

Lumen Copper: Decarbonisation to 2035

Prepared for Board of Lumen Copper

AUDIENCE	DOCUMENT	DATE	STATUS
Board of Lumen Copper	Presentation	October 2026	Draft for Review

Executive Summary

Situation

- Chile and Peru supply **34.8%** of mined copper on direct USGS estimates.
- Lumen's illustrative **420 kt** output carries **1.05 MtCO₂e** of Scope 1+2 emissions.

Complication

- Fleet underdelivery leaves **0.61 MtCO₂e**, above the 0.525 Mt halving threshold

Answer

- Endorse a staged **\$1.4bn** pathway targeting **53%** lower emissions; underwrite premiums separately

Supporting Pillars

- **Supply constraints and emerging differentiation reward credible low-carbon supply:** Direct USGS estimates place Chile and Peru at **34.8%** of mine supply, while the IEA copper survey records premiums for only **20%** of respondents.
- **Power and haulage explain 83% of our emissions exposure:** Illustrative company data allocate **52%** of emissions to electricity and **31%** to haul-truck diesel, identifying the principal intervention points.
- **Sequenced levers could reduce absolute emissions by 53%:** The illustrative bridge reconciles **0.64 MtCO₂e** of gross abatement against **0.08 MtCO₂e** of growth, reaching **0.49 MtCO₂e**.
- **Verified cathode eligibility creates upside without assuming a premium:** Current cathode output caps the initial pool at **120 kt**, below the original **126 kt** proposition, before footprint qualification and buyer allocation.
- **Staged capital protects value while management proves delivery:** Fleet and charging account for **\$0.8bn** of the **\$1.4bn** envelope, making technical performance, funding capacity and accountable capital release decisive.

Agenda

01 Strategic Case

Copper supply security matters, but premium evidence remains selective. Our strategy combines reliable delivery with measurable sustainability attributes rather than assuming a universal green premium.

02 Baseline and Drivers

Illustrative company data establish a prioritisation hypothesis, not verified operating performance. Consistent boundaries and metered activity turn that hypothesis into an accountable baseline.

03 Abatement and Roadmap

Renewable power and efficiency lead; electrified haulage completes the halving case. The bridge reconciles growth and incremental savings, with no unmodelled Wave 3 benefit.

04 Resilience and Commercialisation

Water and circularity strengthen resilience while product-specific evidence supports differentiation. Current cathode availability constrains the first offer before certification and buyer placement.

05 Capital and Accountability

The \$1.4bn envelope is a planning commitment, not unconditional expenditure. Technical performance, funding headroom and buyer evidence govern subsequent capital release.

01

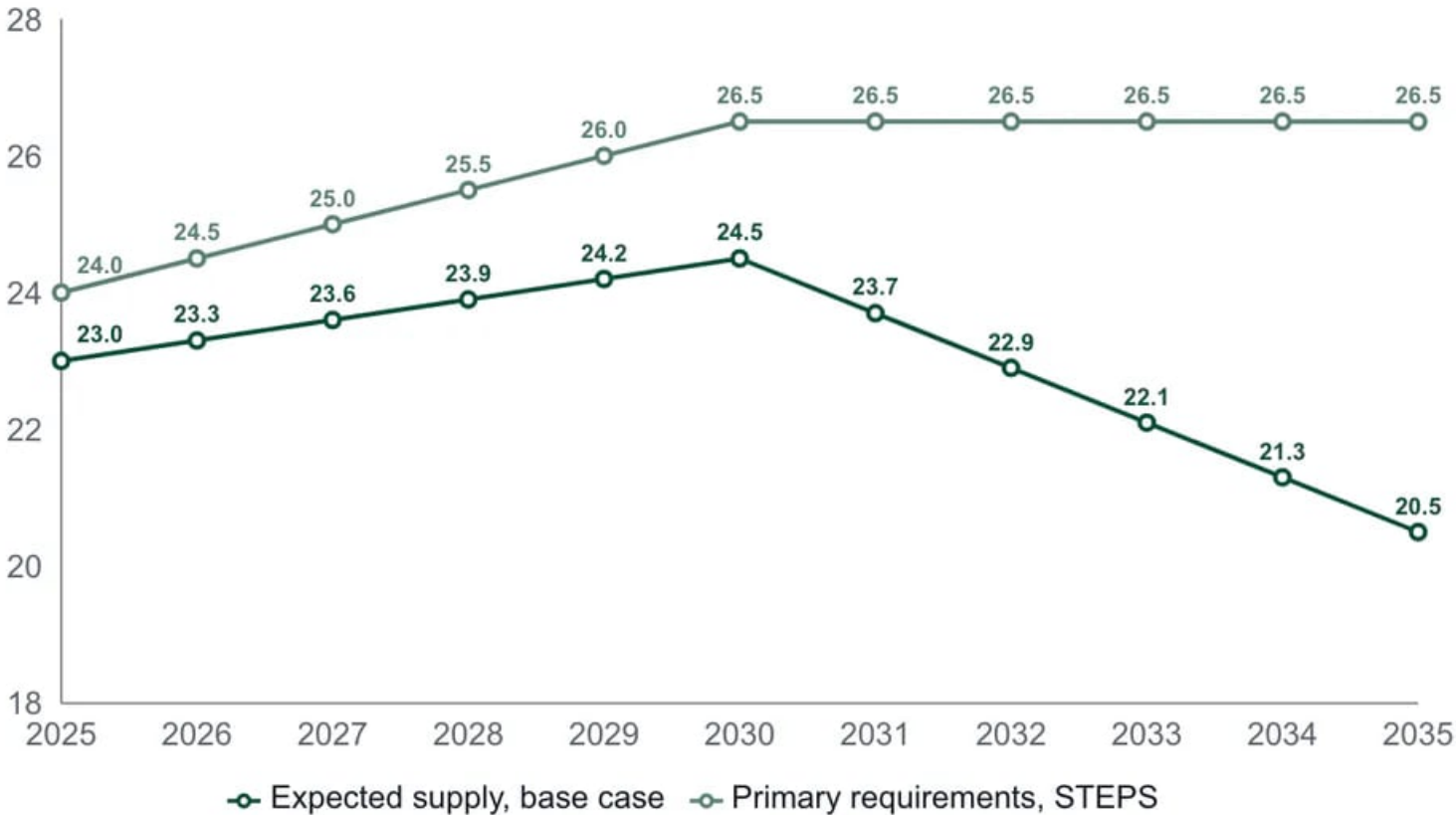
Strategic Case

Copper supply security matters, but premium evidence remains selective. Our strategy combines reliable delivery with measurable sustainability attributes rather than assuming a universal green premium.

Copper's 2035 primary supply gap reaches 22.6%

Expected supply falls below primary requirements through 2035

Copper (Mt) · 22.6% primary supply shortfall



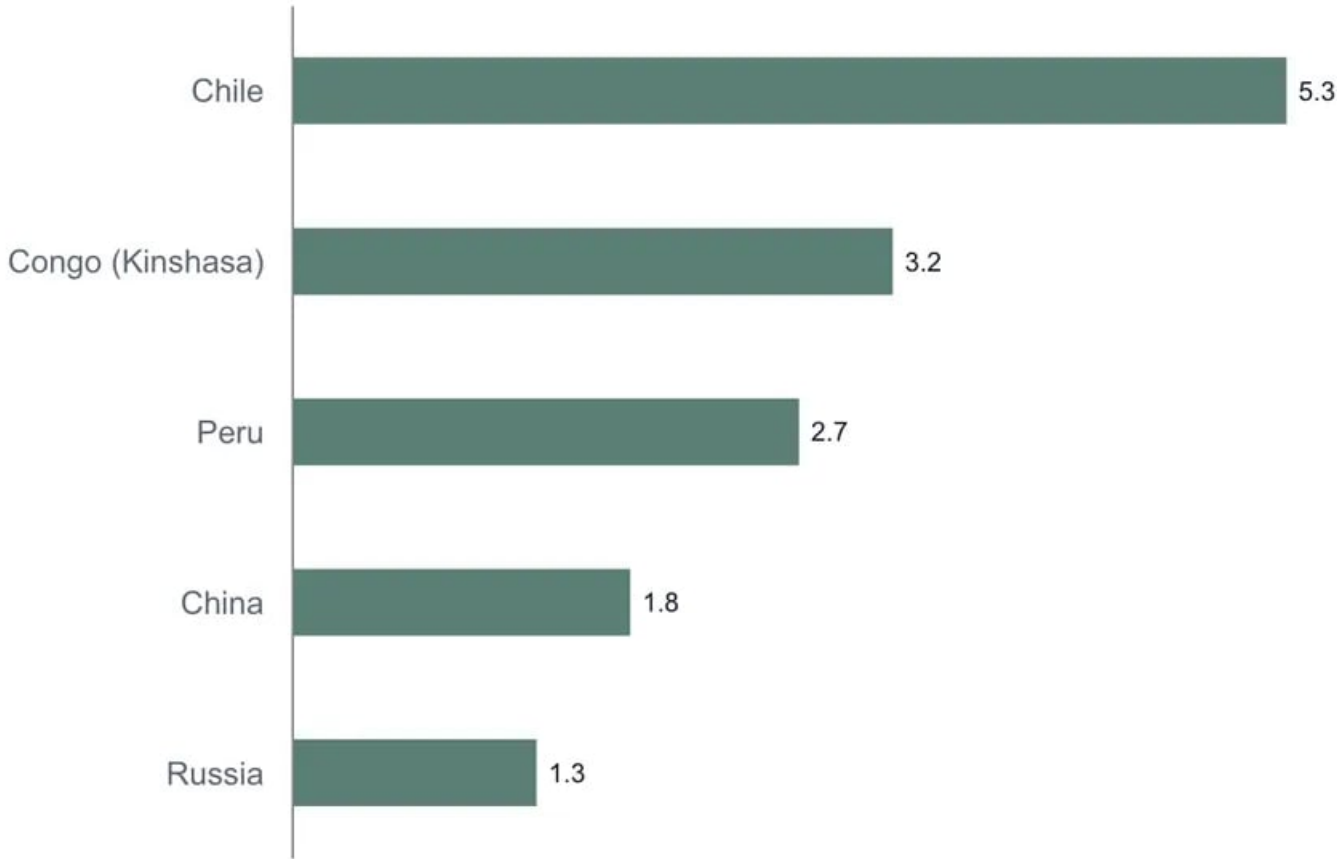
Supply security strengthens our proposition: combine reliable delivery with verifiable differentiation.



