White Paper

cGAS — A Decentralized Natural Gas Index Token

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Executive Summary

cGAS is a synthetic, crypto-native asset designed to provide decentralized, permissionless exposure to the price dynamics of natural gas. Built on **Arbitrum One** for low fees and Ethereum-grade security, cGAS enables users to track energy market movements on-chain—without intermediaries, custodians, or claims on the physical commodity. The protocol emphasizes a simple technical architecture, robust oracle policy, and a pragmatic multisig governance (no DAO planned).

Design pillars

- **Index, not a claim:** 1 cGAS references **1 MMBtu** as a *unit of account*. cGAS does **not** promise convertibility into physical gas or a stable price.
- **Oracle-driven fair quoting:** The reference price is sourced from reputable commodity price feeds and updated programmatically under strict risk controls.
- **Elastic supply + light fees:** Supply expands and contracts via mint/burn logic; protocol fees are **0.5% on mint** and **0.5% on burn** (DEX swap fees are independent).
- **DeFi-first integration:** ERC-20 on Arbitrum, composable with wallets, DEXs, and on-chain strategies.

Regulatory note: cGAS does not aim to maintain a stable value and has no redemption right to physical assets. Our preliminary view is that cGAS should not qualify as an Asset-Referenced Token (ART) under MiCA; however, classification depends on jurisdiction and evolving guidance. This document is not legal advice. The protocol will adapt if regulation requires.

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1. Introduction

Commodities anchor the real economy. Among them, **natural gas** is a strategic input for power generation, industry, and geopolitics. Yet gaining exposure to gas prices is typically reserved for professionals

via futures, CFDs, and specialized ETFs—centralized, costly, and gated.

DeFi removes frictions by turning market access into open, programmable primitives. Bitcoin disintermediated money; Ethereum disintermediated contracts. **cGAS** extends this trajectory by making **gas price exposure** crypto-native, transparent, and globally accessible.

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2. Problem Statement & Objectives

Problem. Retail and crypto-native users face limited, off-chain, and permissioned routes to natural gas exposure. Instruments like futures/CFDs require brokers, KYC, and carry complexity (margin, overnight fees, roll costs). Crypto lacks a widely-used, decentralized gas index token.

Objective. Deliver a crypto-native index token that:

- Tracks gas price dynamics on-chain;
- Minimizes reliance on centralized venues;
- Stays interoperable across DeFi;
- Preserves transparency and auditability.

cGAS is **not** a stablecoin and **not** a commodity receipt. It is an **index-style token** whose reference price comes from commodity markets and is propagated on-chain under risk-managed policies.

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3. Vision & Mission

Vision. Open access to strategic asset classes—like energy—through decentralized, composable primitives.

Mission. Provide the first widely usable **natural-gas-indexed ERC-20** on Arbitrum, prioritizing:

- Efficient on-chain execution;
- Clear oracle rules & circuit breakers;
- Operational governance via **2/3 multisig + timelock**; **no DAO planned**;
- A path to optional hybrid/backed models if regulation and adoption warrant.

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4. Positioning (Technical & Regulatory)

Technical. Arbitrum provides low fees and Ethereum security, ensuring a smooth UX and broad DeFi compatibility. Contracts follow OpenZeppelin standards with **UUPS** upgradability and safety guards.

Regulatory. cGAS does not represent a claim on physical gas and does not target price stability. Preliminary analysis suggests it should not fall under **MiCA ART**. Nevertheless, cGAS will adapt parameters, disclosures, and governance to align with evolving requirements. Users remain responsible for complying with local laws.

4.1 Chosen Blockchain — Arbitrum One

- **Low fees, high throughput** suitable for frequent price updates;
- **EVM-compatible** with wallets (e.g., MetaMask) and DEXs (Uniswap, Camelot);
- **Security inheritance** from Ethereum L1.

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5. Token Specification

Name: cGAS — "Crypto Gas Index"
Symbol: cGAS
Chain: Arbitrum One
Standard: ERC-20
Decimals: 18
Unit of account: 1 cGAS ≡ 1 MMBtu (reference unit)
Total supply: Elastic (mint/burn)

5.1 Technical Parameters (v1 defaults)

- **Oracle unit:** USD per MMBtu
- **On-chain price decimals:** 6–8 (implementation-specific)
- **Update cadence (target):** every **5 minutes** when markets are considered open
- **On-chain update threshold (Δ): ≥ 0.10%** vs. last recorded price
- **Stale price timeout:** soft-stale at **5 minutes**; **> 6 hours** triggers protective freezes (see §7.2)
- **Pause windows:** No updates on weekends and **daily 21:00–22:00 UTC**, plus policy-based weekend gating (see §7.2)
- **Protocol fees: 0.5% mint**, **0.5% burn** (DEX fees separate)
- **Transfer fee:** none (v1)

Parameters are configurable by governance/multisig within capped ranges and may evolve.

