

# Case Analysis of Longshine Technology's RWA Financing: Exploration of Innovative Practices and Domestic Replication Paths

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**Abstract:** The in-depth integration of the digital economy and the real economy is driving blockchain technology to break through the boundaries of traditional finance, opening up a new path for the securitization of physical assets. The Real-World Asset (RWA) tokenization financing project for charging piles completed by Longshine Technology Group Co., Ltd. (Longshine Technology) in Hong Kong has become a landmark practice combining blockchain technology with the securitization of infrastructure assets. This paper systematically sorts out the operation mechanism and innovative breakthroughs of the Longshine case, focuses on analyzing the key conditions such as supervision, technology, and asset adaptability for replicating this model in mainland China, classifies the priority levels of infrastructure types suitable for the RWA model, and compares the advantages and disadvantages of RWA and publicly offered REITs from the dimensions of liquidity, valuation efficiency, cross-border attributes, and operating costs. The research shows that relying on technology-driven efficiency advantages, RWA is more suitable for new infrastructure assets with small-sum, scattered, and high-frequency transactions. The promotion of RWA in mainland China requires the phased construction of a "regulatory-compatible" ecosystem to promote the formation of a complementary asset securitization system between RWA and REITs.

**Keywords:** RWA, Asset Securitization, Blockchain, Infrastructure Financing, REITs.

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## 1. Introduction

With the in-depth integration of the digital economy and the real economy, blockchain technology is gradually breaking through the boundaries of traditional finance, opening up a new path for the securitization of physical assets. Currently, China's infrastructure construction faces pain points such as "difficulty in activating small-sum and scattered assets, low financing efficiency, and inadequate access to cross-border capital". New infrastructure assets such as charging piles and distributed photovoltaic (PV) power stations have small individual scales and scattered distributions, making it difficult to achieve effective financing through traditional Asset-Backed Securities (ABS); although Publicly Offered Infrastructure Investment Trust Funds (REITs) provide an innovative financing channel, there is still room for improvement in terms of liquidity, valuation efficiency, and cross-border capital penetration.

Against this backdrop, the RWA (Real-World Asset) tokenization financing project for charging piles completed by Longshine Technology Group Co., Ltd. (A-share code: 300682) in Hong Kong has become a landmark practice combining blockchain technology with the securitization of infrastructure assets. Relying on Hong Kong's fintech regulatory sandbox mechanism [1], the project issued RWA tokens with 9,000 charging piles as the underlying assets, realized dynamic ownership verification through Internet of Things (IoT) sensors, direct on-chain payment of charging fees, and designed differentiated return grading based on geographical locations, successfully raising 100 million yuan [2]. This innovative practice not only verifies the value of RWA in activating small-sum and scattered infrastructure assets but also triggers industry discussions on core issues such as "whether domestic infrastructure can replicate this

model", "what institutional and technical obstacles need to be overcome", and "what are the advantages and disadvantages compared with REITs, which are also asset securitization tools".

Taking the Longshine case as the research object, this paper focuses on exploring four key issues: first, the operation mechanism and innovative breakthroughs of the case; second, the feasibility and key conditions for replicating this model in mainland China; third, the types of infrastructure suitable for the RWA model and their priority classification; fourth, the comparison of advantages and disadvantages between RWA and publicly offered REITs. The research aims to enrich the theory of blockchain in the field of asset securitization, provide a practical reference path for activating new infrastructure and carbon neutrality assets in mainland China, and at the same time offer decision-making references for regulatory authorities to formulate relevant policies and balance financial innovation and risk prevention.

## 2. Core Innovations and Operation Mechanism of the Longshine Case

### 2.1. Breakthrough in Financial Engineering: Addressing the Securitization Dilemma of "Small-Sum and Scattered Assets"

Longshine Technology took 9,000 charging piles as the underlying assets, covering AC slow-charging piles and medium-and small-power DC fast-charging piles. Each pile has a low value, scattered geographical distribution (covering the Yangtze River Delta, Pearl River Delta, and other regions, with 62% located in suburban areas), and belongs to more than 200 operators, with heterogeneity issues such as inconsistent lease terms, equipment depreciation, and service fee sharing. The asset attributes of "low per-pile value,

geographical dispersion, and complex ownership" are fundamentally conflicting with the operation logic of traditional ABS, leading to multiple practical obstacles in packaged financing: (1) High due diligence costs: the verification cost per pile reaches 2,000–3,000 yuan, with a total cost exceeding 20 million yuan, accounting for more than 3% of the total value of the asset pool; (2) Difficulty in cash flow collection: charging income fluctuates greatly, and funds flow through multiple entities, resulting in long cycles and risks of embezzlement; (3) High difficulty in credit enhancement: the subordinated tranche needs to bear more than 30% of the risk buffer for external credit enhancement; the mortgage rate of charging pile assets is usually less than 40%, and a guarantee fee of 1.5%–2% per year needs to be paid; combined with direct costs such as underwriting fees and rating fees, the total issuance cost will exceed 8%, far higher than the final 6.8% financing cost of the Longshine project; (4) Insufficient asset scale: the total scale of the asset pool is approximately 540 million yuan, which fails to meet the implicit threshold of no less than 1 billion yuan for ABS issuance, making it difficult to attract institutional investors.

