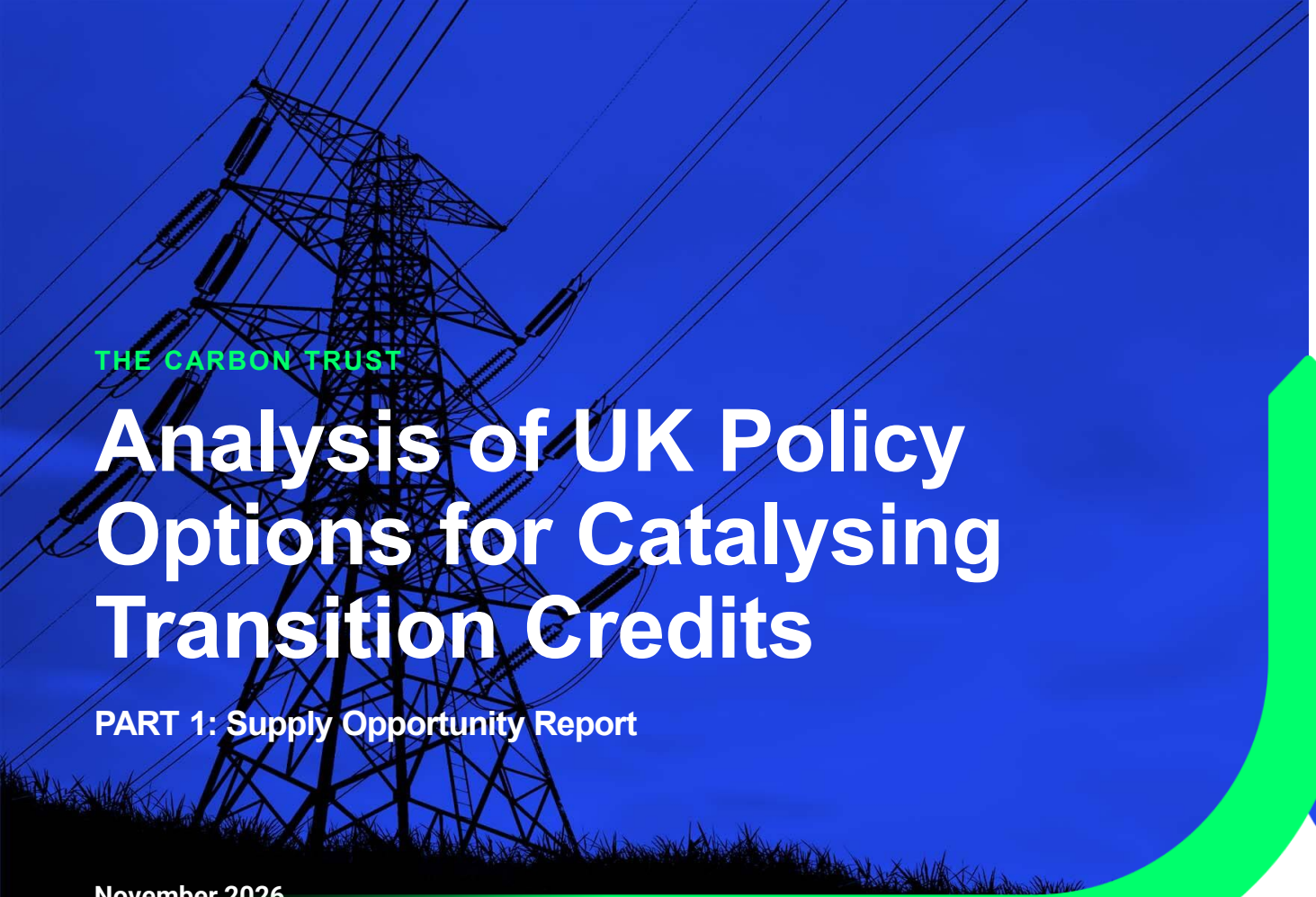


CARBON TRUST

THE CARBON TRUST

Analysis of UK Policy Options for Catalysing Transition Credits

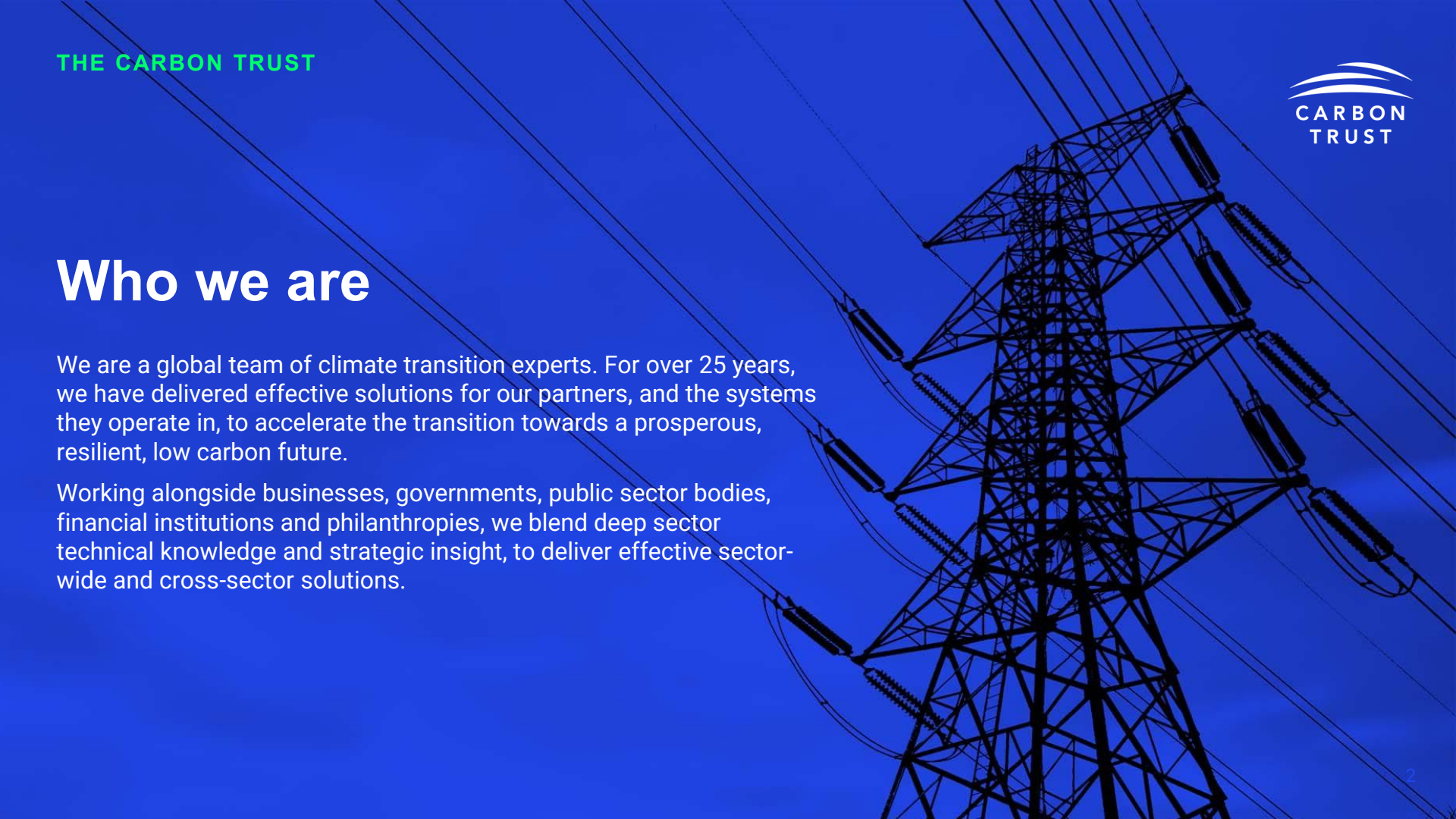
PART 1: Supply Opportunity Report

November 2026

Who we are

We are a global team of climate transition experts. For over 25 years, we have delivered effective solutions for our partners, and the systems they operate in, to accelerate the transition towards a prosperous, resilient, low carbon future.

Working alongside businesses, governments, public sector bodies, financial institutions and philanthropies, we blend deep sector technical knowledge and strategic insight, to deliver effective sector-wide and cross-sector solutions.



Acknowledgements

Supported by

The Rockefeller Foundation

Report authors

Charlie McNelly · The Carbon Trust

Marc Mohajer · The Carbon Trust

James Vyvyan · The Carbon Trust

Fred Stace Smith · The Carbon Trust

Report reviewers

George Mowles-Van Der Gaag · The Carbon Trust

Wei Mei Hum · The Carbon Trust, Singapore

CARBON TRUST

Contents

1. **EXECUTIVE SUMMARY**

2. **CONTEXTUAL ANALYSIS**

Introduction & Scene-setting

Global Transition Credit Supply Outlook

Global Coal Plant Eligibility Screening

Global Transition Credit Supply Profile



CARBON TRUST

ANALYSIS OF UK POLICY OPTIONS FOR CATALYSING TRANSITION CREDITS – PART 1

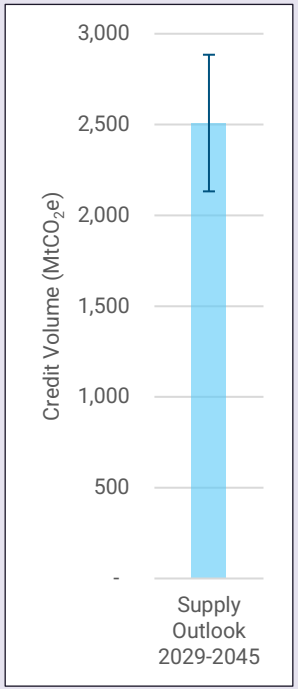
Executive Summary

Modelled transition credit supply totals around 2,500 $MtCO_2e$ over 2029-45, concentrated in Asia

India, Viet Nam, Indonesia and Thailand lead the modelled opportunity. These volumes represent potential issuance under the model's retirement scenarios.

Distribution of forecast transition credit supply





Key insights

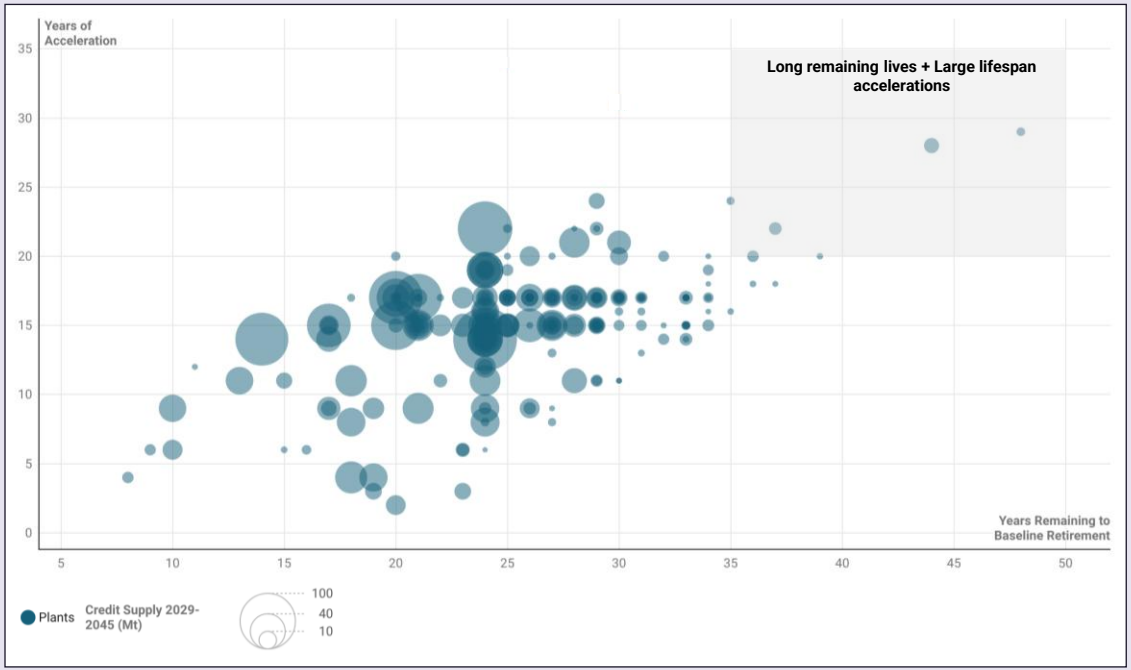
- The majority of supply is focused in South and South-east Asia, which provide 4 of the top-5 suppliers of transition credits.
- Notable non-Asian supplier countries include: Türkiye, Brazil, South Africa and Chile. These markets all issue at least some level of credits from 2029 and continue issuance consistently across the full period.
- Bangladesh, Pakistan, Zambia and Uzbekistan are active, however their issuance skews towards to end of the 16-year outlook period.

Transition credit supply modelled using a modified version of the Global Energy Monitor (GEM) coal asset database combined with baseline and transition scenarios. The uncertainty range is 15%.

Large credit opportunities depend on bringing plant retirement forward by well over a decade

Several sizeable opportunities require retirement 15-22 years ahead of the baseline, making owner compensation, contractual restructuring and timely replacement power central to delivery.

Per plant years remaining to baseline retirement vs years of acceleration



Supply data from Carbon Trust modelling, based on a modified version of the Global Energy Monitor (GEM) coal asset database. "Years of Acceleration" is the number of years earlier retirement occurs under the Accelerated Transition scenario versus the Policy BAU scenario.

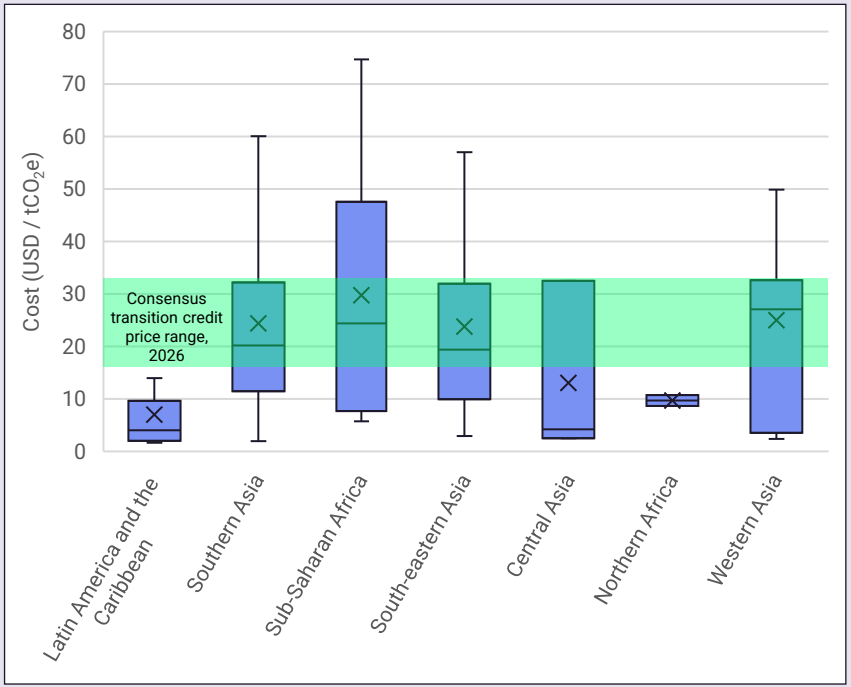
Key insights

- Several large bubbles combine roughly 20-25 years to baseline retirement with 15-22 years of acceleration. Realising these volumes would mean foregoing substantial expected operation, potentially requiring significant owner compensation and contractual restructuring.
- Some plant opportunities imply retirement within roughly 5-10 years, making replacement capacity, financing and approvals potentially urgent dependencies.
- Plants with similar remaining lives and acceleration requirements show markedly different credit volumes, highlighting the role of targeting.
- Bubble sizes capture 2029-45 supply, rather than lifetime abatement. Small bubbles among longer-lived plants could reflect that their crediting period extends beyond 2045.

Projected prices could cover modelled credit costs for part of the supply pool

Under the assumption that credits fund 15% of transaction costs, projected prices could support part of the supply pool; securing the remaining finance and validating project costs remain essential.

Sub-regional plant-level credit cost distribution against forecast price range



Sub-regional averages based on cost estimates for decommissioning, replacement (incl. BESS) and conservative lost PPA value relating to plants issuing between 2029-2045, with credits assumed to cover 15% of the total transaction cost in modelling. Consensus price range: desk sources.

Key insights

- Sub-Saharan Africa has the highest mean transition credit cost estimate ($30 / tCO_2e), followed by Western Asia ($25) and Southern Asia ($24), with South-eastern Asia close behind ($24)
- Sub-Saharan Africa and South-eastern Asia show the widest interquartile ranges, indicating high fleet variability and the need for tailored credit pricing to most efficiently enable transition across CFPPs.
- The mean costs of the four highest sub-regions sit within the 2026 consensus price range, while others sit well below it — indicating greater headroom against modelled credit cost for the lower-cost fleets, but a tighter economic case for higher-cost regions.

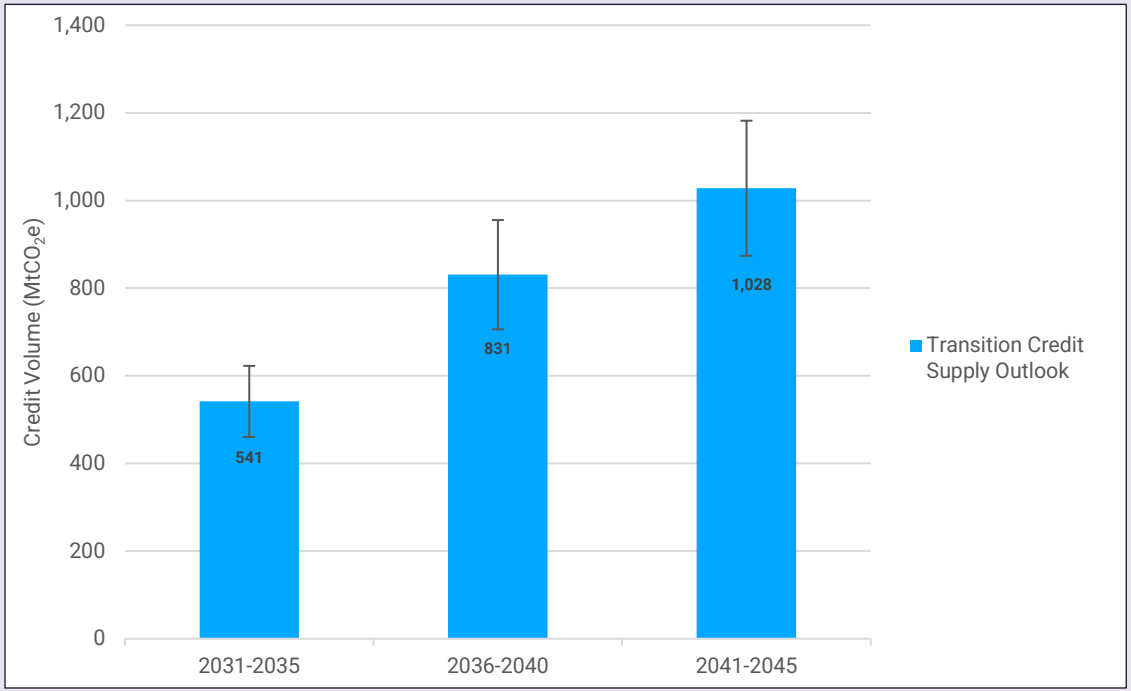
Implications

- The 2026 price range appears sufficient to make a share of transition credits economically viable under the assumed financing structure, particularly for the potentially lower-cost fleet opportunities in Latin America and Northern Africa.
- Higher-cost regions (Sub-Saharan Africa, Southern and South-eastern Asia) have wide variability, meaning more plants may be marginally viable.
- With several cost components estimated and with high uncertainty, real floor-prices could be higher, potentially pushing plants in higher-cost regions out of viability.

Transition credit supply grows steadily out to 2045, and represents only a portion of general global credit demand

Although global demand for carbon credits generally likely far exceeds modelled transition credit supply, this does not necessarily equate to sufficient purchasing at viable prices or in the required delivery periods.

Forecast transition credit supply by year period



Transition credit supply modelled using a modified version of the Global Energy Monitor (GEM) coal asset database combined with baseline and transition scenarios. The uncertainty range is 15%. McKinsey demand estimate (source).

Key insights

- Global carbon credit demand is likely to exceed projected theoretical transition credit supply. For example, McKinsey estimates annual global demand could reach 1,500-2,000 $MtCO_2e$ by 2030.
- It is also worth highlighting that, although some discounting has been applied to the supply to roughly account for the non-realisation of potential due to grid constraints, asset owner willingness, financing availability and transaction complexity, there will likely be challenges in bringing this supply forecast online.
- Should forecast relevant demand for carbon credits exceed modelled theoretical transition credit supply, it must still be noted that the share of demand accessible to transition credits remains uncertain.

To move from market opportunity to market viability, understanding how demand could develop is key

The second part of this analysis will be published shortly, integrating alongside theoretical supply a view of potential transition credit pricing, demand centres, and which policy options could be used to stimulate demand.

Summary flow of integrated transition credit market context and policy options analysis

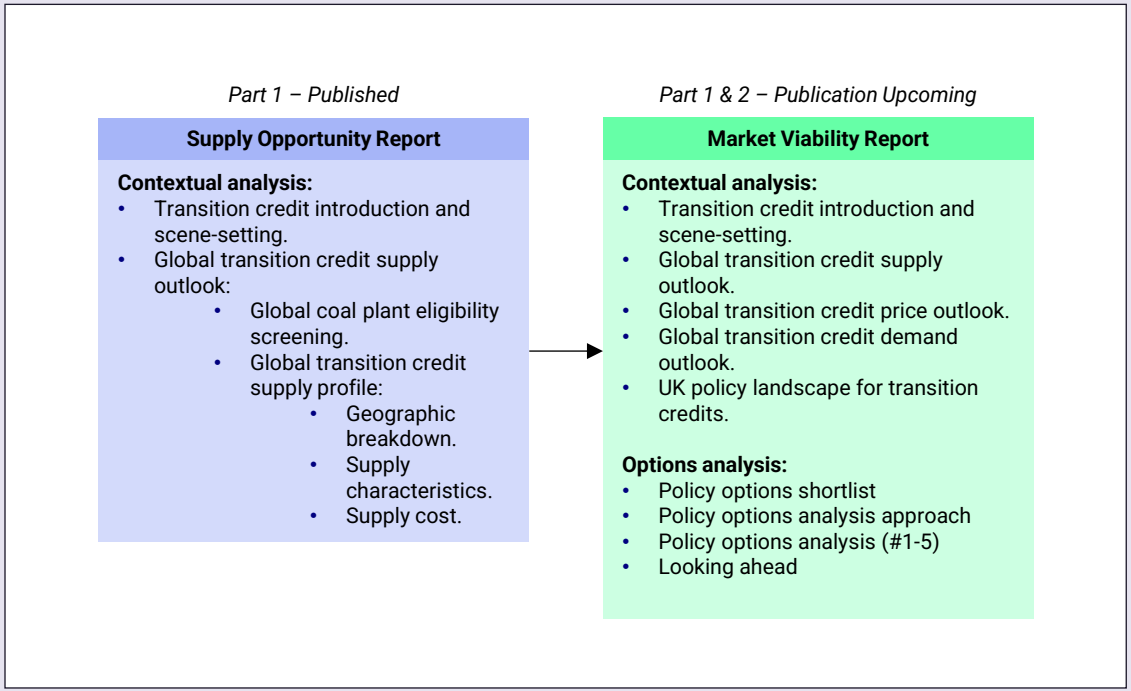
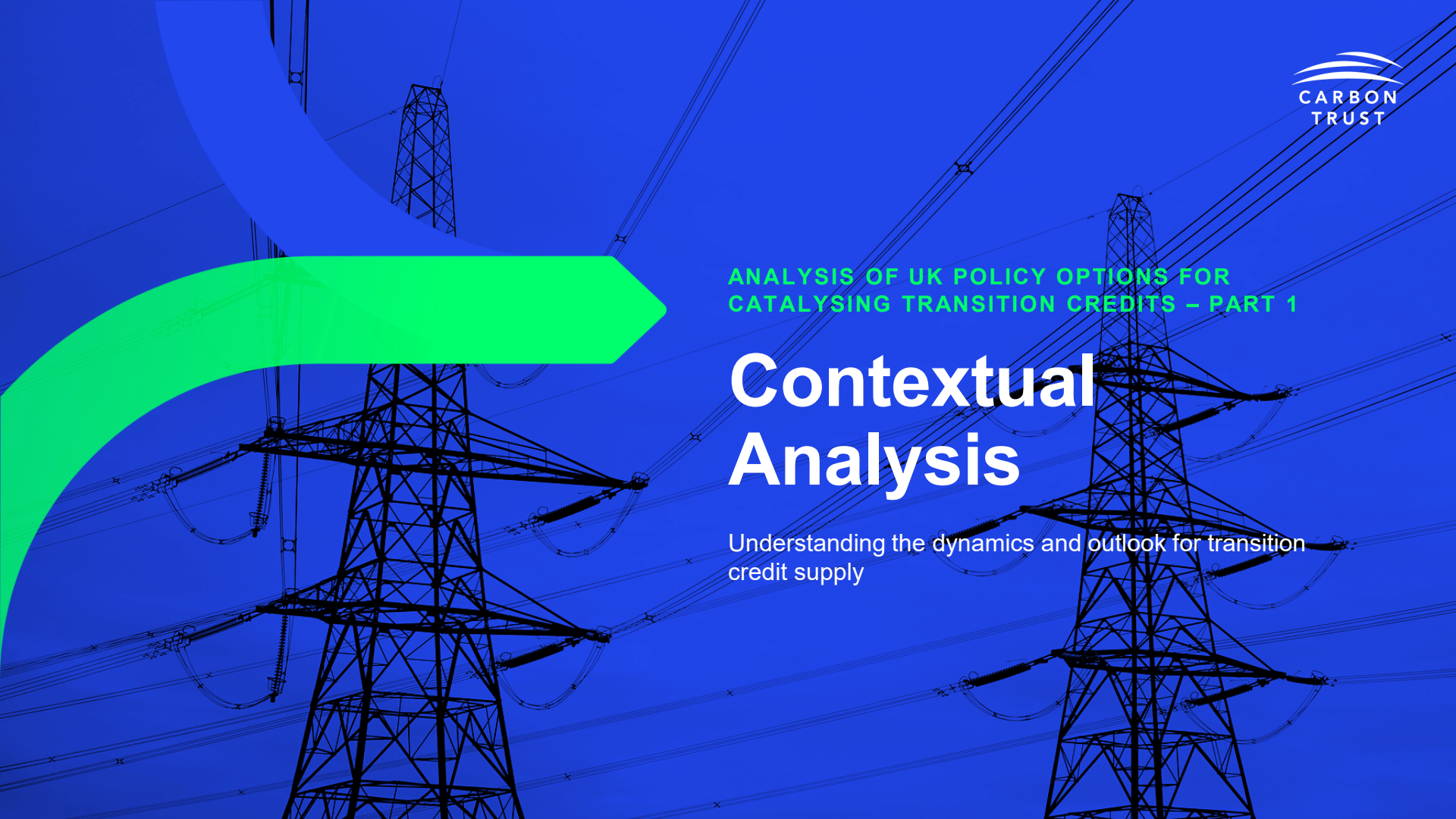


Diagram: Carbon Trust authors.