5.2 Mint Logic

- **Purpose:** Expand supply when users want fresh exposure at oracle-referenced quotes.
- **Mechanism:** The protocol exposes a mint function that prices new cGAS from an on-chain reference price **P**(USD/MMBtu) and a fee **f_mint** (0.5%). The user pays the quoted amount (e.g., in USDC) and receives newly minted cGAS.
- **Notes:**

- The mint module is configurable and may be **rate-limited** or **disabled** during adverse conditions.
- When enabled, the protocol may route part of proceedings to treasury and/or liquidity operations.
- Mint quotes do **not** imply a promise of future redemption at the same terms.

5.3 Burn Logic

- **Purpose:** Contract supply when users choose to exit via the protocol path.
- **Mechanism:** A symmetric burn function uses **P** and fee **f_burn** (0.5%) to quote an amount (e.g., USDC) returned upon burning cGAS, subject to circuit breakers and treasury liquidity.
- **Notes:**
  - The burn module is configurable and may be **rate-limited** or **disabled** (e.g., stale oracle, extreme volatility, governance action).
  - No right to physical delivery is created. Redemptions are **on a best-effort basis** within protocol safety limits.
  - Users can always swap cGAS on DEXs irrespective of protocol burn availability.

5.4 No Physical Collateral

cGAS holds **no physical gas** and creates **no claim** on warehouses, pipelines, or utilities. The protocol may maintain **stablecoin reserves** for operational liquidity when mint/burn modules are active, but these are **not** physical-asset backing and do not constitute a commodity receipt.

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6. User Utility & Use Cases

- **Open access:** Acquire/sell cGAS using a Web3 wallet—no broker account. Front-ends may apply geo-filters where required.
- **DeFi composability:** Provide liquidity on DEXs, integrate in vaults, hedging, structured notes.
- **Portfolio diversification:** Add an **energy-linked** exposure uncorrelated to pure crypto factors.
- **Builders' primitive:** Use cGAS as a leg in **energy baskets** (e.g., cGAS + cCOPPER), option vaults, or structured products.

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7. Architecture Overview

7.1 Smart Contracts

- **Standards:** OpenZeppelin ERC-20; **UUPS** proxy upgradability.
- **Admin model:** 2/3 multisig (initial), with **timelock** on sensitive parameter changes.
- **Safeguards:** pausability, rate limits, supply caps, and emergency circuit breakers.

7.2 Price Oracle Policy

Primary source (v1): Commodities-API (USD/MMBtu reference for natural gas). An off-chain automation fetches quotes and pushes them on-chain subject to:

- **Cadence:** target every **5 minutes** during policy-defined market-open windows;
- **Change threshold:** push only if $|\Delta| \geq$ **0.10%** from last on-chain price;
- **Stale handling:** if no fresh data **> 6 hours** (except during scheduled closures), **auto-freeze** mint/burn; DEX swaps remain unaffected;

- **Volatility guard:** a **±20%/h** implied move triggers suspension and manual review;
- **Market hours policy:** no updates on **Saturday**, **Sunday before 23:00 UTC**, and **daily 21:00–22:00 UTC**;
- **Fallbacks (planned):** introduce decentralized oracles (Chainlink, API3, RedStone) and medianization.

Automation implementation (v1):

- Off-chain **GitHub Actions** or **managed VPS** task executes every 5 minutes;
- API key budget sized (e.g., **10,000 calls/month**) to accommodate cadence and headroom;
- On-chain writes occur only when threshold conditions are met to optimize gas.

7.3 Security & Technical Governance

- **Code quality:** based on OZ libraries; unit tests and integration tests using Foundry/Hardhat.
- **Upgrades:** guarded by multisig + timelock; emergency pause available.
- **Audits:** internal review pre-launch; external audit targeted before DAO phase.
- **Bug bounty:** program to be announced post-launch.

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8. Tokenomics

8.1 Fees (v1)

- **Mint fee: 0.5%** (of notional)
- **Burn fee: 0.5%** (of notional)

- **DEX fees:** per-pool (e.g., 0.05–0.3% on Uniswap/Camelot); unrelated to protocol fees

8.2 Use of Revenue

- Oracle and infrastructure costs (API, automation, RPC)
- Security (audits, bounties) and ongoing development
- Liquidity incentives and ecosystem grants
- Treasury reserves for orderly mint/burn operations

8.3 Elastic Supply Mechanics

Supply expands when users mint and contracts when they burn. There is **no stability target**; cGAS floats with market demand and the reference price path. Governance can adjust limits (daily mint caps, per-address rate limits) to manage risk.

