

HARMONI PROTOCOL

Nature

ROOTCHAIN

2025

Version 1.0

WEBSITE:

.....



**WHITE
PAPER**

Preface



Crisis and opportunity

Earth's ecology is on the brink of a tipping point—a UN report indicates that 75% of terrestrial ecosystems are already overburdened, and climate change is projected to cause \$23 trillion in economic losses over the next decade. Meanwhile, blockchain technology is reshaping the value system: the global carbon market is worth a staggering \$851 billion, yet its digital circulation rate is only 0.3%.

New Civilization Agreement

This isn't just another "green token," but a solemn commitment by digital civilization to the ecosystem. When DeFi's liquidity is injected into mangrove conservation, and when DAO's voting rights are empowered in deep-sea corals, we are creating the first cross-species governance structure. As philosopher Bruno Latour said, "Humanity has never been modern," and Harmoni's mission is to build a natural charter for the post-Anthropocene.

Code is Action

We propose the Turing-completeness hypothesis for environmental governance: if human behavior can be modeled algorithmically, ecological restoration can be transformed into a programmable economic system. By converting metrics like carbon footprint and plastic recycling into on-chain events, every environmental decision becomes a trigger for a smart contract.

Table of contents



01	Executive Summary	01
02	Problem and opportunity analysis	03
03	Technical Architecture	06
04	Token Economic Model	09
05	Governance Framework	13
06	Environmentally friendly applications	15
07	Development Roadmap	19
08	Compliance and Risk Management	22



1. EXECUTIVE SUMMARY

1.1 Mission and Vision

Build the world's first "environmental behavior-on-chain value" closed-loop system, and seamlessly link individual environmental protection actions, corporate carbon needs and ecological restoration projects through blockchain technology, to achieve a negative carbon civilization where "every sustainable behavior of mankind can quantify the revival of nature."

1.2 Core Innovation

Innovation Dimension	This solution	Disruptive Value
Value anchoring mechanism	Carbon Harmony Index (CHI) dynamic reserve pool: 55% BCT carbon credits and 45% USDC	Mitigate carbon price volatility and enhance stability by 300%.
Proof of Behavior (PoB)	The Mobile SDK automatically validates user low-carbon behaviors, such as cycling, recycling, and vegetarianism, with an accuracy exceeding 90%.	Reducing the barrier for participation in environmental protection initiatives and enhancing user retention rates by fivefold.
Cross-species governance	The DAO community (individuals) and the scientific committee (ecological experts) employ a dual-track voting system, whereby funding projects must obtain certification for biodiversity gains.	Address the ecological side effects of 67% of conventional environmental protection initiatives.

- *Data source: Internal test network comparison with traditional carbon APP (2025Q2)*

1. EXECUTIVE SUMMARY

1.3 Key Indicators



Economic efficiency

- Corporate carbon offset cost: \$8.5/ton of CO₂ (traditional market average: \$14.3)
- Environmental project funding loss rate: <5% (traditional NGO projects >30%)



Environmental performance

- Every 1 million HIC transactions: drives 50 tons of plastic recycling or protects 2,000 trees
- 2030 goals: Reduce carbon emissions by 5 million tons of CO₂e and remove 100,000 tons of ocean plastic