Key insights

- Transition credits can create additional value for earlier coal retirement, but cannot on their own resolve the commercial, technical and policy conditions that keep coal plants operating. Progress will depend on identifying the subset of plants where these conditions can credibly be brought together and turning them into a vanguard of investable retirement and replacement transactions.
- Those transactions will ultimately need demand. Understanding how that demand could develop – both in terms of demand sources and potential pricing alignment – and what could stimulate it at scale, is therefore the next part of the transition credit market challenge.
- This question, moving from supply opportunity to a view of market viability, is covered in a second integrated report to be released shortly.



CARBON TRUST

ANALYSIS OF UK POLICY OPTIONS FOR CATALYSING TRANSITION CREDITS – PART 1

Contextual Analysis

Understanding the dynamics and outlook for transition credit supply

CONTEXTUAL ANALYSIS

Introduction & Scene-setting

Project overview

Research questions

Which policy option(s) could be optimal for catalysing the demand of transition credits in the UK?

- *What is the outlook for the supply of transition credits, their price and demand?*
- *What are carbon credit demand stimulating policy options which could be applicable for transition credits?*
- *Which policy option(s) could be optimal for driving UK demand, based on a balance of impact, cost and complexity?*

Objectives

Providing data and insights to enable policymakers, including those in the UK, to make informed decisions regarding how their governments could accelerate global decarbonisation via transition credits.



Providing information and insights to policymakers to develop their understanding of the transition credit opportunity, its market context and the government's available options.



Providing a clearer quantitative picture for officials, from the comparative price outlook for transition credits versus other benchmarks, to quantifying the cost and impact of demand stimulating policy options.



Providing data which can support officials' engagement with partners both within government, host countries, and across relevant international schemes.

HYPOTHESIS: Transition credits are a nascent credit type and are viewed with uncertainty by key policymakers governing significant sources of demand. Putting figures against the opportunity and identifying credible policy steps could provide the clarity needed to build momentum.

Our approach combined global asset data analysis with qualitative assessment to provide insight for policymakers

The approach was guided by the objective to provide a view on the wider opportunity context alongside the potential catalytic policy options, to ensure the information required for decision-makers is packaged together.

1 Contextual analysis

- Utilised the global coal asset database to estimate the supply outlook to 2045
- Contextualised this estimate within demand and pricing outlooks
- Reviewed the UK policy landscape governing carbon credits

2 Options analysis

- Reviewed global approaches to demand stimulation and shortlisted policy options
- Assessed the cost, impact and complexity of implementing 5 options in the UK context
- Assessed the potential for hybrid policy options to be implemented

Policy briefing

- Provided concise policy briefing on the opportunity and options to catalyse it
- Provided full breakdown of the data analysis and approach in a supporting report
- Engaged with key transition credit stakeholders to test and socialise the findings

Transition credits could help close the financing gap for early coal retirement

Transition credits help bridge the economic value gap created when a coal plant is retired early, offsetting the owner's opportunity cost and rewarding the environmental benefit of doing so.

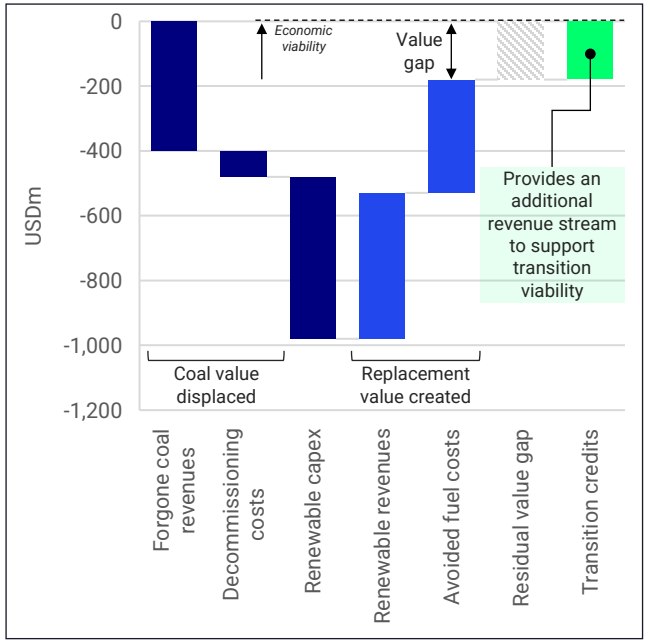
Why is coal retirement a problem?

- Coal fired power is the single largest source of CO_2 in the power sector, and responsible for ~30% of total emissions globally.
- The IEA's Net Zero pathways requires no new unabated coal power generation and the accelerated retirement of existing plants.
- The majority of the global coal fleet is in energy markets where the energy transition is hardest to finance.
- The average age of coal plants in South-east Asia is <15 years old, which makes the challenge even more stark.
- Most coal plants in Asia operate under long term take-or-pay PPAs, which makes early retirement financially challenging for plants owners and off-takers.
- Plant owners face a value gap between early retirement and replacement, and the financial returns from continued operation.

Coal retirement sources: IEA, IEA, RMI, Reuters.

Why are transition credits needed, and what is the role they play?

Illustrative example of how credits help bridge the value gap



- When a coal plant retires early the owner forgoes future revenue streams, remaining PPA payments, capacity payments, and the depreciated book value of the asset.
- This creates a financial shortfall that transition finance alone cannot often bridge.
- Transition credits are designed to generate revenue from verified greenhouse gas emission reductions achieved by early retirement.
- This provides an additional income stream to help close the value gap between what the coal plant owner was expecting from continued operation vs what they would receive from early closure and replacement with renewables.
- Transition credits are not return-seeking and therefore can play a uniquely catalytic role in shifting transition economics, alongside a wider package of concessional financing.

Illustrative CFPP value gap based on a 1,000 MW plant being replaced with renewables by the same asset owner.

Focus on CDR in carbon market best practice guidance may raise questions over support for transition credits

The question is not which are superior, but the respective objectives of carbon purchasing for net zero versus climate finance and sustainable development, and the differentiated role these credits play in supporting them.

Best practice is increasingly focused on durable CDR

- **Net zero frameworks increasingly prioritise removals:** Oxford Offsetting Principles and SBTi Corporate Net Zero Standard guidance identify removals as essential for balancing residual emissions and increasingly orient climate strategies towards durable CDR.
- **Removals are increasingly viewed as the highest-integrity credit class:** Unlike mitigation credits, removals directly address residual emissions and can offer durable carbon storage, aligning closely with long-term net zero objectives.
- **Buyers are increasingly directing finance towards removals:** Net zero commitments, investor expectations and voluntary market guidance are increasing demand for removals within forward looking carbon credit portfolios.

Transition credits and CDR are not direct substitutes, but complementary climate finance instruments, addressing different challenges

	Transition Credits	Carbon Dioxide Removals
Climate function	Avoids future emissions by accelerating coal retirement and replacement with lower-carbon generation.	Removes tonnes of already emitted CO_2.
Impact timing	Immediate, front-loaded into the 2030s.	Long-dated, scales through the 2040s.
Permanence	Not applicable, emissions never occur with transition credits.	Permanence is core to most CDR, with a 200-year benchmark an often-used figure.
Price expectation	Price expectations for transition credits sit at ~$16-32 / tCO_2e (2026).	Materially higher, tracking compliance benchmarks or higher for some CDR solutions.
Supply	Highly concentrated in a few countries and relatively scarce compared to overall carbon market.	Short-term constrained with most supply already pre-contracted.
Co-benefits	Air quality and associated health benefits, alongside just transition value and job creation.	Limited direct local co-benefits typically.

Transition credits and removals can serve complementary climate-finance objectives

There are two likely areas of objection: (1) whether supporting mitigation credits conflicts with the shift towards removals, and (2) whether UK funds should be deployed overseas rather than domestically.

Transition credits remain consistent with best practice

- Whilst Oxford Offsetting Principles, and SBTi Corporate Net Zero Standard guidance prioritises removals as the long-term target, guidance frames the move to removals as a transition over time towards the net zero date, not an instruction to stop supporting mitigation today.
- Near-term availability differs sharply between the two credit classes. A large share of durable removal supply this decade is already committed through pre-purchase agreements and long-term offtakes, so additional demand or carbon finance often competes for a constrained pipeline rather than unlocking new tonnes. Transition credits can deliver mitigation on a nearer timeframe, which matters most in the period before removals scale.
- Support for transition credits therefore sits alongside, rather than in place of, the growing role of durable removals.

Why UK support for overseas credits is defensible

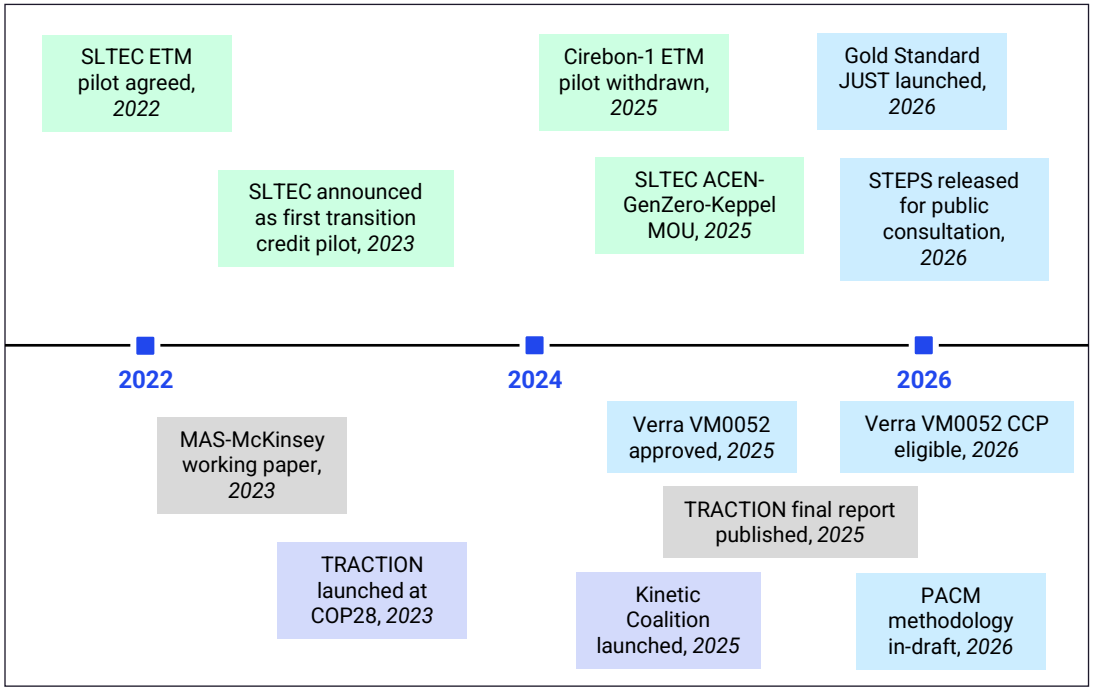
- **UK removal capacity is structurally bounded, not just slow to scale**. Deployment is limited by sustainable biomass, land, and CO_2 storage infrastructure, and the resulting capacity is already allocated to balancing UK residual emissions within the carbon budgets.
- **UK support can unlock overseas mitigation without replacing domestic action**. Transition credits can finance early coal retirement that would otherwise not occur, delivering additional impact as long as incentives for UK decarbonisation and GGR deployment are maintained.
- **Transition credit purchases can deliver global climate impact whilst supporting host-country mitigation pathways, not undermining them**. Exporting lower-cost mitigation can leave host countries facing more expensive reductions. Pricing can compensate for this opportunity cost, while authorisation decisions should protect host-country target delivery.
- **Transition credits can give the UK an additional tool in trade negotiations.** Credit-channeled climate finance can incentivise cooperation and deepen relationships with priority emerging trading economies, with the cost covered by reciprocal concessions negotiated across the wider trade package rather than a standalone spending commitment.
- **The marginal tonne appears cheaper than the UK ETS**. Third party market price estimates for transition credits sit at $16-32 per tCO_2e in 2026, well below a UK ETS path rising to £150 by 2045, potentially lowering abatement costs for UK industry and easing broader cost pressures.
- **Wider co-benefits delivery**: Coal retirement can deliver air quality and health gains, just transition support for workers and communities, and clean replacement investment in host economies, whereas durable removals typically offer little developmental impact.

Sources: Oxford Offsetting Principles; SBTi BVCM; UK government voluntary carbon and nature market principles (integrity and claims, not geography) DESNZ Independent Review on GHG Removals. UK ETS path: DESNZ, Traded carbon values for modelling purposes, 2025. 435 eligible plants and modelled costs: Carbon Trust modelling against simplified eligibility. Consensus price range: desk sources.

Introduction to transition credits: steady progress but significant uncertainty remains

New methodologies are entering the market and CFPP identification and due diligence analysis is underway, however, there remain a limited number of pilot transactions.

Timeline of the development of transition credits



Key: Initiatives | Reports | Standards / Methodologies | Pilots

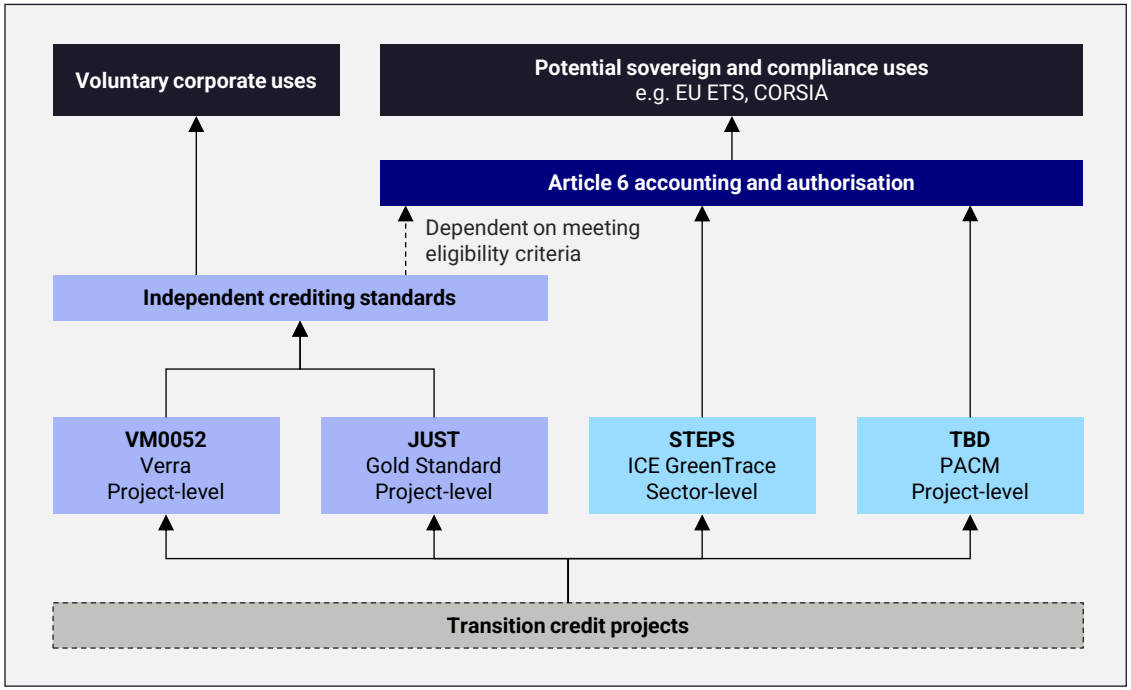
Barriers

- **Price discovery remains limited** – Limited transaction history, and it's unclear whether buyers will consistently pay prices sufficient for early retirement.
- **Demand pathways remain uncertain** – It is unclear which buyer segments will dominate demand and whether there are catalysts for scale; long-term procurement commitments yet to emerge.
- **Compliance market eligibility is unresolved** – Treatment under PACM, EU ETS, CORSIA and SBTi could materially affect demand and price.
- **Methodologies continue to evolve** – Some harmonisations (VM0052 and PACM) but questions remain on pairing and system impacts.
- **Transition credits may not fully close financing gaps** – Credits expected to provide 15-25% transaction value, additional concessional finance will be required.
- **Converting theoretical supply into projects will be challenging** – Requires alignment of asset owners, government, financiers and regulators.
- **Policy and regulatory uncertainty creates investment risk** – Changes in policy or government could materially impact viability, hence recent focus on supporting insurance products.

Multiple methodologies are active or under development to enable issuance, creating an increasingly complex landscape

Methodologies are being introduced covering different jurisdictional levels and different crediting scales, as well as plugging into different parts of the global carbon market.

Summary of interrelation between the different transition credit methodologies



This is a simplified representation of the transition credit issuance landscape. The ability for independent standard credits to transition into Article 6 depends on eligibility criteria being met. A credit issued under an independent standard does not automatically make it eligible for compliance markets, however specific gateways for high-integrity credits could be approved.

Key insights

- **VM0052** is currently the most mature methodology (approved in May 2025, CCP approval November 2026).
- **JUST** is close behind but less proven in application (launched in March 2026).
- **STEPS** is an emerging sectoral approach that is under consultation.
- **PACM** offers strong long-term compliance-market potential but is in development (overall PACM has moved from rule-setting to operationalisation, with the first methodology approved in October 2025).

- The market is increasingly converging around common principles of Article 6 alignment, robust MRV, and just transition safeguards. For example, the Rockefeller Foundation have positioned VM0052 as a practical near-term pathway that could inform future PACM-aligned approaches, while Gold Standard's JUST methodologies were explicitly designed to align with the Paris Agreement and evolving Article 6 architecture.
- Credits issued under independent standards may be eligible for voluntary, sovereign or compliance use, subject to applicable requirements. Article 6 authorisation does not automatically confer eligibility for a particular compliance scheme.

These methodologies have distinctly different approaches and target audiences

The methodology landscape is expanding from project-level independent standard crediting (VM0052 / JUST) towards sovereign and system-level crediting (PACM / STEPS), opening new pathways to finance coal phase-out.

Classification of coal retirement carbon credit ("transition credit") methodologies

	UN Mechanism (Article 6)	Independent Standards
Project-based	**PACM** Sovereign + project-based • Article 6.4 activity-level crediting. • Host country authorisation required. • UNFCCC issuance route. • Transition credit methodology under development.	**VM0052 / JUST** Independent + project-based • Plant-level accelerated CFPP retirement paired with renewable power. • Issued under independent standards: Verra VCS or the Gold Standard. • JUST is recent and adds more restrictive safeguards and replacement requirements.
Sectoral / Jurisdictional	**Emerging** UN Article 6.4 sectoral mechanism • No operational sectoral crediting mechanism under Article 6.4 mechanism yet. • Jurisdictional / sectoral results can still reach buyers through Article 6.2 cooperation. • Space is under development and not reflective of a permanent gap.	**STEPS** Sovereign + independent + sectoral • National power-sector crediting. • Government-designated participants. • Country-level emissions benchmarks. • Jurisdictional transition – electricity-sector performance. • Managed by Environmental Resources Trust (ERT) at Winrock International.

Buyers can be sovereign, compliance or voluntary corporate. The mix depends on buyer preference, not just methodology – e.g. SLTEC coalition combined both.

Carbon methodology documentation is available for VM0052, JUST and STEPS. Although there is no specific public documentation available for the PACM methodology, as this is still in-development, its integrity architecture is being harmonised with VM0052.

Key insights

- **Governance:** Independent standards (Verra, GS, Winrock) sit under independent bodies; PACM sits under UNFCCC / country-authorised Article 6.4 governance.
- **Crediting scope:** Methodologies differ in whether they credit individual coal assets, authorised activities, or sector-wide power emissions.
- **Market use:** Buyer type is a choice, not a methodology feature – PACM and independent standards can each serve sovereign / compliance and voluntary corporate demand.
- **Maturity:** VM0052 is operational and already used in analysis; PACM methodology and STEPS both remain under development / consultation.
- **Integrity approach**: Integrity is set at two levels: each standard's rules, plus ICVCM Core Carbon Principles (CCP) – an additional label for eligible programmes / credits applied above independent standards that is a further integrity stamp (e.g. VM0052). PACM carries direct UN oversight.
- **Adoption outlook:** Jurisdictions signal different preferences by integrity, not methodology – e.g. Singapore accepts any credit meeting its eligibility / CCP criteria rather than a single methodology (EU ETS treatment remains too early to tell).

Verra VM0052* – Methodology summary

Archetype: Independent standard + project-based

Overview

- Project-based methodology for accelerating early retirement of coal-fired power plants, paired with renewable electricity that partially or fully replaces the lost coal generation.
- Was the first transition credit methodology published and therefore is the most progressed in terms of adoption.

Eligibility

- Grid-connected CFPPs with construction initiated before the 31st Dec 2021, with qualifying long-term (20 years+) PPA by 31st Dec 2023.
- Financially viable assets – positive net income and fair value at validation and retirement date.
- Renewable pairing must be planned at validation, export to the grid, cover at least 10% of retired CFPP generation at project start, and at least 40% by the end of the initial crediting period.**
- In a regulated electricity market, the CFPP must be owned either by a regulated utility or an IPP.
- At validation, there must be a publicly available commitment from the asset owner to not build new CFPPs or increase existing CFPP capacity.

Key requirements

- Funded Just Transition Plan available at validation.
- No new coal commitment for relevant owners or jurisdictions.
- Renewable energy replacement requires that: exports to the grid; covers at least 10% of retired generation on an annual basis at project start; and covers at least 40% of retired generation by the end of the initial crediting period.**
- System operator or authority must confirm no material negative effects on consumer prices, access, grid stability, or supply security.
- **Credit issuance:** Starts at accelerated retirement date, ends at baseline retirement or earlier integrity-based trigger events.

