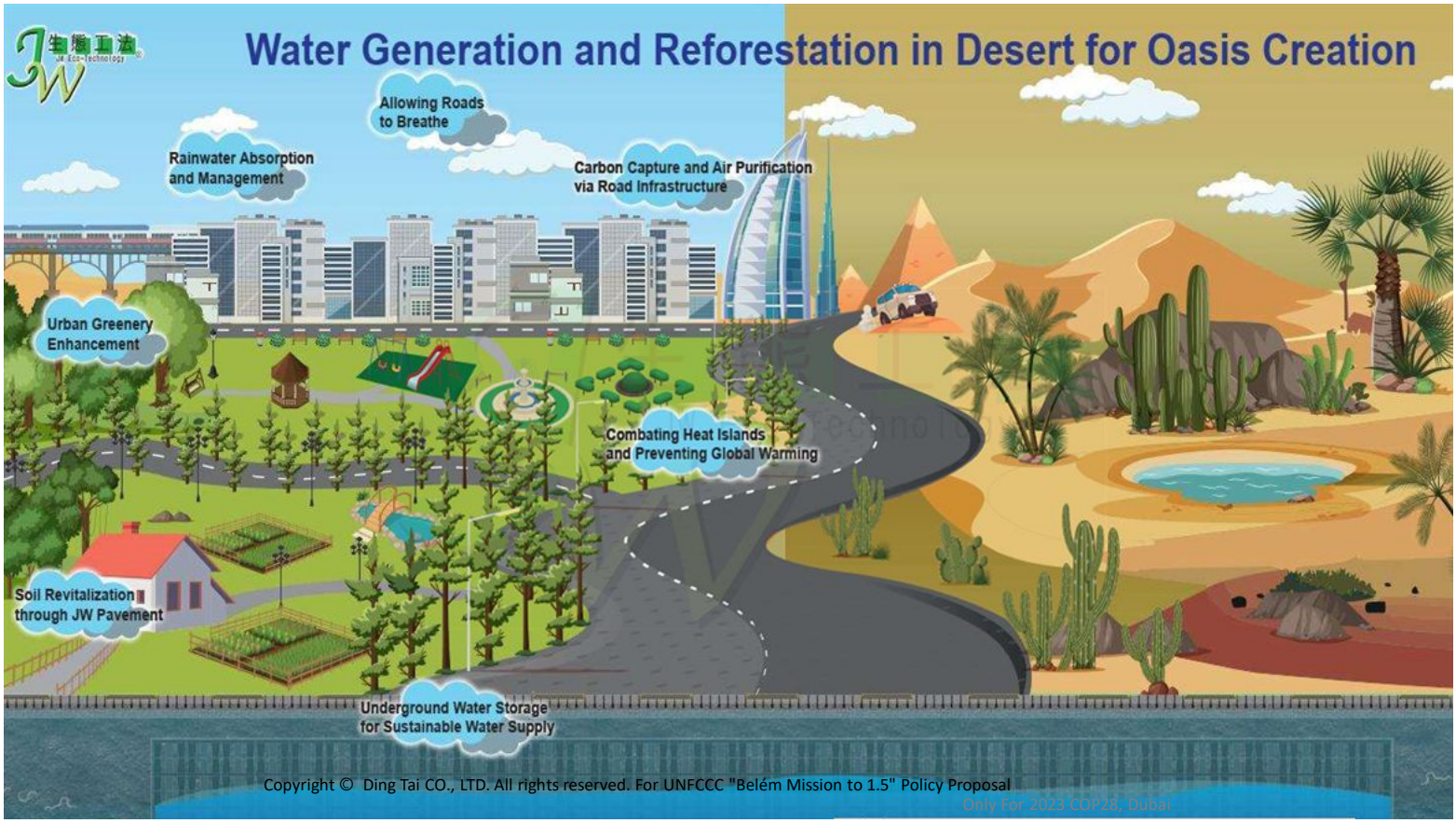
Hydrology & Ecology: Lowers flood and drought risks through high-efficiency infiltration, while reshaping urban habitats to boost biodiversity.
Microclimate Regulation: Utilizes surface permeability to settle airborne particulates, significantly mitigating the heat island effect through moisture evaporation.

