HELIOS WHITEPAPER

Adding accountability to renewable energy

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Helios Whitepaper:

Pioneering the Future of Solar Efficiency and Decentralized Rewards.

The Helios project introduces a transformative leap in renewable energy technology with the world's first AI-powered Maximum Power Point Tracking (MPPT) controller, designed to enhance solar power efficiency by 5-10% over traditional systems—achieving an industry-leading 98-99% performance compared to the standard 93-97%. Leveraging advanced artificial intelligence, Helios optimizes energy harvest in real-time, even under challenging conditions like partial shading, maximizing yield for residential and commercial photovoltaic (PV) systems.

What sets Helios apart is its patented Energy-Synchronized Cryptographic Proof of Efficiency (PoE) system, a ground-breaking innovation that integrates hardware-embedded trust with a proprietary cryptocurrency, "Helios Coins." This system securely mints coins based on verified energy savings, validated by tamper-proof hardware and cryptographic ledger. Unlike conventional proof-of-work or proof-of-stake mechanisms, PoE ensures that every kilowatt-hour saved beyond baseline efficiency translates into tangible rewards, fostering a sustainable, decentralized economic ecosystem. Benefitting users with increased energy returns, financial incentives, and enhanced security, Helios combines cutting-edge engineering with eco-conscious design. Developed by seasoned experts in electronics and cryptocurrency innovation, this project promises to redefine solar power adoption while unlocking new opportunities in the green economy. This whitepaper explores the technology, implementation, and vision behind Helios' revolutionary approach.

Context of Helios within the renewable energy market.

The global renewable energy market is experiencing robust growth, with installed capacity projected to reach 5.08 thousand gigawatts (GW) in 2025, growing at a CAGR of 8.94% to 7.04 thousand GW by 2030. Solar PV leads this expansion, accounting for 42% of capacity in 2024 and expected to grow at a 13% CAGR through 2030, driven by declining module costs, technological advancements (e.g., perovskite-silicon cells), and supportive policies. In 2024, global PV capacity hit 2.2 TW, with 554-601.9 GW of new installations, led by China (357.3 GW) and the EU (62.6 GW). The US anticipates solar capacity rising to 128.2 GW by year-end, bolstered by federal incentives like the Inflation Reduction Act. However, challenges such as grid congestion, curtailment, and high initial costs persist, creating opportunities for innovative solutions like Helios. The market values renewable energy at USD 1.51 trillion in 2024, projected to reach USD 3.60-4.86 trillion by 2033, with a CAGR of 14.9%. Industrial applications dominate (61.63% share), driven by decarbonization goals, while Asia-Pacific holds 41-55% of the market, fuelled by China and India's aggressive targets (e.g., India's 500 GW non-fossil goal by 2030). AI and IoT integration are emerging trends, enhancing efficiency and grid flexibility, aligning with Helios' AI-driven MPPT.

Helios fits into this landscape as a niche, high-efficiency PV controller, targeting the growing demand for optimized solar systems. Its AI-powered MPPT, achieving 98-99% efficiency (5-10% above the 93-97% industry norm), addresses key pain points: partial shading losses and suboptimal energy harvest. The integration of a proprietary cryptocurrency ("Helios Coins") via PoE adds a unique value proposition, incentivizing efficiency gains and appealing to eco-conscious investors and users. This dual focus on technical performance and financial reward positions Helios as a disruptor in the utility-scale (65% market share) and commercial-industrial (C&I) segments, where energy cost savings and sustainability are priorities. The closed-loop blockchain minting, restricted to Helios devices, ensures exclusivity, differentiating it from generic MPPTs and public crypto projects (e.g., SolarCoin). Its hardware-embedded trust (TPM) and patentable PoE mechanism cater to a market seeking secure, verifiable solutions, particularly in regions with strong policy support (e.g., EU's REPower EU, India's green hydrogen initiatives).

Helios Coin potential applications.

Energy Credits Trading:

Users trade "Helios Coins" on exchanges (e.g., wrapped wHelios on the selected network) for energy credits or carbon offsets, appealing to C&I firms meeting ESG goals.