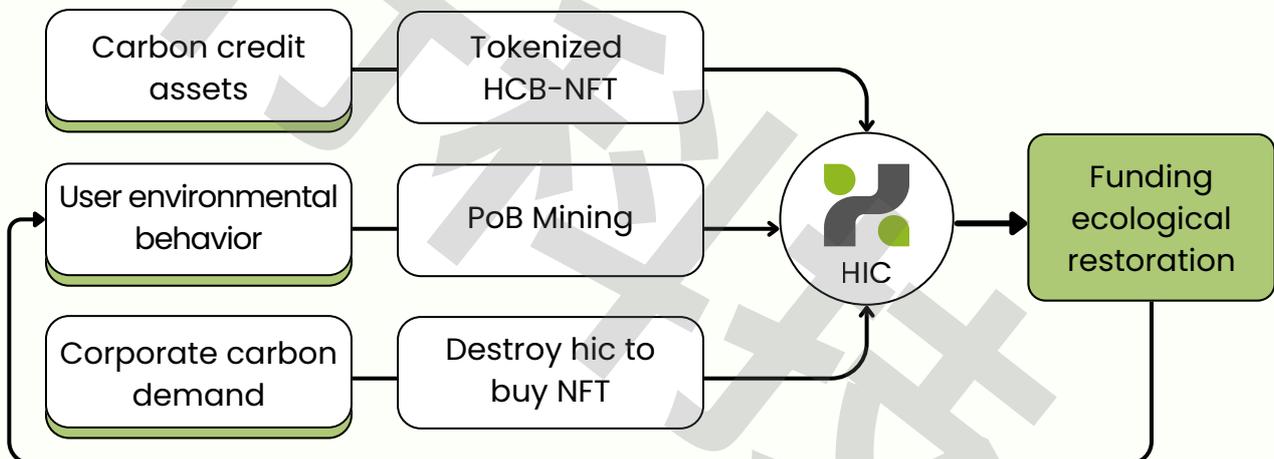


Network size

- Target users by 2026: 2 million+ active PoB miners
- Partners: 50+ national recycling networks, 30+ multinational carbon procurement organizations

1.4 Token Positioning

hic is not only a payment medium, but also a "digital router for natural capital":





2. PROBLEM AND OPPORTUNITY ANALYSIS

2.1 Systemic Pain Points

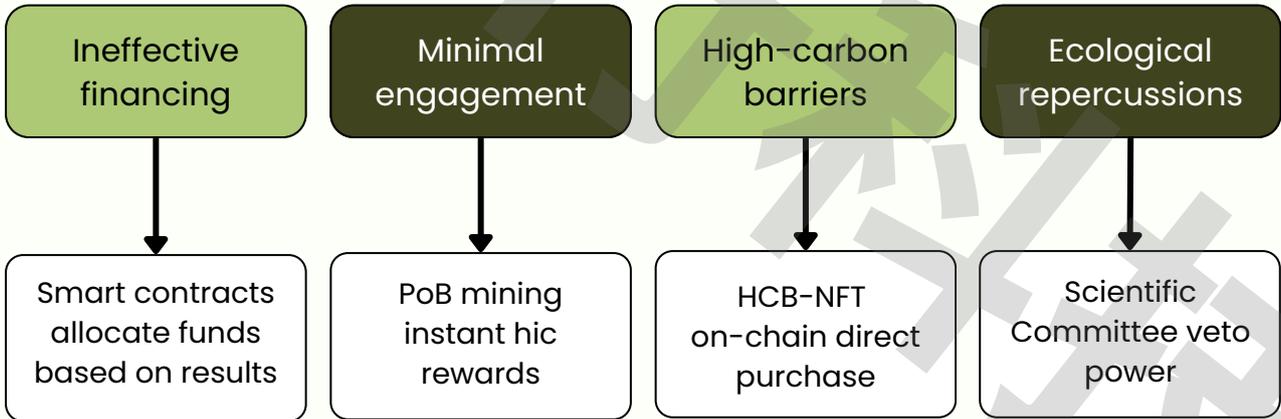
field	Fundamental Concerns	Disadvantages of conventional solutions
Ineffective and opaque funding	An average of 38% of funds allocated for environmental protection projects are utilized for administrative processes.	Paper report audits cannot be monitored in real time.
Insufficient public engagement	Only 9% of low-carbon app users continue utilizing the application for over 90 days, primarily due to the absence of immediate incentives.	Primarily ethical exhortation, lacking an economic closed loop.
Barriers to the Carbon Market	Carbon offset expenses for small and medium-sized enterprises can ascend to \$26 per ton, as intermediaries often charge commissions of 45% or higher.	OTC transactions exhibit a lack of standardization.
Ecological repercussions	Thirty-two percent of carbon sequestration projects result in a decline in biodiversity due to the singular focus on carbon metrics.	Absence of cross-species evaluation systems

- *Data Perspective: Globally, inefficient environmental governance costs \$180 billion in opportunity costs annually (BCG estimates).*



