



# TOKEN STAKING PLATFORM



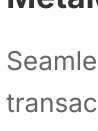



A Decentralized Staking Protocol on Ethereum

Built on Ethereum | Sepolia Testnet  
October 2025

## Project Overview

Token Staking Platform is a decentralized application built on Ethereum that enables users to stake STK tokens and earn RWD tokens as rewards. The entire system operates through smart contracts, requiring no intermediaries or centralized control.

### Key Features

 <b>Stake &amp; Earn</b> Lock your STK tokens to earn RWD rewards automatically	 <b>Dynamic APY</b> Returns adjust based on total pool size and participation
 <b>Time-Locked</b> 24-hour minimum staking period ensures stability	 <b>Real-Time Rewards</b> Watch your rewards accumulate every second
 <b>MetaMask Integration</b> Seamless wallet connection and transaction signing	 <b>Multi-Network</b> Supports both local development and Sepolia testnet

## How It Works

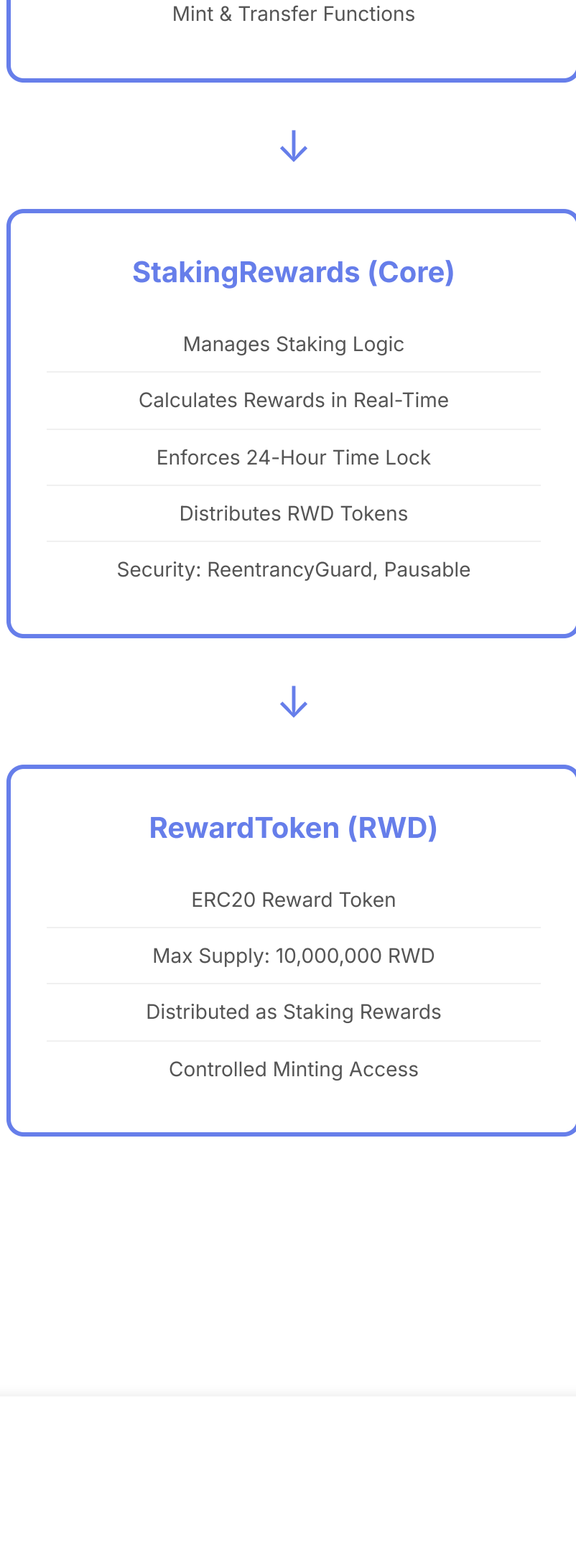
<b>1</b> <b>Connect Wallet</b> Connect your MetaMask wallet to the platform. The system automatically detects your network (Localhost or Sepolia) and loads the appropriate smart contracts.	<b>2</b> <b>Stake Tokens</b> Deposit your STK tokens into the staking contract. Tokens are locked for a minimum of 24 hours to ensure pool stability and fair reward distribution.
<b>3</b> <b>Earn Rewards</b> Rewards automatically accumulate in real-time based on your staked amount, time staked, and the global reward rate. Watch your balance grow every second.	<b>4</b> <b>Claim &amp; Unstake</b> Claim your RWD rewards anytime without unstaking. After 24 hours, withdraw your staked STK tokens along with any remaining rewards.