Chile and Peru supply 34.8% of mined copper

Chile leads the selected copper-producing countries in 2025

Mined copper (Mt)



Our operating geography matters globally: protect reliable Chilean and Peruvian supply.

Source: USGS Mineral Commodity Summaries 2026, copper p2; USGS copper p2, Chile and Peru versus world total; IEA Global Critical Minerals Outlook 2026, p46



Only 20% of copper respondents report differentiated-material premiums

 **COMMERCIAL PROPOSITION**

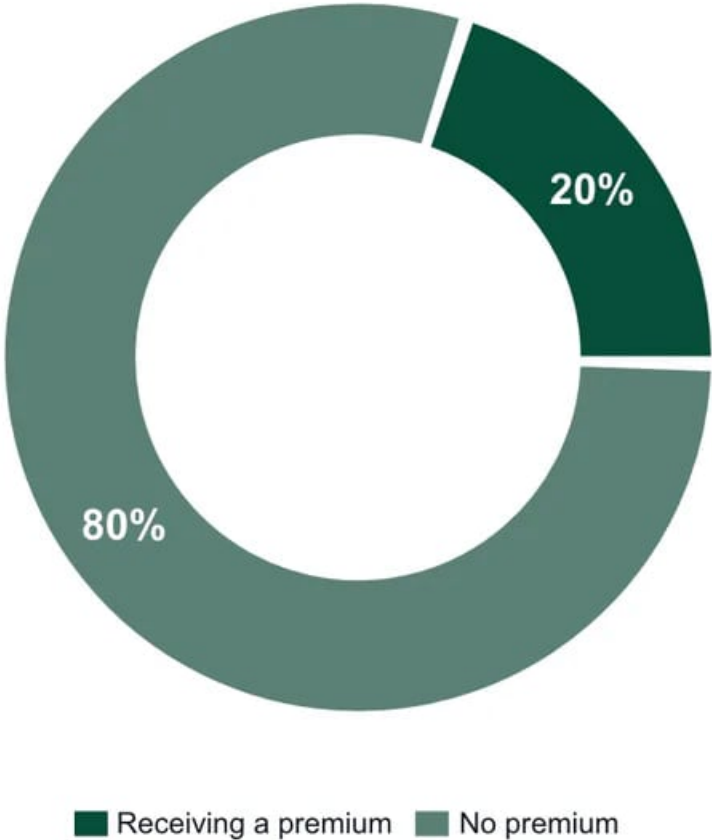
Differentiate before monetising

Access: Traceability supports differentiation without guaranteeing a realised cash premium

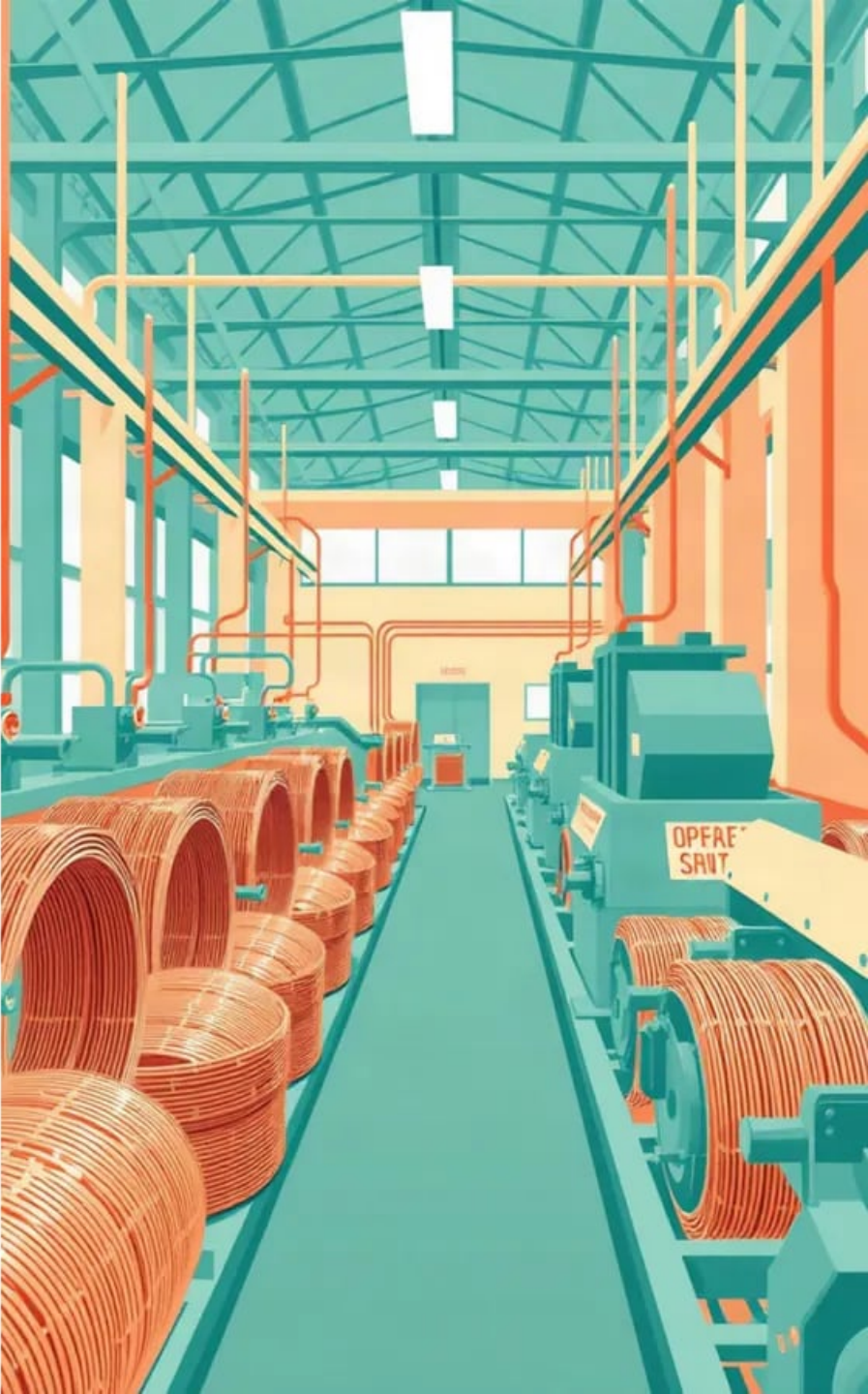
- Sustainability attributes become visible to buyers
- Market access can precede price differentiation

Pricing: European and Asian negotiations will test willingness to pay

- Agree footprint boundaries and custody rules
- Separate premiums from ordinary delivery terms



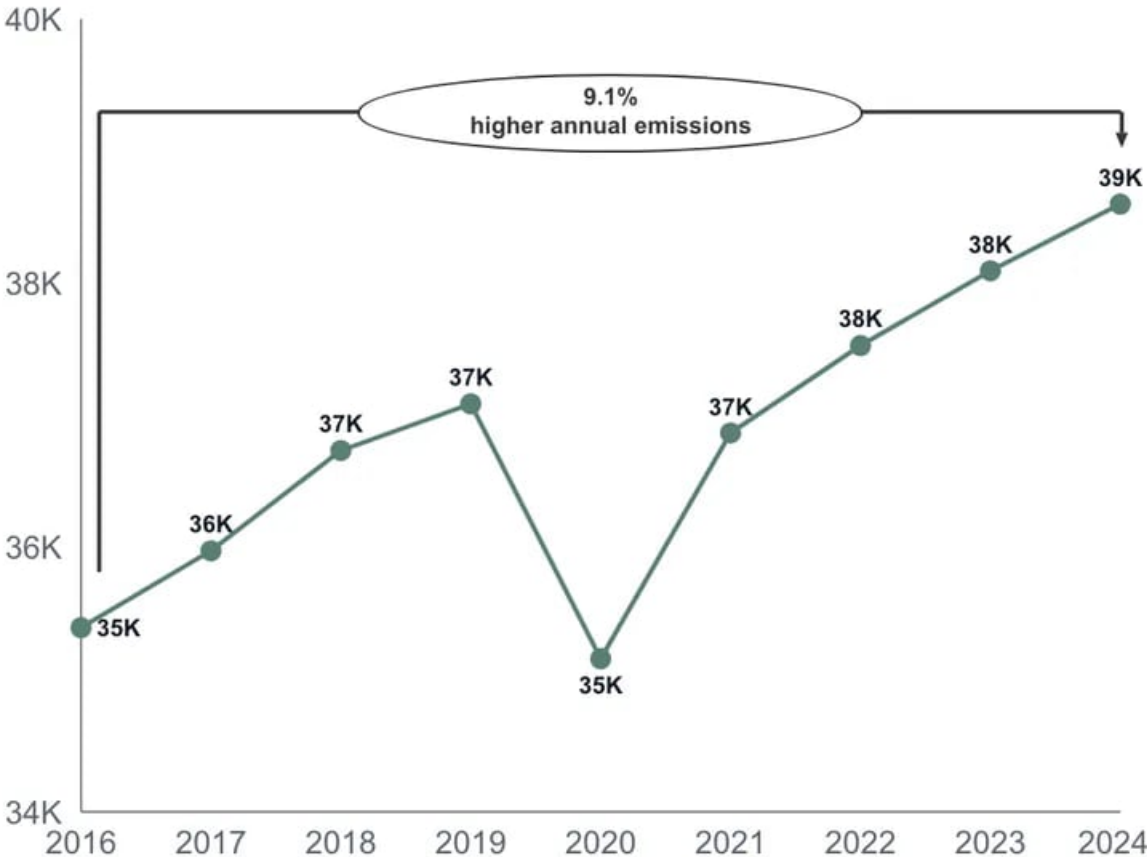
Treat premium revenue as commercial upside, not funding already secured.