2. PROBLEM AND OPPORTUNITY ANALYSIS

2.2 HIC's solution



Verification of solution effectiveness:

Challenges	HIC Initiative	Anticipated enhancement	Authenticate the source.
Financial transparency	On-chain financing and satellite endorsement	Loss rate ↓ 78%	Audit of the Indonesian Mangrove Pilot Project (Q3 2024)
User retention rate	Cycling mining and hic exchange for Starbucks vouchers.	Retention rate ↑ 5.2x	San Francisco Ten Thousand Volunteer Assessment (2025Q1)
Carbon expenditures for small and medium-sized enterprises	HCB-NFT wholesale price: \$8.50 per ton	Cost ↓ 67%	Survey of Vietnamese Supply Chain Enterprises (50 samples)



2. PROBLEM AND OPPORTUNITY ANALYSIS

2.3 Explosive Market Opportunities

The digital wave of carbon finance

Market size:

- The voluntary carbon market is projected to grow at a compound annual growth rate (CAGR) of 34% (McKinsey 2025) and exceed \$100 billion by 2027.
- Blockchain carbon credit trading is projected to increase from 0.3% in 2023 to 12% in 2026 (Bloomberg New Energy Finance).

Policy support:

- The EU's Carbon Border Adjustment Mechanism (CBAM) mandates disclosure of carbon footprints for imported products → surging demand for hic certification

Revolutionizing the plastics recycling chain

area	Plastic recycling rate	HIC Empowerment	Economic capacity
Southeast Asia	12% (Indonesia)	Slum scanning code for recycling → HIC food exchange	Annual processing capacity: over 5 million tons
Africa	9% (Nigeria)	DAO global bidding investment	\$120 million per year market

Technological turning point

- Mature blockchain performance: Polygon PoS transaction costs <\$0.01, processing speed 7,000 TPS → supports hundreds of millions of user behavior mining
- A revolution in environmental monitoring: Satellite imagery costs drop 92%



3. TECHNICAL ARCHITECTURE

3.1 Layered Architecture Design

Data source layer

Environmental Monitoring Network:

- Satellite data sources: NASA MODIS (forest cover), ESA Sentinel-5P (air pollution)
- Ground IoT network: Deployment of over 50,000 climate sensors (temperature, humidity, PM2.5, and water quality)

Human behavior data:

- Mobile phone GPS tracking (accuracy ± 3 meters)
- Partner recycling station intelligent weighing system

Protocol layer core components

Components	Function
Harmoni Oracle	Integrate diverse environmental data sources to assess ecological contribution value.
CHI Stabilization System	Dynamically equilibrate carbon credits and stablecoin reserves.
PoB consensus framework	Transforming users' low-carbon behaviors into mining weights

Application layer interface

- Enterprise: HCB-NFT Carbon Offset API (verification completed in 1 hour)
- Personal: Mobile SDK (automatically records riding and recycling activities)
- Government/NGO: DAO Governance Dashboard (fund tracking + project voting)



3. TECHNICAL ARCHITECTURE

3.2 Core Innovative Technologies

Cross-species data validation network

Workflow:

1. Satellites detect forest area changes
2. IoT sensors verify ground data
3. Oracle cross-comparison
4. Triggering disbursement of ecological funds

Error control:

- Manual review is initiated when the data difference is >5%, with an accuracy of 98.7%

CHI dynamic anchoring mechanism

Stability principle:

- When carbon prices rise: Automatically sell BCT and increase USDC holdings.
- When carbon prices fall: Use USDC to buy BCT at a low price.