The Longshine project achieved three major innovations in terms of technical architecture: (1) Dynamic ownership verification: real-time monitoring of equipment operation data through IoT sensors, and automatic triggering of smart contracts to freeze assets if the equipment is out of service for more than 48 hours, increasing the accuracy of ownership verification to 99.2%; (2) Profit penetration mechanism: enabling direct on-chain transfer of charging fees to a dedicated account, avoiding the risk of embezzlement by operators, and increasing the efficiency of fund flow by 30 times; (3) Risk grading: designing differentiated pricing for charging piles in downtown areas and remote areas based on geographical locations and operation data to meet the needs of investors with different risk preferences [3].

Through technological innovation, the project greatly improved financing efficiency: due diligence costs were reduced by 90%, guarantee fees of 1.5%–2% were eliminated, and cross-border settlement costs were reduced by 40%. The financing cycle was shortened from 3 months to 72 hours, including only 3 days for asset screening and ownership verification, 27 days for sandbox approval, and completion of token issuance within 72 hours.

## **2.2. Regulatory Sandbox Mechanism: The Key Role of Hong Kong's "Policy Green Light"**

The project passed the testing of the Hong Kong Monetary Authority's "Ensemble Sandbox" and was jointly issued by institutions holding Type 1 (securities trading) and Type 9 (asset management) licenses, which is the cornerstone of the compliance of the Longshine RWA project.

After 6 months of sandbox testing, the project completed compliance verification for core links such as on-chain storage of charging pile asset data and cross-border fund flow on the chain. For example, the sandbox connected the data interfaces of the Hong Kong Monetary Authority and the mainland IoT platform, realizing cross-border credible verification of charging pile operation data and solving the cross-border regulatory barrier in asset status verification under the traditional model.

The key to compliance implementation lies in licensed operation. The project was initiated by Longshine Technology's Hong Kong subsidiary in conjunction with

licensed institutions: the partner holds Type 1 (securities trading) and Type 9 (asset management) licenses issued by the Hong Kong Securities and Futures Commission. The former ensures that RWA tokens can be legally transferred to qualified investors, while the latter guarantees the professional management of the asset pool. In terms of legal characterization, the project defined RWA tokens as "income right certificates" rather than securities, avoiding conflicts with the Securities Law. By clearly defining RWA tokens as "certificates representing only the income rights of charging piles" (without involving the transfer of asset ownership or equity attributes), the project did not need to go through the IPO registration process, greatly shortening the issuance cycle.

## **2.3. Reconstruction of Economic Value: From Heavy Asset Holding to Platform-Based Services**

Longshine Technology realized the transformation to asset-light operation in infrastructure financing by acting as a platform for "asset screening + technical services".

As a platform provider, Longshine screens high-quality assets (with more than 1.7 million charging piles connected to the platform) and collects technical service fees and asset management fees. The technical service fee is charged at 4%–6% of the financing scale, covering services such as IoT data monitoring and blockchain system operation and maintenance, which is lower than the 8%–10% comprehensive service fee of traditional ABS service providers. The asset management fee is charged annually at 0.5% of the asset scale for providing operation data monitoring services for the charging piles included in the asset pool. Under this model, Longshine does not need to directly hold charging pile assets, avoiding heavy asset risks such as equipment depreciation and site leasing.

## **3. Analysis of Feasibility Conditions for Replicating the Longshine RWA Case in Mainland China**

### **3.1. Rigid Constraints: Breakthrough Paths in Regulatory and Legal Frameworks**

The implementation of RWA in mainland China faces three major legal and regulatory obstacles.

#### **3.1.1. Ban on Token Financing**

In 2017, seven ministries and commissions including the People's Bank of China jointly issued the Announcement on Preventing the Risks of Token Issuance Financing, defining Initial Coin Offerings (ICO) as "illegal public financing" and directly blocking the path of domestic token issuance [4]. To break this deadlock, it is necessary to promote the amendment of China's Securities Law, add a category of "digital asset certificates", and clarify their legal status of "bearing income rights and non-securities attributes". Reference can be made to Hong Kong's logical characterization of RWA tokens to achieve compatibility with the existing legal system.