Use Case: A factory saves 10,000 kWh, mints 10,000 coins, and sells them for $5,000 (at $0.50/coin) to offset emissions.

System Upgrades:

Coins redeemable for Helios hardware upgrades (e.g., higher-capacity MPPTs) or maintenance, incentivizing long-term use.

Use Case: A homeowner uses 500 coins ($250 at $0.50/coin) to upgrade to a 1000W unit.

Community Energy Projects:

Coins fund local solar initiatives (e.g., rural microgrids), with communities earning rewards for collective efficiency gains.

Use Case: A village installs 50 units, mints 6,570 coins/year, and reinvests to expand capacity.

Decentralized Marketplace:

A peer-to-peer platform lets users buy/sell excess energy or coins, leveraging the closed-loop blockchain's security.

Use Case: A user with surplus 100 kWh trades 100 coins for $50, supporting grid flexibility.

Charitable Donations:

Coins donated to green causes (e.g., reforestation), enhancing Helios' eco-credibility.

Use Case: 1,000 coins ($500) donated to a UK rewilding project, promoted via social campaigns.

Design Methodology: A Precision-Engineered Ecosystem

The Helios Maximum Power Point Tracking (MPPT) controller emerges as a meticulously engineered solution, architected to elevate solar photovoltaic (PV) efficiency to best in class, while embedding a secure, proprietary cryptocurrency minting algorithm. This modular hardware ecosystem, tailored for 200-1000W PV deployments initially, will utilize the most advanced components currently available, each harmonized to achieve a system-wide efficiency of 98-99%— a remarkable 5-10% improvement over the industry benchmark of 93-97%. The design philosophy centres on scalability, security, and low-power operation, with a total energy consumption capped below 15W to preserve the incremental power gains (10-20W for a 200W system). These gains will provide the fuel to drive the proprietary "Proof of Efficiency" (PoE) mechanism.

At the heart of this hardware lies the AI/ML Processing Unit, a robust computational core embodied by the NVIDIA Jetson Nano—a quad-core ARM Cortex-A57 processor, augmented by a 128-core Maxwell GPU and 4GB of RAM, drawing a modest 5-10W. Alternatively, the Coral Dev Board with its Google Edge TPU, consuming a mere 5W, as a power-efficient variant. This unit serves as the intellectual nerve center, executing sophisticated machine learning models to dynamically optimize power extraction.

Complementing it is the Microcontroller, an STMicroelectronics STM32H7, boasting a 480 MHz Cortex-M7 core, 1MB Flash memory, and a 1W footprint, which orchestrates real-time control and sensor interfacing with precision. The DC-DC Converter, a custom-designed buck-boost topology, leverages Silicon Carbide (SiC) MOSFETs to achieve an efficiency exceeding 95%, adeptly managing variable PV inputs spanning 12-48V. This converter, a testament to high-voltage engineering prowess, adjusts impedance in real-time to align with the global maximum power point (GMPP), channelling optimized power to the battery or load. A suite of Sensors—comprising the INA219 for voltage and current measurement, the BH1750 for irradiance, and the DS18B20 for temperature—delivers a continuous stream of environmental data, each drawing minimal power (e.g., 1mA for INA219) to inform the AI's decision-making process.

The Cryptocurrency Module, anchored by the ESP32-WROOM-32 with its dual-core 240 MHz processor and integrated Wi-Fi, consumes a scant 1W. Enhanced by the Microchip ATTPM20P Trusted Platform Module (TPM), this module generates cryptographically secure PoE certificates, linking energy savings to the minting of "Helios Coins." The Communication Module, either the ESP32's native Wi-Fi or the Semtech SX1276 LoRa transceiver (0.1W), facilitates secure interaction with the Helios ledger, ensuring data integrity over long ranges or urban networks. Power is managed by the Texas Instruments TPS7A05 LDO Regulator, delivering stable 3.3V/5V outputs with a quiescent current of 1µA, in line with the system's efficiency ethos.