Supporters

- Led by the Rockefeller Foundation. Developed with inputs from RMI, CPI and South Pole. Overseen by a technical advisory group including the World Bank, ADB, IADB, etc.
- The PACM methodology for transition credits is set to have a shared integrity architecture with VM0052.

Adoption

- Most mature in terms of usage (market studies, asset due diligence and pilot transaction development). Approved as CCP-eligible by ICVCM.
- 434 CFPPs considered eligible under VM0052 screening.
- Potential for 2.5 $GtCO_2e$ in credit supply (2029-45) based on simplified eligibility.

** VM0052 (documentation, baseline methodology). ** Percentages of renewable energy replacement required are expected to be revised upwards, likely by generation and >50%. Correct as of Nov-2026. ICVCM CCP approval confirmed November 2026 (source).*

Gold Standard JUST* – Methodology summary

Archetype: Independent standard + project-based

Overview

- Joined-Up Sustainable Transition (JUST) methodology pairing early coal retirement with RE installation and integrating social, economic and environmental outcomes for a fair and inclusive transition.
- Conservative accounting – dynamic baseline contraction via ambitious performance benchmarks and a downward adjustment factor.

Eligibility

- CFPPs permanently retiring ahead of baseline operating life (must have 5+ years uninterrupted commercial operation prior to project activity start date and 5+ year technical / operational lifetime remaining) – captive or off-grid CFPPs not eligible.
- CFPP must be free of any pre-existing legal mandate for early closure.
- Applicable globally for micro, small and large-scale activities under sectoral Scope 1.
- CFPP owner and activity participants must have no commitments to invest globally in new CFPPs or expand existing CFPP capacity beyond plants reaching FID before 31 Dec 2021.

Key requirements

- Comprehensive Just Transition Plan monitored through crediting period (comply with GS4GG JT Requirements).
- Decommissioning decision directly linked to investment in new grid-connected RE plant (REP) in same host country with equivalent annual generation and capacity adequacy.
- Activity participant(s) may comprise one or a combination of the CFPP asset owners, the REP developer(s), or a third party.
- Phase-out may be spread over 5 years, completed by 31/12/2035, or 31/12/2040 for LDCs and SIDS.
- **Credit issuance:** Starts on commissioning of REP, 5-year crediting period, renewable twice subject to remaining CFPP lifetime.

Supporters

- Gold Standard for Global Goals methodology and requires GS4GG Just Transition compliance.
- Co-developed with UN SEforALL (fossil fuel generators) and shaped via public consultation with developers, financiers and just transition stakeholders.

Adoption

- Public consultation completed; methodology published in March 2026.
- 359 CFPPs considered eligible under JUST screening.
- Potential for 2.5 $GtCO_2e$ in credit supply (2029-45) based on simplified eligibility.

** Joined-up Sustainable Transition (JUST) (documentation).*

STEPS* – Methodology summary

Archetype: Sovereign + independent + sectoral

Overview

- Sectoral crediting standard for power-sector transformation, issuing credits for emissions reductions achieved beyond a Paris-aligned national performance benchmark.
- Reductions across all national electricity generation (grid-connected, captive, RE) and associated emissions, rather than individual coal plant retirement projects.

Eligibility

- Government-designated participant with authority to manage the programme.
- Electric power sector included within the country's NDC.
- Covers all national electricity generation and associated emissions, with robust monitoring and reporting systems.
- Requires a defined sector boundary and Energy Transition Plan with Just Transition elements.
- Registry, verification and no double-counting arrangements required.

Key requirements

- Sector-wide national baseline
- Performance-based crediting approach – performance must exceed a country-specific emissions benchmark that declines towards 2050.
- Compliance with STEPS ESG safeguards, including stakeholder engagement, human rights and environmental protections.
- Additionality demonstrated through historical trend and future capacity tests.
- Emissions accounting framework with monitoring of transition outcomes.
- **Credit issuance:** Issued ex-post, fixed 5-year sectoral crediting periods, renewable through successive programme cycles (minimum commitment 10 years / 2 crediting cycles).

Supporters

- Developed and managed by Environmental Resources Trust (ERT) at Winrock International. ERT manage ACR and ART (REDD+).
- Registry will be hosted on the ICE GreenTrace platform, operated by the Intercontinental Exchange (ICE).

Adoption

- Draft methodology for jurisdictional power-sector crediting. The methodology is currently open for public consultation.
- Designed for government-led implementation at national scale, and is being piloted in the Dominican Republic.

** The Standard for the Transformation of the Electric Power Sector (STEPS) (documentation).*

PACM* – Methodology summary

Archetype: Sovereign + project-based

Overview

- Paris Agreement Crediting Mechanism supporting emission reductions aligned with Article 6 objectives through government-authorised crediting and international cooperation.
- Emerging route for Article 6-aligned transition finance.

Eligibility

- Activities approved by participating host-country governments under PACM rules and must use an approved Article 6.4 methodology.
- Must align with host-country NDC and sustainable development objectives.
- Requires host-country approval and authorisation, including corresponding adjustments for internationally transferred credits.
- The integrity architecture for the PACM methodology is being harmonized with the VM0052 methodology to avoid unnecessary market fragmentation.

Key requirements

- Crediting, issuance and tracking occur through UNFCCC systems.
- Methodologies must meet Article 6.4 requirements for additionality, baselines, monitoring and safeguards.
- Robust MRV and emissions accounting framework.
- Validation, verification and issuance overseen through approved UN processes.
- **Credit issuance:** TBD – specific approach will be defined once the PACM transition methodology is finalised.

Supporters

- UNFCCC Article 6.4 Supervisory Body.
- Host-country governments.
- Developed by RF in partnership with WB, ADB and IADB, with support from South Pole and submitted to PACM advisory board.
- Rules not yet confirmed, but EU may only accept PACM credits.

Adoption

- Designed for compliance and NDC-aligned use cases.
- Transition credit methodology currently under development.
- As of Nov-26, 5 methodologies have been approved under PACM. However, 6-7 are expected to be approved by the end of 2026, covering 60-70% of activities.

** Paris Agreement Crediting Mechanism (PACM). The methodology is nearing submission to the PACM Supervisory Body, but is currently not specifically named. It is a methodology to support high-integrity transition credits for coal-to-clean power projects under Article 6. Approvals (source) and expected coverage (source).*

CONTEXTUAL ANALYSIS

Global Transition Credit Supply Outlook

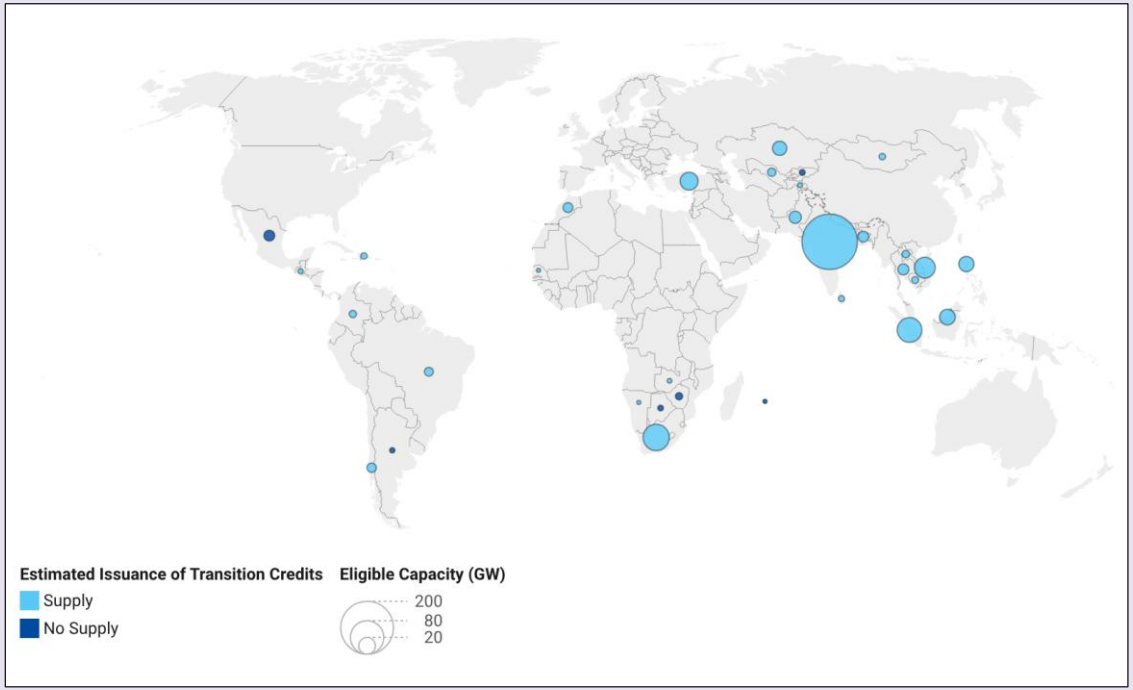
TRANSITION CREDIT SUPPLY OUTLOOK

Global Coal Plant Eligibility Screening

Based on our screening there are 435 eligible plants, representing 18% of global operational plants

This translates into 434 GW of installed capacity which could benefit from the catalytic deployment of transition credits, largely clustered in south and south-east Asia.

Distribution of broadly transition credit-eligible coal plants by installed capacity (GW)



Installed capacity has been sourced from the Global Energy Monitor (GEM) coal asset database. "Eligible" counts all plants that are: operational, non-captive or CHP, and in selected countries (Global South countries relevant for climate finance excluding China). China alone represents 1,039 GW of potentially eligible capacity. TRACTION final report (source).

Key insights

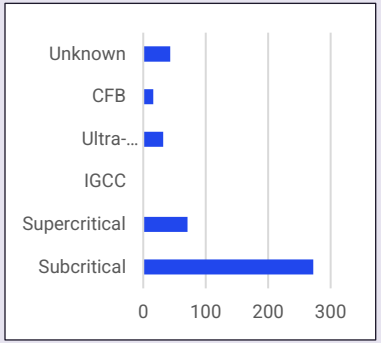
- This is roughly the total addressable market (TAM) of CFPPs for transition credits, based on a light application of VM0052. This would likely be reduced with the inclusion of criteria such as requiring proponents to make a 'No New CFPPs' commitment.
- Additionally, transaction complexity, financing and asset owner interest will reduce the number of CFPPs ultimately issuing credits substantially.
- Furthermore, not all theoretically eligible national fleets are estimated to generate credits in practice – due to existing retirement plans or policies making such credits non-additional.
- Eligible plants are geographically spread, with particular clusters in south Asia, south-east Asia and southern Africa.
- Eligible installed capacity shows a parallel trend to the eligible plant count.
- For comparison, TRACTION identified ~207 GW from IPPs which may be eligible for transition credits. This came from applying its 'Selection and Prioritisation Framework', based on the integrity attributes of the Verra 0052 methodology, to 15 selected Asian markets.

SUMMARY

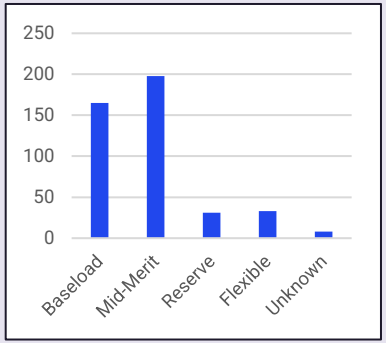
These 435 eligible plants span plant types, sizes, system roles, and plant ages

By count, the eligible pool skews younger and smaller, largely using less-efficient boiler technology and a substantial portion producing load-following mid-merit electricity for the grid.

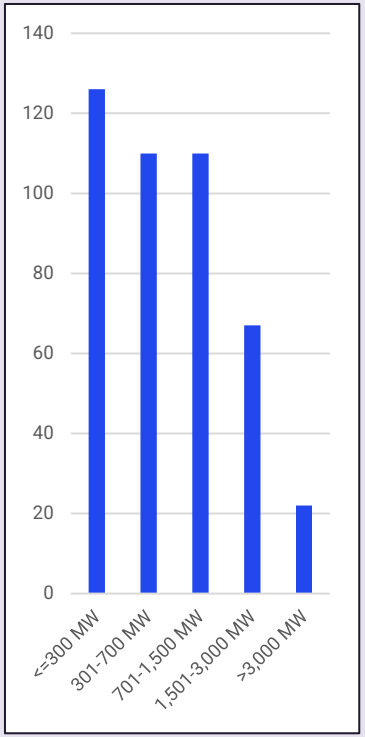
1. Eligible portfolio by plant type



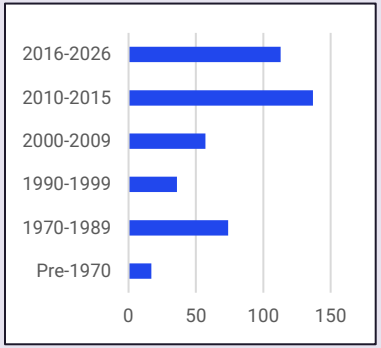
2. Eligible portfolio by plant role



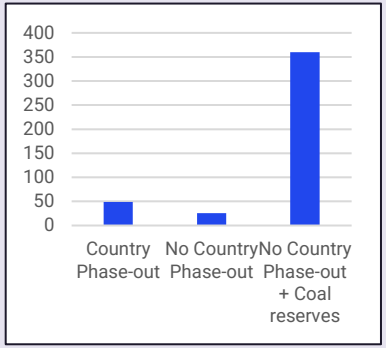
3. Eligible portfolio by plant size



4. Eligible portfolio by year built



5. Eligible portfolio by context



Data sourced from the Global Energy Monitor (GEM) coal asset database. "Coal reserves" based on domestic coal production >5 mt.

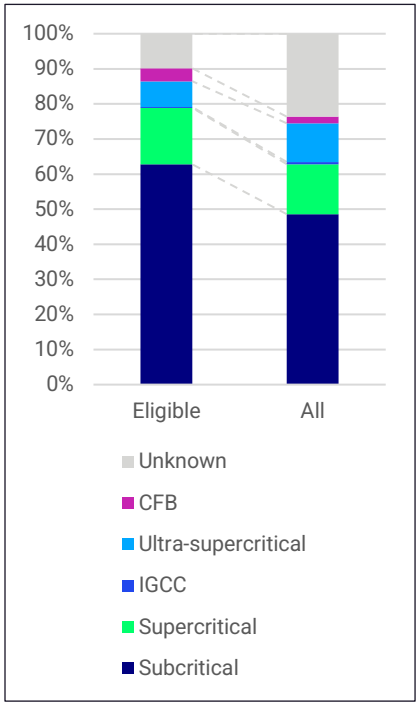
Key insights

- (1) A strong majority of portfolio plants use subcritical technology. This may reflect that such plants are less efficient than super- or ultra-supercritical alternatives, as thus relevant for earlier retirement. However, their prevalence could be driven by frequency in the global fleet due to lower capital costs and simpler design.
- (2) Most eligible plants are mid-merit, with the remainder mostly providing baseload. Mid-merit is load-following (adjustable) and could be more easily replaced without system stability impacts.
- (3) 75% of eligible plants are <1,501 MW capacity, 29% are <301 MW. This is potentially helpful in creating more manageable replacement and transaction sizes.
- (5) Most of the eligible fleet is located in countries without a national phase-out commitment, and with coal reserves. This provides an opportunity for engagement, but also a risk that plant lifespans could be extended.
- It is worth noting that we are not including any pipeline plants in this portfolio. However, this has a less substantial impact than expected due to the dominance of China over all stages of the pipeline, and the exclusion of China's national fleet.

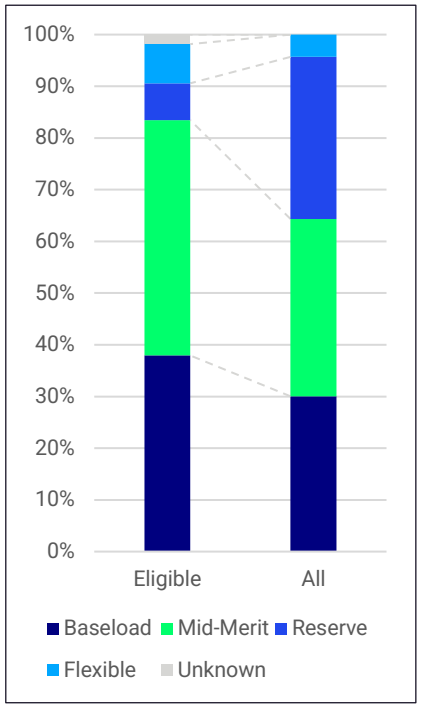
The potentially eligible fleet over-represents subcritical, mid-merit plants built in 2010-15

Sub-critical and CFB plants, those providing mid-merit power, and those built between 2010-15 are over-represented within the eligible plant group. Reserve plants are particularly under-represented, whilst plant size does not appear relevant.

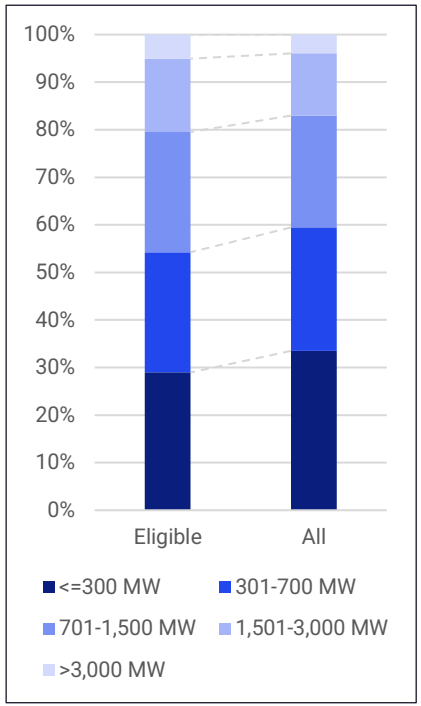
1. Eligible portfolio by plant type



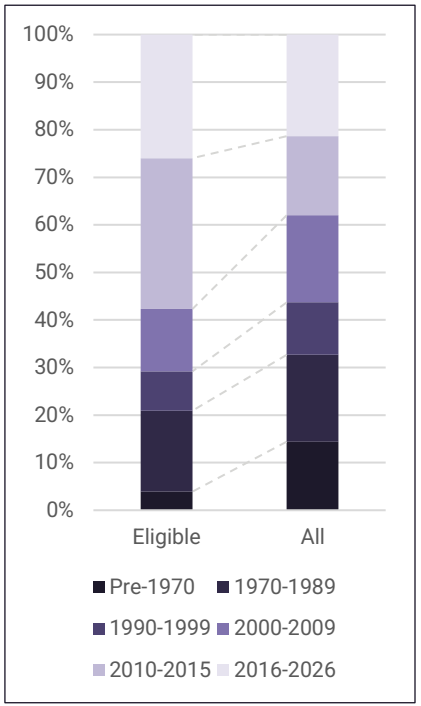
2. Eligible portfolio by plant role



3. Eligible portfolio by plant size



4. Eligible portfolio by year built

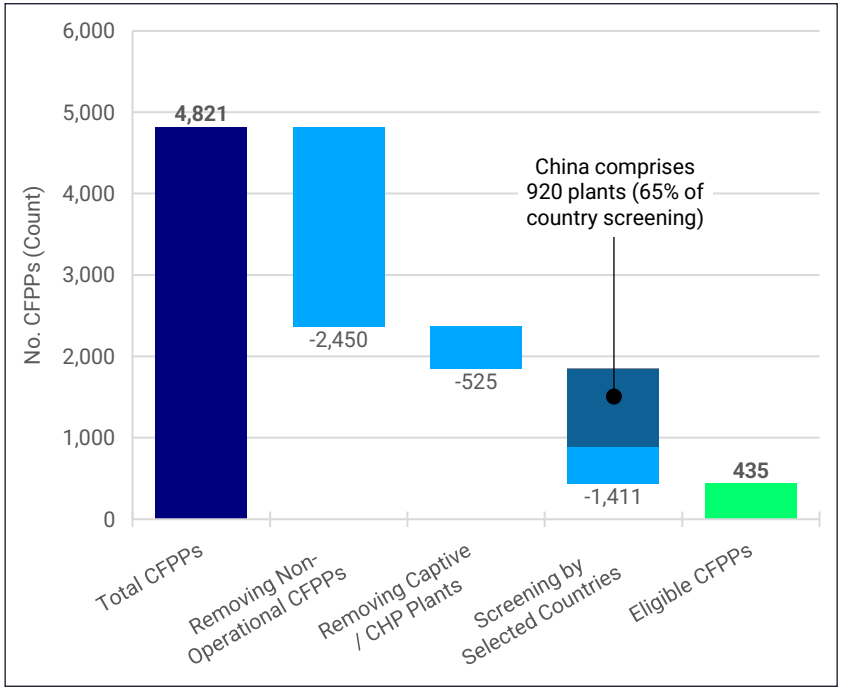


Data sourced from the Global Energy Monitor (GEM) coal asset database. Comparison of eligible portfolio and total database for country context (5) not available.

Eligibility screened for operational, non-captive or CHP coal plants in selected countries

Selected countries include those which for development or climate funds could be realistically expected to flow to, based on economic development, geo-political context and EU accession.

Application of basic eligibility criteria to identify eligible plant portfolio



Screening applied to Global Energy Monitor - Global Coal Asset Database. Excluded countries: US, Canada, Australia, New Zealand, North Korea, South Korea, Japan, China, Taiwan, EU, Israel, UK, Bosnia & Herzegovina, Serbia, Kosovo, North Macedonia, Ukraine and Russia. See also slide 38.

Key insights

- Roughly half of the total global coal fleet is non-operational, either because it is already retired, mothballed, cancelled or in the development pipeline.
- Two of the most important criteria from the VM0052 and JUST methodologies are that pipeline plants are excluded, along with captive plants. These are reflected in this basic screening, however others, such as plant-level proponents having agreed a 'No New CFPP' commitment or plant-level financial performance, are not covered and could be expected to have a depressing impact.
- Energy-specific NDC coverage and related policies are also required; however, this has been implicitly screened-for by the selected countries.

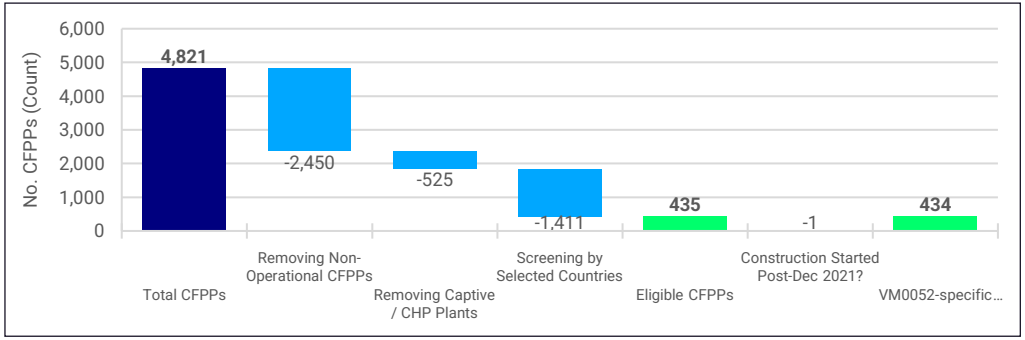
Implications

- Most of the elements being screened for in the chart are 'hard factors', e.g. captive / CHP exclusion or plants being non-operational. There is potential malleability surrounding the selected countries, however, it may be unrealistic to expect development funds to flow to certain jurisdictions, despite the existence of retireable plants. Alternative policy and funding mechanisms or sources will be required to address these plants, which are a majority of the remaining active plants, largely in China.
- There are limited options to increase the number of eligible plants without changing the methodologies in use – e.g. allowing late-stage pipeline – or including wider East Asia countries – e.g. China, South Korea, Japan and Taiwan. Focus must therefore lay with maximising the penetration and conversion of the 435 identified, wherein a degree of drop-off if inevitable.