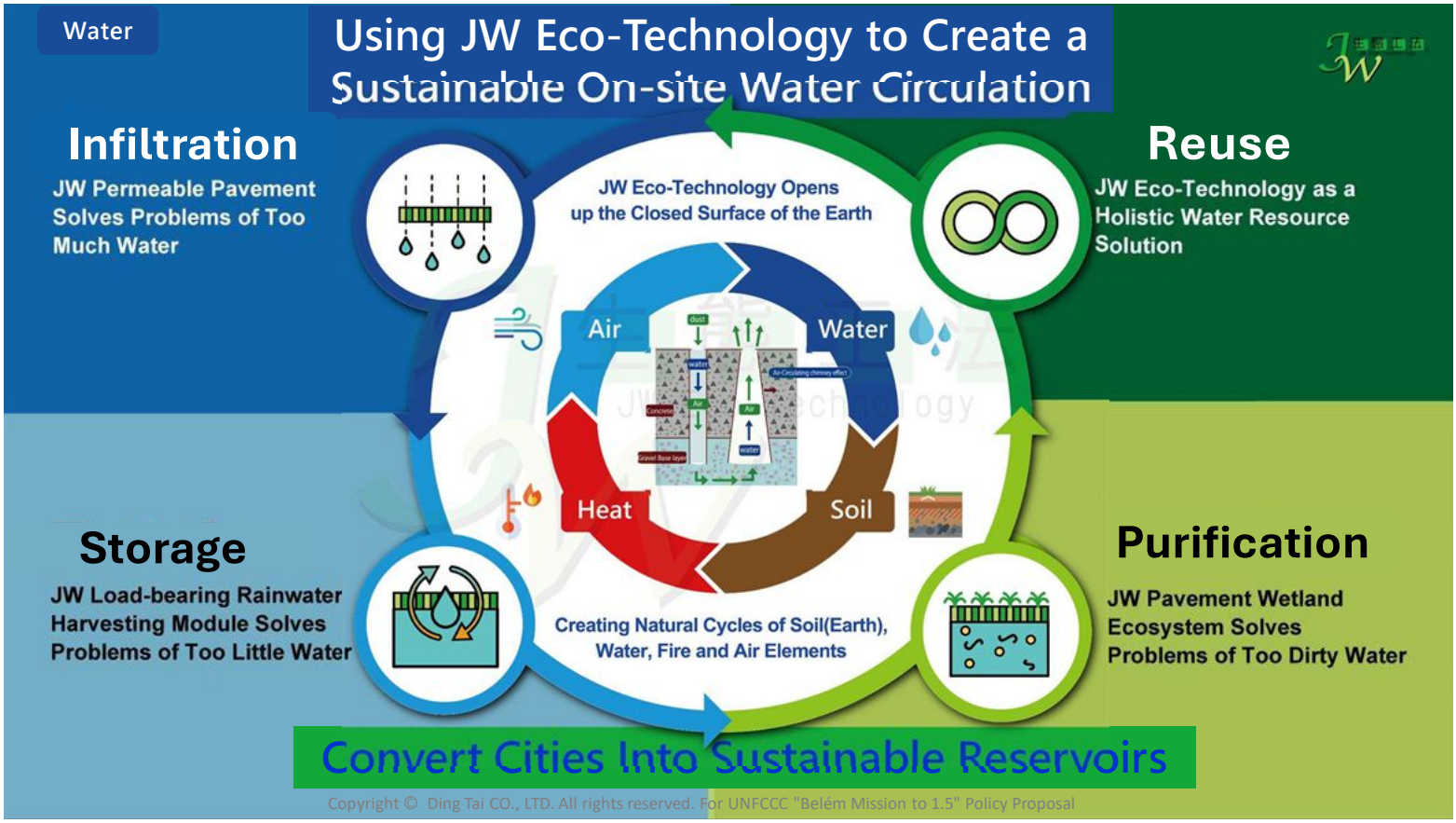
2. Revolutionary Breakthrough in Water Efficiency

On-Site Water Circulation: Integrates rainwater and greywater, utilizing natural filtration mechanisms for the in-situ treatment and conversion of water resources.
Underground Reservoir Concept: Realizes the vision of "a road above, a reservoir below," recharging groundwater resources and strengthening drought defense.

3. Towards a Sustainable Urban Future

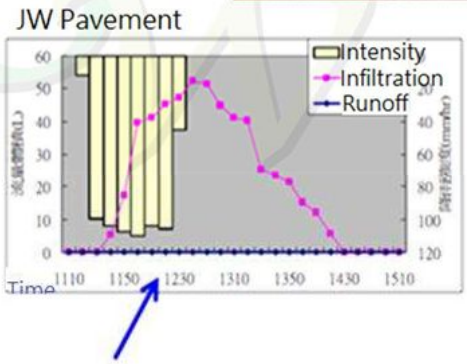
Technological Revolution: Integrates technology from the surface to the subsurface, driving water resource management toward virtualization, smart systems, and modernization.


Water Generation and Reforestation in Desert for Oasis Creation
Allowing Roads to Breathe
Rainwater Absorption and Management
Carbon Capture and Air Purification via Road Infrastructure
Urban Greenery Enhancement
Combating Heat Islands and Preventing Global Warming
Soil Revitalization through JW Pavement
Underground Water Storage for Sustainable Water Supply
Copyright © Ding Tai CO., LTD. All rights reserved. For UNFCCC "Belém Mission to 1.5" Policy Proposal
Only For 2023 COP28, Dubai


Water
Using JW Eco-Technology to Create a Sustainable On-site Water Circulation
Infiltration
JW Permeable Pavement Solves Problems of Too Much Water
JW Eco-Technology Opens up the Closed Surface of the Earth
Reuse
JW Eco-Technology as a Holistic Water Resource Solution
Air
Water
Heat
Soil
Storage
JW Load-bearing Rainwater Harvesting Module Solves Problems of Too Little Water
Creating Natural Cycles of Soil(Earth), Water, Fire and Air Elements
Purification
JW Pavement Wetland Ecosystem Solves Problems of Too Dirty Water
Convert Cities Into Sustainable Reservoirs
Copyright © Ding Tai CO., LTD. All rights reserved. For UNFCCC "Belém Mission to 1.5" Policy Proposal

Flood and Drought Management of JW Eco-Technology (R&D)

Infiltration Test for Permeable Pavement, WRA, Taipei



Zero runoff

Source: Wu, Cheng-Sung. Analysis of the Impact and Benefit of Permeable Pavement on Engineering Environment. Master's thesis, National Central University, 2005.