### Reward Calculation

**Formula:**  $\text{User Rewards} = (\text{Staked Amount} \times \text{Time} \times \text{Reward Rate}) / \text{Total Pool Size}$

The platform uses a time-weighted calculation to ensure fair distribution. The longer you stake and the more you contribute to the pool, the higher your rewards.

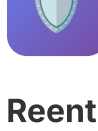
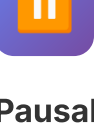


## Technical Architecture



## Technology Stack

<b>Smart Contracts</b> Solidity 0.8.20 OpenZeppelin Libraries	<b>Development Framework</b> Hardhat v3 TypeScript Support
<b>Frontend</b> React.js Modern Component Architecture	<b>Blockchain Interaction</b> Ethers.js v6 Web3 Provider Integration
<b>Testing</b> Mocha & Chai Automated Test Suite	<b>Network</b> Ethereum Hardhat Local & Sepolia Testnet

### Security Features

 <b>ReentrancyGuard</b> Protection against recursive call attacks	 <b>Pausable</b> Emergency stop functionality for critical situations
 <b>Time Locks</b> 24-hour minimum prevents flash loan attacks	 <b>SafeERC20</b> Secure token transfer mechanisms

## Deployment Information

<b>3</b> Smart Contracts	<b>2</b> Networks	<b>~1.2K</b> Lines of Code
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### Sepolia Testnet Deployment

<b>StakeToken (STK)</b> <code>0xEa3AeFcc0d8418f585eb969D406394c8D6088ED</code>
<b>RewardToken (RWD)</b> <code>0xC668843DA7E8BCc04F4a4C078D24B174749CE4</code>
<b>StakingRewards (Main Contract)</b> <code>0xD3EDd8B346Ec385C61D58a32c488f2888c5b9388</code>


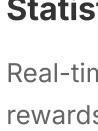


### Configuration

<b>Lock Period</b> 24 hours minimum	<b>Reward Pool</b> 500,000 RWD tokens
<b>Faucet Limit</b> 100 STK per day	<b>Network RPC</b> Alchemy API

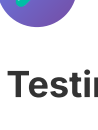

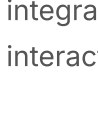
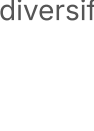
## User Interface

The platform features a clean, intuitive interface built with React. Users can connect their MetaMask wallet, view real-time statistics, and interact with the staking contract through a simple, card-based layout.

### Interface Components

 <b>Wallet Connection</b> One-click MetaMask integration with automatic network detection. The interface displays connected wallet address and current network (Localhost or Sepolia).
 <b>Statistics Dashboard</b> Real-time display of total pool size, current APY, personal STK balance, and earned RWD rewards. Updates automatically every 5 seconds.
 <b>Action Cards</b> Three main interaction areas: Stake tokens, Unstake tokens, and Claim rewards. Each card shows relevant balances and provides clear call-to-action buttons.
 <b>Transaction Notifications</b> Toast notifications inform users of transaction status (pending, confirmed, failed) with clear, friendly messages.

## Use Cases

 <b>Long-term Holders</b> Users who believe in the STK token can stake their holdings to earn passive income through RWD rewards while maintaining their position.	 <b>Learning DeFi</b> Educational platform for understanding staking mechanics, smart contract interactions, and decentralized finance concepts in a safe testnet environment.
 <b>Testing &amp; Development</b> Developers can use this platform to understand staking contract architecture and test Web3 integrations with real blockchain interactions.	 <b>Portfolio Diversification</b> Earn different tokens (RWD) by staking your existing tokens (STK), creating opportunities for portfolio diversification.

### Project Summary

Token Staking Platform demonstrates a complete end-to-end DeFi application, from smart contract development to frontend integration. The project showcases modern Web3 development practices, security patterns, and user experience design.

Built with industry-standard tools and frameworks, the platform is deployed on Ethereum's Sepolia testnet and accessible through any Web3-enabled browser. The modular architecture allows for easy extensions and modifications to suit different use cases.

[GitHub Repository](#)

[github.com/FadiTayh/token-staking-platform](https://github.com/FadiTayh/token-staking-platform)

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