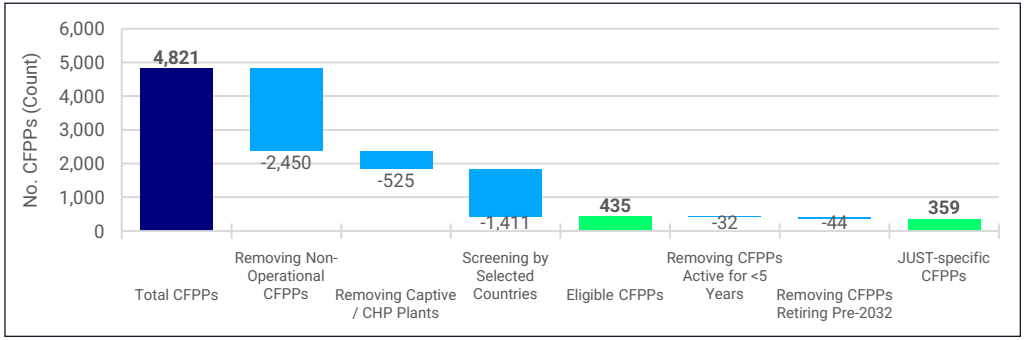
Each crediting methodology has different criteria, resulting in differing numbers of eligible CFPPs

Charts below highlight selected VM0052 and JUST criteria which screen for additionality differently, resulting in 434 versus 359 CFPPs eligible. This does not indicate robustness, however, as further criteria are not included due to data limitations.

Impact of applying further VM0052-specific criteria to the eligible CFPP portfolio



Impact of applying further JUST-specific criteria to the eligible CFPP portfolio



Key insights

- A key additional criteria of the VM0052 criteria is that construction started prior to December 2021. Applying this to the 435 plants identified from the basic screening removed only one plant.
- It's worth noting the harmonisation efforts between the VM0052 and PACM methodologies, including on eligibility criteria. This gives the VM0052 screening cross-relevance.
- The different rules do not indicate a stricter or looser scale, both will likely evolve over time.

Implications

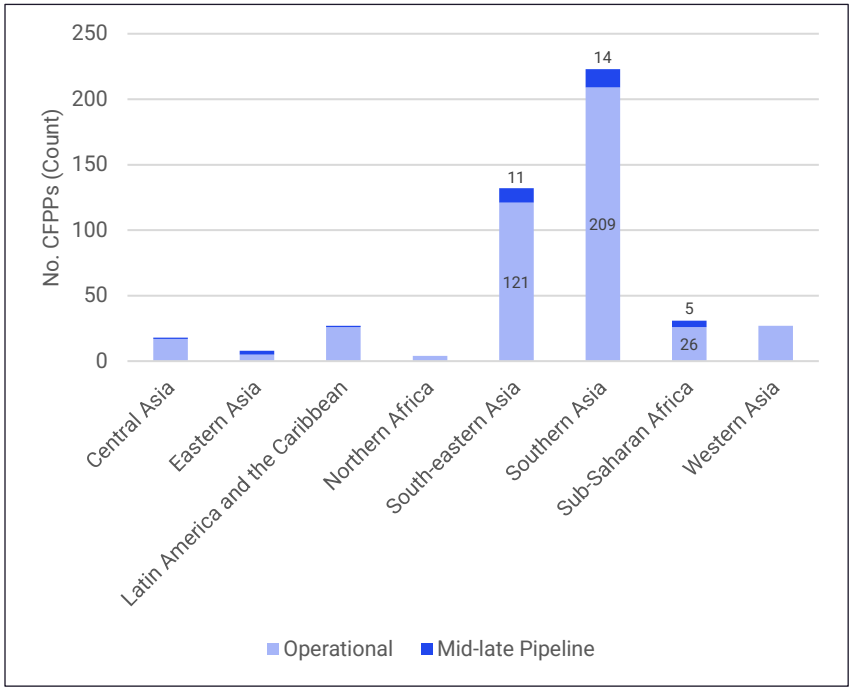
- Gold Standard's registry is popular amongst corporate credit buyers. This gives a demand-access advantage for JUST credits unrelated to its eligibility criteria.
- VM0052 has been the dominant methodology for transition credit studies and pilots to-date. This will likely continue, however new methodologies will create a more varied landscape.
- Ultimately, despite 435 plants being considered eligible, only 205 CFPPs are forecast to issue transition credits in the supply profile 2029-2045, due to the policy baseline scenario against which early retirement has been assessed.

Lack data for proponent-level "No New CFPP Commitment". Country screening resulted in all countries with an NDC power sector decarbonisation target or action / objective to increase renewable share of electricity. This screening does not yet incorporate further Gold Standard JUST CFPP criteria or VM0052-specific criteria; the 434 and 359 figures should be read as intermediate rather than final eligible-pool counts.

If mid-late pipeline plants were made eligible this would increase the number of eligible plants by only 8%

VM0052 does not permit newly built plants to issue, however, accounting for captive plants and selected countries this does not appear to be a critical gap.

Eligible CFPPs by sub-region and pipeline status



"Pipeline" conservatively based on plants classified as either permitted or in-construction by the GEM database. Of which the raw totals are 55 and 103 plants respectively.

Key insights

- The early-stage pipeline may be expected to see significant cancellations as engagement focuses on 'avoiding building'. However, for plants which are in construction (the late-stage pipeline) and thus are likely to become operational yet not eligible for transition credits, there is a small gap.
- There are 2,371 operating plants, and 302 in the pipeline, of which 158 are in the mid-late pipeline. This steers the overall picture, which is evident as eligibility rates are similar for operating plants (18%, 435 of 2,371) and mid-late pipeline plants (22%, 35 of 158), so including the pipeline would add only about 8% more eligible plants.
- The key gap is China, where the majority of pipeline plants are proposed or located. Of the 158 plants in the mid-late pipeline, 113 are in China.

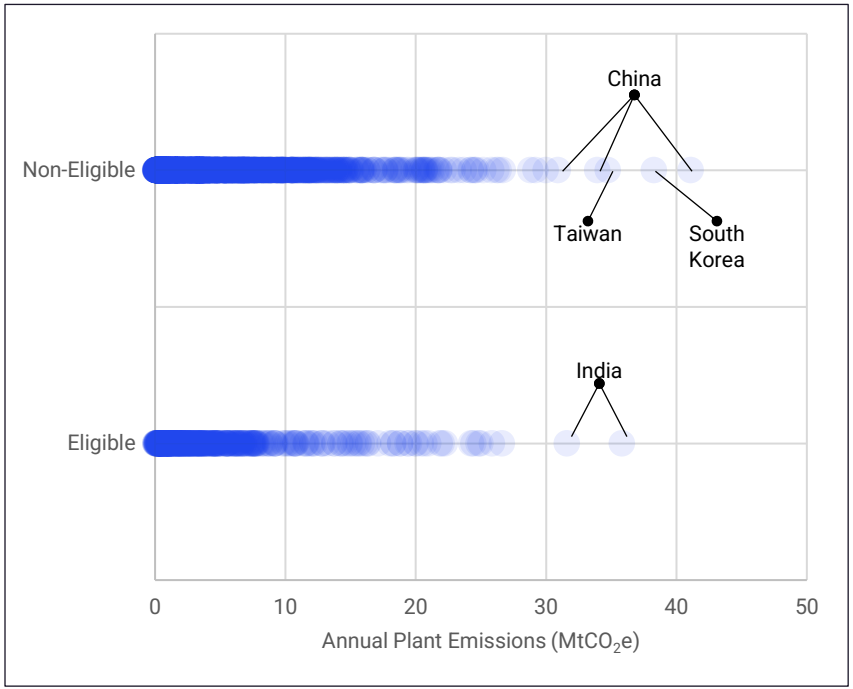
Implications

- The headline implication is that, even whilst excluding pipeline plants, the methodologies are covering the majority of the opportunity. There is a lower risk of a gap between transition credit-supported operating plants and incentives preventing plant construction than may have been expected.
- There are plants which will exist in this gap, however they can either be supported via other tools, or will be impacted by macro shifts driven by coal retirement and renewables competition and organically pushed off the network.
- Where specific thought and engagement may be required is in China, where >70% of late-stage pipeline CFPPs are in development.

Eligible plants span from low-to-high emissions, with missing high-emitting plants largely based in China

The top-5 non-eligible plants by annual emissions are located in: China, South Korea and Taiwan. There is no evidence that the eligible group is systematically under-representing high-emitting plants.

Distribution of operating CFPPs by annual emissions



CFPPs sourced from the Global Energy Monitor (GEM) coal asset database, with basic eligibility screening applied and capacity-adjusted annual emissions figure calculated per CFPP.

Key insights

- Despite a small number of large outliers, the data indicates that there is no relationship between plant size and eligibility. Overall, there are 435 eligible and 1,936 non-eligible CFPPs, however, the distributions within the eligible and non-eligible groups of operating CFPPs are comparable.
- Furthermore, average plant emission size between the two groups is comparable, and a number of the highest emitting plants are eligible.
- 9 of the top-20 CFPPs by annual emissions are in China. As China is an excluded country, this highlights the main gap in emissions opportunity.

Implications

- This analysis affirms that eligibility screening is not resulting in a significant portion of the higher-emitting fleet being missed by transition credits. Transition credits as a solution are indeed targeting the crucial emissions sources where they are in geographies requiring support and where high-integrity can be ensured.
- Equally, it highlights the fundamental dominance of China's fleet across the higher-emitting end of the global fleet. Whilst transition credits can address a broad range of eligible plants going forwards, there will still be a concentrated emissions opportunity in a small number of large Chinese CFPPs that remain unaddressable.

TRANSITION CREDIT SUPPLY OUTLOOK

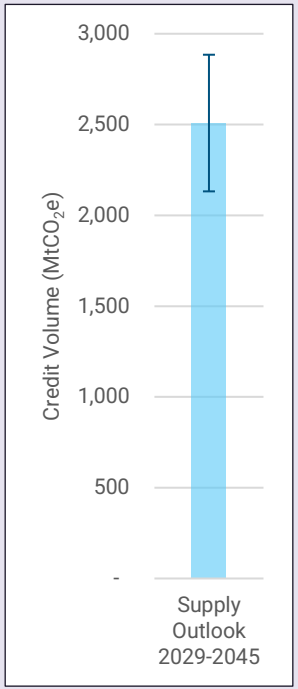
Global Transition Credit Supply Profile

The estimated total transition credit supply potential is 2.5 $GtCO_2e$ globally, from 2029 to 2045

Supply is focused around South and South-east Asia, with the largest single supply jurisdiction being India followed by Viet Nam, Indonesia and Thailand.

Distribution of forecast transition credit supply





Transition credit supply modelled using a modified version of the Global Energy Monitor (GEM) coal asset database combined with baseline and transition scenarios. The uncertainty range is 15%.

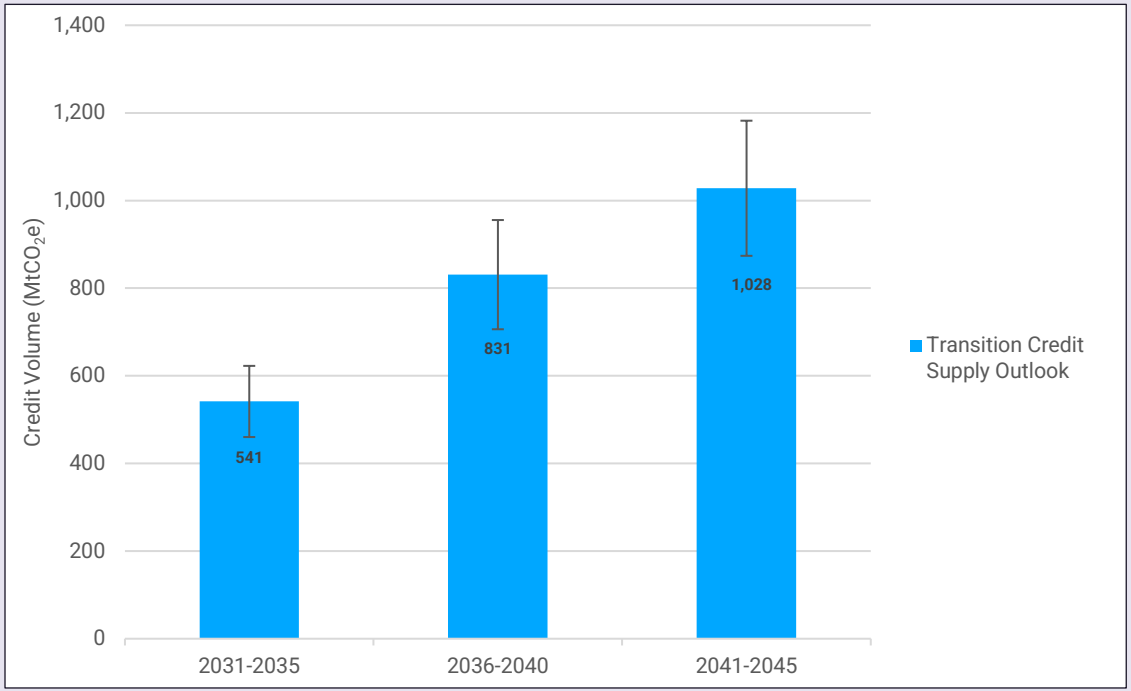
Key insights

- The majority of supply is focused in South and South-east Asia, which provide 4 of the top-5 suppliers of transition credits.
- Notable non-Asian supplier countries include: Türkiye, Brazil, South Africa and Chile. These markets all issue at least some level of credits from 2029 and continue issuance consistently across the full period.
- Bangladesh, Pakistan, Zambia and Uzbekistan are active, however their issuance skews towards the end of the 16-year outlook period.
- There are a number of countries for which supply is either absent or lower than expected: Mexico, Uzbekistan, Zimbabwe, Chile, Mongolia, Argentina and Botswana. This is due to the projected retirement dates in the Policy BAU scenario, or their issuance skewing towards to end of the 16-year outlook period.

Transition credit supply grows steadily out to 2045, and represents only a portion of general global credit demand

Although global demand for carbon credits generally likely far exceeds modelled transition credit supply, this does not necessarily equate to sufficient purchasing at viable prices or in the required delivery periods.

Forecast transition credit supply by year period



Transition credit supply modelled using a modified version of the Global Energy Monitor (GEM) coal asset database combined with baseline and transition scenarios. The uncertainty range is 15%. McKinsey demand estimate (source).

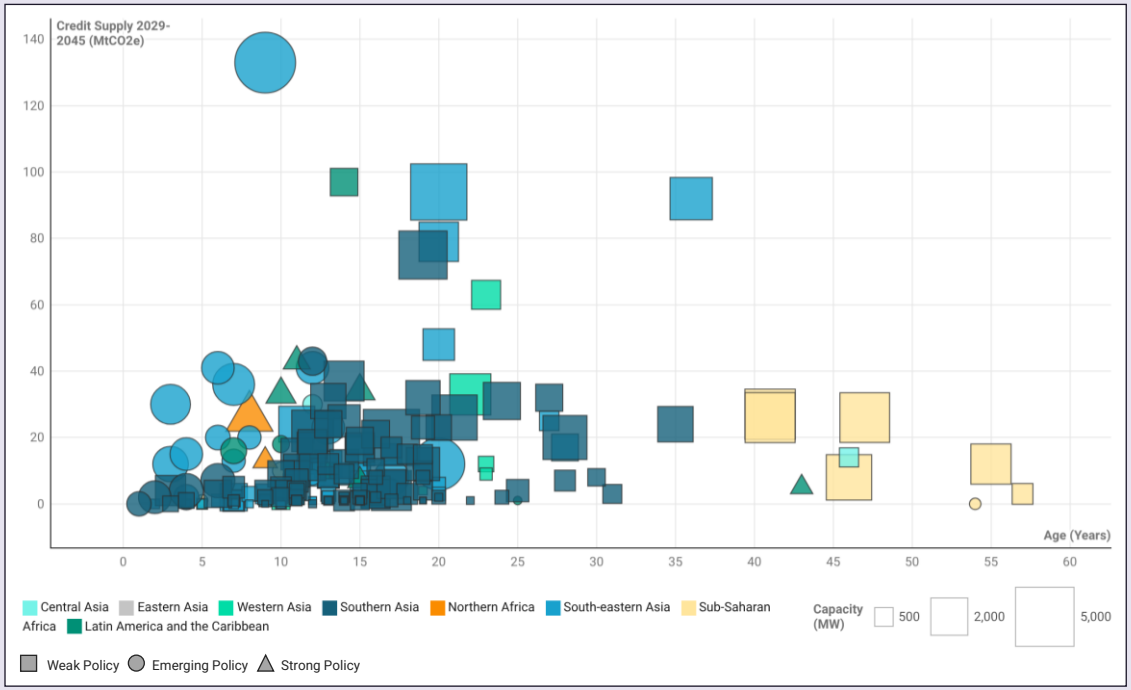
Key insights

- Global carbon credit demand is likely to exceed projected theoretical transition credit supply. For example, McKinsey estimates annual global demand could reach 1,500-2,000 $MtCO_2e$ by 2030.
- It is also worth highlighting that, although some discounting has been applied to the supply to roughly account for the non-realisation of potential due to grid constraints, asset owner willingness, financing availability and transaction complexity, there will likely be challenges in bringing this supply forecast online.
- Should forecast relevant demand for carbon credits exceed modelled theoretical transition credit supply, it must still be noted that the share of demand accessible to transition credits remains uncertain.

Most plants forecast to issue credits are clustered below 40 $MtCO_2e$ total volume and younger than 20 years old

Large outliers span sub-region and plant age, however, generally lack policy impetus. A cluster of plants from Sub-Saharan Africa are both old and large yet offer only modest supply volumes.

Per plant credit supply vs. plant age, classified by plant size (installed capacity), policy context and sub-region



Supply data from Carbon Trust modelling, based on a modified version of the Global Energy Monitor (GEM) coal asset database. National coal retirement policy classifications based on Carbon Trust analysis.

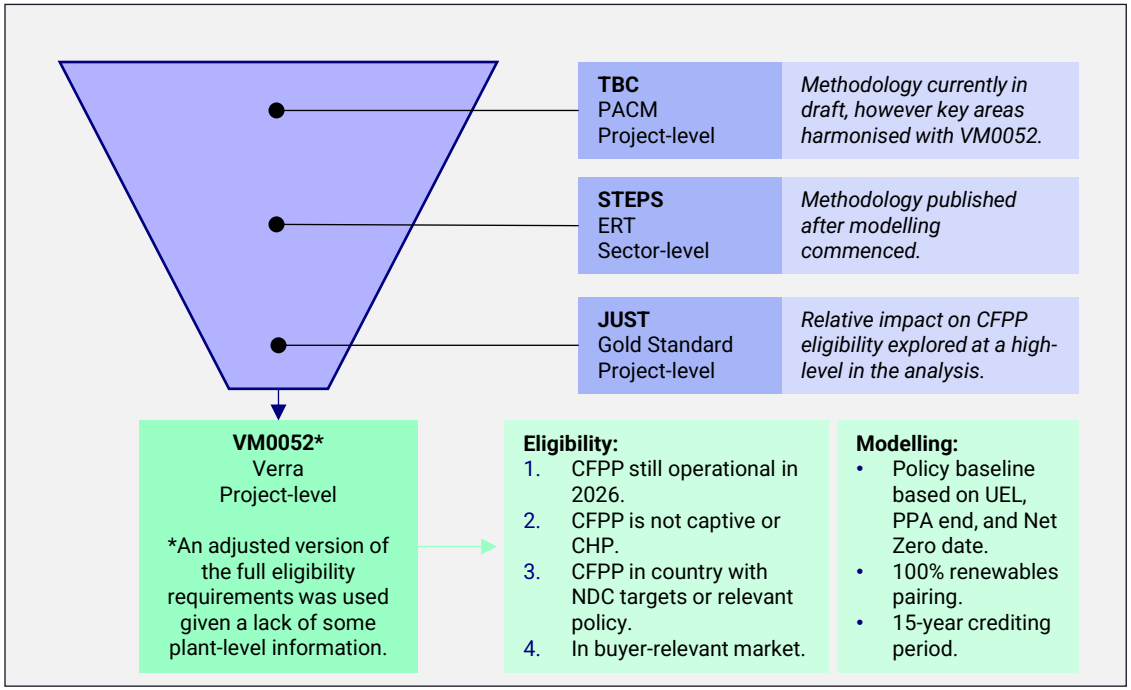
Key insights

- The ideal plant can be envisioned to sit in the upper-right quadrant of the chart; an easier to retire old plant offering high credit volumes. However, this is structurally unlikely – older plants cannot offer long crediting periods.
- In reality, the plants which can offer sizeable volume will be young and difficult to close, they can be seen in the upper-left quadrant.
- However, this analysis shows that the bulk of credit supply volume will come from smaller and younger plants than the 'big ticket' outliers.
- This may be preferable, offering more manageable transaction sizes, associated complexity, and reducing the risk of market sentiment impacts should a flagship project fail to progress.
- In terms of distribution, south-east Asia appears to have a higher proportion of medium to large plant volumes – per plant volume average is 13.5 $MtCO_2e$. Whereas southern Asia has a broader base on small per-plant volumes – per plant volume average is 9.5 $MtCO_2e$.
- The majority of credit volume is forecast to be supplied by plants located in jurisdictions without policies which could support or catalyse early retirement.

A simplified version of VM0052 eligibility was used to underpin the transition credit supply forecast

VM0052 was used due to its prior and ongoing use across other market and pilot analysis, enabling a degree of cross-comparison and benchmarking.

Rationale for the use of VM0052 to underpin the supply forecast



VM0052 (documentation, baseline methodology); JUST (documentation); STEPS (documentation).

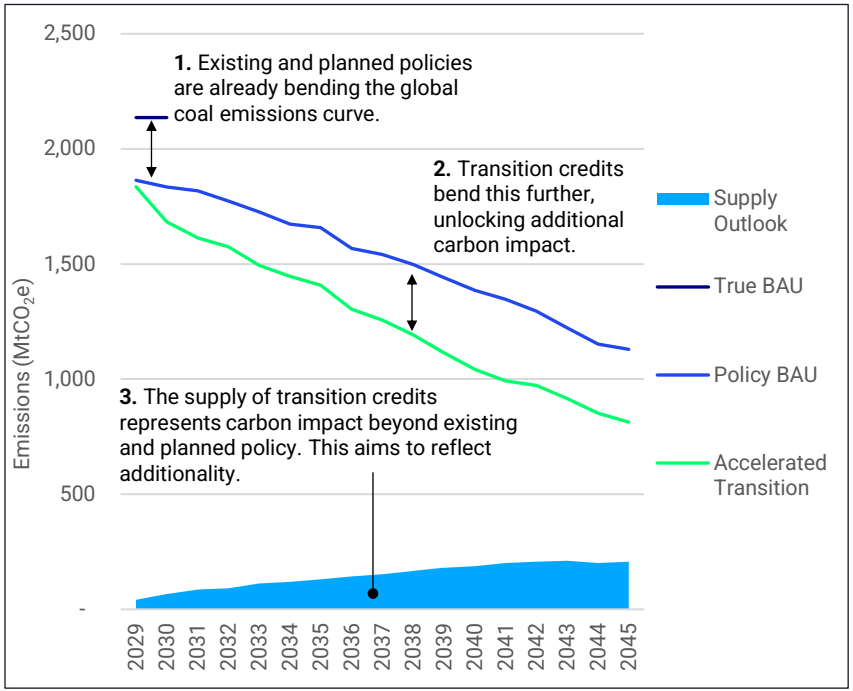
Key insights

- VM0052 is the most mature and widely referenced transition-credit methodology. Using it enables direct comparison with external studies and alignment with pilot programmes. This should enable greater utility of the forecast results, as well as strengthen confidence.
- VM0052 was the first transition-credit methodology published (approved in May 2025). PACM methodology is under development and STEPS was only recently published and is pre-deployment. As such, neither could be used as the basis for the modelling.
- VM0052 is referenced in leading transition-credit market studies, including TRACTION, whilst references to JUST are currently limited as a new methodology. Pilot projects have also been based on VM0052 including SLTEC Philippines and Rockefeller-supported project pipeline of up to 60 projects.
- However, as project-based approaches, the VM0052 and JUST methodologies are similar. As such, their unique requirements were compared for their respective impact on eligibility.

Significant decarbonisation will be driven by existing and planned policies; transition credits can accelerate this

The supply outlook has been forecasted using three scenarios: True BAU, Policy BAU, and Accelerated Transition. The Policy BAU scenario has been used as the baseline to guard against crediting non-additional activity.

How the credit supply profile was forecast using scenarios



Transition credit supply modelled using a modified version of the Global Energy Monitor (GEM) coal asset database.

Scenario details

Name	Purpose	Narrative
#1 – True BAU	Contextualisation	Plants operate until end of technical life.
#2 – Policy BAU	Crediting baseline	Plants operate adjusted lifespans until policy closure.
#3 – Accelerated Transition	Transition credit scenario	Transition credits support early retirement beyond policy.

