

TS-GMRI Methodology v1.1.2 — Addendum (Wrapper Extension + Tolling + ETF/ROY Slots + Future Sub-Slot Framework)

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Revision log

Version	Date	Change	SHA-256
v1.1 (PROD)	16 June 2026 22:36 UTC	Initial registration as TS-GMRI- PROD	ac040556f1685f263f70f70b395d3d519168988d0986828bfa
v1.1 (MEQ)	17 June 2026	Renamed PROD → MEQ; broadened to 5 value- chain segments	e092ea600dd803aad9338722e9e02fc59992e1d43f525f9a61
v1.1.1	17 June 2026	Tolling clarified (midstream);	7ede98c4aa01ec7ad32ec7ebe3a62b306326631965a98732e5

Version	Date	Change	SHA-256
v1.1.2	17 June 2026	2 new slots: TS-GMRI-ETF (etf-wrapper), TS-GMRI-ROY (royalty-only sub-slot) Added §5 Future sub-slot candidate framework (monitored, not trademark-claimed) + §6 version freeze commitment until 1 January 2027	(this file)

All prior versions are preserved at `/gmri/historical/` together with their original OTS proofs.

0. Scope of this addendum

This addendum **does not modify** v1.0. The v1.0 framework — base date, base value, weighting equations, eligibility section, re-balancing schedule, all 16 originally registered family members — remains canonical, byte-stable, and Bitcoin-stamped.

This addendum **extends** the TS-GMRI family with one new registered methodology slot and formalises the concept of a **wrapper dimension** in the universe, alongside the existing dimensions of *filter* (which metals) and *weighting* (how they combine).

0.1 Naming history (transparency)

The slot introduced here was initially registered on 16 June 2026 at 22:36 UTC under the working code **TS-GMRI-PROD** (Producers). Within one hour the code was renamed to **TS-GMRI-MEQ** (Metal Equity) for two reasons:

1. **Disambiguation.** “PROD” was readable as *producer*, *production output*, or *product*. The latter two meanings conflict with existing production-data language elsewhere in the TS-GMRI documentation.
2. **Scope precision.** The slot is defined by its *wrapper* (tokenized equity), not by a single value-chain role. The slot must therefore accommodate miners, refiners, smelters, recyclers, royalty/streaming firms, and integrated commodity traders — all of which are metal-economy equities. “MEQ” denotes the wrapper; “PROD” implicitly narrowed it to upstream producers.

The original PROD addendum is preserved at `/gmri/historical/methodology-v1.1-addendum-prod-superseded.md` together with its SHA-256 (`ac040556f1685f263f70f70b395d3d519168988d0986828bfafff6d1170db420`) and its OpenTimestamps proof. The PROD prior art and the MEQ prior art therefore both stand, with MEQ as the canonical name from 17 June 2026 onward.

1. New concept: wrapper dimension

Up to v1.0, every TS-GMRI member shared the same wrapper type:

Wrapper = direct physical-metal claim. A constituent token represents a fractional ownership interest in a specific quantity of physical metal held in a vault, refinery, or other physical custody, redeemable or backed 1:1 in audited form.

v1.1 introduces an explicit **wrapper field** on each family member. The wrapper field declares the *type of legal claim* the underlying constituent represents. Permitted values:

Wrapper code	Meaning	Example constituents
physical		

Wrapper code	Meaning	Example constituents
	Direct claim on physical metal in vault	PAXG, XAUT, KAU, KAG, XAUM, XAGM, ... (the v1.0 universe)
equity	Tokenized share in a metal-economy company	Robinhood EU stock tokens (BHP, RIO, NEM, FCX), Dinari dShares (dFCX, dNEM, dSQM), Backed Finance xStocks, Swarm Markets
etf-wrap	Tokenized share in an existing physical-metal ETF	Backed Finance bGLD (PAX Gold via ETF), tokenized GLD/SLV/GDX (where issued)
royalty	Tokenized share in a royalty/streaming company	Future tokenization of Wheaton, Franco-Nevada, Royal Gold, Triple Flag (none live as of 17 June 2026) — reserved for prior art
derivative	Tokenized swap, perp, or forward on metal	Excluded; methodology slot reserved for prior art only

Wrappers are not additive. A reader may not sum TS-GMRI (physical wrapper) with TS-GMRI-MEQ (equity wrapper) to derive a single “metals exposure” figure. The underlying economic claims are mathematically distinct (a kilogram of bullion ≠ a share of a mining company), and the risk decompositions differ materially.

All sixteen v1.0 family members are hereby tagged wrapper = physical. This tagging is a documentation refinement only; no value, weight, or eligibility rule changes.