Sector progress raises the bar as global emissions rise 9.1%

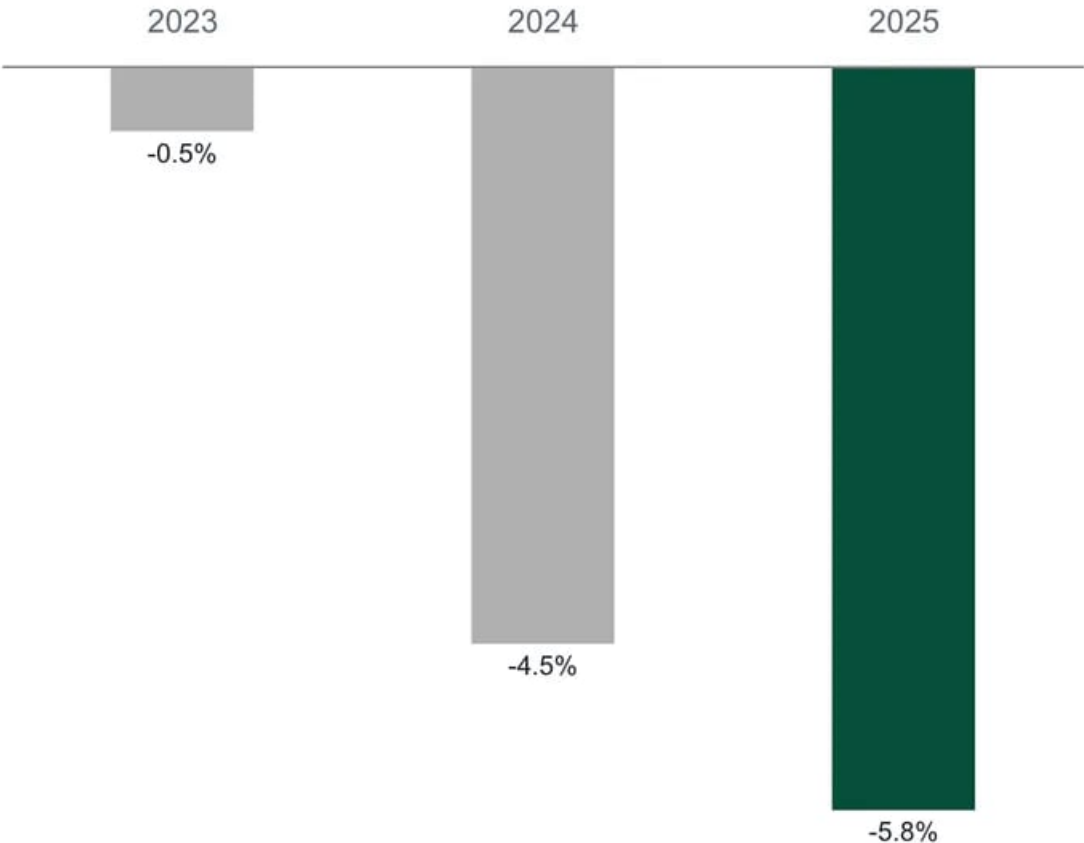
Global fossil-and-industry emissions increased across the displayed period

Annual CO2 emissions (Mt)



Copper-mining intensity reductions accelerated across the reported years

Annual emissions-intensity change (%)



Peer progress makes standing still a relative deterioration, even before a premium emerges.

Source: OWID supplied CO2 dataset, pp5–6, annual CO2; OWID annual CO2, 2016 versus 2024; IEA Global Critical Minerals Outlook 2026, p28

02

Baseline and Drivers

Illustrative company data establish a prioritisation hypothesis, not verified operating performance. Consistent boundaries and metered activity turn that hypothesis into an accountable baseline.

Our 420 kt business starts at 1.05 MtCO₂e



Chile produces concentrate

Two mines and concentrators supply 300 kt of copper

- Open-pit mining feeds the concentrator route
- Downstream smelting sits beyond this product

Concentrate needs its own allocated emissions and custody records

- Allocate site emissions to concentrate copper
- Track downstream processing separately from mining



Peru produces cathode

One mine and SX-EW plant supply 120 kt cathode

- Mining and leaching feed solvent extraction
- Electrowinning produces the initial saleable cathode

Cathode eligibility depends on a verified product carbon footprint

- Include relevant upstream inputs and processing
- Link qualified batches to buyer allocations

SO WHAT

Manage one corporate baseline, but develop separate product-level footprints for concentrate and cathode.



420 kt

Copper production

2025; contained copper across both routes



1.05 MtCO₂e

Scope 1+2 emissions

2025 corporate inventory



2.5 tCO₂e/t

Corporate emissions intensity

2025; not a cathode product footprint

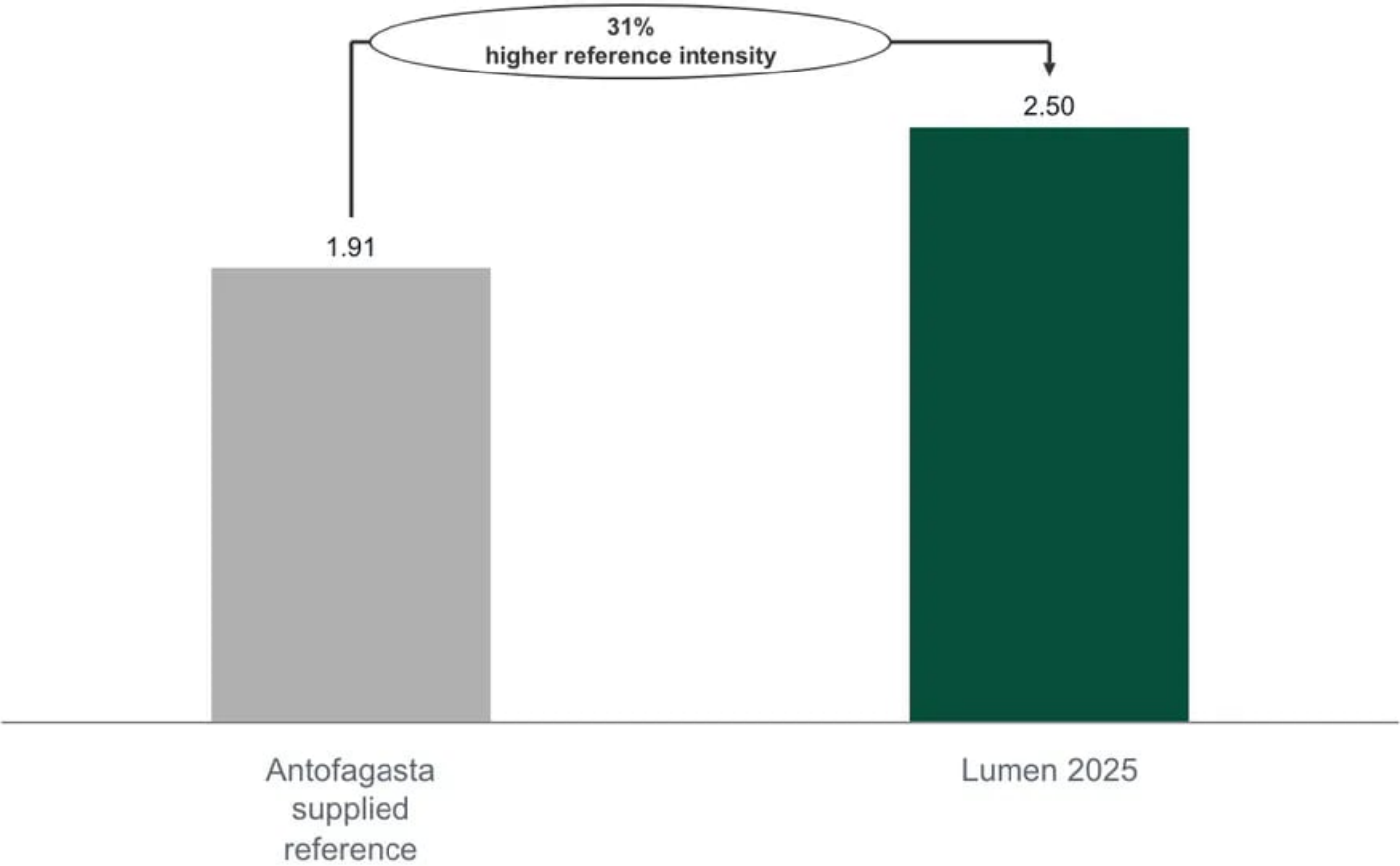
Our intensity exceeds Antofagasta’s supplied reference by 31%



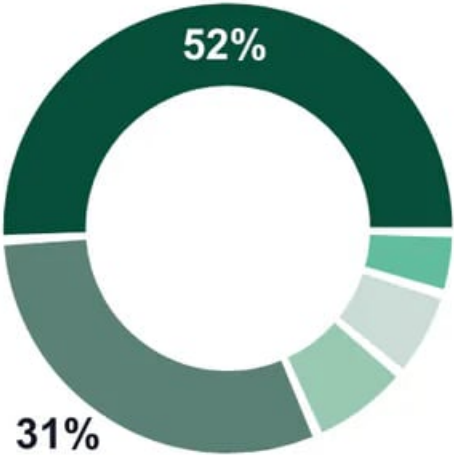
Use the 31% reference gap to motivate action, not claim a like-for-like performance ranking.