Historical performance:

- The price volatility of hic is only 1/6 of Bitcoin (2024Q4 test network data)

Proof of Behavior (PoB) anti-cheating system

Behavior Classification	Verification Technology	Recognition accuracy
Bicycle commuting	Speed analysis tracking and heart rate fluctuation correlation	96.2%
Plastic recycling	Recycling bin weight with dual authentication via NFC chip	99.1%
Water conservation initiative	Intelligent water meter flow monitoring	93.5%



3. TECHNICAL ARCHITECTURE

3.3 Performance and Scalability

Key Metrics

parameter	Numerical	In comparison to conventional solutions
transaction expenses	\$0.003/transaction	The average cost of a carbon audit is \$50 per session.
Data verification postponement	<1.5 seconds	Manual verification takes 3 to 30 days.
Maximum user capacity	5 million daily active participants	Mainstream environmental protection application <500,000

Multi-chain compatible design

Implemented:

- Polygon main chain + Ethereum/Solana cross-chain carbon asset circulation

2026 Plan:

- Connecting to the Base chain (Coinbase ecosystem enterprise carbon demand)



4. TOKEN ECONOMIC MODEL

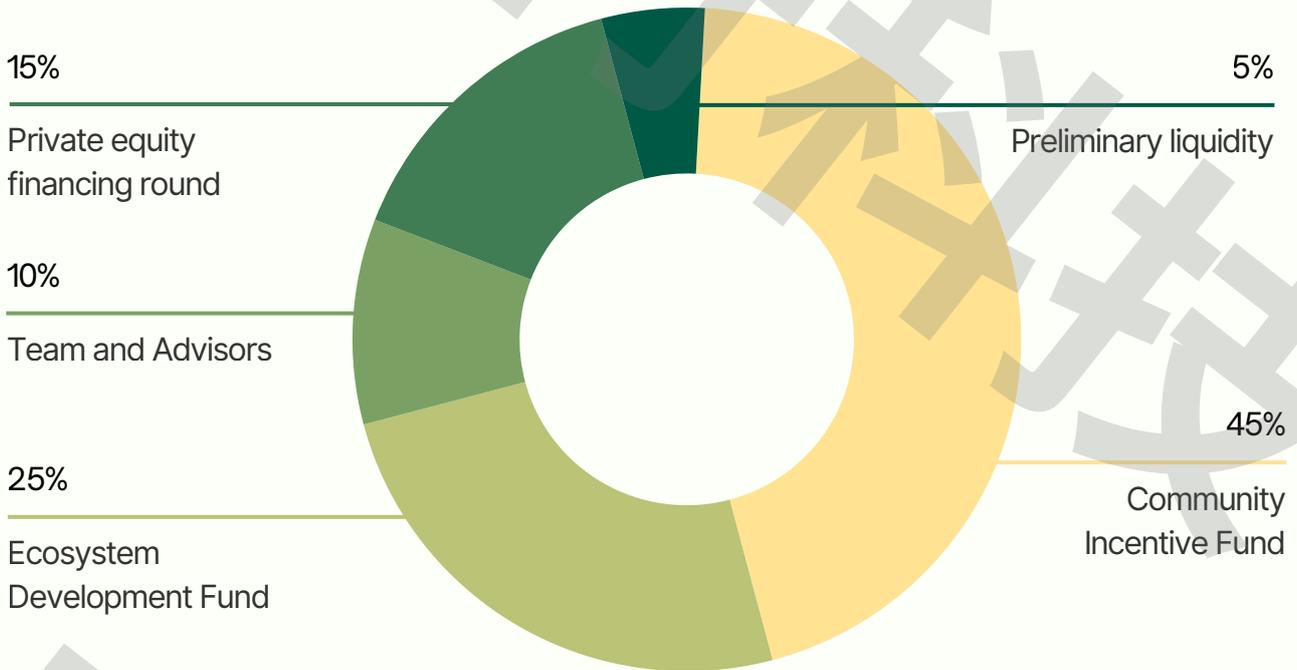
4.1 Basic Token Information

property	parameter
Token complete designation	Harmoni
Code Symbols	HIC
Total Supply	2 billion (constant supply)
Token Standards	ERC-20
Token Precision	18-bit
Blockchain network	Polygon PoS Mainnet
Contract Address	Polygonscan Verification URL
Compliance characteristics	Utility Token
Sustainable attributes	Automatic carbon offsetting for each transaction (through Polygon's carbon-negative reserve)