Housed in an IP65-rated enclosure, the Helios hardware withstands the rigors of outdoor deployment, reflecting a design optimized for durability and scalability. The implementation unfolds across five phases:

Concept and Design: (Q3 2025 kickoff) initiates with schematic development and component sourcing; Prototyping and Simulation (Q4 2025 kickoff) constructs and tests the initial model; Testing and Validation (Q3 2026 kickoff) verifies performance under diverse conditions; Optimization and Pre-Production (Q4 2026) refines the design and secures certifications; and Commercialization and Launch (Q4 2027) scales production and deploys the ecosystem. This phased approach ensures a robust transition from concept to market.

Algorithms for MPPT Optimization: A Computational Vanguard The pursuit of 98-99% efficiency mandates a sophisticated algorithmic framework, eclipsing conventional MPPT techniques. Helios employs a hybrid artificial intelligence (AI) approach, synergizing an Artificial Neural Network (ANN) with a Long Short-Term Memory (LSTM) network, executed on the Jetson Nano via TensorFlow Lite.

This dual-model architecture addresses the non-linear, time-varying nature of PV systems, particularly under partial shading, where traditional methods like Perturb and Observe (P&O) or Incremental Conductance (IC) falter, achieving only 93-97% efficiency.

The ANN Component is structured as a multi-layer perceptron, comprising 3-5 hidden layers with 10-20 neurons each, trained on a comprehensive dataset of voltage ((V)), current ((I)), irradiance ((G)), and temperature ((T)) profiles. The network's output, the predicted GMPP voltage (V_{mpp}) and current (I_{mpp}) is derived from the equation:

$$V_{mpp}, I_{mpp} = f_{ANN}(V, I, G, T; W, b)$$

where f_{ann} represents the activation function (e.g., ReLU), (W) denotes weight matrices, and (b) signifies bias vectors. Training employs supervised learning with backpropagation, optimized using the Adam algorithm (η=0.001) to minimise the mean squared error (MSE):

$$MSE = \frac{1}{n}\sum_{i=1}^{n}(y_i - \hat{y}_i)^2$$

where y_i is the actual GMPP, and y^i is the predicted value. The LSTM Component enhances this with a recurrent architecture, featuring 2-3 LSTM layers to capture temporal dependencies over 10-60 second intervals. The output is adjusted via:

$$h_t = LSTM(x_t, h_{t-1}; W_h, W_x, b)$$

where h_t is the hidden state at time (t), x_t is the input sequence, and W_h, W_x, (b) are learned parameters. Dropout (0.2) prevents overfitting during gradient descent training.

The Hybrid Integration combines outputs through a weighted average:

$$V_{mpp_{final}}, I_{mpp_{final}} = \alpha \cdot V_{mpp_{ANN}} + (1-\alpha) \cdot V_{mpp_{LSTM}}$$

where α=0.7, balancing ANN's spatial accuracy with LSTM's temporal refinement. This composite signal, updated at 100-500 ms intervals, drives the STM32 to modulate the DC-DC converter's duty cycle ((D)):

$$D = \frac{V_{out}}{V_{in}} = f(V_{mpp_{final}}, I_{mpp_{final}})$$

Validation against simulated I-V curves

$$(I = I_{sc}[1 - e^{-(V + I \cdot R_s)/V_t}]$$

, where I_{sc} is short-circuit current, Rs is series resistance, and Vt is thermal voltage, This ensures ±1% accuracy, achieving the desired 5-10% efficiency gain.

Linking MPPT Optimization to Proof of Efficiency

The algorithmic prowess of the hybrid ANN/LSTM model extends beyond optimization, serving as the lynchpin for the PoE mechanism. The process unfolds with meticulous precision: first, the AI computes the optimal V_{mpp} and I_{mpp}, yielding a power output $P_{out}=V_{mpp}*I_{mpp}$. This is compared against a baseline efficiency model ($P_{base}=0.93 \cdot P_{max}$, where P_{max} is the theoretical maximum), deriving the excess power $\Delta P=P_{out}-P_{base}$. Over time (t), the energy savings are quantified as:

$$E_{saved} = \int_0^t \Delta P dt$$

typically aggregated hourly (e.g., 131.4 kWh/year per 200W unit). The STM32 packages this data into a structured format, which the Jetson Nano validates against its trained model, ensuring consistency with expected PV behaviour.