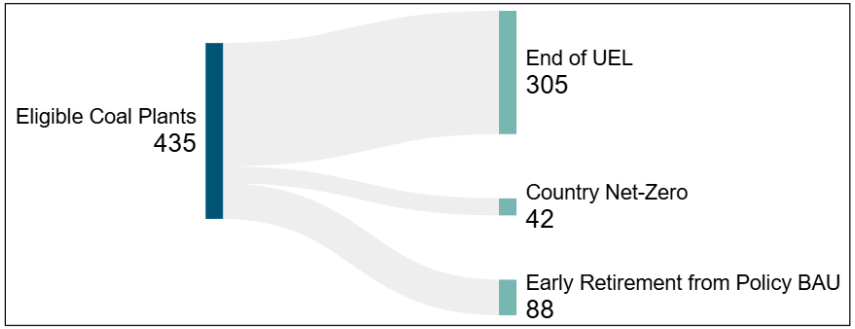
Approach

- The baseline was established broadly in line with the VMD0060 guidance for baselining which accompanies the VM0052 methodology.
- The Policy BAU scenario included plants retiring due to: end of useful economic life (adjusted for repex), PPA end year, country coal phase-out year and country net-zero year, as well as shortened plant lifespans from existing or planned policies.
- In the Accelerated Transition scenario, further triggers such as announced plant retirement year are included, as well as a further revision of plant lifespans.
- Across both scenarios, plant lifespans were adjusted reflecting plant types, system roles and country contexts, as well as how an accelerated transition could interplay with these factors.

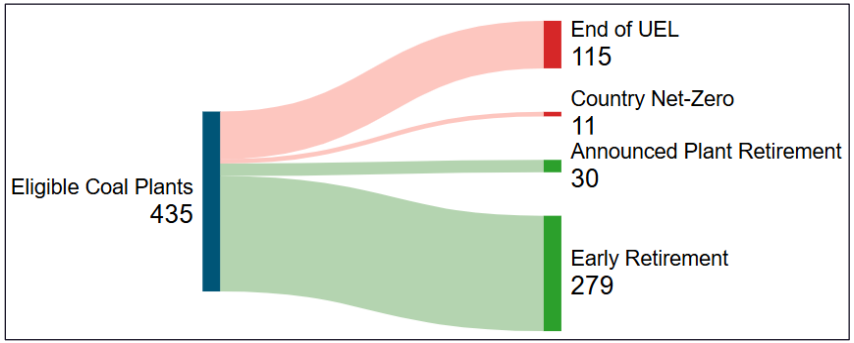
Transition credits could shift 221/435 plants to early retirement, reducing the share retiring at end of UEL or country net-zero

Under Policy BAU, 70% of eligible plants (305) run to end of useful economic life; under Accelerated Transition that falls to 26% (115), with early retirement becoming the dominant closure trigger at 64% of plants, up from 20%.

Breakdown of plant closure triggers under Policy BAU scenario



Breakdown of plant closure triggers under Accelerated Transition scenario



Key insights

- The baseline (Policy BAU) scenario sees limited early retirement – under Policy BAU, 305 of 435 eligible plants (70%) close only at the end of their useful economic life (UEL), with a further 42 (10%) retiring on country net-zero dates. Together, 80% of eligible plants close for reasons that generate no creditable abatement.
- Policy-driven early retirement is a small slice of BAU – just 88 plants (20%) retire early on the strength of policy and country dynamics.
- The Accelerated Transition scenario, introducing transition credits, changes the dominant retirement trigger from end of UEL to early retirement. Combined with Announced Plant Retirement this is a total of 221 additional plants retiring early.
    - "Early Retirement" is driven by adjusting the estimated plant lifespan based on country context, plant type and plant role to reflect the likely impact of the policy and macro regimes of a BAU or transition future.

Implications

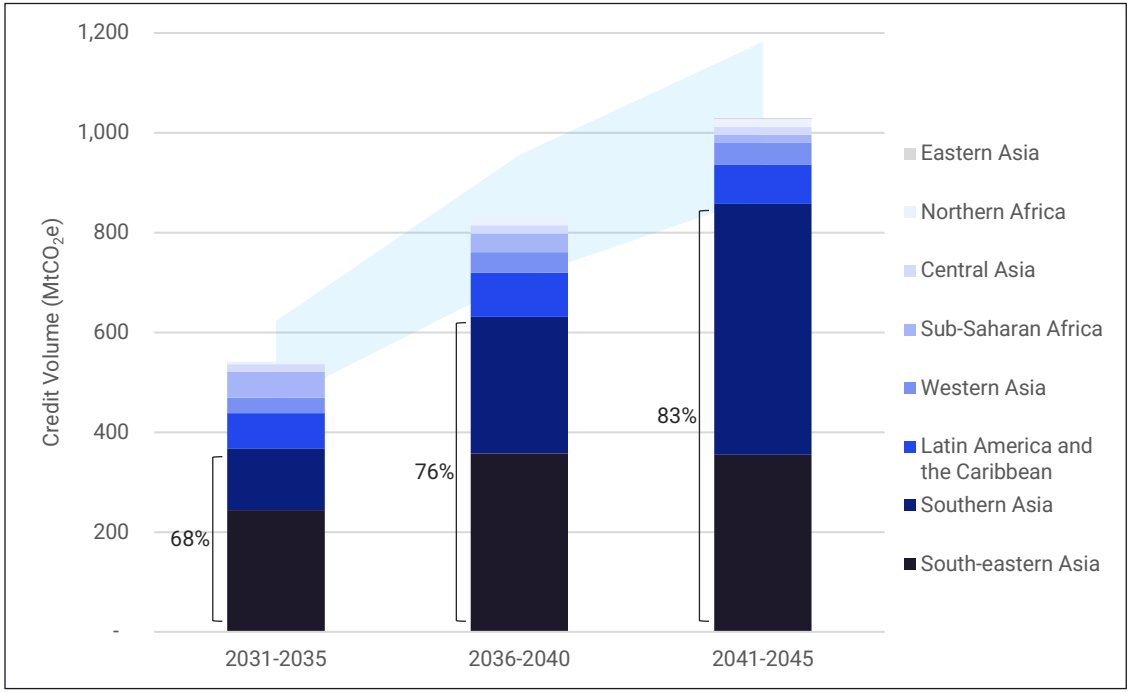
- This modelling of potential highlights a group of plants (221) for whom there may be an opportunity to accelerate retirement timelines, drawing them earlier than existing policy 'sunset' dates and technical lifespans.

For the Accelerated Transition scenario, red shading indicates plants which are not creditable, whilst green indicates plants which are creditable. "Announced Plant Retirement" assumed to require transition credit funding in order to occur, and only included for Accelerated Transition scenario in line with VM0060 baselining guidelines.

Supply is largely dominated by countries across southern (37%) and south-eastern (40%) Asia

Over time, supply is projected to grow increasingly concentrated in Southern and South-eastern Asia, rising from a 54% share in 2029-30 to an 83% share in 2041-45.

Transition credit supply outlook by year period, stacked by sub-region



Supply data from Carbon Trust modelling, based on a modified version of the Global Energy Monitor (GEM) coal asset database. The shaded uncertainty range is 15%.

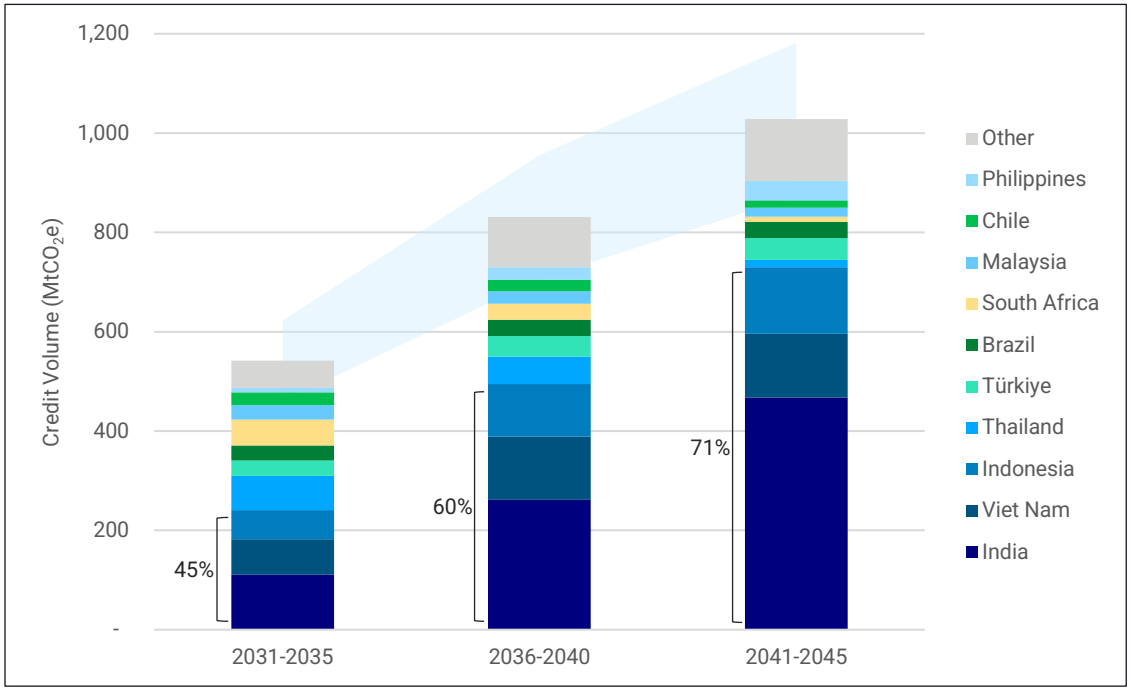
Key insights

- Overall, the sub-regional supply volume split is: South-eastern Asia (40%), Southern Asia (37%), Latin America and the Caribbean (11%), Western Asia (5%), Sub-Saharan Africa (5%), Central Asia (2%) and Northern Africa (2%). Eastern Asia (<0.1%) is marginal due to country exclusions.
- Credit supply is highly concentrated in two sub-regions, South-eastern Asia and Southern Asia, and this grows throughout the period. Concentration opens at 68% and reaches 83% by the closing stage of the 15-year outlook.
- South-eastern Asia is consistently the largest supplier sub-region until 2041-45, at which point growth plateaus and southern Asia becomes the dominant supply source.
- Latin America and the Caribbean constitutes a consistent share (8-13%) over the full period.
- This may imply that the Southern Asian fleet, dominated by India, will take some time to sufficiently mature for retirement.

India, Viet Nam and Indonesia are the largest sources of supply, contributing a 60% share over the 15-year period

Supply concentration grows substantially over the period; the top-3 share of total transition credit supply increases from 45% to 71% by 2041-45.

Top-10 countries' transition credit supply outlook by year period



"Other" includes 16 countries: Colombia, Sri Lanka, Morocco, Tajikistan, Laos, Cambodia, Guatemala, Dominican Republic, Kazakhstan, Bangladesh, Pakistan, Zambia, Uzbekistan, Senegal, Namibia, Mongolia. The shaded uncertainty range is 15%.

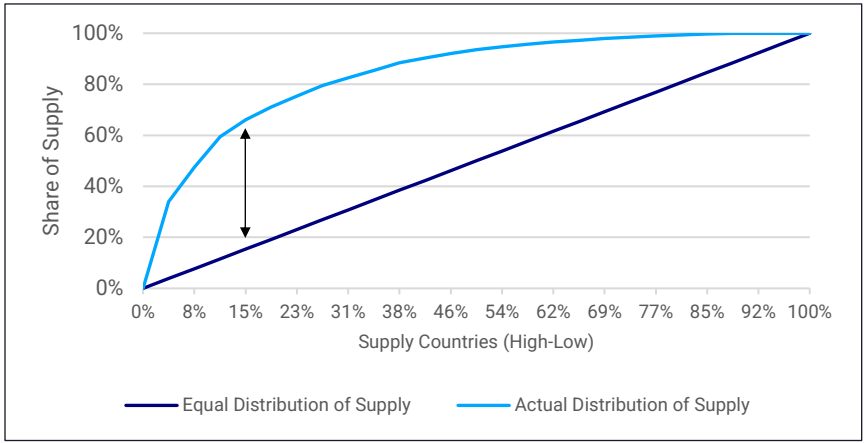
Key insights

- Top-10 supplier countries consistently represent 88-90% of the total supply per year period. Within this group there are 5 south-east Asian countries, highlighting both the importance of the sub-region and the relatively balanced distribution.
    - By contrast, India constitutes almost all of southern Asia's supply. This could present concentration risk given the importance of national policies in shaping the dynamics surrounding coal retirement.
- Whilst the top-10 share is consistent, the top-3 countries (India, 34%; Viet Nam, 13%; Indonesia, 12%) grow to dominate the supply outlook. Although this allows for the concentration and targeting of resources and engagement, it also creates risk. Domestic energy is a politically sensitive policy area, and policy shifts relating to energy bills could draw governments into conflict with the need for systematic transition of the power grid. In this context, a single political cycle could take material supply offline.
- Overall, transition credit supply is shaped like a bell curve, peaking and falling away after 2050 as plants retire and crediting periods end.

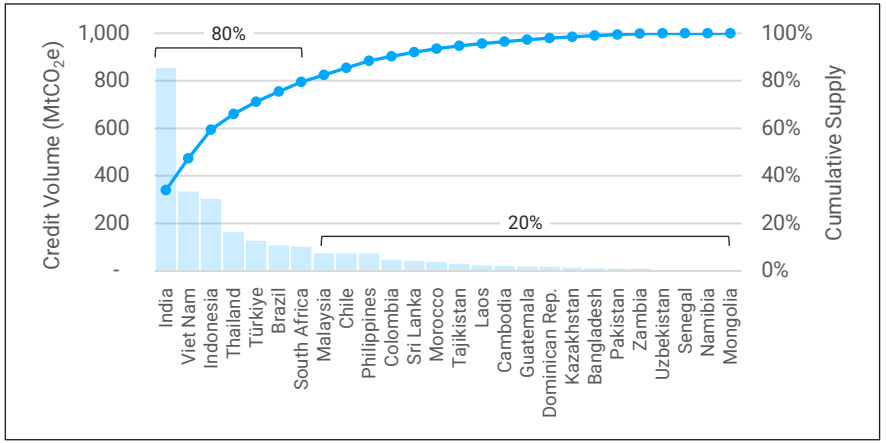
Seven countries account for 80% of supply, enabling targeted engagement but creating concentration risk

This supports targeted engagement and use of resources but creates concentration risk in those countries, as carbon credits are a highly policy-exposed market.

Lorenz Curve – Highlighting high concentration in supply distribution



Pareto Chart – Identifying specific contributors to concentrated supply



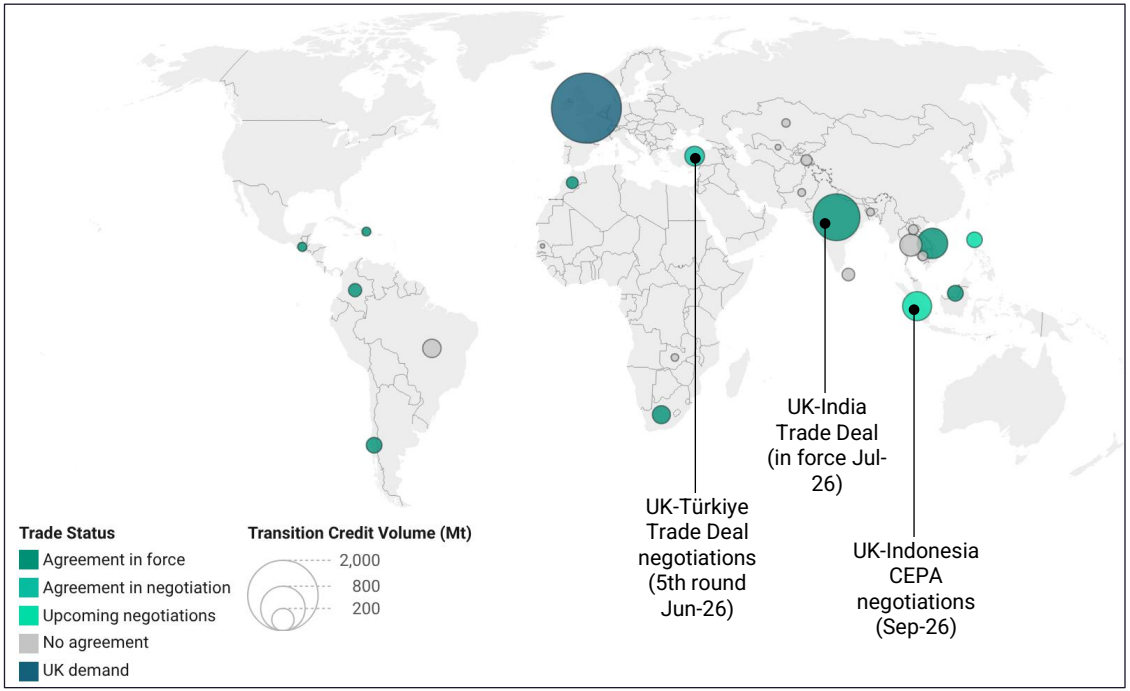
Key insights

- The Lorenz curve analysis highlights how concentrated supply is, with the significant steepness to the supply curve revealing that a small share of countries are providing significantly more supply than an even distribution would suggest. This is natural given the differences is country size, energy needs and resulting CFPP fleet size, however, is a characteristic of this nascent market that will shape its future development and could have destabilising second-order effects (e.g. national-level political change, or regional energy crises).
- The Pareto chart builds on the above analysis to identify where the specific concentration exists – 80% of credit volume is supplied by 7 countries. By contrast, the remaining 20% of credit supply is spread across 19 countries. This provides potential insight to support the targeting of strategic opportunities; however, it does not reflect the relative difficulty of realising the supply in question. There may be more easily addressable plants within the 20% tail of the supply which will be crucial to capitalise upon in order to build market momentum.

Several key supply countries are also strategic priorities for UK trade negotiation

The UK's trade priorities overlap with key transition credit suppliers, creating opportunities for the use of transition credits as a channel for climate finance within a broader economic package.

UK demand with the distribution of forecast transition credit supply, coloured by trade negotiation status



Transition credit supply modelled using a modified version of the Global Energy Monitor (GEM) coal asset database combined with baseline and transition scenarios. The uncertainty range is 15%. UK demand is a composite of voluntary, CORSIA and sovereign data. UK assumed is responsible for 10% of global voluntary demand. UK trade information (source).

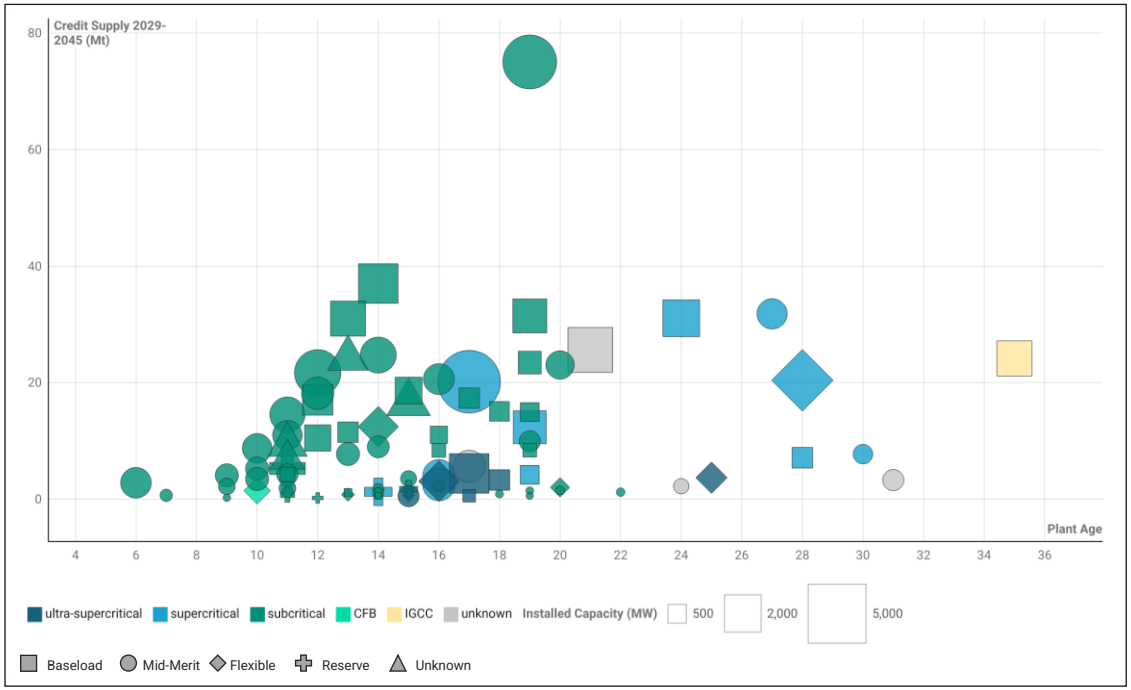
Key insights

- The UK Government's Trade Strategy defines several broad categories of markets:
  - "**Global Pillars**" – E.g. India;
  - "**Regional Hubs**" – E.g. Türkiye, Brazil, South Africa;
  - "**Established, Influential and Growing Importers**" – *No transition credit relevant countries;*
  - "**Emerging Markets**" – E.g. Indonesia, Bangladesh; Most credit supply countries will likely sit in this category;
- These categories of market prioritisation broadly match the concentration of supply in several key countries, and could provide strategic impetus.
- Of the top-10 supply countries by volume, 2 have upcoming negotiations (Indonesia, Philippines), 1 has an agreement in negotiation (Türkiye), and 2 have no agreement (Thailand, Brazil). This underlines the extent to which such discussions could provide a strategic-level forum for transition credits to be introduced as a tool.
- 62% of supply is covered by in-force agreements, with 18% under no agreement, 15% under upcoming negotiations and 5% in negotiation.

India – Fleet opportunity (853 $MtCO_2e$) depends on retiring younger plants whilst replacing their power-system role

Plants are clustered between 10-20 years old, and are most frequently subcritical baseload or mid-merit. Cost-effective replacement power will be key to unlocking this opportunity.

India: Per plant credit supply vs. plant age, classified by plant size (installed capacity) and role



Supply data from Carbon Trust modelling, based on a modified version of the Global Energy Monitor (GEM) coal asset database.

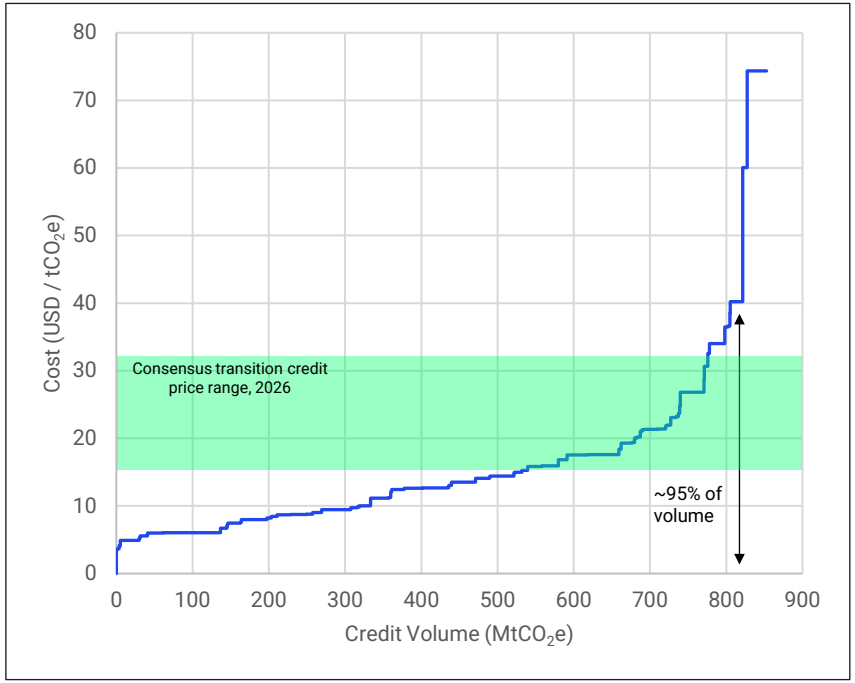
Key insights

- Most plants cluster at 10-20 years old, with plant frequency and credit volumes low for very young (<10 years) plants, and dropping as plant age increases beyond 20 years. This is unsurprising as older plants may have avoided years of operation to credit, as well as less remaining years for credit issuance.
- Interestingly, India's younger crediting plants are subcritical, whilst older plants tend to be supercritical, with a cluster of 15 to 18-year-old ultra-supercritical plants.
- Most plants sit below 20 $MtCO_2e$, with all but a single outlier below 40 $MtCO_2e$. Subcritical and supercritical plants span the clustered range, however ultra-supercritical plants are clustered at the low end of supply.
- Replacement power will be central to unlocking much of this fleet opportunity. Baseload and mid-merit plants dominate the higher-volume opportunities. Unlocking these credits means replacing active generation.