Our illustrative corporate ratio exceeds the supplied peer reference

Scope 1+2 intensity (tCO2e/t copper)



Power and haulage create 83% of our emissions



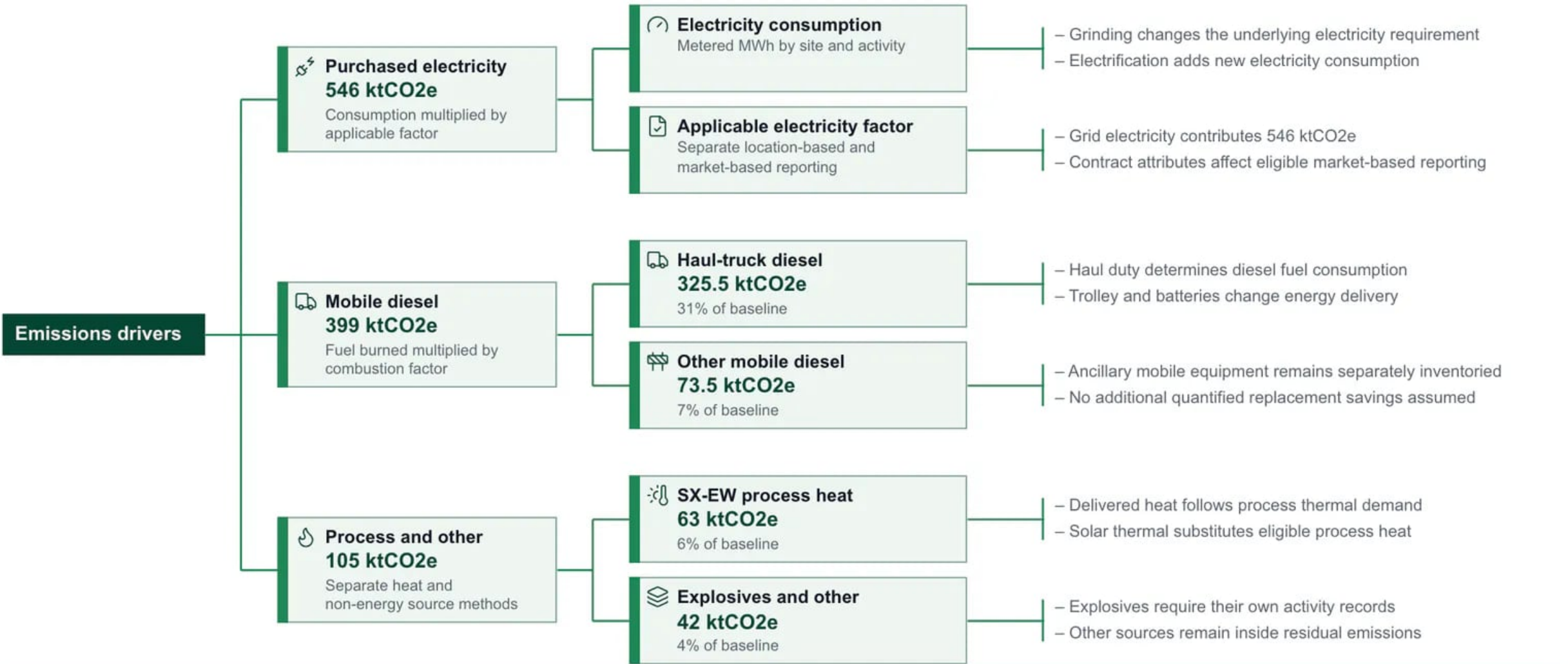
- Grid electricity
- Haul-truck diesel
- Other mobile diesel
- Process heat (SX-EW)
- Explosives and other

Concentrate technical effort on electricity and haulage while retaining a complete residual inventory.

Source: Illustrative baseline multiplied by source shares



Metered energy and emissions factors determine our 1.05 Mt footprint



Track activity and emissions factors separately so operational savings cannot be counted twice.

Source: Illustrative 1,050 kt inventory multiplied by source shares; public: GHG Protocol Scope 2 Guidance, 2015

03

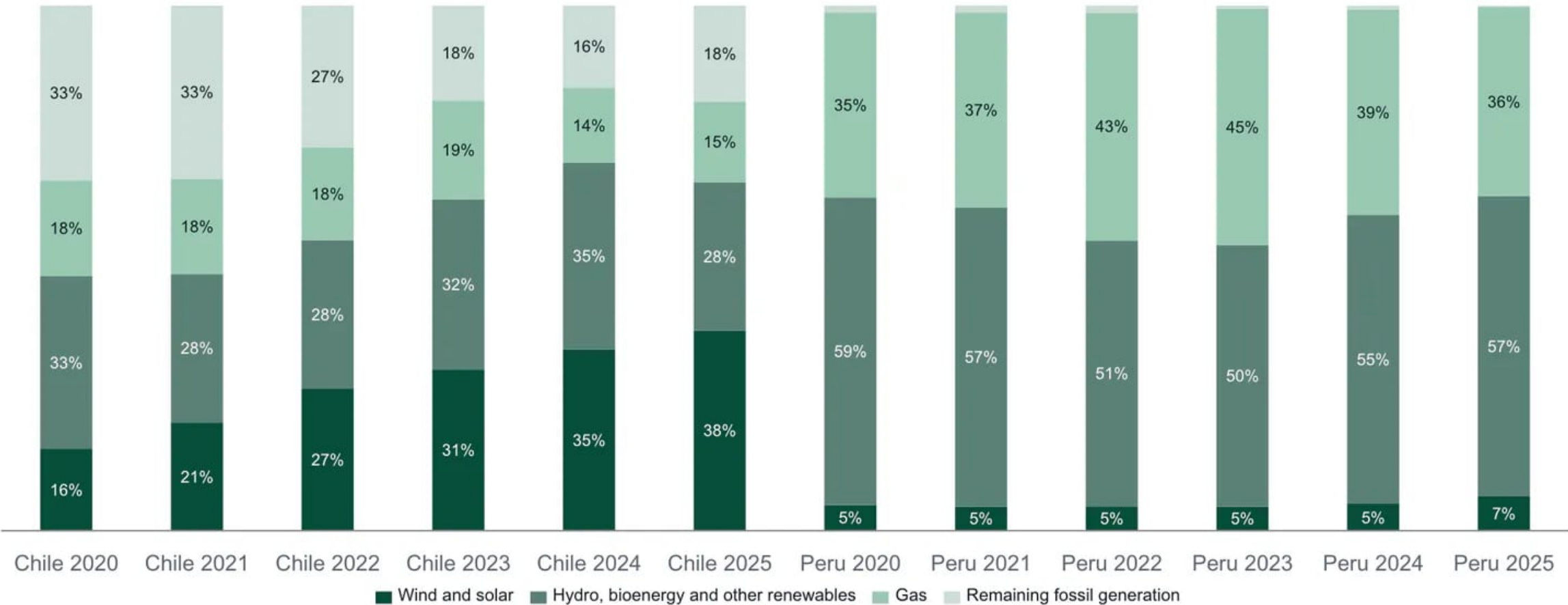
Abatement and Roadmap

Renewable power and efficiency lead; electrified haulage completes the halving case. The bridge reconciles growth and incremental savings, with no unmodelled Wave 3 benefit.

Chile's 38.14% wind-solar share outpaces Peru's 6.52%

Chile's wind-and-solar expansion exceeds Peru's across the displayed years

Share of national generation (%)



Design country-specific power procurement rather than assume the same renewable supply conditions.

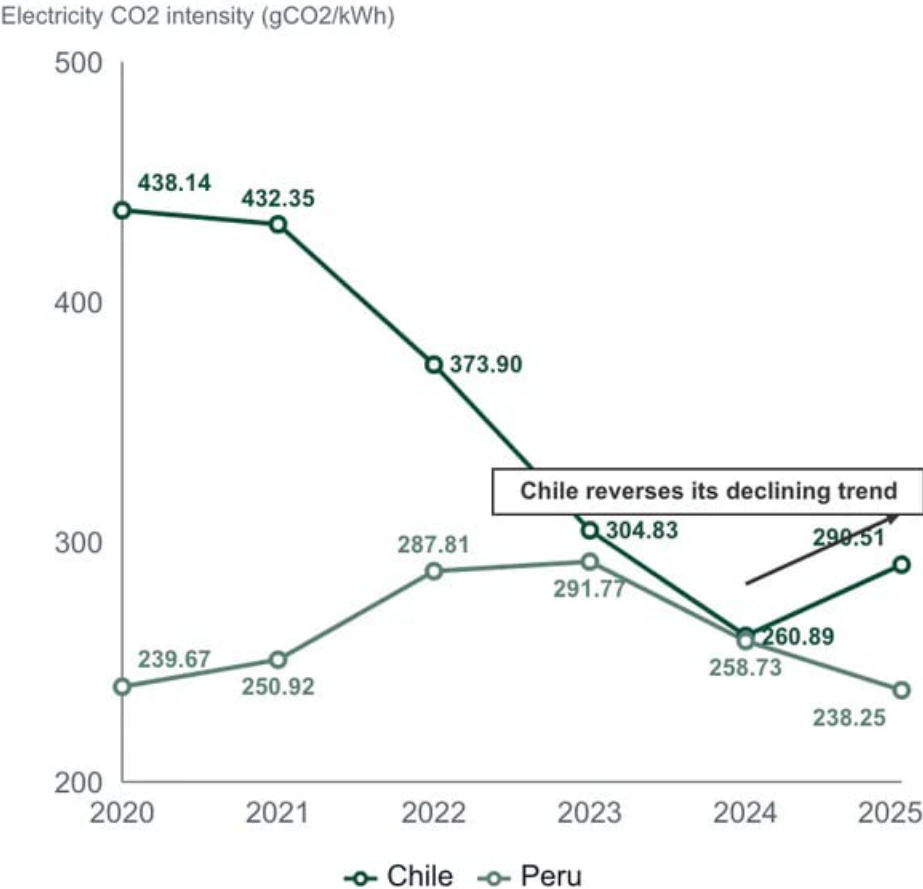
Source: Ember_Yearly_Electricity_Data_C, generation, 2020–25; Ember generation shares, residual to complete each mix

Chile's grid intensity rebounded 11.4% in 2025

POWER ACCOUNTING

- Contracts change eligible reporting
- Claims: Qualified contracts affect market-based Scope 2, not every boundary**
- Retain and retire exclusive energy attributes
 - Report location-based grid emissions alongside contracts
- Control: Electrification and efficiency share one reconciled site electricity ledger**
- Add trolley, charging and desalination loads
 - Recalculate efficiency savings after power-factor changes

National electricity intensity remains exposed to annual generation changes



Secure qualified power attributes while retaining separate location-based reporting.