This validated metric is transmitted to the Cryptocurrency Module, where the ESP32, fortified by the TPM, generates a PoE certificate. The certificate's cryptographic hash is computed as:

$$H = SHA - 256(E_{saved}, T_{stamp}, ID_{device}, S_{AI})$$

Where T_{stamp} is the timestamp, ID_{device} is the unique device identifier, and S_{AI} is the AI signature. The TPM signs this hash with a private key, producing a certificate that is immutable and tamper-proof. This certificate is then relayed via the Communication Module to the closed-loop blockchain, where consensus nodes verify its integrity using the public key, minting "Helios Coins" proportional to E_{saved} (e.g., 1 coin/kWh).

The linkage is seamless: the AI's optimization drives efficiency gains, which are cryptographically validated and transformed into economic value. This proprietary synergy, protected by the TPM and closed-loop architecture, distinguishes Helios from competitors in the space.

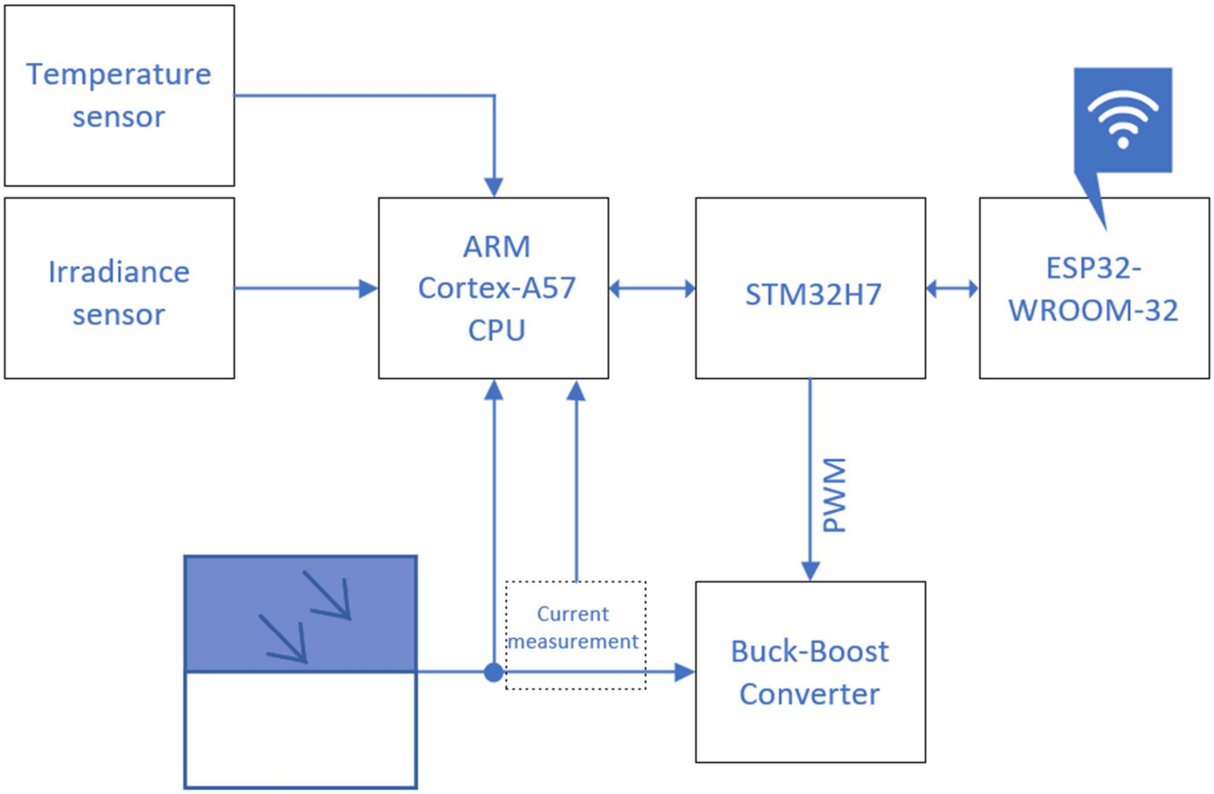

Figure 1- block diagram of Helios MPPT.