India – Potential supply of 853 $MtCO_2e$ across 88 CFPPs at an average cost of $17 / tCO_2e

Despite being the largest single supplier with 34% of the total 2029-45 outlook, India's supply will be challenging to bring online given an unsupportive policy environment and continuing expansion of the coal fleet.

India: Marginal cost curve of transition credits 2029-2045



** Some plants may be excluded due to insufficient data, rather than not being able to generate credits. For further details on cost analysis approach see slide 63. Consensus price range: desk sources. India electricity generation mix (source).*

Key insights

- Of the 659 CFPPs contained in the coal asset database, only 88 plants would be expected to generate credits in the 2029-45 study period.*
- The cost curve steepens sharply beyond $40 / tCO_2e meaning only the final ~5% of volume sits well above the averaged consensus price band and could be challenging to unlock should price estimates rise.
- A significant portion of theoretical supply falls within or below the averaged transition credit price range ($16-32 / tCO_2e; 2026).

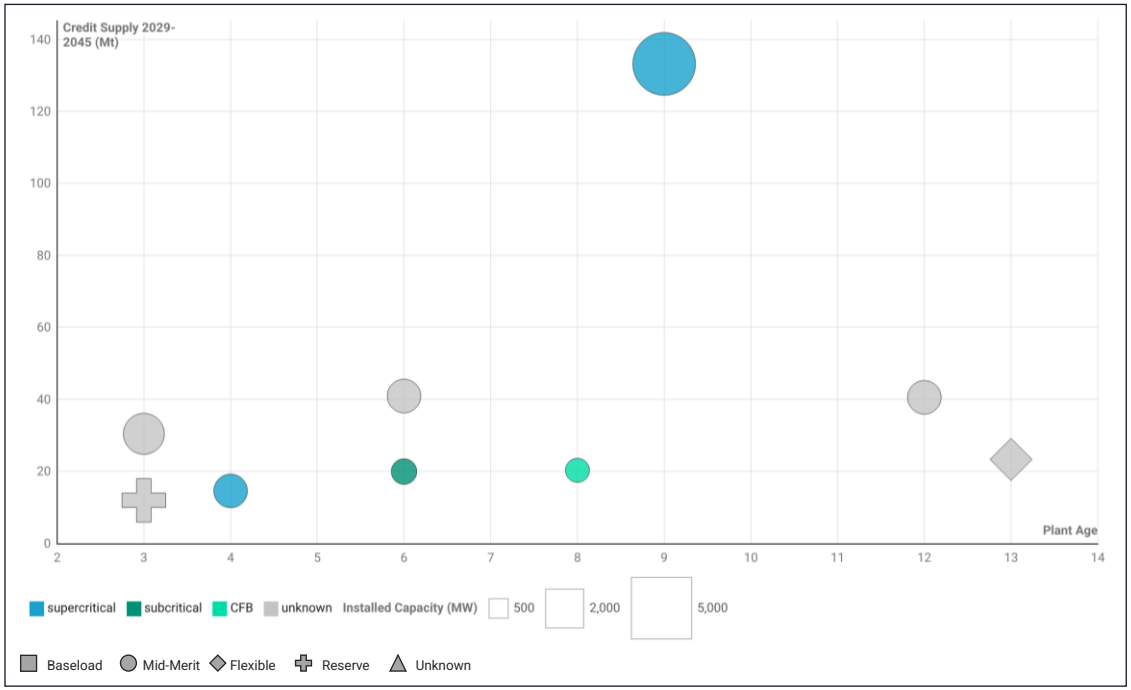
Implications

- Price may not be the binding constraint for the bulk of supply. Other principal barriers are policy, additionality and system reliability, meaning buyer appetite alone will not unlock the opportunity.
- Theoretical economic viability does not imply deliverability. Plant eligibility, additionality, transaction complexity, financing, asset owner interest and replacement capacity requirements could substantially reduce realisable supply.
- India's policy and power system context remains a key barrier. Coal and lignite still provided around 70% of electricity generation in Q1 FY2026/27, while coal generation increased by 9% year on year. Continued coal development and the absence of a formal phase-out timeline further constrain the immediate feasibility of credit-supported retirement.

Viet Nam – Credit supply (335 $MtCO_2e$) hinges on a small number of young, mid-merit plants

The largest plant contributes around 40% of estimated national fleet supply, while the nine plants are 3-13 years old, creating substantial exposure to individual projects as well as the unique challenges of retiring very young assets.

Viet Nam: Per plant credit supply vs. plant age, classified by plant size (installed capacity) and role



Supply data from Carbon Trust modelling, based on a modified version of the Global Energy Monitor (GEM) coal asset database.

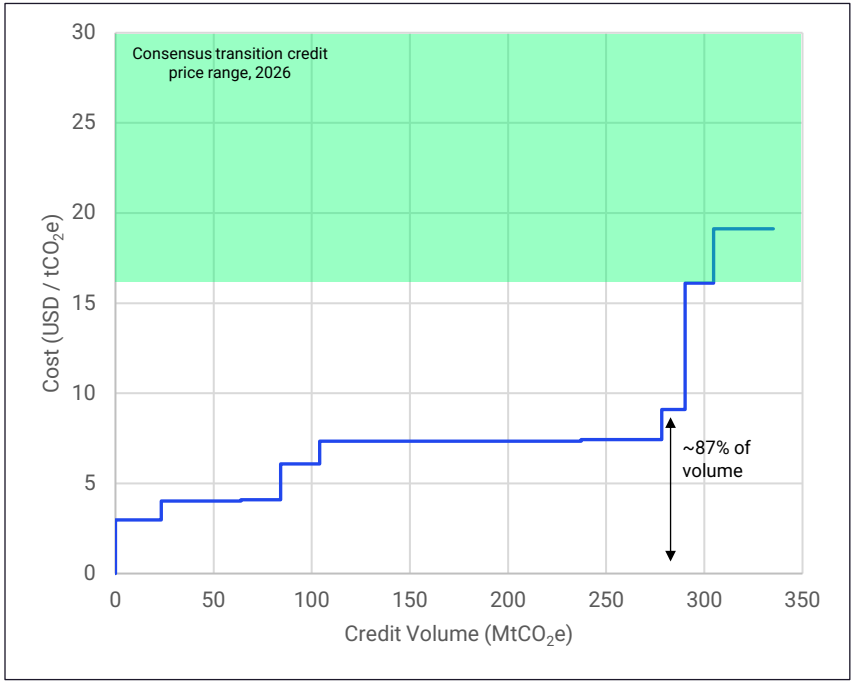
Key insights

- Supply is highly concentrated: One plant offers approximately 130 $MtCO_2e$, over three times the next-largest opportunity, and 39% of the total supply volume.
- There is no mature-asset retirement opportunity, as the plant age range is only 3-13 years old. Early closure will likely therefore require addressing substantial unrecovered investment and remaining contractual commitments, rather than relying on accelerating assets approaching retirement.
- Excluding the large outlier, plant credit potential is within a tight range across the full age range.
- Mid-merit generation dominates the crediting fleet. Seven of nine plants, including the four largest credit opportunities, are mid-merit. Replacement planning will need to address their operating profile and contribution to reliability, rather than simply match annual electricity output.
- 3 of the top 4 plants for credit supply have unknown technology classifications.

Viet Nam – Potential supply of 335 $MtCO_2e$ across 9 CFPPs at an average cost of $9 / tCO_2e

Viet Nam is the second largest country by overall supply, representing 13% of theoretical supply, with only 9 eligible plants and a commitment to halt new coal after 2030.

Viet Nam: Marginal cost curve of transition credits 2029-2045



For further details on cost analysis approach see slide 63. Consensus price range: desk sources. Viet Nam PDP8 (source).

Key insights

- Theoretical supply volume is concentrated in a handful of assets with 9 of 54 total CFPPs nationally generating credits in our analysis.
- The two largest steps in the curve (the jump from around $9 to $16 to $19 / tCO_2e) represent one plant each, so national supply is highly sensitive to the inclusion or exclusion of a small number of specific assets.
- The bulk of supply is estimated to be competitive. 87% of identified volume sits at or below $9 / tCO_2e, with almost all plants costed at below the consensus price range.

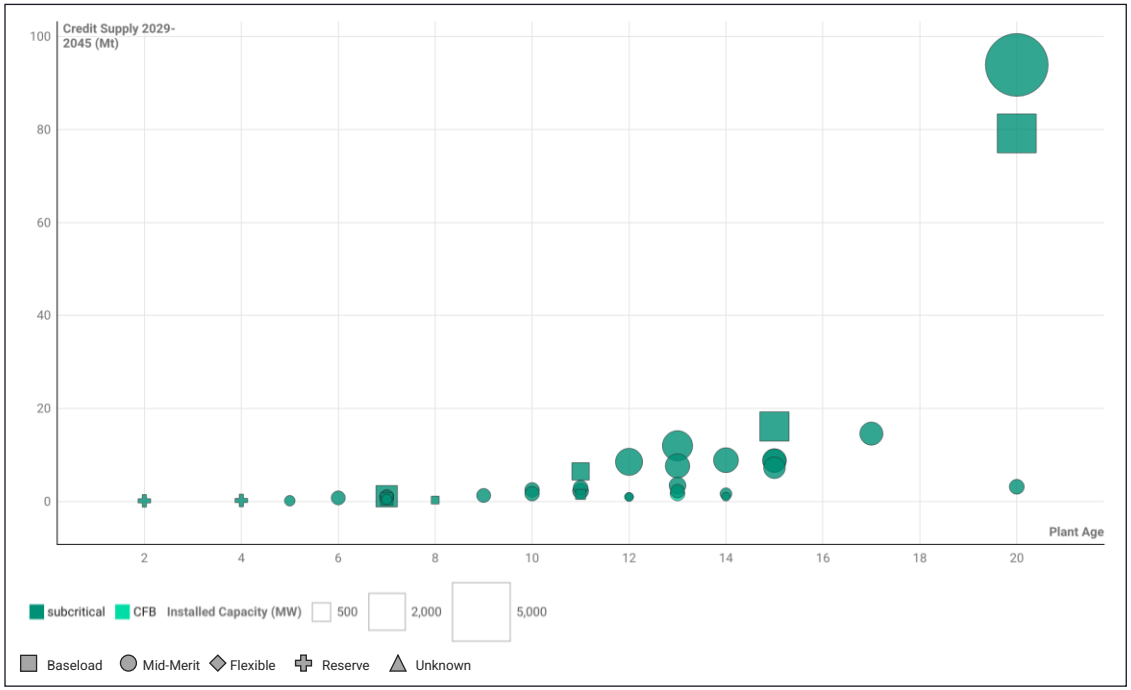
Implications

- Viet Nam's policy backdrop is more supportive than India's, the only larger supply country. PDP8 caps coal capacity and bars new coal plants after 2030, and the JETP financing package is built around exactly this phase out path, giving Viet Nam a strong starting position against the VM0052 no new coal test.
- Concentration cuts both ways. A small number of eligible plants makes full diligence more feasible but also means losing even one or two plants from the pipeline would materially affect national volume.
- Viet Nam looks potentially suited to near-term sourcing. With supportive policy and most volume costed below the consensus range, it may be reasonable to prioritise Viet Nam for early transactions.

Indonesia – Opportunity (304 $MtCO_2e$) dominated by subcritical plants; most offer modest supply <20 $MtCO_2e$

Two large outlier plants, among the oldest in the crediting cohort, represent 57% of Indonesia's total 2029-45 supply outlook – a substantial concentration risk.

Indonesia: Per plant credit supply vs. plant age, classified by plant size (installed capacity) and role



Supply data from Carbon Trust modelling, based on a modified version of the Global Energy Monitor (GEM) coal asset database.

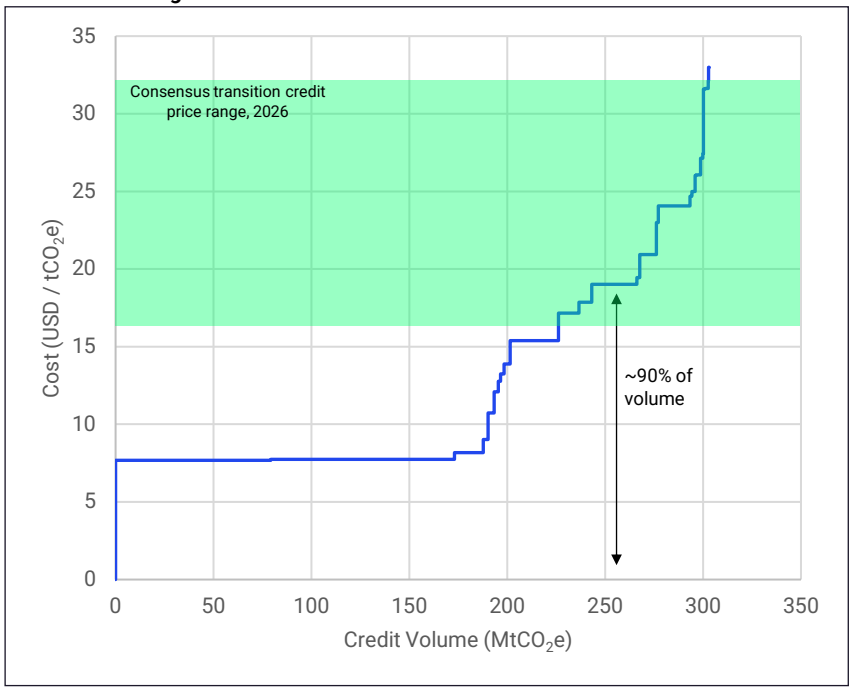
Key insights

- Older plants offer the largest volumes: The two standout opportunities sit at around 20 years old, rather than among the youngest assets. Their relative maturity could ease capital-recovery challenges, although age alone does not establish retirement readiness.
- The remaining opportunity is fragmented, most plants cluster around 10-15 years, with individual volumes below 20 $MtCO_2e$. As plant age increases, so too does installed capacity and supply volume. It appears as though newer eligible plants tend to be smaller in size.
- Technology offers limited differentiation, both the outliers and main body of plants are subcritical.
- The fleet of credit supplying plants is almost entirely split between baseload and mid-merit plants. Two very young reserve plants are included, however supply volume is low, potentially due to a very low reported capacity factor.

Indonesia – Potential supply of 304 $MtCO_2e$ across 36 CFPPs at an average cost of $20 / tCO_2e

Indonesia represents 12% of the total 2029-45 outlook. However, slow JETP implementation and continuing coal fleet expansion mean this theoretical supply appears challenging to deliver in the near term.

Indonesia: Marginal cost curve of transition credits 2029-2045



** RUPTL: Rencana Usaha Penyediaan Tenaga Listrik, is Indonesia's Electricity Supply Business Plan. For further details on cost analysis approach see slide 63. Consensus price range: desk sources. Cirebon 1 cancellation (source). Indonesia electricity mix (source). JETP pledges (source).*

Key insights

- ~85% of theoretical supply falls under $20 / tCO_2e, with a large portion of supply sitting around $8 / tCO_2e.
- Indonesia's JETP has stalled in the face of complex political and delivery challenges. The flagship retirement project, Cirebon 1, was cancelled in December 2025, and no coal retirement financing has been approved despite $20 billion originally pledged.
- Coal capacity continues to expand under the RUPTL*, despite Indonesia's previous commitment to halt new coal development.

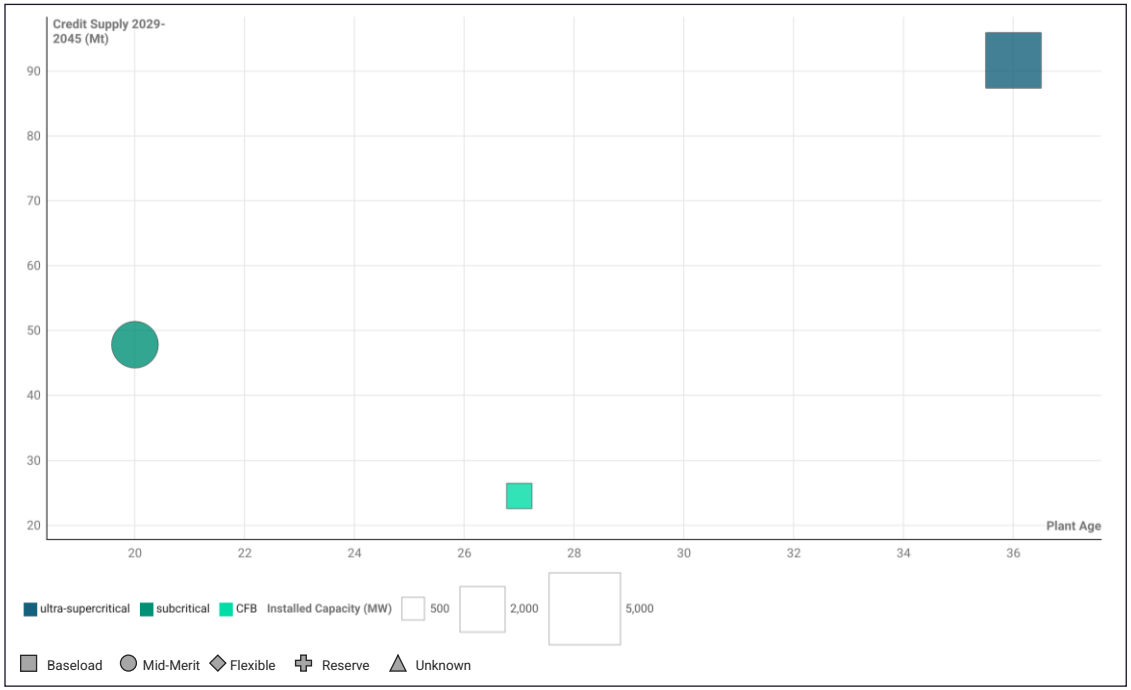
Implications

- This is a theoretical ceiling, not an available pipeline. Coal still supplies around 62% of Indonesia's electricity, and with JETP retirement financing stalled and the Cirebon 1 precedent transaction cancelled, this volume lacks a clear near-term route to delivery under current conditions.
- Continued coal expansion undermines the no new coal test. Grid connected additions in the RUPTL make it harder for owners to demonstrate the kind of national or corporate commitment VM0052 requires.
- Indonesia may be a longer horizon opportunity than its volume suggests. Given the financing and policy setbacks, it may be reasonable to treat Indonesia as a market to monitor rather than prioritise, pending clearer signals.

Thailand – Fleet opportunity (164 $MtCO_2e$) offers sizeable volume overall, but is highly concentrated in only 3 plants

Small crediting fleet size means there is a small sample group for observing broader trends. However, the cohort is notably older than other large supply markets, ranging from 20-36 years, with larger supply volumes.

Thailand: Per plant credit supply vs. plant age, classified by plant size (installed capacity) and role



Supply data from Carbon Trust modelling, based on a modified version of the Global Energy Monitor (GEM) coal asset database.

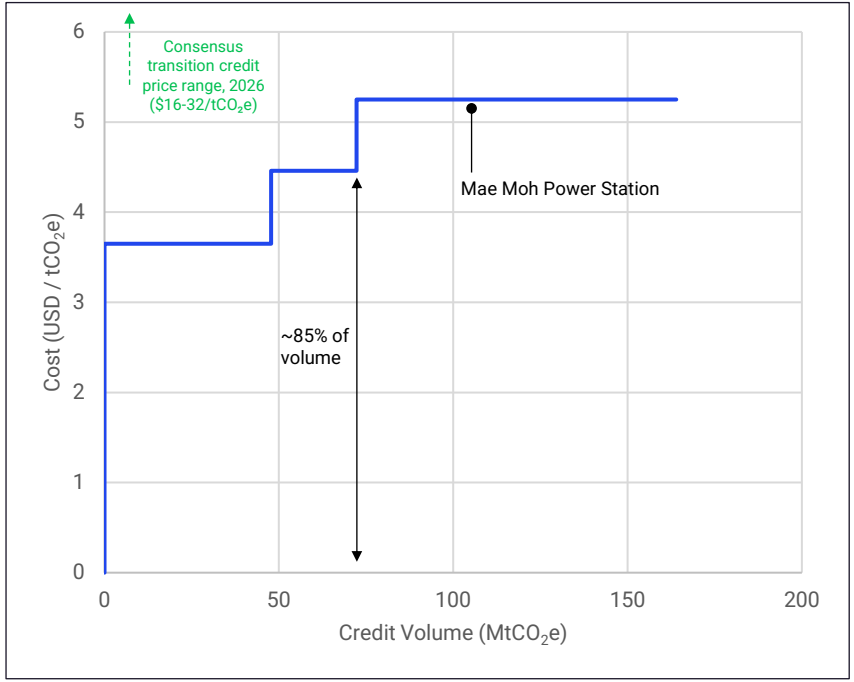
Key insights

- Thailand's forecast crediting plants are older than those in other large supply markets, with the oldest plant offering the largest volume. This could reduce remaining capital-recovery requirements relative to younger fleets.
- The smallest plant credit volume is 25 $MtCO_2e$, which is larger than considerable portions of supply in other large supply markets. This concentration of supply in a few large projects creates substantial risk. An issue with financing, regulation, relationships, etc. at one plant could remove a considerable amount of the country's potential supply.
- There is an insufficient number of plants to make observations on plant type, however the plants are either baseload or mid-merit which highlight the importance of replacement power. This is especially true for the largest supplying plant, which is both baseload, ultra-supercritical (more efficient), and a large installed capacity – its high credit volume indicates a high capacity factor, and therefore importance to the power grid.

Thailand – Potential supply of 164 $MtCO_2e$ across 3 CFPPs at an average cost of $5 / tCO_2e

Thailand represents 7% of the total 2029-45 outlook and offers some of the lowest-cost supply identified, but the opportunity is concentrated in three plants and heavily dependent on Mae Moh's eligibility.

Thailand: Marginal cost curve of transition credits 2029-2045



Low costs for Thai CFPP transition credits are driven primarily by large credit volumes, which dilute the relatively low renewable replacement, decommissioning and JT costs across a significant credit volume. Additionally, all plants generating credits are relatively mature, meaning CAPEX recovery requirements are limited. For further details on cost analysis approach see slide 63.

Key insights

- Supply is highly concentrated. Mae Moh alone accounts for around 53% of national volume, and the top two plants for around 85%.
- Cost is low with the three plants sitting between $3.65 and $5.25 / tCO_2e, well below the consensus range.
- Thailand has deferred rather than accelerated retirement. In August 2025 Mae Moh units 8 and 11 were extended to 2031, and units 12 and 13 to 2048.

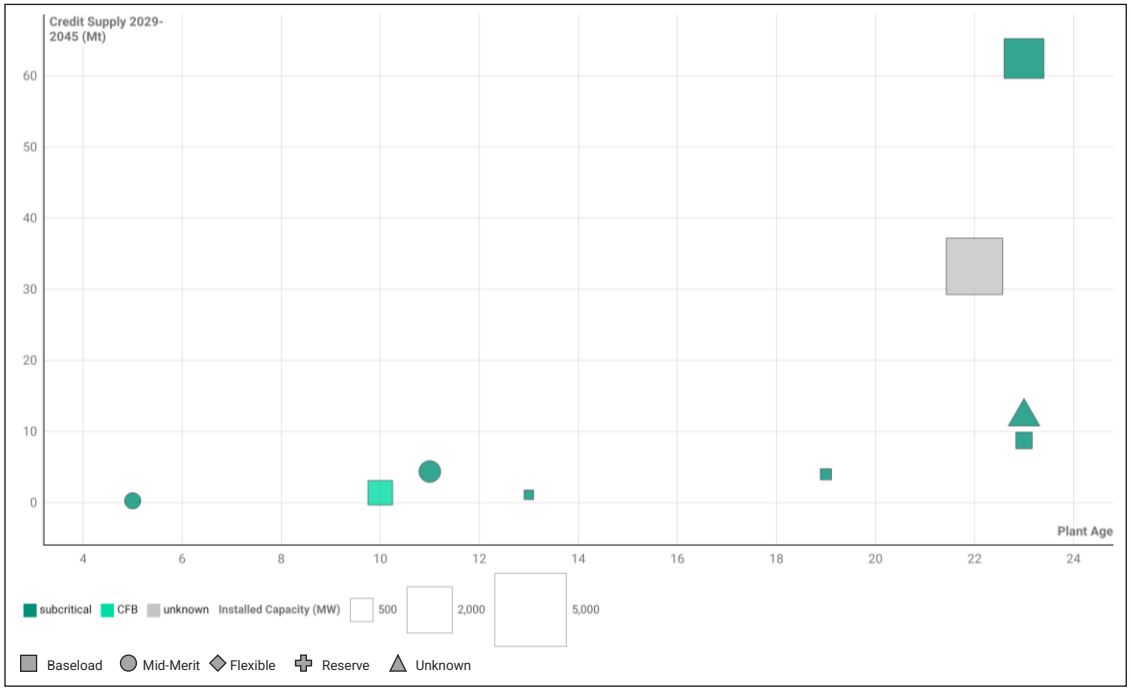
Implications

- Mae Moh's eligibility requires confirmation. It is potentially fed by EGAT's adjacent lignite mine, and VM0052 does not apply to mine mouth plants, which would remove around half of national supply.
- Retirement delays weakens the counterfactual. With Mae Moh delayed to 2031 and 2048, the acceleration case has become harder to make rather than easier, though avoided operating years may have increased.
- Thailand offers a low-cost but relatively small opportunity. Supply is highly concentrated and the absence of a national coal phase-out commitment weakens confidence in near-term delivery.
- Price may not be the limiting factor, even with likely upward cost revisions as more specific data is available. The key question is whether these plants remain eligible and can demonstrate a credible accelerated retirement case.