JW Eco-Technology：Flood & Drought Prevention (Case)

600mm in 24 hours

7 days Flooding

Heavy Loss of Lives & Property

Aug. 2018
Tainan, Taiwan

Source: pnn.pts.org.tw ; www.eoc.gov.taipei

JW Eco-Technology：Flood & Drought Prevention (Case)

From → **To**

Full of smelly & flood guaranteed gutters

70cm lower than surrounding ground

60 years of flood, mosquitos, dengue fever

Gutter-free
Flood-free

22,800T IN ONE DAY
On site water recovery
Pavement = Reservoirs

Environmental Education Site

Li Ming High School
"The Unflooded School"
- PTS INNNEWS

8,000m²
JW Eco Pavement

In 38,000 m² Campus

JW Eco-Technology:Water Quality Improvement(Case)

Before → After

Dirty, Undrinkable ➡ **1st Grade Water**

Before	Test Items	After
0.91	Ammonia-Nitrogen	ND
157	Total Organic Carbon (mg/L)	2.7
10.3	Kjeldahl Nitrogen (mg/L)	0.68
9.39	Organic Nitrogen (mg/L)	0.67
4.6	Dissolved Oxygen (mg/L)	7.7

Test directed by: Bureau of Environmental Protection, New Taipei City & SGS

JW Eco-Technology:Water Quality Improvement(Case)

Water Quality Comparison by EPA -JW pavement

EPA of New Taipei City

Inspection on November 25, 2013 REP-W-10201-1

Measured location / Category		Chei Tung River river water	Breathable JW Pavement underground water	Cathay General Hospital river water	Wisdom Stream river water	Li-Men Stream river water	Keelung River river water	Sampling date: November 25, 2013 Sample collection date: November 25, 2013		
Report #		R-W-10211055	R-W-10211059	R-W-10211058	R-W-10211057	R-W-10211056	R-W-10211054	Report date: December 10, 2013		
Measurement item	unit	Measured data						Measurement method	note	verified
pH	--	7.4	8.3	7.8	7.5	7.4	7.3	NIEA W424.52A	現場檢測	*
water temperature	℃	19.9	22.2	22.5	21.0	20.3	20.6	NIEA W217.51A	現場檢測	
transparency	cm	>30	>30	>30	>30	>30	>30	NIEA W221.50A	現場檢測	
conductivity	μ mho/cm	170	580	855	326	278	288	NIEA W203.51B		
suspended solids	mg/L	N.D<2.5	※2.7	14.9	※7.4	16.1	※6.1	NIEA W210.58A	※為 MLD:2.5	*
BOD	mg/L	N.D<2.0	N.D<2.0	6.9	10.0	7.0	N.D<2.0	NIEA W510.55B	委外檢測	*
COD - low	mg/L	7.2	8.0	34.9	31.8	26.4	8.6	NIEA W517.52B	委外檢測	*
ammonia nitrogen	mg/L	0.20	0.06	4.38	3.68	3.95	0.94	NIEA W437.52C	委外檢測	
zinc	mg/L	N.D<0.0034	0.007	0.106	0.023	0.017	0.011	NIEA W311.52C	委外檢測	*
copper	mg/L	N.D<0.0029	0.003	0.106	N.D<0.0029	N.D<0.0029	0.019	NIEA W311.52C	委外檢測	*
iron	mg/L	0.085	0.194	0.447	0.269	0.274	0.229	NIEA W311.52C	委外檢測	*
manganese	mg/L	0.012	0.005	0.052	0.089	0.053	0.043	NIEA W311.52C	委外檢測	*
lead	mg/L	N.D<0.0025	N.D<0.0025	N.D<0.0025	N.D<0.0025	N.D<0.0025	N.D<0.0025	NIEA W311.52C	委外檢測	*
cadmium	mg/L	N.D<0.0011	N.D<0.0011	N.D<0.0011	N.D<0.0011	N.D<0.0011	N.D<0.0011	NIEA W311.52C	委外檢測	*
total chromium	mg/L	N.D<0.0029	N.D<0.0029	N.D<0.0029	N.D<0.0029	N.D<0.0029	N.D<0.0029	NIEA W311.52C	委外檢測	*
coliform density	CFU/100mL	2.9×10^4	1.8×10^4	<10	8.8×10^3	4.5×10^3	2.7×10^4	NIEA E202.55B		*
dissolved oxygen	mg/L	9.1	7.7	7.0	4.6	4.6	6.0	NIEA W422.52B		
以下空白										

Source: EPA of New Taipei City2013.11.25

JW Eco-Technology： Flood & Drought Prevention (Case)

Zhangjiakou: A Sponge City Powered by JW Eco

In Zhangjiakou, China, JW Eco-Technology played a central role in the city’ s sponge city development—transforming over 32,000 square meters of main and secondary roads, branch streets, sidewalks, and parking areas into permeable infrastructure. The total project footprint reached 1.95 million square meters, achieving a runoff control ratio of 1:60 across the built-up urban area.