Approximate Costing to Reach Hardware Prototype Stage

The hardware prototype stage typically encompasses the design, assembly, and initial testing of a functional unit (e.g., a 200W MPPT controller as referenced in prior discussions). Based on available market data and project requirements, the following breakdown provides a rough estimate:

Design and Engineering Costs

PCB Design: Developing a multi-layer PCB with generic components (e.g., computational optimization unit, control unit) requires schematic capture and layout tools (e.g., Altium Designer or KiCad). Licensing or subscription costs range from $500-$2,000 annually, with 3-6 months of use estimated at $250-$1,000.

AI Algorithm Development: Implementing a hybrid ANN/LSTM model involves software engineering and training data preparation. Using open-source tools (e.g., TensorFlow) reduces costs, but labor for coding and optimization (assuming 100-200 hours at $50-$100/hour) totals $5,000-$20,000.

Cryptographic Integration: Designing the PoE mechanism with a secure hardware element (e.g., TPM-like module) requires security expertise. Initial design and testing may cost $2,000-$5,000, leveraging Raymond Thomson's experience to minimize external consultant fees.

Subtotal: $7,250-$26,000.

Hardware Components

Core Modules: Generic components (e.g., microcontroller, sensors for voltage/current/irradiance, power conversion module) are estimated based on MPPT controller market trends. A 10A-50A controller's component cost ranges from $70-$260 (per web data on ZHC Solar), scaling to a 200W prototype at $150-$300 per unit. For 2-5 prototypes, this totals $300-$1,500.

Enclosure and Peripherals

A weather-resistant enclosure (IP65-rated) and communication interface (e.g., Wi-Fi module) add $50-$150 per unit, or $100-$750 for 2-5 units.

Subtotal: $400-$2,250.

Generic enclosures will be preferred at this stage to proof out the hardware. Bespoke enclosures will follow at production stage.

Hardware interaction will be by Windows PC over a USB link or Wifi connection.

Fabrication and Assembly

PCB Manufacturing: A small batch (2-5 units) of a 4-layer PCB costs $200-$500, depending on complexity and supplier (e.g., JLCPCB or Seeed Studio).

Assembly: Manual or outsourced assembly, including soldering and testing, may cost $100-$300 per unit, totaling $200-$1,500 for 2-5 units.

Subtotal: $400-$2,000.

Testing and Validation

Equipment: Basic test gear (e.g., multimeter, oscilloscope, solar simulator) rental or purchase costs $500-$2,000 for initial validation.

Labour: Testing the AI optimization, PoE validation, and efficiency (98-99%) requires 50-100 hours at $50-$100/hour, totaling $2,500-$10,000.

Subtotal: $3,000-$12,000.

Contingency and Miscellaneous

Unforeseen costs (e.g., component shortages, redesigns) and administrative expenses (e.g., documentation, shipping) add a 20% buffer to the base estimate, or $2,210-$8,450.

Total Estimated Cost Range: $13,260-$50,700

Mid-Range Estimate: ~$32,000Assumptions: 2-5 prototypes to account for iterations.

Labor rates reflect mid-tier freelance or in-house engineers (e.g. Team members have relevant design experience).

Component costs align with 2025 market trends (e.g., MPPT controllers at $70-$600, per ZHC Solar).No large-scale production or advanced materials (e.g., Silicon Carbide) included yet.

Contextual Considerations

Phase 1 Alignment: As of August 26, 2025, Phase 1 (August 2025 - October 2025) focuses on ICO planning and initial design. The $500,000 ICO target (from tokenomics) covers this stage, with prototyping costs fitting within the $100,000/year budget for Phases 1-3.

Market Insights: The MPPT Solar Charge Controller market, valued at $178.2-$258 million in 2025 (per web data), suggests growing availability of affordable components, but custom AI and PoE features drive costs higher than off-the-shelf units ($70-$600).

Scalability: Costs may decrease with bulk orders or partnerships, but the prototype stage prioritizes functionality over economy.