Türkiye – Fleet opportunity (127 $MtCO_2e$) centres on retiring two mature baseload plants

Two plants aged ~22-23 years provide roughly 75% of forecast country supply. This supports targeted engagement but creates concentration risk to supply.

Türkiye: Per plant credit supply vs. plant age, classified by plant size (installed capacity) and role



Supply data from Carbon Trust modelling, based on a modified version of the Global Energy Monitor (GEM) coal asset database.

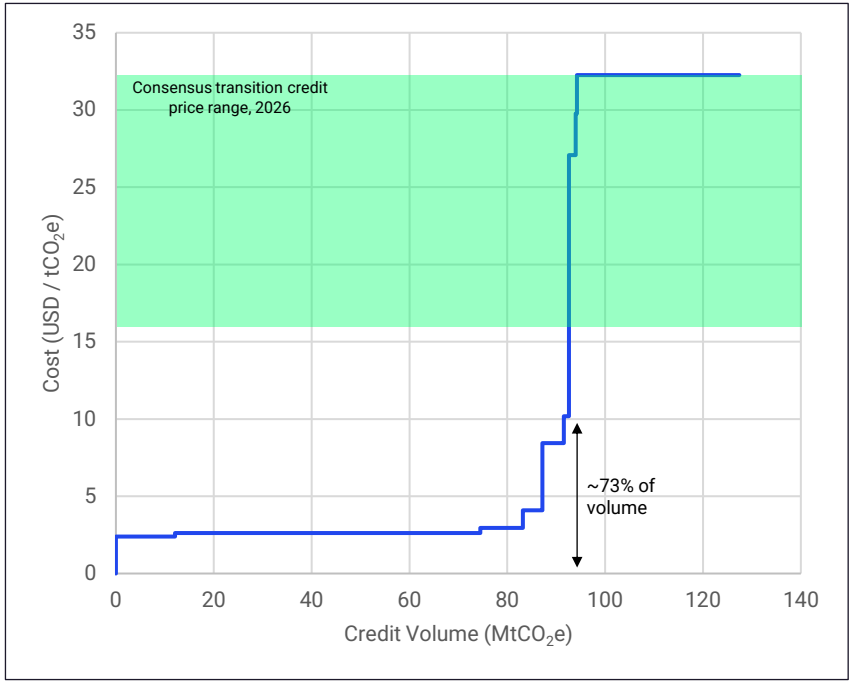
Key insights

- The largest opportunities are among the oldest plants. Two assets aged approximately 22–23 years offer around 60 $MtCO_2e$ and 33 $MtCO_2e$. Their maturity could reduce capital-recovery barriers relative to younger assets, however their large plant size and baseload role present different challenges to engagement.
- Younger plants provide limited diversification, plants below 20 years each offer <5 $MtCO_2e$. They could support smaller, potentially simpler and more manageable initial transactions, but cannot readily compensate if either large plant fails to progress.
- Both high-volume plants serve baseload roles, whereas the mid-merit opportunities offer much smaller volumes. Realising substantial supply therefore depends on replacing sustained generation, rather than withdrawing capacity which is not system crucial.
- 70% of the crediting fleet use subcritical technology. However, this is not a deciding factor, as it spans both young-older and low-high credit supply plants.

Türkiye – Potential supply of 127 $MtCO_2e$ across 9 CFPPs at an average cost of $13 / tCO_2e

Türkiye represents 5% of the total 2029-45 outlook, with a largely low-cost supply curve and an opportunity to attract disproportionate market attention as COP host.

Türkiye: Marginal cost curve of transition credits 2029-2045



For further details on cost analysis approach see slide 63. Consensus price range: desk sources.

Key insights

- 72% of theoretical supply form Türkiye falls below $10 / tCO_2e, with costs remaining low across most of the supply curve.
- The final ~27% of supply is significantly more expensive, creating a steep cost increase in the upper end of the curve.
- Compared with larger markets such as India and Indonesia, Türkiye offers a smaller but potentially cost-competitive supply opportunity.

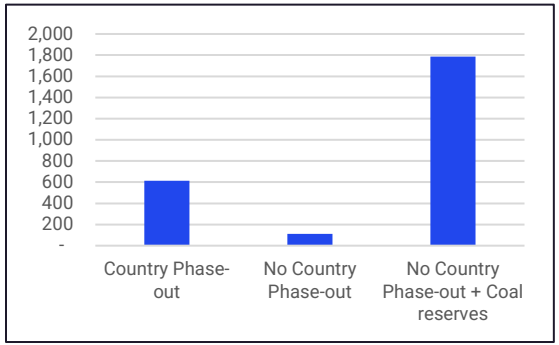
Implications

- Price is unlikely to be the primary constraint, with most theoretical supply falling well below the average transition credit price ranges.
- The market could represent an attractive early opportunity, as a relatively modest volume may be sufficient to demonstrate the transition credit mechanism at country level.
- As COP host, Türkiye will face increased scrutiny of its coal transition pathway. Demonstrating credible retirement mechanisms could provide a high-profile opportunity to showcase progress on coal transition and climate finance.

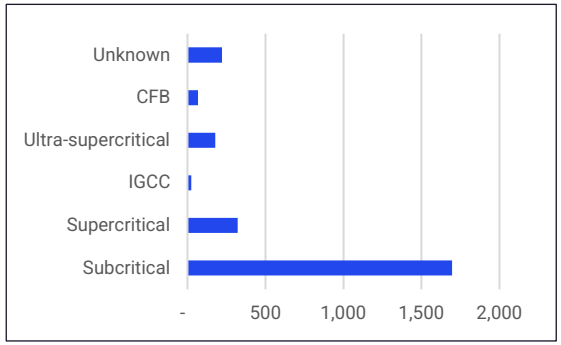
Beyond country concentration, plant characteristics shape the opportunity to realise supply

This highlights that certain plant archetypes and contexts will be most opportune for transition credits, whilst other sections of the supply volume will be challenging to bring online.

1. Supply profile by country archetype



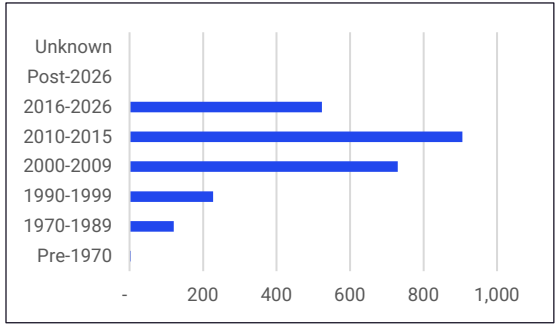
2. Supply profile by plant type



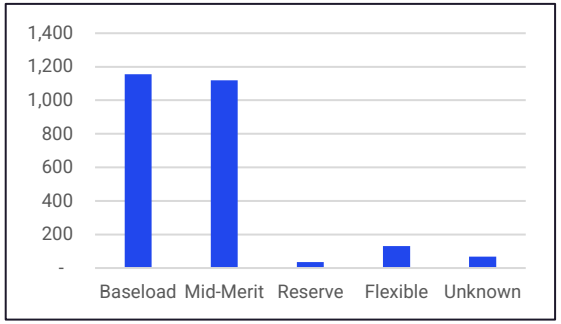
Key insights

- (1) Country barriers: 71% of supply is in coal-reserve countries without phase-out commitments.
- (2) Technology: Subcritical plants are 68% of supply.
- (3) Newer assets dominate: 86% comes from plants built since 2000; 36% from 2010-2015.
- (4) System replacement: Baseload and mid-merit provide 91% of supply, requiring replacement of active generation.
- (5) Scale: 71% comes from plants above 700 MW; smaller projects offer entry points, but scaling will require larger, more complex retirements.

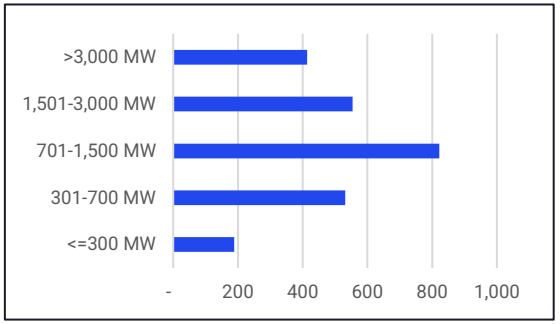
3. Supply profile by year built



4. Supply profile by plant role



5. Supply profile by plant size

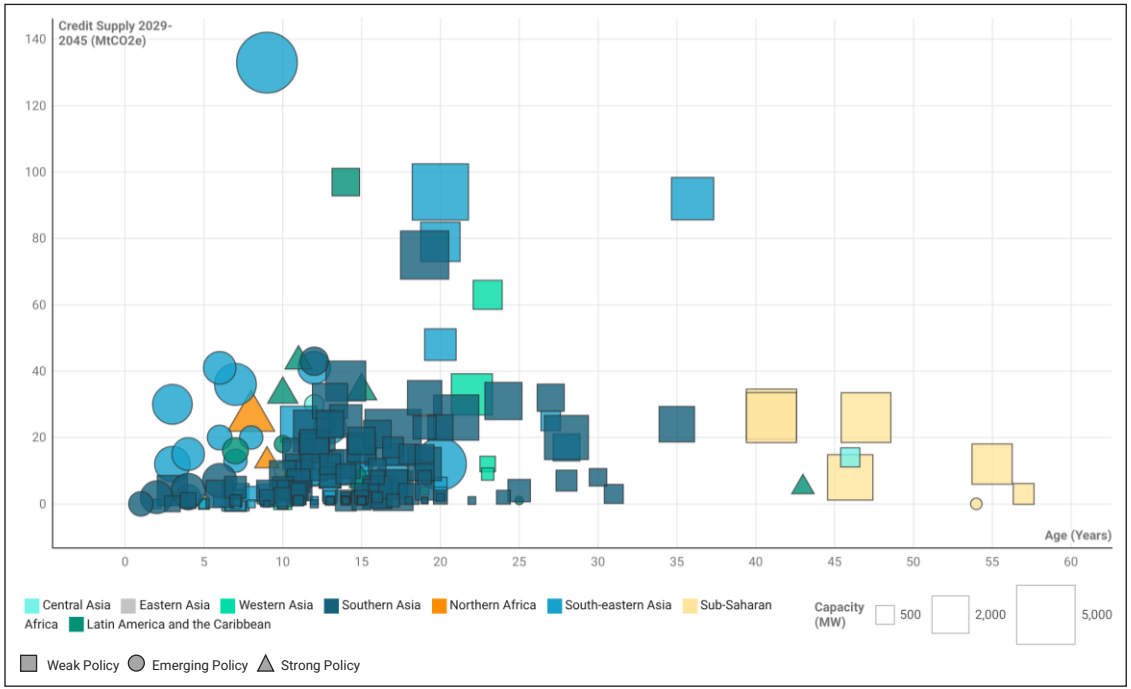


Supply data from Carbon Trust modelling, based on a modified version of the Global Energy Monitor (GEM) coal asset database.

Most plants forecast to issue credits are clustered below 40 $MtCO_2e$ total volume and younger than 20 years old

Large outliers span sub-region and plant age, however, generally lack policy impetus. A cluster of plants from Sub-Saharan Africa are both old and large yet offer only modest supply volumes.

Per plant credit supply vs. plant age, classified by plant size (installed capacity), policy context and sub-region



Supply data from Carbon Trust modelling, based on a modified version of the Global Energy Monitor (GEM) coal asset database. National coal retirement policy classifications based on Carbon Trust analysis.

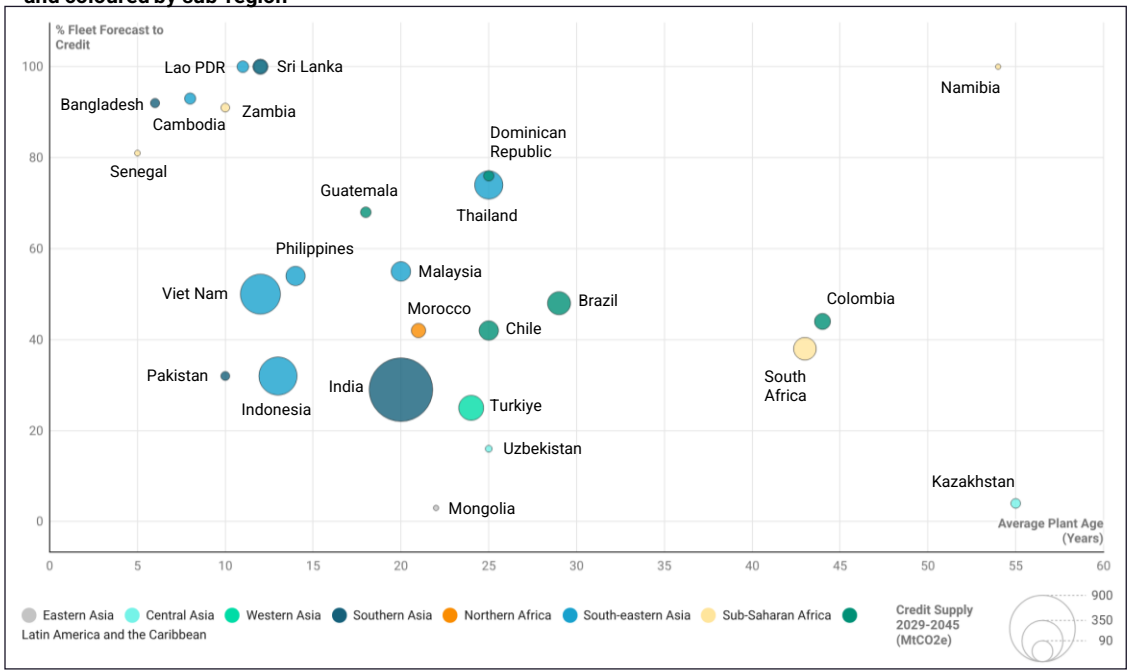
Key insights

- The ideal plant can be envisioned to sit in the upper-right quadrant of the chart; an easier to retire old plant offering high credit volumes. However, this is structurally unlikely – older plants cannot offer long crediting periods.
- In reality, the plants which can offer sizeable volume will be young and difficult to close, they can be seen in the upper-left quadrant.
- However, this analysis shows that the bulk of credit supply volume will come from smaller and younger plants than the 'big ticket' outliers.
- This may be preferable, offering more manageable transaction sizes, associated complexity, and reducing the risk of market sentiment impacts should a flagship project fail to progress.
- In terms of distribution, south-east Asia appears to have a higher proportion of medium to large plant volumes – per plant volume average is 13.5 $MtCO_2e$. Whereas southern Asia has a broader base on small per-plant volumes – per plant volume average is 9.5 $MtCO_2e$.
- The majority of credit volume is forecast to be supplied by plants located in jurisdictions without policies which could support or catalyse early retirement.

The largest credit supply countries offer scale, but transition credits can only penetrate part of their coal fleets

India and Indonesia combine large credit volumes with ~30% potential fleet participation. Smaller markets have high participation due to a small fleet. Older crediting fleets do not consistently offer greater volumes or broader participation.

Per country average crediting plant age vs proportion of fleet forecast to credit, sized by credit supply volume and coloured by sub-region



Supply data from Carbon Trust modelling, based on a modified version of the Global Energy Monitor (GEM) coal asset database. Participation is the percentage of the country's operating coal fleet which is forecast to issue credits between 2029-45.

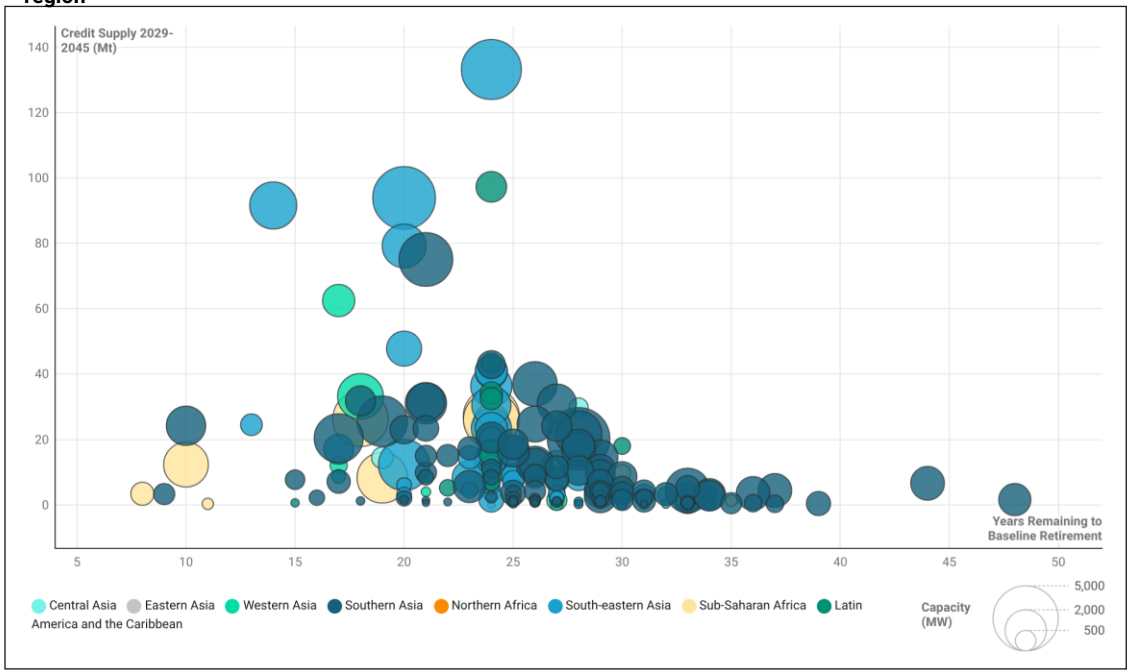
Key insights

- Two trends are observable, although the relationships are not directly traceable:
  - The older the average fleet plant age, the lower the proportion of the fleet which is forecast to credit.
  - Larger forecast country credit volumes sit with younger average fleet age and lower fleet participation.
- Where supply scale and fleet coverage diverge (e.g. India, Indonesia, Viet Nam) other support mechanisms will be required to address the remaining fleet.
- High participation does not guarantee scale. Small national fleets result in high participation, however the few plants offer low credit volume. It is unsurprising that as fleet size scale, so too does the number of ineligible or unsuitable plants.
- Age alone is a poor proxy for opportunity. South Africa and Colombia average over 40 years, yet only around 40-45% of plants credit. Kazakhstan's still older cohort offers minimal participation and volume. Maturity therefore does not establish credit potential or retirement readiness.

The largest credit opportunities come from plants with substantial operating lives remaining

The largest credit opportunities sit 14-25 years from baseline retirement, the highest frequency between 17-29 years. Plants nearing baseline closure offer smaller volumes, as do those with >30 years remaining.

Per plant years remaining to baseline retirement vs credit supply volume, sized by capacity and coloured by sub-region



Supply data from Carbon Trust modelling, based on a modified version of the Global Energy Monitor (GEM) coal asset database. "Baseline Retirement" is the earliest of: end of useful economic life (UEL), end of power purchase agreement (PPA), country coal phase-out date, or country net zero year.

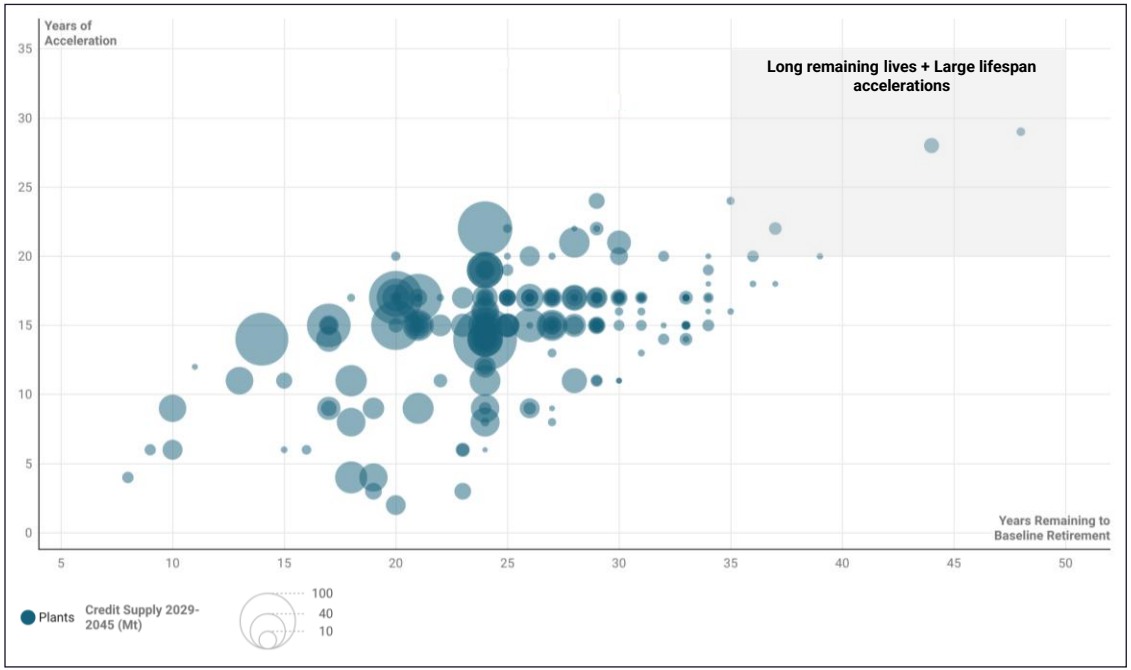
Key insights

- The strongest volume opportunities occupy the middle of the remaining-life range: Several plants with roughly 15-25 years to baseline retirement forecast volumes of 60-135 $MtCO_2e$. These warrant targeted diligence, but substantial remaining operating lives could make owner compensation and contractual commitments material barriers.
- The longest-lived plants do not offer the most credits. Beyond approximately 30 years remaining, plant volumes generally fall below 10 $MtCO_2e$. This may be due to their crediting periods being truncated by the 2045 cut-off, or the impact of the policy BAU scenario.
- Nearer-term closures offer a different trade-off: Plants within roughly 10 years of baseline retirement provide relatively modest volumes. They could require less acceleration, likely meaning less compensation, but offer a narrower window for emissions reductions that provide additionality.
- Similar retirement horizons also conceal very different opportunities, at around 20-25 years remaining, supply ranges from marginal to over 130 $MtCO_2e$.

Large credit opportunities depend on bringing plant retirement forward by well over a decade

Several sizeable opportunities require approximately 15-22 years of acceleration. The long tail of plants with many years remaining offers comparatively low volume, however this may be due to the credit period being cut-off at 2045.

Per plant years remaining to baseline retirement vs years of acceleration



Supply data from Carbon Trust modelling, based on a modified version of the Global Energy Monitor (GEM) coal asset database. "Years of Acceleration" is the number of years earlier retirement occurs under the Accelerated Transition scenario versus the Policy BAU scenario.