2. New family member: TS-GMRI-MEQ (slot, awaiting constituents)

Field	Value
Code	GMRI -MEQ
Display name	TS-GMRI Metal Equity
Wrapper	equity
Filter rule	wrapper = equity AND issuer_business ∈ metal_value_chain
Weighting	Market-cap weighted with 25% single-issuer cap
Base date	7 June 2026 (shared with rest of family)
Base value	100
Publication threshold	$N \geq 3$ eligible constituents from ≥ 2 distinct tokenization issuers AND ≥ 2 distinct value-chain segments
Current N	0
Current value	Not published (below threshold)
Status	Methodology slot — pre-launch

2.1 Eligible value-chain segments

A constituent issuer must operate primarily ($\geq 50\%$ of revenue or identifiable assets) in **one of the following five segments** of the physical-metal value chain:

Code	Segment	Examples (conventional listings; tokenization to follow)
upstream_producer	Mining and extraction of physical metal	BHP, Rio Tinto, Newmont, Freeport- McMoRan, SQM,

Code	Segment	Examples (conventional listings; tokenization to follow)
midstream_refiner_smelter	Refining or smelting of metal concentrates and recyclate, including both take-title refiners (who buy concentrate/scrap and sell refined metal on own account) and toll refiners (who provide processing services for a fee without taking title to the metal)	Albemarle, Vale, Anglo American Aurubis (copper refining — mixed take-title + tolling), Boliden (zinc/copper smelting), Umicore (precious-metal refining), Asahi Holdings (refining), Heraeus (PGM tolling), Johnson Matthey (PGM tolling), Asahi Refining
recycler_scrap	Collection, processing, and re-melting of metal scrap	Sims Metal Management, Schnitzer Steel Industries, Aurubis recycling segment
royalty_streamer	Royalty and streaming rights to metal production without operating mines	Wheaton Precious Metals, Franco-Nevada, Royal Gold, Triple Flag Precious Metals
physical_trader_logistics	Physical-commodity trading and logistics where \geq 50% of revenue derives from physical metals	Glencore (when applicable), publicly-listed integrated commodity traders

The five-segment classification permits cross-cutting filters in future addenda (e.g. a sub-slot for streamers only) without redefining MEQ.

2.2 Eligibility

A constituent token is eligible for TS-GMRI-MEQ if and only if **all** of the following are satisfied:

1. The underlying equity is listed on a recognised stock exchange in the LSE, NYSE, NASDAQ, HKEX, ASX, TSX, SGX, JPX, or SIX universe.
2. The issuing company's primary business ($\geq 50\%$ of revenue or $\geq 50\%$ of identifiable assets) falls in one of the five value-chain segments enumerated in Section 2.1, as evidenced by audited annual reports (GICS Materials sub-industries 1510101010 through 1510304030, plus 2030101010 trading conglomerates where physical-metal exposure dominates). **Title-passage neutrality:** for the midstream segment, the eligibility test is satisfied irrespective of whether the issuer takes title to the metal it processes (take-title refining) or earns a treatment-charge / refining-charge / tolling fee without title (toll refining).
3. The tokenization wrapper is regulated by a tier-1 jurisdiction regulator: US SEC/FINRA broker-dealer, EU MiFID II investment firm, CH FINMA, HK SFC Type 1/4/7, or SG MAS CMS.
4. The token issuer has published the on-chain smart contract address(es) of the constituent token, and maintains a verifiable 1:1 backing audit performed at least monthly by a qualified independent auditor.
5. The constituent token has a 30-day rolling average daily on-chain trading volume of at least USD 50,000 across its primary venues, as measured by CoinGecko or equivalent aggregator.
6. The token issuer publishes regular share-backing attestation (monthly minimum).

A constituent that ceases to satisfy any of the above is removed at the next scheduled re-balance (monthly), with no retroactive adjustment to historical index values.

2.3 Weighting

TS-GMRI-MEQ uses **market-cap weighted, issuer-capped at 25%**, with overflow redistributed pro-rata to uncapped issuers. The cap is set higher than the 20% used in TS-GMRI-CAP20 because the MEQ universe

is expected to be smaller at launch ($N = 3$ to 30) and the cap-redistribution effect therefore more material. The cap is reviewed annually at the calendar-year-end re-balance.

Market cap is computed as: token's on-chain circulating supply \times the issuer's published share price at 23:59 UTC on the re-balance date. Where the issuer publishes the share price in a currency other than USD, the WM/Reuters 16:00 London Fix on the same date is used for conversion.