Tokenomics

Overview

Helios Coin (HLC) is a pioneering cryptocurrency designed to reward solar efficiency, minted through the patented Energy-Synchronized Cryptographic Proof of Efficiency (PoE) mechanism. Initially represented by a placeholder token (HPL) launched prior to a dedicated blockchain, HLC offers flexibility to operate as a native token on established networks (e.g., Solana or Hedera TBC) or transition to a proprietary closed-loop blockchain. HLC is issued algorithmically based on verified energy savings (e.g., 1 HLC per kWh above a 93% efficiency baseline) achieved by Helios MPPT controllers, serving as a utility token with potential security characteristics, convertible to a wrapped version (wHLC) for public trading.

Token Supply Model

Uncapped, with issuance throttled over time to mirror Bitcoin's halving schedule, ensuring long-term viability while rewarding early adopters. The initial issuance rate is high to incentivize early deployment, decreasing over time, pegged to real world energy units.

Minting Mechanism

Algorithmic Issuance: HLC is minted based on hardware performance, with 1 HLC issued per kWh saved above 93% efficiency, validated by the hybrid ANN/LSTM AI model and signed by the Trusted Platform Module (TPM). The issuance rate is throttled using a halving schedule:

$$I_{HLC}(t) = I_0 \cdot \frac{1}{2^{\lfloor t/T_h \rfloor}} \cdot \int_0^t (P_{out} - 0.93 \cdot P_{max})dt$$

where $I_{HLC(t)}$ is the number of coins issued at time (t), I_0=1 HLC/kWh is the initial rate, T_h=4 years is the halving period, ⌊t/Th⌋ is the number of halvings, P_{out} is the actual power output, and P_{max} is the theoretical maximum. For example, after 4 years, the rate drops to 0.5 HLC/kWh, after 8 years to 0.25 HLC/kWh, and so on.

Network Flexibility:- If hosted on a third party blockchain, minting occurs via smart contracts with off-chain hardware data submission. A proprietary blockchain would use a permissioned PoE consensus.

Security Risk Assessment:- Algorithmic issuance linked to hardware carries a manipulation risk (e.g., spoofing efficiency data). This is mitigated by TPM encryption, AI validation, and on-chain audits. Regular security reviews and legal oversight will be implemented to address potential vulnerabilities and mechanisms will be in place to freeze any issuance points proven to have been manipulated or tampered with.

Burn Mechanism: A 10% token buyback and burn program is implemented, funded from the revenue generated by MPPT controller sales. For every controller sold (e.g., at an average price of $350), 10% of the proceeds—approximately $35 per unit—is allocated to repurchase wHLC from the open market. These repurchased tokens are subsequently burned, reducing the circulating supply. This mechanism, adjustable based on sales volume and market conditions, aims to offset the uncapped issuance, enhance scarcity, and stabilize HLC value. The buyback strategy will be subject to community governance to ensure transparency and alignment with economic goals.

Token Distribution

Initial Allocation (10 Million HLC):

40% (4 million HLC): Allocated to early adopters and users, convertible to HLC post-launch (Phase 5, July 2028), rewarding early deployment.

30% (3 million HPL): Dedicated to development, marketing, and operations (Phases 1-4).

20% (2 million HPL): Reserved for the placeholder token sale and team incentives, with a 24-month vesting period.

10% (1 million HPL): Held in a community fund for partnerships and charitable initiatives.

Post-Launch Distribution:- Ongoing minting allocates 70% to users, 20% to reinvestment, and 10% to the fund, adjusted for the chosen network.

Vesting Schedule:- Team and advisor tokens locked for 12-24 months, released linearly to align with long-term goals.

Value Drivers

Efficiency Correlation:- HLC value is tied to the 5-10% efficiency gain, with each coin reflecting energy savings, projected at $0.10-$0.50 initially, rising to $1-$5 by 2030 due to throttling.

Scarcity and Throttling:- The halving schedule mimics Bitcoin's scarcity model, increasing value as issuance slows, benefiting early adopters.