#### **3.1.2. Cross-Border Capital Controls**

China's capital account has not yet been fully liberalized, and cross-border fund flows involved in RWA require approval from foreign exchange management authorities. In this regard, closed testing in free trade zones can serve as a transitional solution: restricting funds to flow within the zone, limiting RWA tokens issued based on infrastructure assets in the pilot area to domestic qualified investors (excluding cross-

border capital flows for the time being), and reducing regulatory risks.

### 3.1.3. Adaptation Dilemma of Asset Registration System

China's current asset registration relies on the centralized system of China Securities Depository and Clearing Corporation (CSDC), which cannot support dynamic ownership verification on the blockchain. It is necessary to establish a central bank-led blockchain-based digital registration system to realize on-chain storage and real-time update of asset ownership and status data, and link with IoT monitoring data to form a closed loop of "registration-monitoring-ownership verification".

### 3.2. Technical Infrastructure: Independent and Controllable Blockchain and Oracle System

The oracle network should be led by the state to build IoT data on-chain verification nodes to ensure the authenticity and immutability of data; the alliance chain architecture should adopt national cryptographic algorithms to build an independent and controllable underlying chain, support the automatic execution of smart contracts, and comply with the requirements of the Cyber Security Law.

### 3.3. Asset Adaptability: Infrastructure Meeting the "Three Characteristics"

Not all infrastructure is suitable for RWA issuance; priority should be given to screening assets with the characteristics of "high-frequency and stable cash flow, IoT-penetrable monitoring, and strong policy orientation".

First, high-frequency and stable cash flow is the foundation. The asset should have fine-grained and predictable cash flow to avoid the cash flow fluctuation risks of traditional infrastructure (such as high single transaction fees and long cycles). Second, IoT-penetrable monitoring is the key. The asset must be equipped with IoT sensors to realize real-time status tracking and avoid valuation "black boxes"—the current monitoring of charging piles in the Longshine project follows this logic, ensuring that investors can grasp the operation status of assets in real time. Third, assets with strong policy orientation are more likely to obtain regulatory support. For example, new infrastructure and carbon neutrality fields are in line with national strategies, with clear policy subsidies, which can reduce asset operation risks and enhance attractiveness to investors.

### 3.4. Replicable Asset Types of the Longshine RWA Model and Their Priority Classification

Based on cash flow granularity and IoT coverage, assets are classified into three priority levels: high, medium, and low.

High-priority assets: Including distributed PV power plants, data centers, and 5G base stations. These assets have high-frequency and transparent cash flow, complete IoT coverage, and low on-chain costs.

Medium-priority assets: Covering cold chain warehouses and hydrogen refueling stations. These assets have a data foundation but face issues such as large cash flow fluctuations or incomplete monitoring systems.

Low-priority assets: Including expressways and ports/terminals. These assets have stable cash flow but face difficulties in data integration and complex ownership, resulting in low economic benefits of on-chain

implementation.

## 4. Comparison with REITs: Advantages and Structural Defects of RWA

Both RWA and publicly offered REITs belong to infrastructure asset securitization, but they show significant differences in dimensions such as liquidity, valuation efficiency, cross-border attributes, and operating costs.

### 4.1. Advantages of RWA

Compared with publicly offered REITs, RWA achieves efficiency advantages in four dimensions.

In terms of liquidity: The trading of publicly offered REITs relies on traditional stock exchanges, with significant liquidity constraints (e.g., high transaction thresholds, short trading hours, T+1 settlement system, and 10% daily price fluctuation limit). RWA achieves a leap in liquidity through token fragmentation—for example, the Longshine project split the assets of 9,000 charging piles into tokens with a minimum unit of 10 US dollars, allowing investors to subscribe flexibly according to their actual capital volume. More importantly, the 24/7 uninterrupted trading mechanism based on blockchain breaks free from the time constraints of exchange operating hours, greatly reducing liquidity friction costs.

In terms of valuation efficiency: The application of real-time data in the RWA model greatly reduces information asymmetry. The valuation of publicly offered REITs relies on the traditional model of "periodic disclosure + third-party evaluation": the operation data of underlying assets (such as rental income and equipment utilization rate) is disclosed quarterly, and annual valuation requires entrusted evaluation companies to conduct on-site verification, resulting in valuation results lagging behind the actual status of assets. In contrast, RWA realizes real-time valuation through "IoT + oracle" technology, allowing investors to adjust decisions based on dynamic data. This mechanism greatly reduces the degree of information asymmetry.