2.4 Segment-dominance safeguard

To prevent a single segment from determining the index in its early stages, the publication threshold requires constituents from **at least two distinct value-chain segments**. Once $N \geq 10$, this safeguard is relaxed to "no single segment may exceed 60% of total cap-weight" applied at each monthly re-balance.

2.5 Risk decomposition vs core TS-GMRI

A TS-GMRI-MEQ constituent's price equals (approximately):

| metal-economy equity value \times tokenization wrapper basis

A TS-GMRI (core) constituent's price equals (approximately):

| reference metal price \times redemption discount/premium

The TS-GMRI-MEQ price therefore carries three additional risk dimensions that TS-GMRI does not:

1. **Operational leverage.** Producer, refiner, and recycler equity moves more than the underlying metal in both directions; the multiplier varies by segment. For miners it approximates $(1 + \text{debt/equity}) \times (1 - \text{all-in-sustaining-cost} / \text{metal price})$. Royalty and streaming firms have lower operational leverage but higher counterparty exposure to the operating mines they finance.
2. **Management quality.** Capex discipline, hedge book, jurisdiction allocation, dividend policy, M&A history.
3. **Securities regulation.** The wrapper is a security in every tier-1 jurisdiction; the constituent token is subject to KYC/AML, suitability, and trading-venue restrictions that do not apply to physical-metal wrappers.

These risks are inherent to the equity asset class. The index does not attempt to hedge them; TS-GMRI-MEQ is published as a *benchmark of the wrapper's natural performance*, not a synthetic pure-metal exposure.

2.6 Rationale for slot registration on 17 June 2026

As of the slot registration date, no operator has published a public benchmark dedicated to tokenized metal-economy equities. The natural analogs in conventional finance — GDX (VanEck Gold Miners), COPX (Copper Miners), SIL (Silver Miners), LIT (Lithium & Battery Tech), URA / URNM (Uranium), PICK (iShares Diversified Mining), GOEX (Global Gold Explorers) — are each multi-billion-dollar products and have been live for 10–20 years. The tokenized equivalent is in early formation:

- **Robinhood EU stock tokens** (live since June 2025) include BHP, Rio Tinto, Newmont, Freeport-McMoRan, SQM, Albemarle.
- **Dinari dShares** offers dFCX, dNEM, dSQM and others to non-US investors.
- **Backed Finance xStocks** has confirmed the technical capability to add metal-equity wrappers; no dedicated launches as of 17 June 2026.
- **Swarm Markets** (BaFin-regulated) hosts tokenized equities including selected miners.

The publication threshold of $N \geq 3$ from ≥ 2 distinct tokenization issuers and ≥ 2 distinct value-chain segments is expected to be met within the 2026 H2 – 2027 H1 window for the upstream-producer segment, and 2027 – 2028 for the midstream and royalty segments. The slot is registered now to establish prior art for the methodology framework, in line with the v1.0 principle of *registering rules ahead of constituents* (the same approach used for TS-GMRI-BASE, -BTR, -FE, -LT, -MN, -REF, -STL, -CRT, -FA, and -JUR at v1.0 publication).

3. Family member count update

The TS-GMRI family now comprises **17 registered members**:

- 6 live: TS-GMRI, TS-GMRI-EW, TS-GMRI-CAP20, TS-GMRI-AU, TS-GMRI-PRE, TS-GMRI-NONAU.
- 11 methodology slots (pre-launch): TS-GMRI-BASE, TS-GMRI-BTR, TS-GMRI-FE, TS-GMRI-CRT, TS-GMRI-FA, TS-GMRI-LT, TS-GMRI-MN,

TS-GMRI-REF, TS-GMRI-STL, **TS-GMRI-MEQ (new in v1.1)**, TS-GMRI-JUR.

All other v1.0 specifications — eligibility (Section 3 of v1.0), data discipline, re-balancing schedule, governance, license, and the v1.0 base date and value — are preserved without amendment.

4. Integrity proof

This addendum is timestamped via OpenTimestamps onto the Bitcoin blockchain. The published artifacts are:

- `methodology-v1.1-addendum.md` (this file, locked source)
- `methodology-v1.1-addendum.pdf` (typeset copy of this file)
- `methodology-v1.1-addendum.sha256.txt` (SHA-256 hex digest of the .md)
- `methodology-v1.1-addendum.ots` (OpenTimestamps proof referencing the .md SHA-256)

The OpenTimestamps proof references the SHA-256 of `methodology-v1.1-addendum.md` only. Any modification of this addendum invalidates the proof and is detectable.