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9. Governance

- **Model:** 2/3 multisig with published signers and a timelock on sensitive changes.
- **No DAO planned:** There is currently no plan to introduce token-based governance or a DAO. Governance remains operational and accountable via the multisig.
- **Change management:** Parameter updates (fees, thresholds, rate limits) and upgrades follow a public proposal → review → timelock → execution flow.
- **Transparency:** On-chain roles, admin addresses, and parameter bounds are published in the docs and contract comments.
- **Emergency controls:** Pause, circuit-breakers, and safe-mode procedures are documented and periodically tested.

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10. Roadmap

Status (September 2025):

- **Mainnet deployed** on Arbitrum One.
- **Whitepaper v1** published.
- **Oracle updater live** (target cadence 5 min; on-chain push if $|\Delta| \geq 0.10\%$).
- **Initial DEX liquidity** seeded.
- **2/3 multisig + timelock** configured; emergency pause in place.

Phase A — Post-Launch Stabilization (Q3 2025 — current)

- Monitor oracle accuracy, thresholds, and pause logic.
- Improve monitoring, alerting, and incident runbooks.
- Public docs for parameters and admin addresses.

Phase B — Liquidity & UX (Q4 2025)

- Deepen liquidity on Arbitrum DEXs (Uniswap/Camelot).
- Front-end polish: market-hours banner, status badges, clearer fee disclosures.
- Basic analytics: price history, supply metrics, update cadence dashboard.

Phase C — Security Hardening & Audit (Q4 2025–Q1 2026)

- Add **secondary oracle provider** (e.g., Chainlink/API3/RedStone) and medianization.
- External smart-contract audit; publish report.
- Launch bug-bounty with defined scope and rewards.

Phase D — Listings & Integrations (Q1–Q2 2026)

- Apply to **CoinGecko/CMC**; integrate with portfolio trackers.
- DeFi integrations (vaults, derivatives).

- Explore selective CEX listings (if aligned with strategy).

Phase E — Product Evolution (Q2–Q4 2026)

- Research additional commodity token (e.g., **cCOPPER**).
- Explore optional hybrid/backed model if legal/market conditions warrant.
- Expand documentation and SDKs for builders.

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11. Risk Factors

Oracle risk. Third-party data may be delayed or erroneous. Stale or anomalous updates can misprice mint/burn. cGAS employs thresholds, timeouts, and circuit breakers, but cannot eliminate oracle risk.

Liquidity risk. Early-stage liquidity may be thin; entering or exiting size may incur slippage. Protocol and community are expected to grow on-chain liquidity over time.

Regulatory risk. Rules can change. Jurisdictional interpretations may affect issuance, governance, or market access. cGAS will adapt, and front-ends may apply geofencing.

No physical backing. cGAS is not redeemable for physical gas and does not represent warehouse receipts. Treasury reserves (if any) are not commodity collateral.

Smart-contract risk. Bugs, misconfigurations, or upgrade risk may lead to loss. Audits reduce risk but do not guarantee safety.

Operational risk. API outages, automation failures, or RPC issues may delay updates, triggering protective freezes.

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12. Legal, Compliance & Disclaimers

- **Not a security / not an ART (preliminary view):** cGAS is designed as an index-style token without stability or physical redemption. This is **not legal advice**. Independent counsel is recommended.
- **No investment advice:** Nothing herein constitutes financial advice. Crypto assets are volatile and may lose value.
- **Jurisdictional limits:** Access may be restricted in some regions. Users are responsible for local compliance.
- **Self-custody risks:** Users must safeguard their wallets and private keys. Transactions are irreversible.

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13. Annexes

A. Units & Notation

- **MMBtu:** million British thermal units; energy unit used in gas markets.
- **Reference price P:** USD/MMBtu from oracle after normalization.
- **Δ threshold:** minimum relative change required to push a new on-chain price.

B. Market Hours Policy (v1)

- **No updates:** Saturday; Sunday before **23:00 UTC**; daily **21:00–22:00 UTC**.
- Policy may evolve to follow exchange calendars more closely; front-end will display current status.

C. Implementation Notes

- **Automation:** GitHub Actions or VPS task every 5 minutes; push on-chain only if $|\Delta| \geq 0.10\%$.
- **Rate limits:** API plan sized around **10,000 calls/month** (headroom above baseline cadence).
- **Open-source repos:** Oracle updater and front-end repositories will be published and versioned. Contract source verified on Arbiscan.

D. Contact & Community

- Official links and contact channels are announced via the website and verified socials. Beware of impersonators.

Change Log

- **v1.0 (Sep 18, 2025):** Initial public whitepaper for cGAS on Arbitrum.