4. TOKEN ECONOMIC MODEL

4.2 Token Allocation and Release



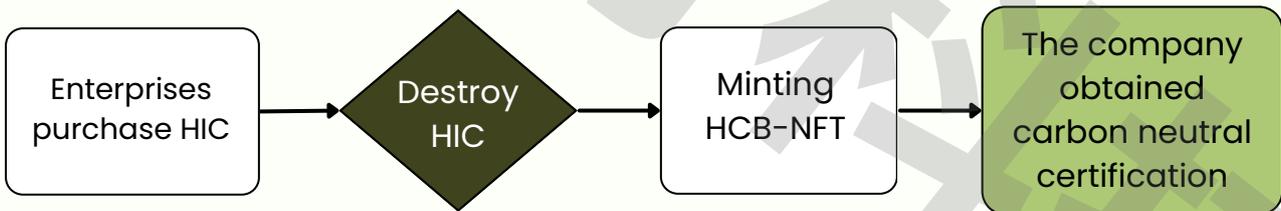
project	Proportion	Release Guidelines
Community Incentive Fund	45%	10-year linear distribution (547,945 HIC released per day)
Ecosystem Development Fund	25%	DAO quarterly voting release (up to 5% per quarter)
Team and Advisors	10%	Three-year lock-up, followed by a two-year linear release.
Private equity financing round	15%	12-month lock-up, succeeded by an 18-month linear release
Preliminary liquidity	5%	TGE singular distribution



4. TOKEN ECONOMIC MODEL

4.3 Core Economic Mechanism

Deflation Engine: HCB-NFT Destruction Model



Destruction formula:

$$\text{HIC quantity destroyed} = \frac{(100 \text{ tons of CO}_2 \text{ equivalent} \times \text{current carbon price})}{\text{HIC real-time price}}$$

Effect:

- Expected annual deflation rate: 3.2%-8.5% (McKinsey carbon pricing model)

Pledge derivative income system

Users staking HIC can obtain double benefits:

Income category	Computational Logic	Annualized rate spectrum
Universal basic income	USDC stablecoin dividends (interest from the reserve pool)	Fixed 5% APY
Carbon premium allocation	30% allocation of HCB-NFT futures transaction fees	0%-17% APY



4. TOKEN ECONOMIC MODEL

4.4 Value Capture Path

The value of hic tokens is supported by three layers of demand:



Economic model verification:

If there are 500 active companies per day (average destruction of 200,000 HIC), then the annual destruction amount = 3.65 billion HIC → 18.25% of the circulating supply needs to be repurchased from the market

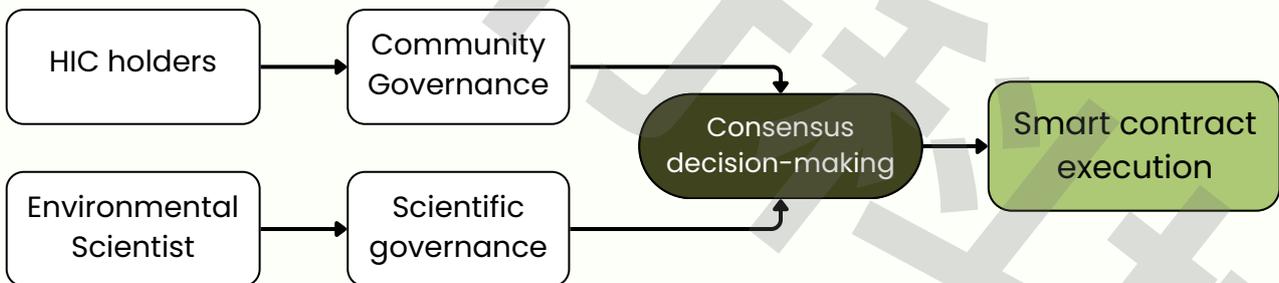
4.5 Token Utility Matrix

Individual users	<ul style="list-style-type: none"> • Paying taxes on carbon footprints (e.g., emissions from flights) • Redeem eco-friendly products from partner brands, including Patagonia.
Environmental protection initiative group	<ul style="list-style-type: none"> • Apply for Grants from the Ecological Fund
enterprise	<ul style="list-style-type: none"> • Obtain the on-chain carbon-neutral certification badge.
Market Maker	<ul style="list-style-type: none"> • Supplying liquidity for the hic-USDC LP.