This initiative is featured as part of Zhangjiakou’ s official Sponge City Master Plan (2017–2035). ◦

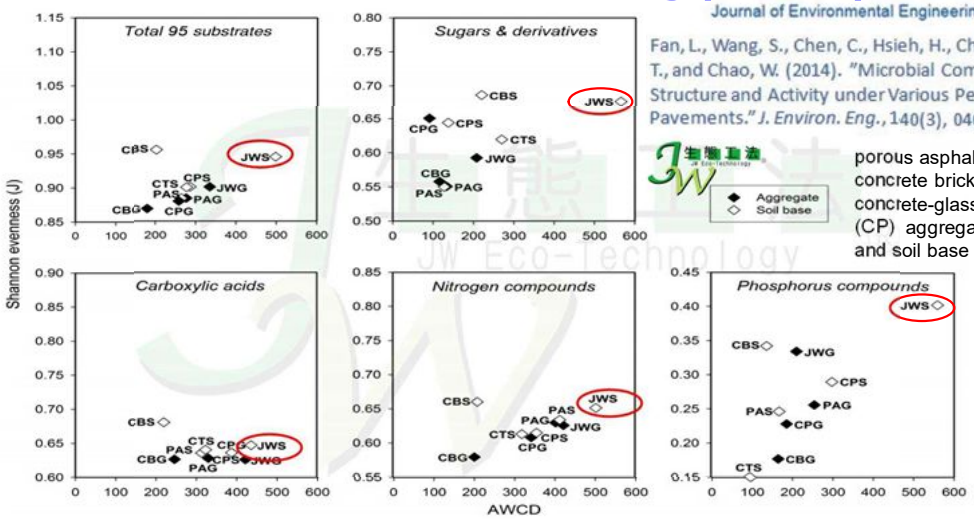
JW Eco-Technology provides clean and sustainable water sources and greening solutions for arid regions.

Visit of the Vice Minister of the Ministry of Housing and Urban-Rural Development

Source: Zhangjiakou Urban and Rural Planning Bureau

load-bearing at the 100-ton level.

JW Eco-Technology: Soil Reviving & Wetland Forming(R&D)



Journal of Environmental Engineering

Fan, L., Wang, S., Chen, C., Hsieh, H., Chen, J., Chen, T., and Chao, W. (2014). "Microbial Community Structure and Activity under Various Pervious Pavements." *J. Environ. Eng.*, 140(3), 04013012.

porous asphalt (PA), concrete brick (CB), concrete-glass block (CP) aggregate (G) and soil base (S)

Item	JW soil	PA soil	PB soil	PG soil	CT soil
Water Content(%)	21.5	10.1	7.2	9.7	11.8
Organic Carbon Matter	1.1	0.4	0.3	0.3	0.4

Higher **Water Content, Organic Carbon Matter for better microbial activity and biodiversity** in soil under JW Pavement

JW Eco-Technology: Soil Reviving & Wetland Forming(Case)

Microorganisms & worms survive underground

Fertile lands for plantation and food.

JW Eco-Technology for Greening in Arid Areas, Zhangjiakou, Hebei, China (R&D, Case)

- Trees in JW pavement are apparently taller and healthier than plants in neighboring areas (230 cm vs. 150cm).
- Driving a Green Carbon Economy: The Solution to Desertification

JW Pavement

JW pavement -230cm

Other Pavements

Other Pavements-150cm

Social Benefits of JW Eco-Technology

1. Economic Benefits & Safety Value

High Cost-Effectiveness: Features a lifespan exceeding 30 years, with total maintenance costs at just 10%–20% of traditional pavements.

Proven Durability: Validated by cases lasting over 10 years, the stable structure reduces energy consumption and the social costs of frequent repairs.

2. Public Health & Wellness Safeguards

Epidemic Prevention: Eliminates surface standing water and sludge, breaking the breeding cycle of vector mosquitoes to reduce infectious disease risks.

Cooling & Dust Reduction: Protects residents' respiratory and cardiovascular health by mitigating the heat island effect and reducing airborne dust.

3. Community Resilience & Environmental Quality

Livable Aesthetics: Enhances landscape beauty through breathable ground surfaces, boosting residential satisfaction.

Climate Adaptability: Strengthens water retention and cooling capabilities, elevating residents' sense of psychological security when facing extreme weather.

Over 1,000 JW Eco-Technology Projects Implemented Worldwide

JW Eco-Technology Permeable Pavement: High Load-Bearing Capacity (Proven Track Record)

Heavy-Duty Capacity: Up to 10,000+ lbs

Yantian Port,World's Busiest Port Container Yards

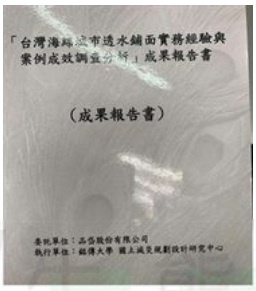
Zhangjiakou City

JW Eco-Technology: Sustainability (Case Tracking)

Based on the research report, "Investigation and Analysis of Practical Experience and Case Effectiveness of Permeable Pavements in Taiwan's Sponge Cities":

This project validated permeable pavement performance across 10 demonstration cases approved by the Ministry of the Interior in 2004.“The JW Disaster-Prevention A/C Water-Guided Pavement (Case 1), after 13 years of current use, remains in good condition and meets standards. With simple maintenance, the effectiveness of the engineering method was restored to an ‘as-new’ state.” This is the most successful permeable pavement case among the demonstrations, possessing seven key characteristics: high load-bearing capacity, high permeability, high water storage, high air permeability, increased ecological capacity, low cost, and sustainability.

Through practical research, the JW Pavement used in Case 1 has surpassed all other permeable pavement cases and can achieve the required paving effect for future Sponge Cities.