Network Choice:- Value may leverage Solana's high throughput (65,000 TPS) or Hedera's low fees ($0.0001/transaction), or a proprietary chain's control. Other networks will also be considered as part of due diligence.

Utility:- Redeemable for upgrades, energy credits, or community projects. It will also drive "accountability" in the renewables sector, quantifying output in a publicly verifiable way, and creating "value storage" which can be used to offset high carbon projects in other fields and sectors. It can also be used to trade for offsetting purposes in a wider economy.

Economic Model

Initial Valuation: The placeholder token (HPL) is priced at $0.25, targeting a $500,000 raise, with conversion to HLC at parity or a 10% bonus for early holders upon mainnet launch (July 2028).

Revenue Projections:

2025 (Phase 3): With 100 units deployed, approximately 13,140 HLC are minted (at 1 HLC/kWh), valuing $1,314-$6,570 (at $0.10-$0.50), alongside $100,000 from hardware sales.

2030 (Phase 5): With 35,200 units (35.2 MW), 2.32 million HLC are minted (at 0.5 HLC/kWh post-first halving), valuing $2.32-$11.6 million (at $1-$5), plus $12.32 million from hardware revenue.

2033: At 1% market share (70.4 MW), 4.63 million HLC are minted annually (post-second halving), valuing $4.63-$23.15 million, with hardware sales potentially exceeding $24.64 million.

Inflation Management: The throttled issuance schedule and 10% retail buyback work in tandem to mitigate over-issuance risks, with minimal network fees (e.g., Hedera's $0.0001) ensuring cost-effectiveness. Further strategies to increase scarcity will be considered TBC.

Bridging to Public Trading

Wrapped Token (wHLC): Minted HLC or converted HPL are wrapped as wHLC on a public network (e.g., Solana SPL or Hedera HTS), enabling trading on exchanges such as Binance or Kraken post-launch.

Two-Way Peg: A 1:1 peg links HLC to wHLC, managed by a smart contract or oracle system, subject to rigorous security audits to ensure reliability.

Liquidity Provision: A pre-mined reserve of HLC ensures initial trading volume, with the throttled minting process gradually introducing additional supply to the market.

Placeholder Token Strategy (Helios Pre-Launch Token - HPL)

Purpose: The HPL is introduced to raise initial capital of $500,000 to fund Phases 1-3 (August 2025 - September 2026) prior to the deployment of the dedicated blockchain or network integration.

Token Details:

Name: Helios Pre-Launch Token (HPL)

Type: Network TBC for the initial launch, convertible to HLC or wHLC.

Supply: 2 million HPL.

Pricing: $0.25 per HPL.

Distribution:

80% (1.6 million HPL): Offered in a public Initial Coin Offering (ICO) sale, restricted to accredited investors with Know Your Customer (KYC) and Anti-Money Laundering (AML) compliance.

10% (0.2 million HPL): Allocated to the team and advisors, vested over 12 months.

10% (0.2 million HPL): Reserved for marketing and legal expenses.

Conversion Mechanism:

1 HPL = 1 HLC (or wHLC) upon mainnet launch (July 2028), with a 10% bonus for early holders as an incentive for participation.

Conversion is executed via a smart contract, with HPL tokens burned post-exchange to prevent recirculation.

Timeline:

Q4 2025 (Phase 1): Announcement of the ICO and deployment of the smart contract.

Q1 2026 (Phase 2): Execution of the ICO to secure funding for prototyping.

Q3 2026 (Phase 3): Planning for conversion following testing and validation.

Regulatory Compliance: Adheres to UK Financial Conduct Authority (FCA) regulations, requiring registration as a cryptoasset business and inclusion of investor disclosures.

Use Cases and Applications

Energy Credits Trading: HLC can be traded for carbon offsets or renewable energy credits on public exchanges, appealing to commercial and industrial (C&I) entities pursuing sustainability goals.

System Upgrades: Users may redeem HLC for hardware enhancements, maintenance services, or advanced features, encouraging long-term adoption.

Community Projects: A portion of HLC from the community fund supports local solar initiatives, such as rural microgrids, boosting regional energy access.