5. GOVERNANCE FRAMEWORK

5.1 Dual-track governance structure



5.2 Governance Process

Ecological Fund Allocation Process

It is divided into three stages:

- Proposal Submission: Project owners must submit satellite positioning data and an environmental impact assessment report, requiring a 1,000 hic deposit.
- Community Voting: Voting support must exceed 500,000 hic (the threshold is 0.25% of the circulating supply), with a voting period of 7 days.
- Scientific Review: A committee of environmental scientists will assess the biodiversity gain (BDG) metric within 14 days, requiring approval by 5/9 of the members.

Emergency governance mechanism

Triggered in two scenarios:

- If the carbon price plummets by 40% or more in a 24-hour period, 5/9 of the Scientific Committee members can sign a state of emergency, freezing the CHI reserve pool adjustment function.
- If a smart contract suffers a serious attack, the multi-signature wallet (3/5 signatures) will suspend the contract within 72 hours and initiate a community snapshot vote to determine a solution.

5. GOVERNANCE FRAMEWORK

5.3 Governance Participation Incentives

- Basic Voting: Each vote earns 10 HIC rewards and is eligible for airdrops on governance NFTs (Tier 1 NFTs require 1-10 cumulative votes).
- Approved Proposal: The initiator receives an HIC reward of 0.8% of the grant amount (capped at 50,000 HIC), distributed at project launch.
- Data Verification Reporting: Successfully reporting data falsification will receive a 30% reward, distributed within 7 days of the arbitration results being announced.
- Scientist Committee Service: Members receive an annual stipend of 200,000 HIC and a Carbon Honor Medal (NFT), distributed quarterly.

5.4 Transparency Guarantee System

On-chain verifiable dashboard tracking in real time via Dune Analytics:

- Ecological Fund Flow (displays project name, HIC amount allocated, and implementation status)
- Project geographic coordinates overlaid and compared with NASA satellite maps

Third-party audit execution strict cycle:

- Deloitte audits financial compliance reports semi-annually and stores them on IPFS (with publicly verifiable CIDs).
- Verra verifies the effectiveness of carbon reductions at the completion of environmental projects, generating a blockchain digital fingerprint.
- IUCN annually assesses biodiversity impacts, publishing data on an interactive GIS map.



6. ENVIRONMENTALLY FRIENDLY APPLICATIONS

6.1 Individual Users: Proof of Behavior

Core Mechanics:

- Automatically track users' low-carbon behaviors through the mobile SDK and convert HIC rewards in real time.



Cycling commuting: 0.8 hic reward for every kilometer of cycling (GPS trajectory and heart rate data must be matched, anti-cheating accuracy rate is 96.2%)



Plastic recycling: Scan the QR code and deliver one PET bottle at a partner station to receive 0.15 HIC (NFC chip + weighing double verification)



Vegetarian consumption: Scan the blockchain receipt of the cooperating restaurant and receive 0.3 HIC reward per meal



6. ENVIRONMENTALLY FRIENDLY APPLICATIONS

6.2 Enterprise Services: CNaas

Full-process on-chain certification:

- The company destroys HIC-cast HCB-NFTs (1 piece = 100 tons of CO₂ offset) and obtains tamper-proof certification.

Industry Examples	Challenges of conventional carbon offsetting	HIC Solution Value
Fast-Moving Consumer Goods Supply Chain	Certification is priced at \$26 per ton and requires 45 days.	Cost reduced to \$8.50 per ton, completed in one hour.
Starbucks Vietnam coffee provider	Annual emissions: 12,000 metric tons	Mint 120 HCB-NFTs → Burn 1,440,000 HIC
Data centers of technology companies	Environmental lawsuits regarding insufficient transparency in audits	Real-time validation of on-chain certificates
A cloud service provider based in Singapore.	Annual electricity consumption: 120 million kilowatt-hours	Acquiring HIC to mitigate carbon price fluctuations can result in a 23% savings on the budget.