Source： "Investigation and Analysis of Practical Experience and Case Effectiveness of Permeable Pavements in Taiwan's Sponge Cities", 2018

鋪面種類	工程名稱及編號	平均透水率	透水機能評估
JW防災空調導水鋪面	1. 台北縣北 91 道路改善工程	1.195cm/sec	符合
	1. 台北縣北 91 道路改善工程(維護後)	2.11 cm/sec	符合
透水磚鋪面	2. 榮歌鎮育英街透水性鋪面	2.67×10^{-4} cm/sec（使用量高）	不符合
		2.13×10^{-2} cm/sec（使用量低）	符合
	3. 觀音鄉觀音國小前人行步道工程	0.5×10^{-2} cm/sec（使用量高）	不符合
		2.035×10^{-2} cm/sec（使用量低）	符合
	4. 橫山鄉新興村都市計畫人行道	1.5×10^{-4} cm/sec	不符合
	6. 中華西路人行道改善工程	拆除（改不透水鋪面）	拆除（改不透水鋪面）
	7. 關廟鄉立圖書館前廣場工程	2.94×10^{-3} cm/sec	不符合
	8. 高雄市立左營高中校園鋪設透水性鋪面工程	3.63×10^{-3} cm/sec（使用量高）	不符合
		4.28×10^{-2} cm/sec（使用量低）	符合
多孔隙瀝青鋪面	5. 中正大學特定區停車場景觀工程	0.87×10^{-3} cm/sec	不符合

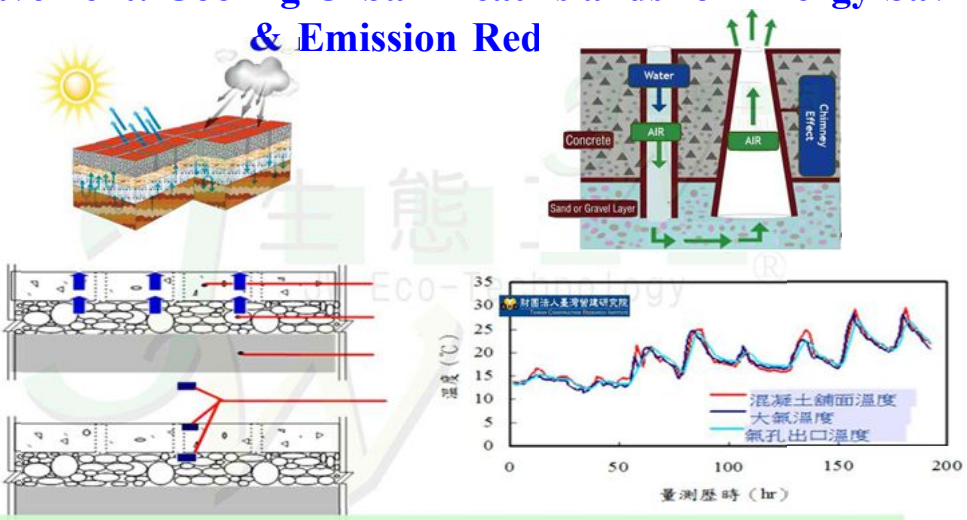

台北縣北 91 道路改善工程現勘照

14 Years of Performance Tracking

Sustainability of JW Eco-Technology (Proven Track Record)

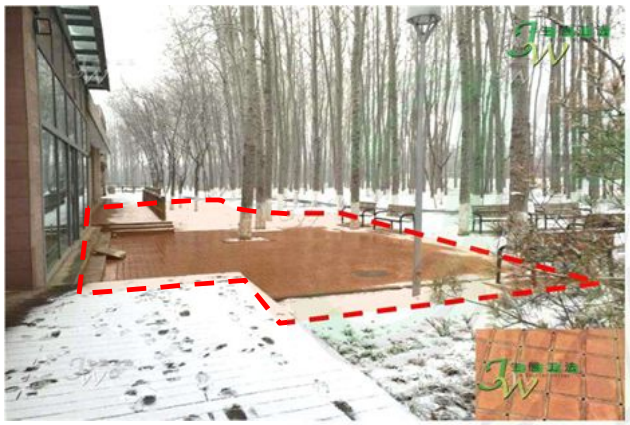
Urban Heat Island Prevention of JW Eco-Technology (R&D)

JW Pavement: Cooling Urban Heat Islands for Energy Saving & Emission Red

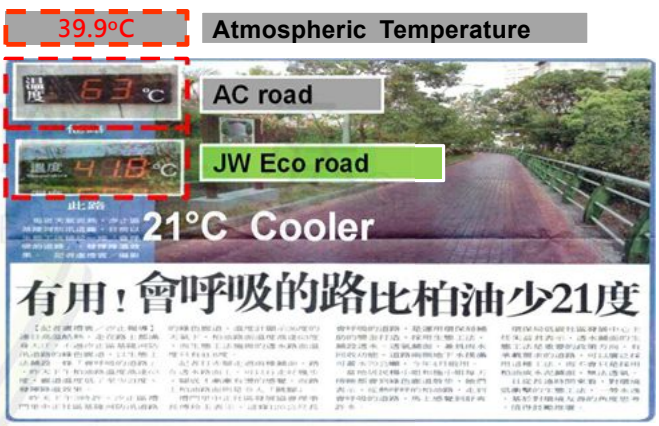


The temperature of the JW pavement and the ambient atmospheric environment consistently remained between 2–3°C, with the temperature curve showing a gradual rise and gradual decline trend.