Two prior-art artifacts cover the same conceptual slot, both Bitcoin-stamped:

- `/gmri/historical/methodology-v1.1-addendum-prod-superseded.md` (TS-GMRI-PROD, SHA-256 `ac040556...`, stamped 16 June 2026 22:37 UTC)
- `/gmri/methodology-v1.1-addendum.md` (TS-GMRI-MEQ, this file, stamped 17 June 2026)

The first establishes prior art over the equity-wrapper concept; the second establishes prior art over the canonical name and the broadened value-chain scope.

5. Future sub-slot candidates — monitored, not registered

The methodology framework permits adding new family members when **BOTH** conditions are met:

1. A distinct TradFi or wrapper-class parallel emerges — a recognised sub-segment exists in conventional indices, ETFs, or regulated venues, AND
2. ≥ 3 eligible tokenized constituents from ≥ 2 distinct issuers exist on public venues over a 90-day window, OTSFA-compliant.

The following sub-slots are **monitored but NOT trademark-claimed**. They become registered slots only when both threshold conditions above are independently verified.

Candidate	Status today (17 June 2026)	Currently absorbed by	Trigger registered
Tolling refiners	0 tokenized issuers	TS-GMRI-MEQ via §2.1 title-passage neutrality	≥ 3 tokenized toll refiners from ≥ 2 issuers
Recycling / secondary smelting	0 tokenized issuers	TS-GMRI-MEQ via business_segment=recycler_secondary_smelter	≥ 3 tokenized recycler from ≥ 2 issuers (Aurubis, Umicore, Sims Metals etc.)
Refining take-title pure-play	0 tokenized issuers	TS-GMRI-MEQ	Same threshold needs distinct correlation profile (vs MEQ)
	n/a	n/a	

Candidate	Status today (17 June 2026)	Currently absorbed by	Trigger register
Mining juniors index			Would require distinct issuer-class liquidity floor; ≥ 1 eligible juniors from ≥ 3 jurisdictions
Storage / vaulting providers	0 tokenized issuers	n/a	Would emerge as service-wrapper class; need ≥ 3 tokenized vault operators (Brink's, Loomis, Bullion etc)
Exchange / clearing infrastructure	0 tokenized issuers	n/a	LME/COMEX adjacent tokenized equity wraps; ≥ 2 venues

This section codifies the framework's openness to evolution without pre-emptive landgrab. Consistent with OTSFA principle: **data must precede the index, not follow it.**

The list is illustrative, not exhaustive — any future sub-slot proposal must clear both (a) and (b) before registration, regardless of whether it appears above.

6. Version freeze commitment

This methodology document (v1.1.2) is **frozen until 1 January 2027** unless a critical defect requires correction. Routine improvements, clarifications, and expansion proposals are deferred to the first scheduled quarterly review:

- **Next planned revision:** v1.2 — January 2027 (quarterly review window).
- **Permitted interim edits:** typo fixes, broken links, and clarifications that do not alter eligibility rules, weighting equations, or family membership.
- **Prohibited interim edits:** new family members, new sub-slots, threshold changes, weighting changes, base-date changes, wrapper definitions.

This freeze establishes institutional discipline. Frequent methodology drift undermines index credibility; index providers (S&P, MSCI, FTSE, Bloomberg) typically issue major revisions on an annual cadence with rare mid-year clarifications. TS-GMRI adopts the same discipline from inception.

A dated freeze statement is preferred over an open-ended one because it (i) acknowledges the project is in early stage where some evolution is expected, (ii) sets an explicit checkpoint for the next review, and (iii) removes ambiguity about which edits are permissible in the interim.

7. Trademark notice

TrueSource Metals™, TS-GMRI™, Global Metals RWA Index™, TS-GMRI-MEQ™, TS-GMRI-ETF™, TS-GMRI-ROY™, TS-GMRI-EW™, TS-GMRI-CAP20™, TS-GMRI-AU™, TS-GMRI-PRE™, TS-GMRI-NONAU™, TS-GMRI-BASE™, TS-GMRI-BTR™, TS-GMRI-FE™, TS-GMRI-CRT™, TS-GMRI-FA™, TS-GMRI-LT™, TS-GMRI-MN™, TS-GMRI-REF™, TS-GMRI-STL™, TS-GMRI-JUR™, OTSFA™ are unregistered trademarks claimed by TrueSource Metals (Hong Kong), first published 7 June 2026 (core family), 17 June 2026 (TS-GMRI-MEQ, TS-GMRI-ETF, TS-GMRI-ROY). The candidate sub-slots listed in §5 are **explicitly not trademark-claimed** until they pass the threshold criteria. All other names, marks and logos are the property of their respective owners.

End of v1.1 addendum (revision v1.1.2). v1.0 remains canonical for all matters not explicitly amended above.