Source: Ember_Yearly_Electricity_Data_C, CO2 intensity, 2020–25; Ember Chile CO2 intensity, 2024 versus 2025; public: GHG Protocol 2015; ISO 14067:2018



Four lever groups could deliver 0.64 Mt annual abatement



Build an integrated portfolio: the 0.64 Mt potential depends on net, non-overlapping project performance.



Renewable power contracts

Abatement: Chile and Peru contracts could avoid 0.37 MtCO₂e annually

- Chile contract contributes 0.30 MtCO₂e
- Peru contract contributes 0.07 MtCO₂e

Economics: Assumed costs range from –\$15 to +\$5 per tonne

- Chile contract costs –\$15/tCO₂e
- Peru contract costs +\$5/tCO₂e

Dependency: Delivery depends on qualified attributes and a reconciled load

- Match contractual claims to eligible electricity
- Include new electrification and pumping demand



Grinding and digital control

Abatement: Grinding and digital controls could avoid 0.04 MtCO₂e annually

- Reduce electricity consumed per processing activity
- Apply the post-procurement electricity emissions factor

Economics: Assumed abatement cost saves \$30 for each tonne avoided

- Energy savings provide the economic mechanism
- Control performance needs measured operating evidence

Dependency: Delivery depends on ore-adjusted baselines and stable process performance

- Normalise throughput and ore characteristics separately
- Verify recovery alongside electricity consumption changes



Electrify suitable haulage

Abatement: Trolley and battery haulage could avoid 0.18 MtCO₂e annually

- Trolley assist contributes 0.06 MtCO₂e
- Battery trucks add 0.12 MtCO₂e

Economics: Assumed costs rise from \$25 to \$95 per tonne

- Trolley assist costs +\$25/tCO₂e
- Battery trucks cost +\$95/tCO₂e

Dependency: Delivery depends on duty cycles, charging and reliable power

- Validate payload and availability on representative routes
- Allocate trolley and battery savings incrementally



Replace eligible process heat

Abatement: Solar thermal could avoid 0.05 MtCO₂e of process emissions

- Baseline process heat represents 63 ktCO₂e
- Proposed substitution avoids 50 ktCO₂e annually

Economics: Assumed solar-thermal abatement cost is \$40 per tonne avoided

- Thermal substitution drives the emissions benefit
- Heat integration determines achievable operating value

Dependency: Delivery depends on process temperatures and seasonal thermal availability

- Verify the useful heat demand profile
- Retain reliable heat during solar shortfalls

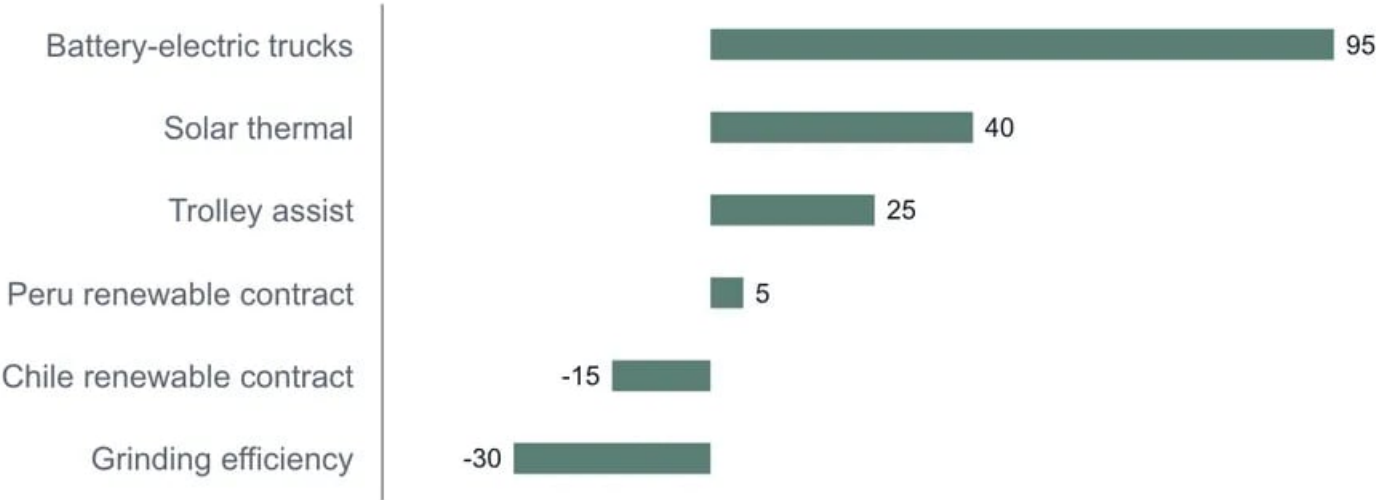
Negative-cost levers cover 340 kt annual abatement potential



Start with 340 kt/year of negative-cost potential; sanction expensive fleet conversion on integrated evidence.

Assumed costs favour efficiency and Chilean renewable procurement

Abatement cost (\$/tCO2e)



300 ktCO2e/year
Chile power potential
Illustrative annual abatement



40 ktCO2e/year
Grinding efficiency potential
Additive to power after reconciliation

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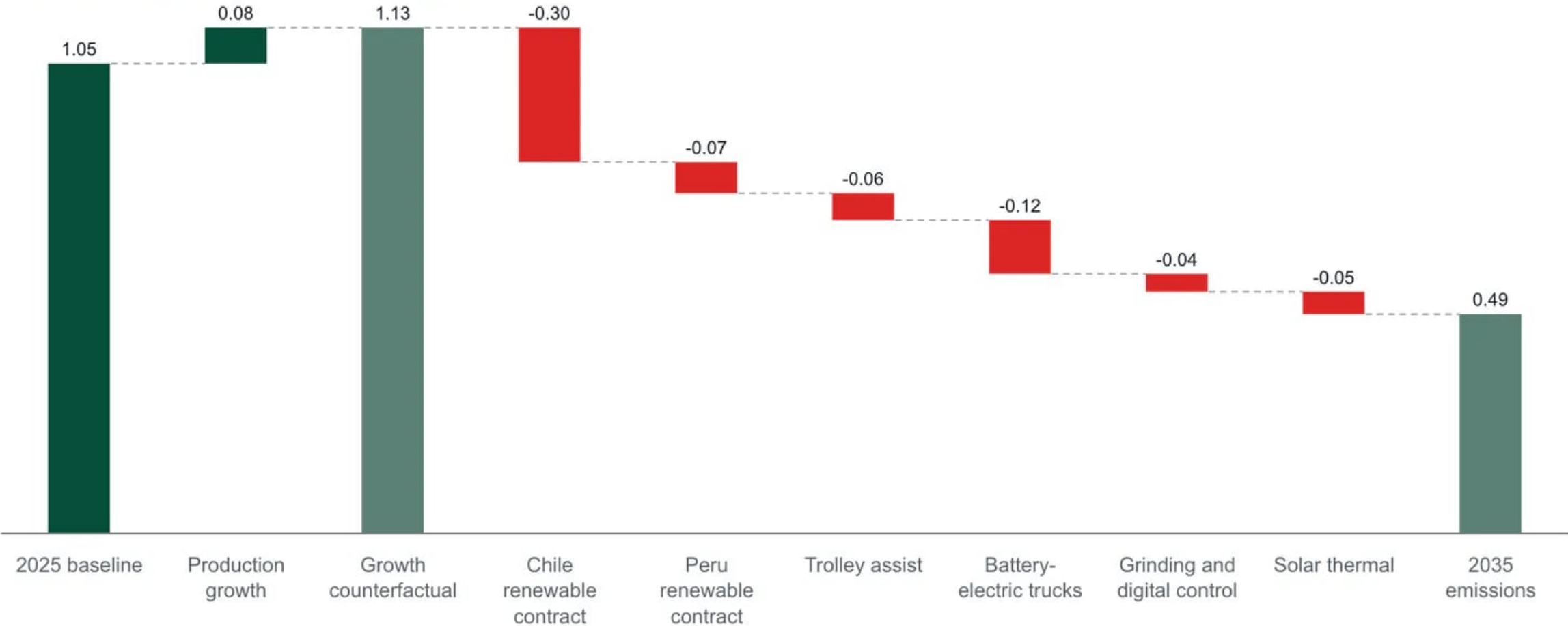
340 ktCO2e/year
Negative-cost abatement potential
300 + 40; implied annualised savings \$5.7m