Urban Heat Island Prevention of JW Eco-Technology (Case)



Winter: Snow Melting
(Olympic Park, Beijing, China)



Summer: Temperature Cooling
(Li-Men community, New Taipei City)

Economic Benefits of JW Eco-Technology

1. Localized Transition & Circular Economy

Green Jobs: Utilizes local labor and recycled materials (e.g., waste plastics) to transform traditional construction into "green craftsmanship," avoiding reliance on costly imported machinery.
Resource Utilization: Combines recycled materials with concrete, shortening the supply chain and significantly lowering raw material costs.

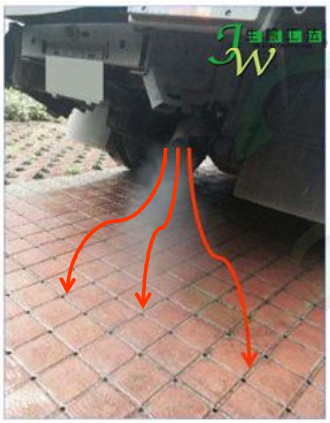
2. Climate Resilience Dividends

ESG Asset Attraction: Its combined water-storage, cooling, and carbon-reduction capabilities make it a highly attractive adaptive asset for international green funds (e.g., GCF, AIIB).
Risk Diversification: Attracts international development finance through PPP (Public-Private Partnership) models, relieving government budget constraints.

3. Carbon Sink Economy & Emerging Revenue

Carbon Credit Conversion: Leverages its low carbon footprint and microclimate regulation potential to package infrastructure into green assets capable of generating carbon credit revenue.

JW Eco-Technology: Carbon Capture(R&D)



CO	CO_2	SO_2
61%	76%	97%
NO	NO_2	NO_X
66%	63%	64%

Up to **76%** of CO2 captured from car emission in 20 minutes

Published in Journal of the Air & Waste Management Association, 2012

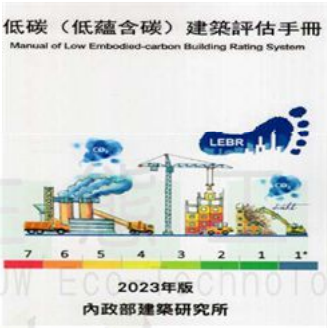

Journal of the Air & Waste Management Association
Publication details, including instructions for authors and subscription information:
http://www.tandfonline.com/loi/uawm20
Experimental studies of the dilution of vehicle exhaust pollutants by environment-protecting pervious pavement
Chung-Ming Liu [a], Jui-Wen Chen [b], Jen-Hui Tsai [c], Wei-Shian Lin [a], M.-T. Yen [a] & Ting-Hao Chen [b]
[a] The Chinese Association of Low Carbon Environment, Taipei, Taiwan, R.O.C.
[b] Dingtai Co., Ltd., Shulin, New Taipei, Taiwan, R.O.C.
[c] Department of Architecture, National Taipei University of Technology, Taipei, Taiwan, R.O.C.
Available online: 29 Dec 2011

Low-Carbon Certification

JW Eco-Technology Has Been Certified as a Low-Carbon Construction Method

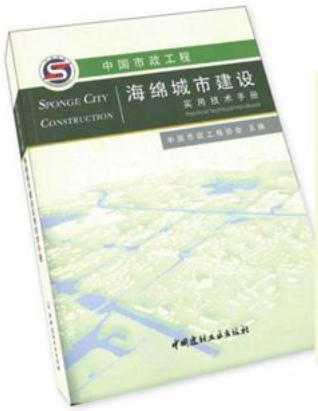
According to Taiwan’ s Low-Carbon Assessment System, JW Eco-Technology Can Reduce Carbon Emissions by Up to 189.9 $kgCO_2$ per Square Meter.

This Further Represents Taiwan’ s Government’ s Strong Commitment and Significant Contribution to Global Environmental Improvement.



Regulatory Certification

JW Eco-Technology Certified in China Sponge City Technical Handbook & Fujian Province Technical Standards for Sponge City



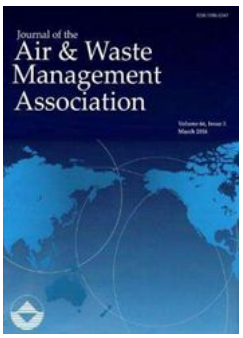
Sponge City Technical Handbook

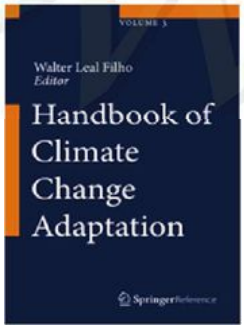
Fujian Province Technical Standards for Sponge City

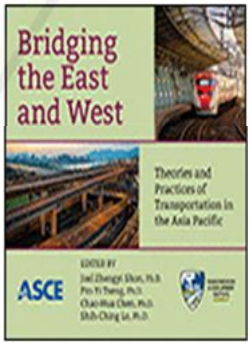
Scientific Validation

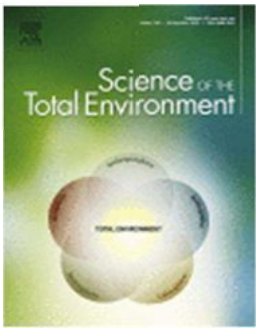
JW Eco-Technology: Scientific Publications Across Multiple Disciplines