In terms of cross-border attributes: The cross-border financing of publicly offered REITs is limited by the capital control framework; foreign investors need to participate through the Qualified Foreign Institutional Investor (QFII) channel, with a quota approval cycle of up to 3 months and restrictions on the foreign shareholding ratio of individual projects. The RWA model can realize the free flow of cross-border capital through the characteristics of digital assets. When the Longshine project was issued in Hong Kong, it supported dual-channel subscription with Hong Kong Dollar stablecoins (e.g., HKD Tether) and Digital RMB. Foreign investors could transfer funds directly through compliant stablecoin wallets, while domestic investors could use Digital RMB for cross-border payment. The fund settlement time was shortened from the traditional 3–5 days to 2 hours, without being restricted by QFII quotas.

In terms of operating costs: The application of smart contracts in the RWA model shortens the agency chain and reduces management fee costs. The operation of publicly offered REITs relies on multiple intermediaries, resulting in high management costs—including fund managers (fee rate: 0.8%–1.2%), asset custodians (0.2%–0.3%), and evaluation institutions (0.5%–1%), with a comprehensive fee rate of 2%–3%. Such costs stem from information asymmetry in the

principal-agent relationship—investors need to pay fees to supervise the performance of intermediaries, forming "supervision costs". The RWA model replaces manual intermediaries with smart contract automation, compressing the management fee rate to 0.5%–1%. In the Longshine project, links such as profit distribution, asset status monitoring, and risk early warning are automatically executed by code without the intervention of fund managers; operations such as asset freezing and unfreezing are triggered by IoT data, eliminating manual review costs. This "disintermediation" reduces principal-agent costs.

## 4.2. Structural Defects of RWA

In terms of legal ownership verification risks: On-chain certificates lack legal effect in mainland China, and dispute resolution relies on foreign arbitration, resulting in connection gaps. Differences in cross-border rules may lead to restricted fund repatriation or stablecoin reserve risks. In addition, there is the risk of technical runs: misreporting of IoT data or oracle attacks may trigger asset freezing or valuation distortion, causing market panic.

In summary, REITs are suitable for large-scale core infrastructure assets with clear ownership, while RWA is more suitable for new infrastructure assets with small-sum, scattered, and high-frequency transactions.

## 5. Longshine RWA Model: Phased Development Path in China

The promotion of RWA in China needs to follow the principle of "controllable risks and gradual progress", and build a "regulatory compatible" ecosystem in three phases, gradually breaking down the barriers between technological innovation and institutional adaptation.

### 5.1. Pilot of Non-Transactional On-Chain Registration

In the first phase, 2025-2026, priority will be given to policy pilot areas such as Xiong'an and Hainan to carry out pilot practices of "data on-chain + pledge financing" for infrastructure assets, without involving token issuance to avoid regulatory risks. For example, the power generation of distributed photovoltaic power stations, operating data of charging piles, etc., will be put on the alliance chain to form credible asset files for banks to evaluate the pledge value.

### 5.2. Offshore-Onshore Capital Bridging

In the second phase, 2027-2028, a cross-border channel will be built relying on Hong Kong's mature regulatory environment. Mainland new infrastructure assets (such as photovoltaic power stations) will transfer their income rights

to Hong Kong SPVs, which will issue RWA tokens to raise funds from qualified investors. At the same time, through the State Administration of Foreign Exchange's "pilot for cross-border transfer of RWA income rights", the subscription funds will be connected with Hong Kong clearing banks via digital RMB, forming a closed loop of "Mainland assets - Hong Kong issuance - digital RMB settlement". This not only takes advantage of Hong Kong's cross-border capital advantages but also avoids the risk of capital outflows.

## 5.3. Formation of Sovereign RWA Ecosystem

In the third phase, a central bank-led digital asset registration and settlement system will be established to unify standards for asset confirmation, transaction and liquidation. Individuals will be allowed to directly subscribe to RWA through digital RMB, lowering investment thresholds. Relevant judicial interpretations will be introduced simultaneously to clarify the legal effect of on-chain certificates, ultimately achieving full integration of RWA with China's financial system.

## 6. Conclusion

The success of the Longshine project stems from the alignment of technological efficiency and regulatory frameworks. Replicating RWA in mainland China requires balancing financial efficiency and sovereign risks, as well as technological innovation and legal traditions. Priority should be given to breaking through in asset fields with favorable policies and complete data, and gradually building an asset securitization ecosystem where RWA and REITs complement each other. Only through the coordinated evolution of systems and technologies can RWA become a long-term tool to solve the financing dilemma of new infrastructure.

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