Supplied levers reach 0.49 Mt, a 53% absolute reduction

Growth offsets part of the gross emissions savings

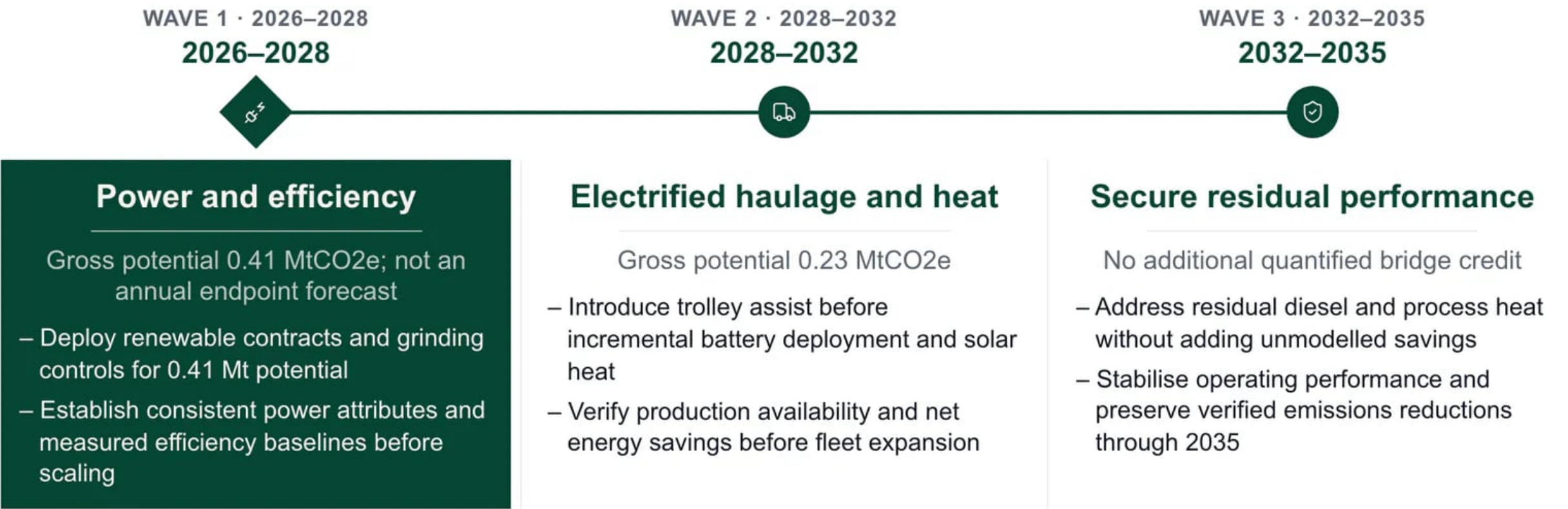
Annual Scope 1+2 emissions (MtCO₂e) · 35 kt below halving threshold



The model clears halving by 35 ktCO₂e; protect that limited delivery buffer.

Source: Illustrative emissions bridge and 2025 baseline

Wave 1 addresses 64% of gross abatement potential



Front-load the 0.41 Mt opportunity; use Wave 3 to secure delivery, not inflate the bridge.

Source: Illustrative bridge levers allocated to proposed waves

Resilience and Commercialisation

Water and circularity strengthen resilience while product-specific evidence supports differentiation. Current cathode availability constrains the first offer before certification and buyer placement.

Seawater reaches 80%; circularity strengthens resource resilience

COPPER CIRCULARITY



Partner for material loops

Context: Scrap contributes about 30% of copper supply in the US

- USGS includes recovered copper from scrap
- This does not establish Lumen processing capability

Claims: Qualify recycling partners before adding recycled-content claims to products

- Verify material compatibility and chain of custody
- Calculate carbon effects with life-cycle boundaries



Shared desalination

Increase seawater supply to 80% while managing desalination energy demand

- Seawater share rises from 45%; shared regional utility asset
- Current seawater share is 45%
- Target increase is 35 percentage points



Process water use

Match process water quality and quantity to operating requirements

- Meter total demand and water quality
- Separate fresh makeup from recycled flows
- Include pumping electricity in site consumption



Tailings water recovery

Recover suitable tailings water without assuming an unmeasured recovery rate

- Recovery potential requires engineering assessment
- Assess available water and chemical quality
- Protect tailings safety and operating reliability



Return water to operations

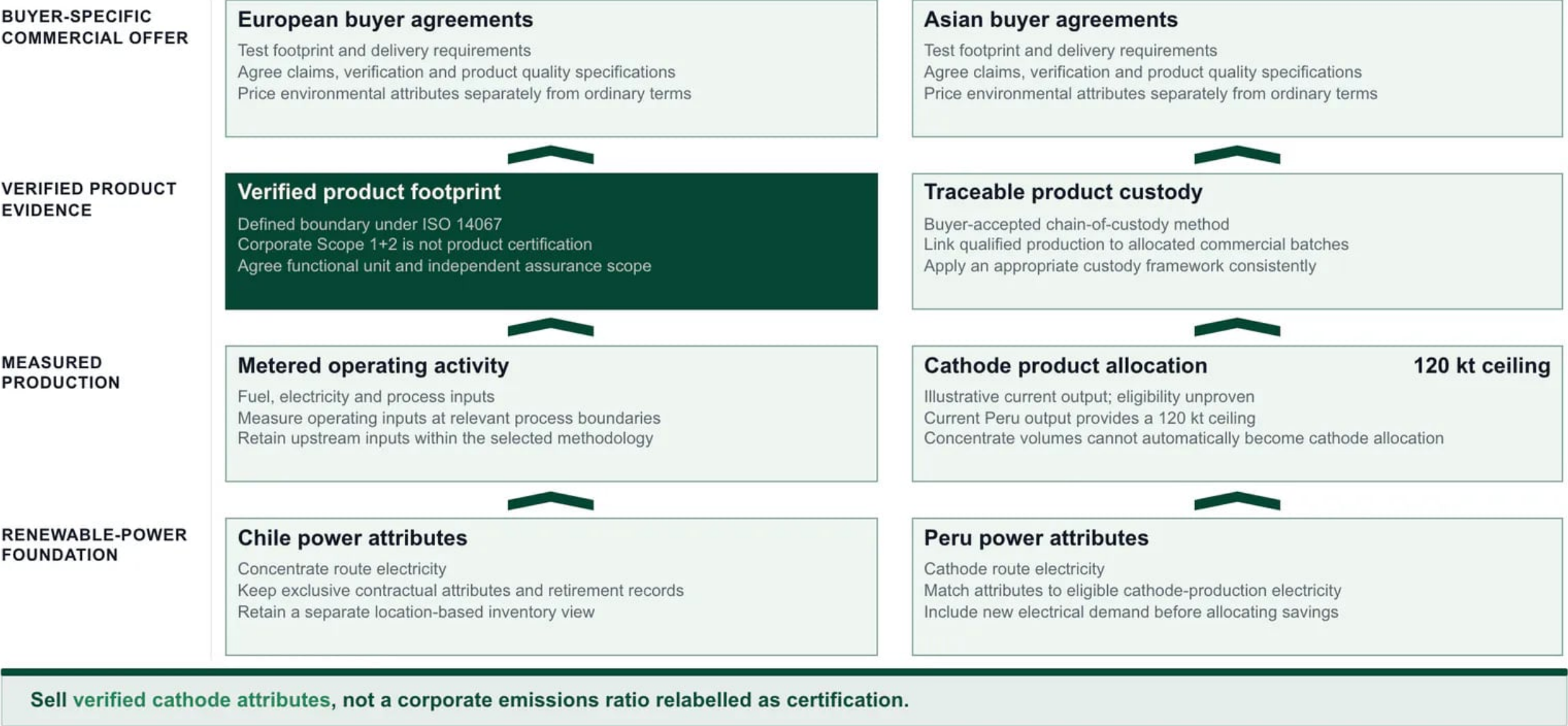
Return suitable recovered water and reconcile the complete site balance

- Reconcile internal flows before claiming savings
- Measure makeup demand and discharge separately
- Report resilience independently from emissions reductions

SO WHAT

Deliver 80% seawater by 2030 while keeping resource benefits separate from the carbon bridge.

Build the 2029 offer on verified product evidence



Source: public; ISO 14067:2018; ISO 22095:2020; GHG 2015

The 126 kt ambition exceeds current cathode by 6 kt

ILLUSTRATIVE COMPANY DATA			
Commercial basis	Volume (kt/year)	Total-output share	Eligibility assumption
Original proposition	126	30.0%	• Uses 30% of total copper output • Includes a 6 kt gap against current cathode availability
Cathode ceiling	120	28.6%	• All current cathode qualifies and is placed from 2029 • Cathode output remains unchanged • No concentrate conversion or purchased supply
Smaller pilot	36	8.6%	• Covers 30% of current cathode output • No production growth assumed



126 kt

Original premium volume
420 kt × 30%



120 kt

Current cathode output
Finished cathode, not concentrate copper



6 kt

Cathode eligibility shortfall
126 kt – 120 kt; before qualification

Start with a qualified subset of 120 kt; do not promise 126 kt without an explicit supply solution.

The cathode ceiling could generate \$12–24m annual premium revenue

 NO PREMIUM REALISED	 LOW PREMIUM REALISED	 HIGH PREMIUM REALISED																								
Assume unchanged cathode output qualifies and is placed from 2029 • Buyer acceptance and assurance remain uncontracted • Costs below revenue remain outside this calculation	Assume unchanged cathode output qualifies and is placed from 2029 • Buyer acceptance and assurance remain uncontracted • Costs below revenue remain outside this calculation	Assume unchanged cathode output qualifies and is placed from 2029 • Buyer acceptance and assurance remain uncontracted • Costs below revenue remain outside this calculation																								
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Underwrite investment at \$0 premium; recognise \$12–24m only as contingent gross revenue.

Source: Assumed cathode volumes multiplied by assumed premiums

05

Capital and Accountability

The \$1.4bn envelope is a planning commitment, not unconditional expenditure. Technical performance, funding headroom and buyer evidence govern subsequent capital release.

Stage **\$1.4bn**; modelled abatement averages **\$14.9/tCO₂e**

ANNUALISED LEVER ECONOMICS			
Lever	Abatement (ktCO ₂ e/year)	Cost (\$/tCO ₂ e)	Annualised cost (\$M)
Grinding efficiency	40	−30	(1.2)
Chile power	300	−15	(4.5)
Peru power	70	5	0.4
Trolley assist	60	25	1.5
Solar thermal	50	40	2.0
Battery trucks	120	95	11.4
Total	640	−	9.6



\$1.4bn

Total investment envelope

2026–2035; planning envelope, not funded commitments



\$0.8bn

Fleet and charging capital

57.1% of total envelope



\$0.6bn

Other programme capital

Derived balance; project allocation not specified

The blended **\$14.9/tCO₂e** is promising, but project cash flows and funding capacity determine sanction.

Assign **\$1.4bn** oversight; retain fleet sanction with the Board



Endorse the **\$1.4bn planning envelope**, not unconditional expenditure; retain evidence-based capital release.