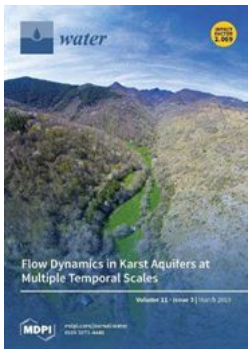
- Water Resources
- Civil Engineering
- Air Quality
- Biodiversity
- Climate Adaptation
- Environment
- Roads
- Sustainability







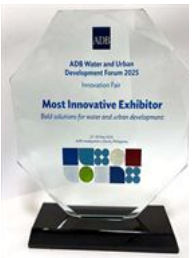




Endorsed by International Awards of Multiple Disciplines

JW Eco-Technology Recognized Across Fields

- **Innovation**: Multiple Global Invention Awards
- **Engineering**: Global Road Achievement Award (2017 , First Prize)
- **Environmental:** Energy Globe Award (2018, 2019)
- **Water Management:** Rushlight Awards (2020/21), Green Apple Award (2023)
- **Sustainability**: UN LivCom SDG Awards (2023, Sole First Place)
- **Finance**: ADB’ s Most innovative Award (2025)

2017 Global Road Achievement Award	2018,2019 Energy Globe Award	2020/21 Rushlight Awards	2023 UN LivCom Awards	2023 Green Apple Awards	2024 Green World Awards	2025 Innovation Award (ADB)
						

First and Only Prize in SDGs
Recognition of UN LivCom Awards for SDG

In June 2023, JW Eco-Technology was awarded with first place (also the only award) in "Technology and Solution Project Award" of the LivCom Awards for SDG, which is endorsed by the UNEP.

"JW Eco-Technology: Revolutionary Infrastructure for Achieving Sustainable Development Goals" has won the LivCom SDG awards' first place, providing the international best practice for global sustainable development goals.

THE INTERNATIONAL AWARDS FOR LIVEABLE COMMUNITIES

THE 2023 LivCom® SDG AWARDS

JW Eco-Technology Aligns with 15 UN SDG

SDG	Achieving*	SDG	Achieving	SDG	Achieving
1 終結貧窮	Reducing exposure and vulnerability to climate-related extreme events...	7 可負擔的潔淨能源	Enhancing international cooperation to facilitate access to clean energy research and technology, including renewable energy...	12 責任消費及生產	Achieving the sustainable management and efficient use of natural resources
2 消除飢餓	Strengthening resilience and adaptive capacity to climate-related hazards, extreme weather, drought, flooding,...	8 體面工作與經濟成長	Achieving higher levels of economic productivity through diversification, technological upgrading, and innovation.	13 氣候行動	Strengthening resilience and adaptive capacity to climate-related hazards and natural disasters...
3 健康與福祉	Substantially reducing the number of deaths and illnesses from air, water, and soil pollution and contamination...	9 工業化、創新及基礎建設	Developing quality, reliable, sustainable, and resilient infrastructure to support economic development and human well-being	14 保育海洋生態	Preventing and significantly reducing marine pollution of all kinds, in particular from land-based activities...
4 優質教育	Ensuring all learners acquire the knowledge and skills needed to promote sustainable development	10 減少不平等	Encouraging official development assistance and financial flows to States where the need is greatest.	15 保育陸域生態	Combating desertification, and restoring degraded land and soil
6 淨水及衛生	Achieving universal and equitable access to safe and affordable drinking water	11 永續城鄉	Reducing the adverse per capita environmental impact of cities,	17 多元夥伴關係	Assisting developing countries to achieve the SDGs

*Achieved by aligning with SDG targets; examples are for illustrative purposes only

Support other 2

2022: Published in UNFCCC Global Stocktake

The JW Eco-Technology Selected to Showcase in UNFCCC Global Stocktake

We provide recommendations to the UN COP27, for climate change improvement strategies and technologies, with the JW Eco-Technology to solve both of the climate change adaptation and mitigation.

Source: UNFCCCC

JW Eco-Technology : International Cooperation

- The JW Eco-Technology has been successfully implemented in over 1,000 projects worldwide. Furthermore, more than 60 countries have signed MOUs, committed to utilizing this technology to improve local environments and foster green economies.
- This proves that JW Eco-Technology is highly replicable and scalable for the application of roads, which are indispensable for human development; it also has a high adaptability across different social/economic/cultural/political environments.

JW Eco-Technology Wins Global Financial Backing & Investments

Winner of the ADB Best Innovation Award

Photo：ADB

International banks are seeking collaborations

Invited to present at the 3W (Water, Hydrogen, Carbon) Congress hosted by the Bank Gospodarstwa Krajowego (BGK), a Polish Development Bank."

Global Water Risk vs. Opportunities

JW Water Bank System: Mitigating Flood Risks & Generating Hydro-Economic Revenue

	Data	Source
Water & Drought Disaster Losses (2024)	$550 Billion USD	Global Water Monitor
Global Water Infrastructure Investment Demand (by 2030)	$7 Trillion USD	World Bank
Water & Sanitation Funding Gap	$140.8 Billion USD/ year	World Bank

Air Pollution Damages vs. Carbon Sink Opportunities

JW Pavement reduces air pollution, minimizing health damages and mortality.