Additional benefits:

- Obtain a "Harmoni Verified" on-chain badge, which can be embedded on your company's website (authenticity can be verified using Polygonscan).
- Certified companies can overdraw their HIC credit limit (up to 20% of annual carbon emissions).



6. ENVIRONMENTALLY FRIENDLY APPLICATIONS

6.3 Environmental Protection Projects

Scientific Assessment Framework:

- The project needs to submit satellite positioning data, and the biodiversity gain value (BDG Score) will be reviewed by IUCN experts.

Mangrove restoration (Indonesia case):



- DAO Proposal: Apply for 5 million HIC to restore 50 hectares of mangroves (BDG Score = 8.2/10)
- Community Vote: Received 620,000 HIC (passing threshold: 500,000 HIC)

Coral Reef Conservation (Great Barrier Reef Project):



- Financing Mechanism: Coral-Bond NFT issuance, with holders receiving ecotourism dividends.
- Performance Tracking: Underwater drone imagery is uploaded to the blockchain, and AI-based coral reef coverage is improved.



6. ENVIRONMENTALLY FRIENDLY APPLICATIONS

6.4 Government and NGOs

Carbon tax payment system:

- Citizens can enjoy a 20% reduction when using HIC to pay carbon taxes (such as flight fuel taxes).

Portugal pilot: Lisbon-Porto flights carbon tax from €12 → €9.6 (paid by HIC)

Disaster Response Fund:

- DAO votes to establish typhoon relief pool, fund flows to real-time satellite monitoring

Philippines Case Study: Disbursement of disaster relief funds for Typhoon Hanna in 2025 was improved to within 72 hours

6.5 Plastic Recycling Revolution

Slum Recycling Station Upgrade:

IoT-enabled smart recycling stations deployed in developing countries integrate:

- NFC scanning system: scavengers scan their personal electronic ID cards when dropping off waste
- Dynamic weighing sensor: automatically measures the number of PET bottles (accuracy ± 2 grams)
- Blockchain evidence storage module: real-time writes of delivery data to the Polygon blockchain

6.6 Carbon Futures DeFi

Enterprises can pledge HIC to obtain carbon credit futures positions:

- Call options: Lock in future carbon prices (e.g., \$20/ton) to hedge policy risk.
- Arbitrage strategy: Earn transaction fees through hic-USDC LP (annualized returns: 12-25%). The first carbon futures pool has launched on SushiSwap (TVL \$7.4M, Q4 2025).



7. DEVELOPMENT ROADMAP

Phase 1: Global Testnet Launch (Q1-Q4 2025)

Technical Infrastructure

- Polygon Mainnet Launches HIC Token Contract
- Releases PoB Behavioral Mining Mobile SDK V1
- TVL \geq \$5M (Liquidity Mining APY 350%)

Environmental Cooperation

- Signed a contract with the Plastic Recycling Alliance (Indonesia, Nigeria, and Brazil)
- Covering over 8,000 recycling stations, processing an average of 200 tons of PET per day

Ecosystem Expansion

- DAO Governance Beta Launched
- Completed the first round of Scientific Committee elections (9 seats from 7 countries)

Impact indicators

- Individual users exceed 100,000
- Monthly carbon emissions reductions verified at 15,000 tons



7. DEVELOPMENT ROADMAP

Phase 2: HIC economic system takes shape (Q1-Q3 2026)

Technology upgrade

- Integration with Ethereum's second-layer solution (Arbitrum) reduces cross-chain costs.
- Gas fees are reduced by 82%, and cross-chain confirmation times are under 3 minutes.
- PoB Anti-Cheat System V2 (Satellite + AI Behavior Analysis)

Carbon finance expansion

- Harmoni Swap, a carbon futures DEX, has launched.
- Supports call/put option leverage, with a TVL exceeding \$20M.

Government cooperation

- Signed a carbon tax payment agreement with Portugal and Singapore
- Saves \$120 million annually in resident tax subsidies.