Control area	Exposure	Management owner	Proposed control
Electricity claims	- Corporate baseline accounting method requires a consistent definition - Procurement and efficiency can overlap - Electrification adds electricity demand	Chief Sustainability Officer	Reconcile location-based and market-based inventories Maintain an incremental site-energy ledger Separate corporate and product claims
Fleet delivery	\$0.8bn fleet and charging exposure - Missing battery savings leaves 0.61 MtCO₂e - That delivers only 41.9% reduction and misses halving by 85 kt	Chief Operating Officer	Retain major fleet sanction with the Board Demonstrate route availability and charging performance Credit battery savings only incrementally to trolley
Funding and economics	\$1.4bn is an aggregate planning envelope - Annual spending and liquidity trough are not modelled - Operating-cost scalability and abatement-cost methodology are not established	Chief Financial Officer	Present project cash flows without premium reliance Show annual funding, contingency and cash headroom Distinguish annualised abatement cost from cash operating expense Retain project-level capital approvals
Product monetisation	- Cathode eligibility and buyer placement are unproven - No premium is secured - Corporate intensity is not a product footprint	Chief Commercial Officer	Contract buyer-specific claims and eligibility Coordinate product assurance with the Chief Sustainability Officer Use no premium revenue in base funding
Water resilience	80% seawater target by 2030 depends on a shared utility asset - Tailings recovery and scrap benefits are unquantified - Pumping and desalination add energy demand	Chief Operating Officer	Allocate utility-interface accountability Include water infrastructure loads in power planning Report water and circularity benefits separately from the emissions bridge

Endorse staged investment targeting **53%** lower emissions by **2035**

	01 Endorse mandate	02 Validate baseline	03 Launch first wave	04 Qualify offer	05 Sanction fleet
	CRITICAL GATE				CRITICAL GATE
Owner	Board and Chief Executive Officer	Chief Sustainability Officer and Chief Operating Officer	Chief Operating Officer and Chief Financial Officer	Chief Commercial Officer and Chief Sustainability Officer	Board, Chief Operating Officer and Chief Financial Officer
Timeline	2026	2026–2027	2026–2028	2028–2029	2028–2032
Activities	• Endorse the 2035 halving ambition and planning envelope • Retain project-level and major fleet sanctions • Confirm existing delegated contracting limits	• Reconcile inventory boundaries and site meters • Establish location-based and market-based electricity views • Recalculate incremental lever effects and product allocation	• Develop renewable-contract and efficiency business cases • Present capital phasing and premium-free funding capacity • Incorporate fleet, charging and water-infrastructure electricity demand	• Agree buyer-specific product boundaries and assurance • Validate eligible cathode allocation with European and Asian buyers • Negotiate premium terms separately from ordinary sales conditions	• Demonstrate route productivity and charging availability • Verify incremental emissions performance after trolley and procurement • Present funded project cash flows, contingencies and liquidity headroom
Deliverables	• Board mandate and reserved matters • Named executive accountabilities	• Assured baseline and integrated energy ledger • Reconciled abatement register	• Approved project cases • Contracted power attributes and measured efficiency programme	• Buyer-accepted footprint and custody method • Commercial pilot with explicit eligibility and pricing	• Evidence-based fleet sanction • Funded deployment plan and residual-performance oversight through 2035

Figures & Assumptions Reference

From public knowledge (not your documents):

- Slide 13: Corporate electricity accounting distinguishes location-based grid factors from market-based contractual instruments; consumption and factor changes require separate tracking. — public: GHG Protocol Scope 2 Guidance, 2015
- Slide 16: GHG Protocol distinguishes location-based and market-based Scope 2 reporting and specifies quality criteria for contractual instruments; ISO 14067 addresses product carbon footprints. — public: GHG Protocol 2015; ISO 14067:2018
- Slide 23: ISO 14067:2018 provides product-carbon-footprint principles and requirements; ISO 22095:2020 addresses chain-of-custody frameworks; GHG Protocol Scope 2 Guidance addresses electricity instruments rather than complete product certification. — public: ISO 14067:2018; ISO 22095:2020; GHG 2015

Derived (calculated from the above):

- Slide 5: The 2035 primary supply gap is 6.0 Mt, equal to 22.6% of STEPS requirements; annual connecting values are linearly interpolated between the published anchors. — IEA p41 base supply versus STEPS requirements
- Slide 6: Chile and Peru together produce 8.0 Mt, equal to 34.8% of the rounded 23.0 Mt world total. — USGS copper p2, Chile and Peru versus world total
- Slide 8: Global annual fossil-and-industry CO₂ increased 9.1% between the printed 2016 and 2024 values. — OWID annual CO₂, 2016 versus 2024
- Slide 11: Lumen's illustrative ratio is 0.59 tCO₂e/t, or 30.9%, above the supplied Antofagasta reference; accounting boundaries and denominators are not normalised. — Lumen intensity versus brief-provided Antofagasta ratio
- Slide 12: Electricity and haul-truck diesel sum to 83% of baseline emissions, or 0.8715 MtCO₂e; the complete source allocation sums to 100%. — Illustrative baseline multiplied by source shares
- Slide 13: Source allocations are electricity 546 ktCO₂e; haul diesel 325.5 kt; other mobile diesel 73.5 kt; process heat 63 kt; explosives and other 42 kt. Diesel totals 399 kt and process plus other totals 105 kt. — Illustrative 1,050 kt inventory multiplied by source shares
- Slide 15: Remaining fossil shares reconcile every bar to 100%; Chile residuals are 33.26%, 33.06%, 26.99%, 18.08%, 15.66%, 18.33%; Peru residuals are 1.28%, 1.28%, 1.33%, 0.54%, 0.71%, 0.22%. — Ember generation shares, residual to complete each mix
- Slide 16: Chile's electricity CO₂ intensity increased 11.4% in 2025 versus 2024. — Ember Chile CO₂ intensity, 2024 versus 2025
- Slide 17: Grouped annual potential is power 0.37 MtCO₂e, grinding 0.04, electric haulage 0.18 and solar thermal 0.05, totalling 0.64 MtCO₂e. — Illustrative lever estimates grouped by intervention
- Slide 18: The two negative-cost levers total 340 ktCO₂e/year and imply \$5.7m/year of annualised savings at the supplied abatement-cost assumptions. — Illustrative Chile power and grinding volumes and costs
- Slide 19: Gross annual abatement is 0.64 MtCO₂e; absolute baseline reduction is 0.56 MtCO₂e, or 53.3%; growth-counterfactual reduction is 56.6%; the halving threshold is 0.525 Mt and endpoint buffer is 35 kt. — Illustrative emissions bridge and 2025 baseline

Figures & Assumptions Reference (continued)

- Slide 20: Wave 1 contains 0.41 MtCO₂e, or 64.1%, of gross potential; Wave 2 contains 0.23 MtCO₂e; Wave 3 adds no quantified savings beyond the 0.49 Mt endpoint. — Illustrative bridge levers allocated to proposed waves
- Slide 22: The illustrative seawater target represents a 35 percentage-point increase; absolute freshwater reduction cannot be calculated without total water demand. — Illustrative current and target seawater shares
- Slide 24: A premium on 30% of total current production implies 126 kt, exceeding current cathode output by 6 kt; 120 kt is 28.6% of total output. A pilot on 30% of current cathode output is 36 kt, or 8.6% of total output. — Illustrative product volumes and assumed 30% coverage
- Slide 25: At 120,000 t/year, gross annual premium revenue is \$0m, \$12m or \$24m. At the original 126 kt basis it would be \$12.6–25.2m, exceeding the capped case by \$0.6–1.2m. — Assumed cathode volumes multiplied by assumed premiums
- Slide 27: Other capital is \$0.6bn; fleet and charging represent 57.1% of the envelope. Weighted annualised abatement cost is \$14.9/tCO₂e across 0.64 Mt/year, equivalent to approximately \$9.6m/year using unrounded products. — Illustrative capital split and lever-weighted cost estimates
- Slide 28: Without battery-truck abatement, emissions are 0.61 MtCO₂e, a 41.9% absolute reduction and 85 kt above the 0.525 Mt halving threshold. — Illustrative bridge excluding battery-truck saving

Assumed (no source — verify before presenting):

- Slide 7: Proposed European and Asian buyer engagement will test footprint requirements, chain of custody, eligible cathode allocation and willingness to pay; no Lumen premium or financing benefit is secured. — hypothetical assumption
- Slide 10: Illustrative company data: 2025 production 420 kt copper; Scope 1+2 emissions 1.05 MtCO₂e; intensity 2.5 tCO₂e/t. — hypothetical assumption
- Slide 10: Illustrative company data: Chile has two open-pit mines and concentrators producing 300 kt copper in concentrate; southern Peru has one mine and an SX-EW plant producing 120 kt cathode. — hypothetical assumption
- Slide 11: Illustrative company data: Lumen's 2025 corporate Scope 1+2 intensity is 2.5 tCO₂e/t copper. — hypothetical assumption
- Slide 12: Illustrative company data: grid electricity 52%; haul-truck diesel 31%; other mobile diesel 7%; process heat (SX-EW) 6%; explosives and other 4%, against 1.05 MtCO₂e in 2025. — hypothetical assumption
- Slide 13: Illustrative company data: 1.05 MtCO₂e baseline with electricity 52%, haul diesel 31%, other mobile diesel 7%, process heat 6%, and explosives and other 4%. — hypothetical assumption
- Slide 17: Illustrative company data: Chile renewable contract –0.30 MtCO₂e; Peru renewable contract –0.07; trolley assist –0.06; battery trucks –0.12; grinding efficiency and digital process control –0.04; solar thermal for SX-EW –0.05. — hypothetical assumption
- Slide 17: Illustrative company data: grinding –\$30/tCO₂e; Chile renewable contract –\$15; Peru renewable contract +\$5; trolley +\$25; solar thermal +\$40; battery trucks +\$95. — hypothetical assumption

Figures & Assumptions Reference (continued)