	Data	Source
Global PM2.5 Health Damage Costs (2019)	$8.1 Trillion	World Bank
Global Air Pollution Mortalities (2023)	7.9 Million / year	Health Effects Institute

Heatwave Losses vs. Opportunities for Change

JW Pavement mitigates the Urban Heat Island effect, reducing mortalities and economic losses.

	Data	Source
European Heatwave Mortalities (2025)	24,400 / year	WHO
European Heatwave Economic Losses (2025)	€43 Billion	Imperial College London

Infrastructure Investment: Demands & Opportunities

JW Eco-Technology delivers safe, sustainable, and long-lifecycle solutions to cut expenditures.

	Data	Source
Total Global Infrastructure Investment Demand (by 2040)	$94 Trillion	G20
Annual Infrastructure Investment Gap	$3 Trillion / year	G20

Road Infrastructure: High Investment & Maintenance Costs

JW Eco-Pavement reduces construction and maintenance costs, utilizing recycled materials and effectively driving local green economies.

	Data	Source
Total Value of Global Road Construction Projects (2025)	$3.95 Trillion	GlobalData
Annual Global Road Investment	$1.24 Trillion / year	GlobalData
Global Road Maintenance Market Size (2022)	$548 Billion / year	Market Research Future

Youth Engagement Dilemmas in the Green Economic Transition

1. Lack of Entrepreneurial Support & Scaling Difficulties

Resource Gaps: A shortage of dedicated financing, incubators, and technical validation sites limits the real-world implementation of innovative ideas.

Structural Mismatch: Industrial adjustments fail to align with local needs, resulting in slow local green job growth and making it difficult for youth to sustain livelihoods.

2. Imbalanced Institutional Participation Mechanisms

Decision-Making Gap: Top-down governance models lack platforms that allow youth to translate their values into policy execution.

Dividend Maldistribution: The absence of mature, sustainable economic models in communities hinders micro-entrepreneurship, preventing grassroots society from sharing transition benefits.

3. Reshaping Transition Mechanisms & Empowerment

Youth as Core Agents: Government and civil society must collaborate to recognize youth as central actors in the transition, strengthening their social foundation through resource injection.

Building New Pathways: Establish a support system that balances environmental protection with economic gain, turning the green economy into a practical arena for youth to generate wealth.

Cost and Effect Analysis
JW Eco Pavements & Traditional Permeable Pavements

Item	Trad. Permeable Pavements	JW Eco Technology
Load Bearing	Not possible	Able to bear heavy loading & traffic
Permeability	Surface Permeability	On site infiltration preventing flooding
Water Retention	-	Prevent droughts with water storage systems
Breathable	Not breathable	Promotes air circulation between atmosphere and soil, regulates environmental temperature all season
Environment & Health	Pollutions created during construction, maintenance, renovation	Uses recycled/sustainable material, saves energy and reduces emission; captures pollutants & carbon
Ecologic	Ecologic dessert beneath pavements	Vitalizes soil beneath pavements forming JW Eco Wetlands
Affordable	Pavements and gutters require frequent maintenance & renovation	Gutter free, renovation free under normal usage for 30yrs
Sustainable	Prone to damages and safety hazard	Keeps intact without runoff
Energy saving	Material Absorbs heat, creating heat island effects and increases energy consumption	Promotes air circulation and regulates temperatures

Type (For 4m Road)	Approx. Accumulated Total Cost			Renovation
	10yrs	20yrs	30yrs	
JW Eco-Technology	1	1	1	30 yrs↑
Permeable Brick	3.6	5.4	7.0	Every 5 yrs
Permeable Concrete	3.3	5.1	6.5	Every 5 yrs
Permeable AC	3.5	5.5	7.5	Every 3 yrs

Sources:
- Kaohsiung City Hall Road Construction Budget Report 2004-2013
- Analysis Report of the Ministry of Interior Affairs
- Taipei City Hall Budget Report

==========

- **According to Taiwan Conditions, situation may vary according to area and design**

JW Eco-Technology: Highly Replicable & Scalable

Market Size: Highly replicable and scalable

- estimated 12 trillion USD for SDG investment in 2030

- Active investment of JW Eco by financial institutions

Multinational cooperation platform / Achieving SDGs

Sustainable city / Green economy / Youth employment

CSR/ Circular economy/ Green Enterprises

Energy saving / Environmental protection / Livable environment

Diversified business cooperation

Source : UNDP

Conclusion | JW Eco-Technology: A Sustainable Blueprint for Eco-Social-Economic Prosperity

- **Eco-Driven Resilience (Environment Society & Economy)**
  - Leverages eco-infrastructure for water storage, flood control, cooling, and carbon capture.
  - Builds a healthy environment as the bedrock for social stability and economic prosperity.
- **Livable & Cost-Effective Society (Society Economy & Environment)**
  - Features a **30-year maintenance-free** design to secure long-term urban resilience.
  - Enhances quality of life while eliminating high maintenance costs to ensure eco-friendliness.
- **Green Economy Reinvestment (Economy Environment & Society)**
  - Transforms climate risks into green transition opportunities.
  - Channels capital into infrastructure gaps, boosting social defense and protecting environmental assets.

Summary: JW Eco-Technology is more than an engineering solution—it is a sustainable governance model seamlessly integrating environmental restoration, social well-being, and a green economy.


生態工法
JW Eco-Technology
期待能與您一同
擁抱地球・造福人類
Email: jw@jwprocess.com.tw