Decentralized Marketplace: Facilitates peer-to-peer trading of energy or HLC within the ecosystem, enhancing flexibility and user engagement.

Charitable Donations: HLC contributions to green causes, such as reforestation, enhance the project's environmental impact and brand reputation.

Risks and Mitigations

Security Risk (Algorithmic Issuance): The potential for manipulation of efficiency data is mitigated through TPM encryption, AI validation, and on-chain audits, with provisions to freeze compromised issuance points.

Regulatory Risk: Compliance with FCA and EU MiCA regulations is ensured through legal consultation, potentially structuring HLC as a security token offering (STO) if required.

Market Volatility: Managed through the throttled issuance schedule and adjustable burn mechanism, with community oversight to maintain stability.

Integration and Notes

Completion: The section wraps up with Use Cases and Risks, providing a holistic view of HLC's economic and practical framework.

Proprietary Angle: The PoE mechanism and throttled issuance reinforce Helios' uniqueness, with network flexibility preserving strategic options.

Efficiency Goal: The 5-10% efficiency gain drives HLC minting, validated by AI and TPM.

Team

Allan Hawryluk – CEO. Allan is an IT specialist with a robust background in instrumentation and cryptocurrency, complemented by global deployments in the oil and gas industry and green energy projects. His expertise includes fiber-optic monitoring systems and the construction of renewable energy installations, such as solar, wind, and Tesla E-reserve projects. This hands-on experience and network equips him to optimize the Helios MPPT's AI-driven algorithms (ANN/LSTM) for real-time energy harvest in the real world, to acheive the project's efficiency goals and deployment targets. Allan's extensive work with large Bitcoin mining farms provides critical insights into scalable blockchain solutions and cryptocurrency operations. His dual expertise bridges IT infrastructure and crypto economics, supporting the project's transition from prototype to commercialization while maintaining security and performance.

James Thomson - Chief Technical Officer

James is an Electronic Engineer with an extensive background spanning mixed-signal electronics, harsh environment systems, and embedded technologies. With over a decade of experience, he has worked with industry leaders in Defence, energy and commercial sectors, specializing in Mil-spec electronics, renewables, and oil and gas applications.

His expertise in designing reliable systems for challenging conditions directly informs the Helios MPPT controller's durability and efficiency, targeting a 98-99% performance level—a 5-10% improvement over the industry standard of 93-97%.

James also brings a pioneering spirit to cryptocurrency innovation, having patented a world-first carbon offsetting system utilizing crypto to automate carbon credits (GB2200837.9). This ground-breaking work underpins the development of the PoE mechanism, which will securely mint "Helios Coins" based on verified energy savings. His leadership ensures the integration of hardware-embedded trust (via TPM) and the closed-loop blockchain, aligning Helios with both technical excellence and economic viability.

Roadmap

We didn't come this far to stop now.

Phase 1: Launch (Q3 -Q4 2025)

What's Happening: Our team will craft the first working model, programming smart technology, and testing ideas in simulations.

Key Steps: Assemble the prototype, develop software to optimize solar power, and test our crypto reward system.

Milestone: A functional prototype delivering enhanced efficiency.

Crypto "placeholder" coin launched on network TBC as early seed fundraiser.

Patents filed.

Phase 2: Real-World Testing (Q2 2026)

What's Happening: We're putting Helios through its paces in labs and field installations to ensure it outperforms standard systems.

Key Steps: Validate efficiency gains and test the secure coin-minting process.

Milestone: Proven results and a working crypto integration.

Phase 3: Refinement and Preparation (Q3 2027)

What's Happening: We're perfecting the design, building a small batch for testing, and securing patents for our unique technology.

Key Steps: Enhance performance, reduce costs, and earn industry certifications.

Milestone: Certified pre-production units and patent protection underway.

Phase 4: Launch and Growth (Q4 2027)

What's Happening: Helios hits the market main network, with our cryptocurrency ecosystem fully live and ready for users worldwide.

Key Steps: Partner with manufacturers, launch the app, and roll out to homes and businesses.

Key Steps: Assemble the prototype, develop software to optimize solar power, and test our crypto reward system.