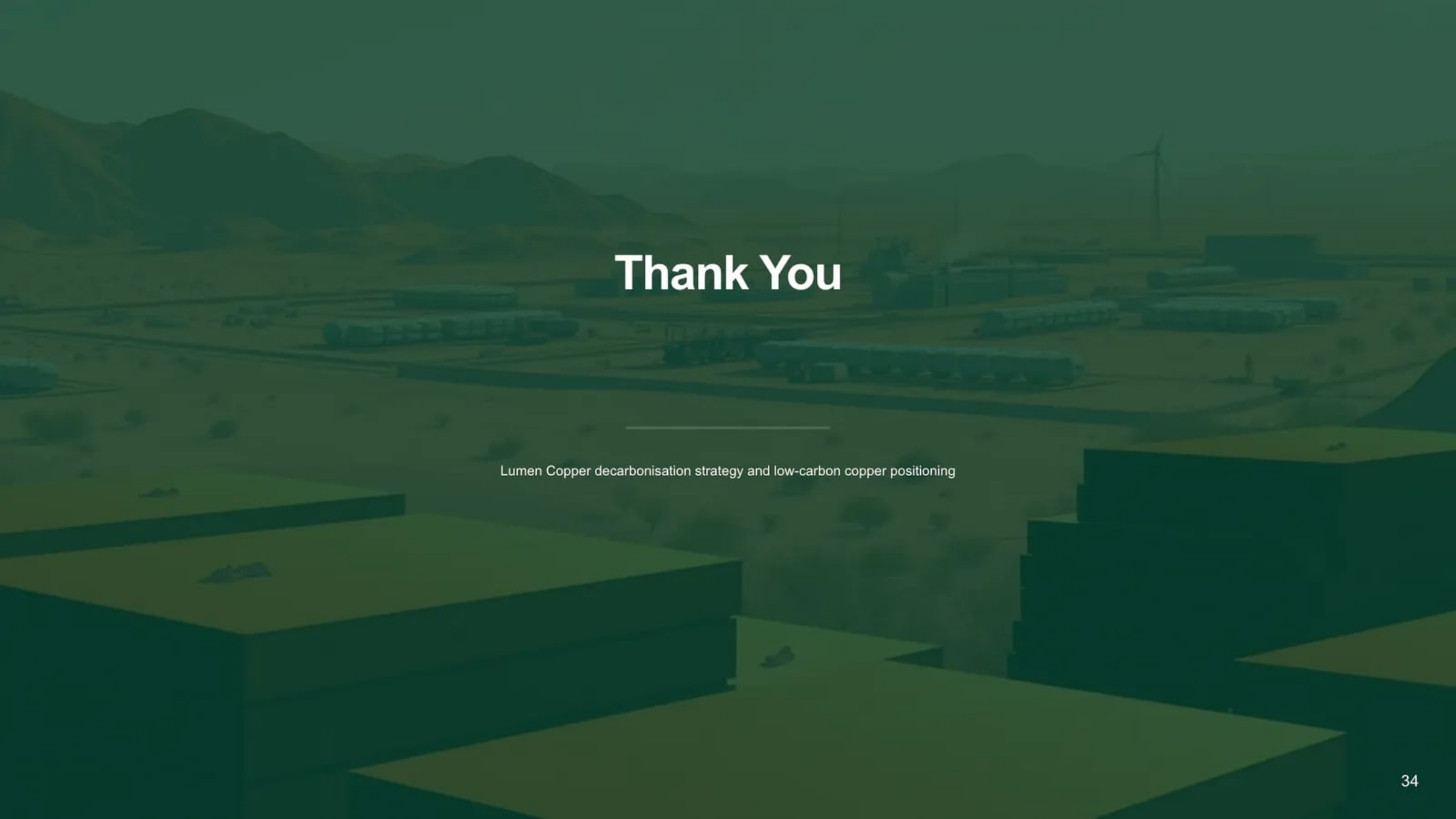
- Slide 17: Proposed integrated studies will test incremental haulage savings, post-procurement efficiency effects, charging loads, thermal availability and site delivery constraints. — hypothetical assumption
- Slide 18: Illustrative company data: grinding efficiency $-\$30/\text{tCO}_2\text{e}$; Chile renewable contract $-\$15$; Peru renewable contract $+\$5$; trolley assist $+\$25$; solar thermal $+\$40$; battery-electric trucks $+\$95$. — hypothetical assumption
- Slide 18: Illustrative company data: Chile renewable contract avoids 0.30 MtCO₂e annually and grinding efficiency avoids 0.04 MtCO₂e annually. — hypothetical assumption
- Slide 19: Illustrative company data, MtCO₂e: start 1.05; production growth +0.08; Chile renewable contract -0.30 ; Peru renewable contract -0.07 ; trolley assist -0.06 ; battery-electric trucks -0.12 ; grinding efficiency and digital process control -0.04 ; solar thermal -0.05 ; end 0.49. — hypothetical assumption
- Slide 19: The bridge assumes incremental trolley and battery savings, net electricity effects after procurement, and efficiency savings evaluated after power-factor changes; the baseline Scope 2 method and site energy balances require consistent definition. — hypothetical assumption
- Slide 20: Illustrative company roadmap: Wave 1 2026–2028 renewable power contracts and efficiency; Wave 2 2028–2032 trolley assist followed by battery-electric trucks and solar thermal for SX-EW; Wave 3 2032–2035 residual diesel and process heat. — hypothetical assumption
- Slide 20: Proposed sequencing makes fleet deployment conditional on route performance, power availability and incremental savings; annual emissions milestones and wave-level capital allocations are not specified. — hypothetical assumption
- Slide 22: Illustrative company data: seawater supplies 45% of water today, with an 80% target by 2030 through a desalination plant shared with the regional utility. — hypothetical assumption
- Slide 22: Proposed complementary measures include tailings-water recovery, process-water return and qualified scrap/recycling partnerships; no quantified carbon, recovery-rate or water-volume benefit is assumed. — hypothetical assumption
- Slide 23: Proposed low-carbon cathode offer starts from renewable-power attributes, measured site operations, product allocation, independent footprint assurance, chain of custody and buyer-specific commercial terms for European and Asian buyers. — hypothetical assumption
- Slide 23: Illustrative company data: current cathode output is 120 kt; corporate intensity is 2.5 tCO₂e/t; the corporate 2035 emissions endpoint is 0.49 MtCO₂e. These are not a certified cathode product footprint. — hypothetical assumption
- Slide 23: The proposed premium proposition begins in 2029; buyer acceptance, footprint thresholds and certification are not secured. — hypothetical assumption
- Slide 24: Illustrative company data: 420 kt total copper comprises 300 kt copper in concentrate and 120 kt cathode. — hypothetical assumption
- Slide 24: The cathode-ceiling case assumes unchanged 120 kt annual cathode output and full eligibility and buyer placement from 2029; the smaller pilot assumes 30% cathode coverage. No concentrate conversion, purchased cathode or growth is assumed. — hypothetical assumption
- Slide 25: Hypothetical commercial assumption: low-carbon premium of $\$100\text{--}200$ per tonne on 30% of total volumes from 2029. — hypothetical assumption
- Slide 25: Hypothetical ceiling scenarios assume unchanged 120 kt annual cathode output from 2029, full eligibility and placement, and premiums of $\$0/\text{t}$, $\$100/\text{t}$ or $\$200/\text{t}$; no premium is secured. — hypothetical assumption

Figures & Assumptions Reference (continued)

- Slide 25: Revenue excludes verification, certification, logistics, incremental selling costs and tax; full-capex payback or NPV is not established. — hypothetical assumption
- Slide 27: Illustrative company data: capex is \$1.4bn over 2026–2035, including \$0.8bn for battery-electric fleet and charging; lever costs and annual abatement are grinding –\$30/t and 0.04 Mt; Chile power –\$15/t and 0.30 Mt; Peru power +\$5/t and 0.07 Mt; trolley +\$25/t and 0.06 Mt; solar thermal +\$40/t and 0.05 Mt; battery trucks +\$95/t and 0.12 Mt. — hypothetical assumption
- Slide 27: Annual capital phasing, project-level allocations, replacement-versus-growth capital, operating-cost scalability, financing sources, cash trough and investment NPV are not modelled; abatement-cost methodology is unspecified and may include annualised capex. — hypothetical assumption
- Slide 28: Illustrative company data: investment envelope \$1.4bn during 2026–2035; fleet and charging \$0.8bn; battery abatement 0.12 MtCO₂e; target endpoint 0.49 Mt; baseline 1.05 Mt; seawater target 80% by 2030. — hypothetical assumption
- Slide 28: Proposed governance assigns inventory and assurance to the Chief Sustainability Officer, technical delivery and utility interfaces to the Chief Operating Officer, funding and investment economics to the Chief Financial Officer, buyer validation to the Chief Commercial Officer, and major fleet sanction to the Board. — hypothetical assumption
- Slide 28: Proposed Board decision endorses a planning envelope, retains project-level approvals, limits initial contracting to existing delegated authority, requires premium-free funding analysis, and treats power claims, fleet performance, funding sufficiency, product eligibility and shared-water delivery as explicit control areas. — hypothetical assumption

Deck-level assumptions (recorded when the argument was planned):

- Illustrative 2025 emissions and intensity — 1.05 MtCO₂e Scope 1+2; 2.5 tCO₂e/t copper
- Illustrative growth-counterfactual emissions increment — 0.08 MtCO₂e
- Illustrative renewable-contract abatement — Chile 0.30 MtCO₂e; Peru 0.07 MtCO₂e
- Illustrative investment envelope — \$1.4bn during 2026–2035; \$0.8bn fleet and charging
- Illustrative deployment windows — Wave 1 2026–2028; Wave 2 2028–2032; Wave 3 2032–2035
- Illustrative seawater shares — 45% currently; 80% target by 2030
- Hypothetical original commercial proposition — \$100–200/t premium on 30% of total volumes from 2029
- Hypothetical smaller commercial pilot — 30% of current cathode output
- Hypothetical premium-failure sensitivity — \$0/t premium



Thank You

Lumen Copper decarbonisation strategy and low-carbon copper positioning