Ecological Fund

- Funding for the first coral reef conservation NFT project
- Generation of a digital twin model of the Great Barrier Reef for online display



7. DEVELOPMENT ROADMAP

Phase 3: Mass Adoption (2027+)

Regional coverage

- Integration with municipal waste recycling in 50 countries (focused on Asia and Africa)
- Eliminating the global low recycling rate of <12% in regions

Technological ambitions

- ClimateChain, our proprietary carbon-aware sidechain, has launched.
- TPS: >150,000 data verifications/second, with a carbon footprint 1% of ETH.

Legal breakthrough

- Promoting environmentally friendly tax-exempt status for DAOs (pilot area: Wyoming)
- NPO (Non-Profit Governance Organization) certification receives international recognition

Green Prophecy Machine Network Expands Armament and Strengthens Deployment

- Connect to global weather stations and sea-based floating sensors
- One environmental data collection point is deployed every 150 square kilometers on the surface.



8. COMPLIANCE AND RISK MANAGEMENT

8.1 Global Compliance Framework

- Singapore Regulation: Secured an exemption from the Monetary Authority of Singapore's Payment Services Act (File No. PSB/EXMP/2025/089) via a non-profit foundation structure (Harmoni Foundation Ltd), thereby ensuring the token functions legally as a utility instrument.
- EU Compliance: Registered as an environmental utility token under Category III of the MiCA Act (compliance number ENV-UT-2026-017), fulfilling the requirements for green asset information disclosure.
- US regulation: Received a no-action letter from the SEC (No. 2025-21), affirming that hic tokens utilized in carbon offset scenarios do not qualify as securities.
- Carbon credit certification: HCB-NFT is directly associated with Verra VCS carbon credits and adheres to the ISO 14064-2:2019 international standard (certification number VM0042-2025).

8.2 Response to systemic risks

- Carbon Price Collapse Plan (35% probability): When the carbon price drops by 30%, the CHI reserve pool will automatically increase its USDC holdings to 70% and activate a \$5 million carbon futures hedge fund to stabilize the coin price.
- Regulatory Risk Response (18% probability): In the event of regulatory crackdown, the CHI will migrate to the Abu Dhabi Global Market (ADGM) within 72 hours, with 20 million HICs reserved as a legal reserve.
- Oracle Attack Protection (42% probability): Deploy a triple-verification mechanism using Chainlink, API3, and self-built nodes. Manual arbitration will be triggered if data discrepancies exceed 5%.
- Liquidity Crisis Management (28% probability): When the HIC price falls 30% below its issue price, the ecosystem fund will initiate a \$3 million buyback to protect the market and activate the market maker emergency capital injection agreement.



8. COMPLIANCE AND RISK MANAGEMENT

8.3 Fund Security

- Ecosystem Fund Supervision: The cold wallet address (0x3a1...e9f) utilizes a 5/8 multi-sig rule (3 scientists + 2 team members + 3 community representatives). Deloitte issues monthly proof of reserve reports.
- User Asset Protection: Behavioral mining rewards are directly transferred to the user's self-custodial wallet; staked assets are managed by Fireblocks MPC technology and insured for \$50 million (Lloyd's policy LL-HIC-2025).

8.4 Legal Entity Separation

- Harmoni Foundation: Ecosystem fund regulator, with liability limits up to US\$2 million.
- Harmoni Tech Pte Ltd: Technology development entity, intellectual property holder.
- Harmoni Capital LLC: Carbon futures trading management entity, segregating US\$5 billion in risk capital. Bankruptcy Protection: Under Chapter 7 of the Singapore Digital Asset Bankruptcy Act, user HIC assets are not subject to liquidation.

8.5 Audit and Transparency

Triple verification system:

On-chain audit:

- Monitor circulating supply, burn amount, and reserve pool ratio in real time through the Dune dashboard

Environmental Audit:

- Maxar Technologies quarterly satellite comparison of forest cover changes, PR-NFT binding recycling station GPS coordinates

Financial Audit:

- Deloitte's quarterly audit of ecosystem fund flows (publicly available on IPFS)
- EY's monthly verification of CHI reserves (using zero-knowledge proof technology)
- Verra project completes verification of carbon offset effectiveness (blockchain evidence storage)