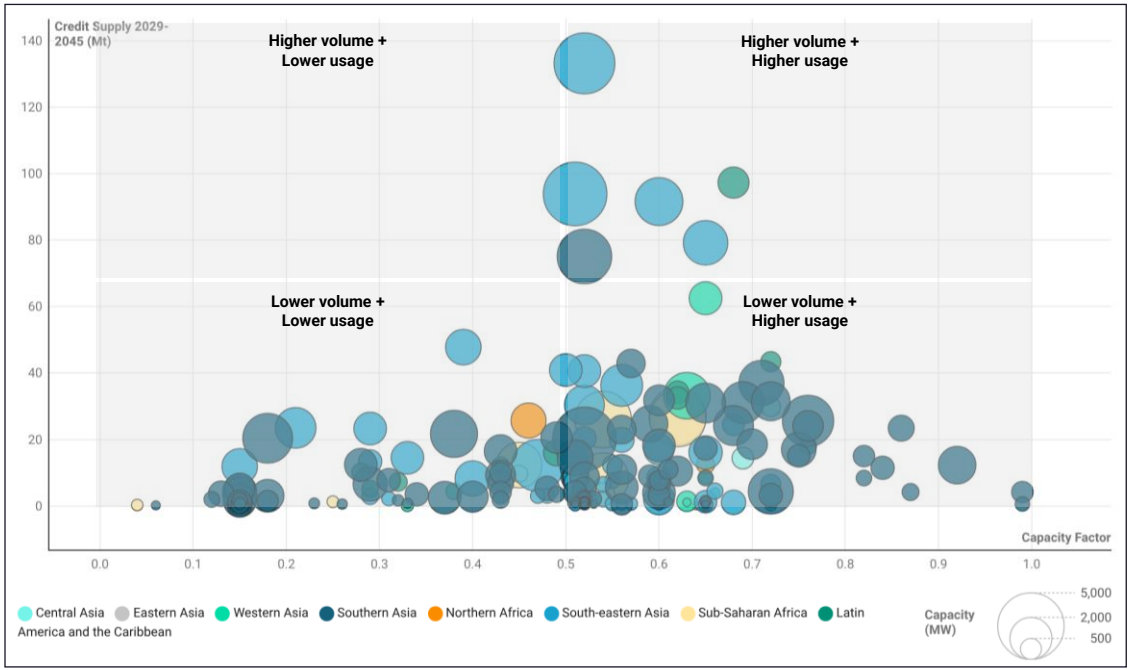
Key insights

- Several large bubbles combine roughly 20-25 years to baseline retirement with 15-22 years of acceleration. Realising these volumes would mean foregoing substantial expected operation, potentially requiring significant owner compensation and contractual restructuring.
- The delivery timetable implied by subtracting acceleration from remaining baseline is tight for several sizeable opportunities. These imply retirement within roughly 5-10 years, making replacement capacity, financing and approvals potentially urgent dependencies.
- Surprisingly, the most extreme cases are not the largest volume opportunities – e.g. plants combining >30 years of remaining life with >15 years of acceleration do not have large volumes.
- Plants with similar remaining lives and acceleration requirements show markedly different credit volumes, highlighting the role of targeting.
- Bubble sizes capture 2029-45 supply, rather than lifetime abatement. Small bubbles among longer-lived plants could reflect that their crediting period extends beyond 2045.

Scaling credit supply will require replacing actively used generation

Large credit volume opportunities will naturally be challenging as the volumes are driven by the active generation of the plant. Substantial ‘easy’ volumes from plants with a low capacity factor are structurally unlikely.

Quadrant analysis of per plant credit supply vs capacity factor, sized by capacity and coloured by sub-region



Supply data from Carbon Trust modelling, based on a modified version of the Global Energy Monitor (GEM) coal asset database.

Key insights

- The “easy wins” quadrant is empty: No plotted plant combines low utilisation with high credit supply. There is little evidence that large volumes can be unlocked simply by retiring lightly-used assets. In line with this, every opportunity above 60 $MtCO_2e$ operates at a 50-70% capacity factor.
- The largest opportunities are active, but not the most intensively used. High-volume outliers cluster at 50-70% capacity factors, rather than >80%. Targeted replacement strategies could unlock substantial supply without necessarily tackling the fleet’s most heavily utilised plants first.
- Large assets do not always offer large credit volumes. Some sizeable capacity bubbles sit below 30 $MtCO_2e$. These are challenging because replacement requirements and transaction complexity may be substantial relative to forecast credit revenues.
- Lower utilization plants may require less annual energy replacement, but could still be providing essential peak or local reliability services.

Scaling transition credits depends on engaging coal-producing countries without phase-out commitments

These markets account for 1,786 $MtCO_2e$ (71%) of forecast supply, compared with just 161 $MtCO_2e$ (6%) in countries committed to phasing out coal by 2040.

Heatmap of transition credit supply (Mt) by country archetype and policy context

Country Archetype	Policy Context: Strong	Policy Context: Emerging	Policy Context: Weak
Country Phase-out	161 (6%)	453 (18%)	-
No Country Phase-out	-	110 (4%)	-
No Country Phase-out + Coal Reserves	-	-	1,786 (71%)

Policy context assigned based on: Strong policy = committed to phase out coal relatively early (≤2040); Weak policy = no strong commitment and identified as having coal reserves; Emerging policy = has a later coal transition target (≤2050) or doesn't fit either of the above categories. "Coal reserves" determined using annual domestic production >5 Mt as a proxy.

Key insights

- The majority of the credit volume opportunity lacks a national retirement timetable; countries without phase-out commitments and with domestic coal production account for 71% of supply. Delivery therefore depends heavily on securing retirement agreements where national policy provides limited direction.
- Coal reserves may create a tailwind or political "stickiness" for continued operations, however, weak policy on coal phase-out may also present an opportunity for engagement to generate retirement-supportive momentum.
- However, having a phase-out commitment in-place does not necessarily imply near-term momentum. Countries with commitments contribute 614 $MtCO_2e$ (24%), but 453 $MtCO_2e$ falls under "emerging" policy – having a phase-out target later than 2040. The policy-supported opportunity is therefore weighted towards later transitions, rather than early coal exits.
- Nevertheless, given the high proportion of volume in challenging contexts, even with geographic diversification there is supply risk (struggle bringing opportunities online) due to the prevalence (71%) across the supply profile.

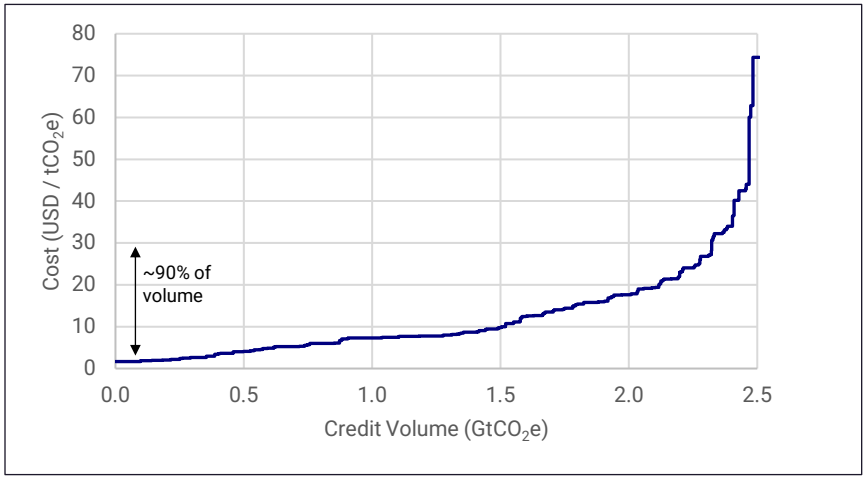
Implications

- Policy-aligned pilots alone cannot deliver scale: Strong-policy markets could provide starting points, subject to project eligibility, but accessing the much larger weak-policy pool will require owner incentives and government engagement alongside credit finance.
- Treat the heatmap as segmentation, not independent evidence of difficulty: The definitions themselves link domestic coal production and absent phase-out commitments to "weak" policy. The concentration therefore partly reflects classification rules, rather than demonstrating that these projects are intrinsically harder.

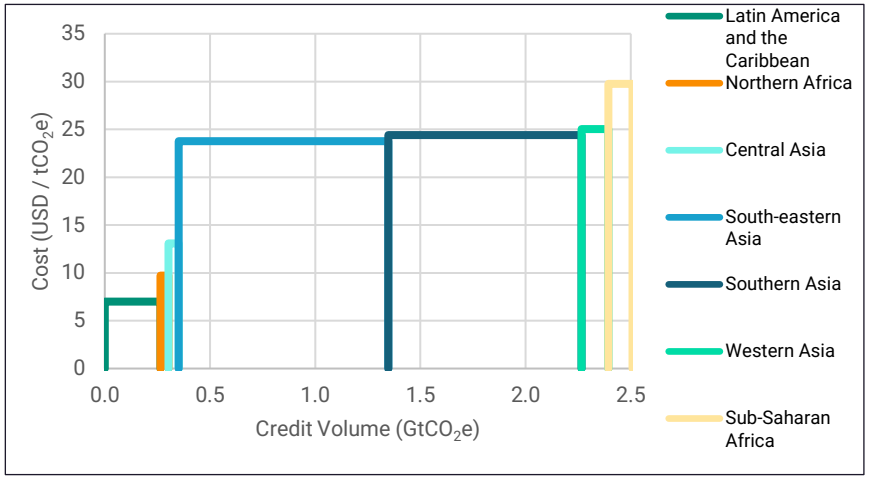
~90% of forecast transition credit supply volume sits below a cost-level of $30 / tCO_2e*

This plant-level assumption-driven cost estimate implies that there may be a sufficient volume of regionally-varied and economically viable supply for transition credits to operate at some scale.

Marginal cost curve of transition credits 2029-2045



Marginal cost curve of transition credits by sub-region average 2029-2045



Key insights

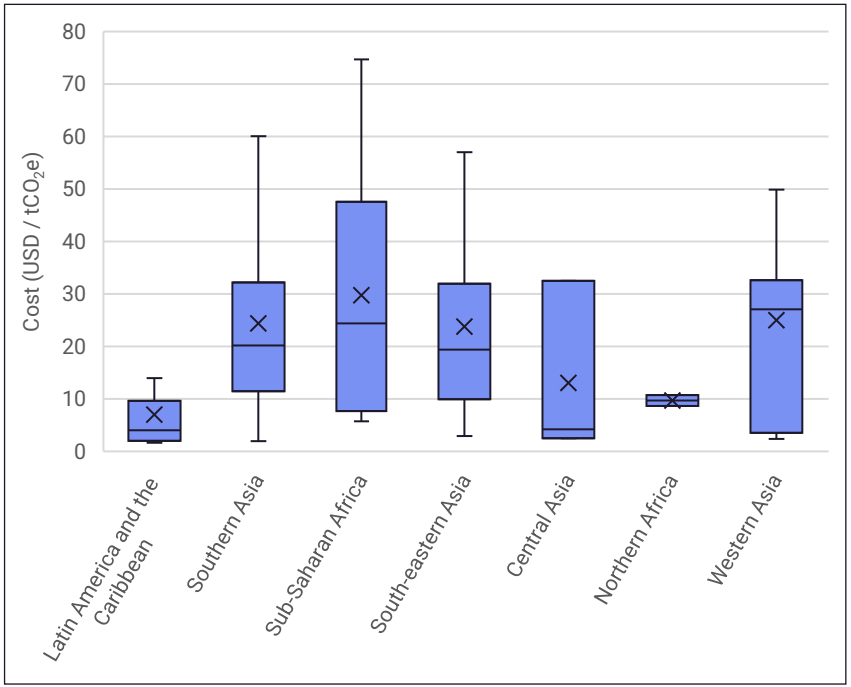
- Cost varies materially by sub-region, driven less by geography than by credit volume relative to plant size – a few large South African plants with high installed capacity but low credit volumes pull the sub-regional average sharply upward.
- "Cost" is a break-even floor, covering decommissioning, replacement with renewables and battery storage and limited PPA revenue loss. It suggests the minimum price credits could need to achieve, under the assumed financing structure, not an expected market price.
- Exclusions: plants above $100 / tCO_2e, and Eastern Asia, where the sole issuing plant (Darkhan, Mongolia, $308) is an outlier driven by a 35 MW asset spreading costs across few credits.

** ~$30 commonly cited as expected rough price point for transition credits.*

The lowest-cost regions contribute relatively little of the total supply opportunity

Sub-regional averages mask a wide intra-region spread. Lower cost supply appears to sit in low volume regions, however, at the plant-level the largest volumes correlate to the lowest cost..

Transition credit average cost by sub-region



Outlier plants with a price over $100 / tCO_2e are excluded from this analysis as these sites would be likely unsuitable. Eastern Asia was excluded due to issuance being solely from a single outlier plant, resulting in a skewed sub-regional cost figure.

Key insights

- Latin America and the Caribbean is the most commercially accessible supply, averaging ~$7 / tCO_2e, followed by Northern Africa and Central Asia at $10-13 / tCO_2e.
- Sub-Saharan Africa, South-eastern Asia, Southern Asia and Western Asia represent >80% of total global supply 2029-45, yet all sit clustered at the high end, ~$24-30 / tCO_2e, with Sub-Saharan Africa the costliest.
- These averages mask a wide intra-region spread across plants and are likely low-end estimates, as costs are based on assumption-driven calculations across the fleet.

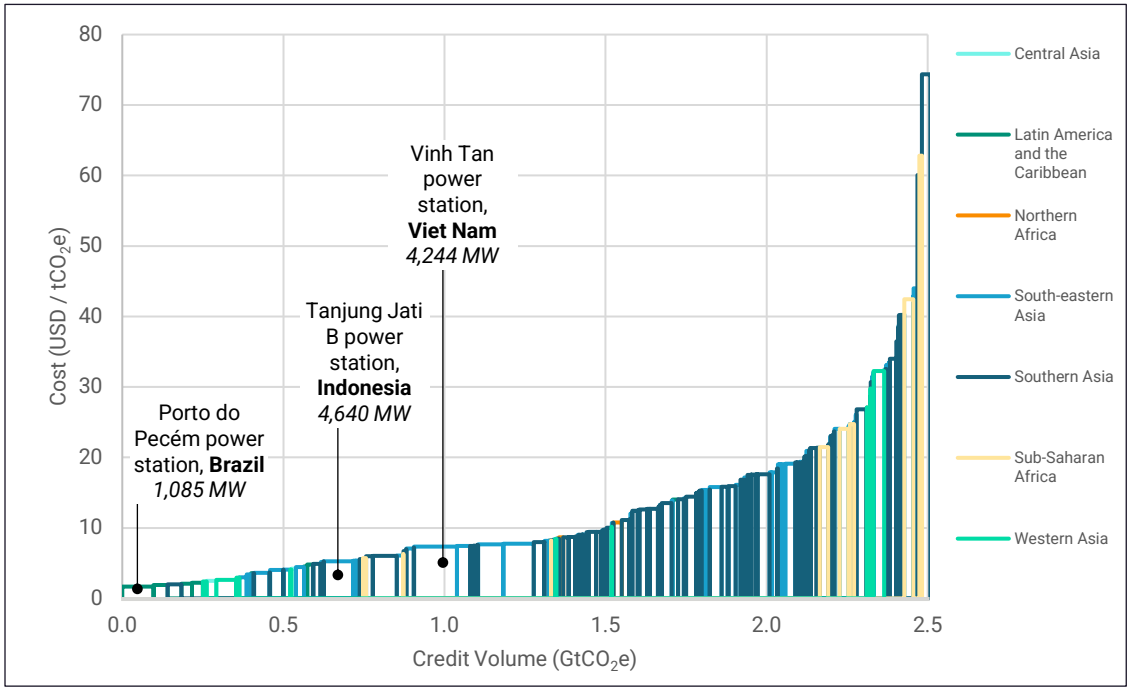
Approach

- Lost PPA revenue is captured by identifying how much CAPEX must still be recovered based on plant's age and useful economic life, and then calculating the value of the remaining CAPEX and the value of remaining PPA revenue using regionalised LCOE for CFPPs.
- Just transition costs captured on a per-worker basis based on regionalised CFPP salaries and exchange rates.
- Replacement with renewables is based on the optimal power mix from country-level wind and solar data, then applying third-party $/MWh delivered costs (including battery storage) to derive total replacement cost.
- Decommissioning cost takes a midpoint of third-party CFPP decommissioning cost sources and calculates decommissioning cost as a factor based on installed capacity and regional construction costs.

Regional averages conceal wide differences in plant-level credit costs

Plants from Western Asia, South-eastern Asia, Southern Asia and Sub-Saharan Africa can be seen across the cost curve, however several plants in Latin America and the Caribbean are clustered at ~$2.

Marginal cost curve of transition credits 2029-2045 by plant and sub-region distribution



Credit cost is calculated by dividing decommissioning costs, replacement costs (incl. BESS) and lost PPA value for a CFPP by its total expected credit supply. The per MW decommissioning cost is regionalised. Replacement pairing is 100%, with solar and wind shares country-specific. Credit volume is based on a 15-year crediting period. 15% of overall cost is assumed to be met by transition credits.

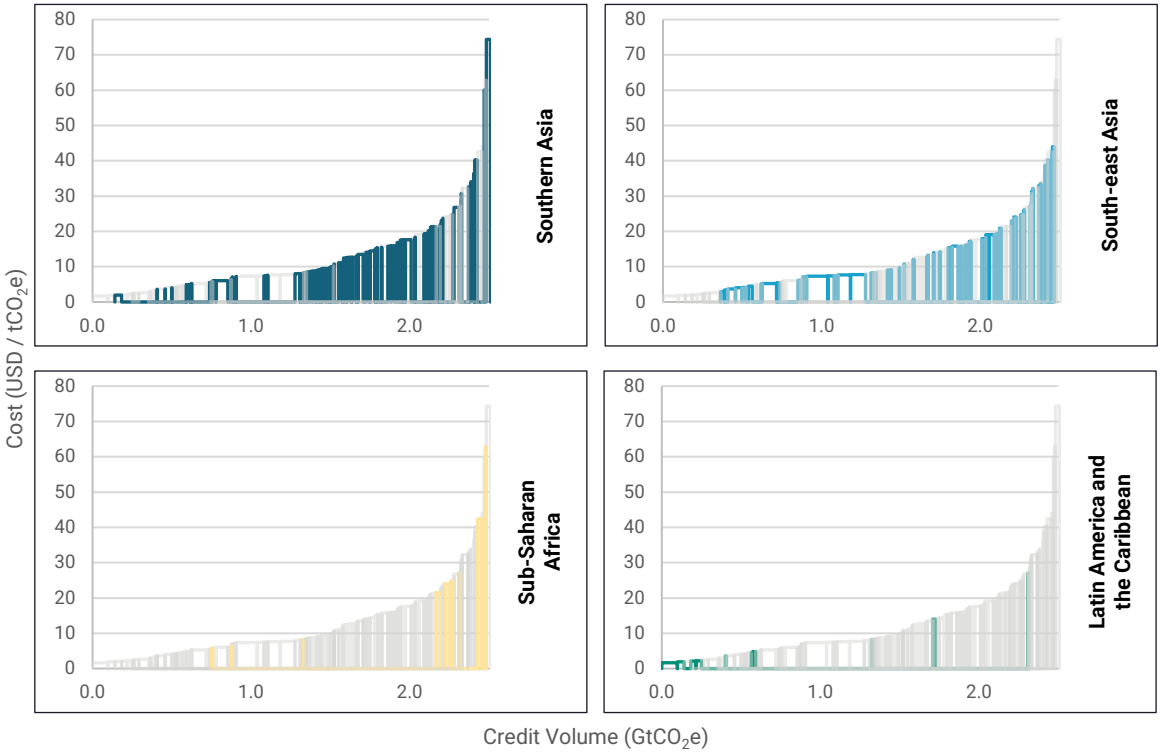
Key insights

- ~60% of supply sits below $10 / tCO_2e, but the curve turns exponential – although these are rough estimates, a portion of the tail may not stack up economically. The curve means each additional increment of volume is disproportionately more expensive.
- The largest assets sit among the lowest-cost supply. Tanjung Jati B (4,640 MW) and Vinh Tan (4,244 MW) appear at the base of the curve, because substantial decommissioning and replacement costs are spread across correspondingly large credit volumes.
- Sub-regions with the largest volumes and most plants are spread widest across the curve, implying that plant-level factors are the dominant cost driver.
- The chart stacks plants low-to-high cost, shaded by sub-region, showing the price composition and distribution of the supply curve.
- This excludes small volume outlier CFPPs with estimates >$100. In volume order: Hwange, Zimbabwe ($103); Medupi, South Africa ($767); Sumsel-5, Indonesia ($136); Çan-2, Türkiye ($161); Darkhan, Mongolia ($308).

Asian supply spans the cost curve, making plant-level screening essential

Isolating supply sub-regions shows that plant-level variation within a region is often wider than the difference between regional averages. Strategic prioritisation must be focused based on plant characteristics.

Marginal cost curve of transition credits 2029-2045 by plant with sub-region distribution highlighted



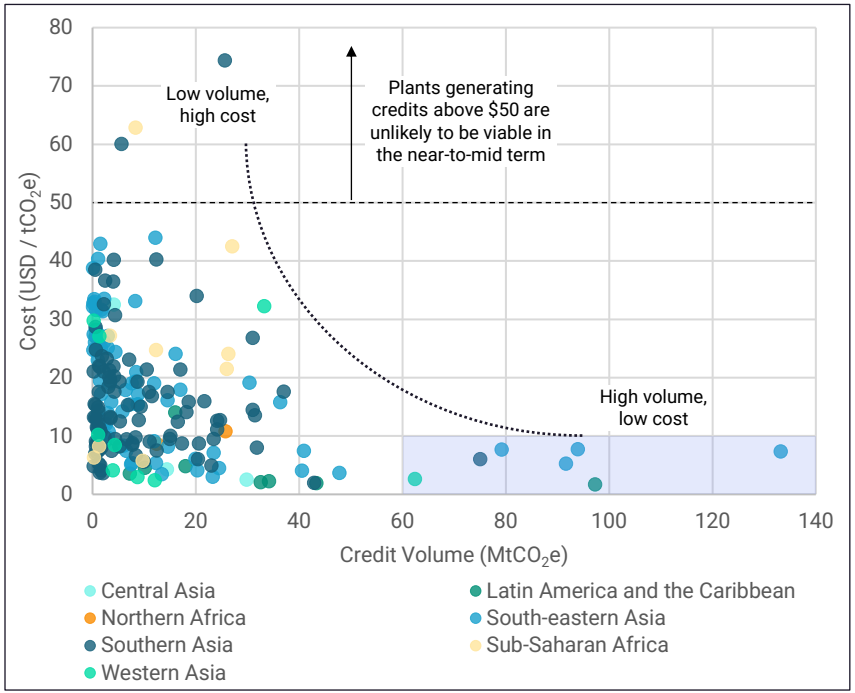
Key insights

- Southern and South-east Asia dominate volume but sit across the full cost range, so regional averages of roughly ~$25/tCO$_2$e describe very few of their individual plants. Latin America and the Caribbean is the strongest exception, and the only genuinely concentrated sub-region, as material volume clusters near the bottom of the curve.
- Distribution shape should determine procurement strategy. Regions with tightly clustered supply, such as Latin America and the Caribbean, can be approached with a single regional price and portfolio-level offtake. This could unlock scale efficiencies. Dispersed regions such as Southern and South-east Asia require plant-by-plant screening and differentiated pricing, since a regional average would materially overpay for some plants and underfund others.
- The low-cost frontier draws from every sub-region, reinforcing that plant characteristics – plant type, role, age and installed capacity – dominate geography as cost drivers.

Large-volume plants sit among the lowest modelled unit costs, but delivery remains project-specific

Across the 205 issuing plants between 2029-45, volume concentrates at the low-cost low-volume end of the curve with a tail of high-cost, low-volume assets beyond \$50 / tCO_2e.

Transition credit cost estimate against supply volume per issuing plant 2029-45



Cost includes a conservative estimate of lost PPA value and assumes 15% of the transaction is funded by credits. Outlier plants with a price over \$100 / tCO_2e are excluded from this analysis as these sites would be likely unsuitable. Blue shading highlights high-volume low-cost frontier.

Key insights

- Plants with large credit volumes (>60 $MtCO_2e$) are among the lowest cost of the crediting cohort (below \$10 / tCO_2e). This may suggest that the frontier is driven by plant characteristics over geography. However, although price and volume appear to run inversely, this is partly due to volume being the denominator of unit cost.
- A tail of high-price, low-volume supply extends beyond \$50 / tCO_2e. These are either younger, high-efficiency assets, or large plants running at low capacity where few credits are spread across substantial decommissioning and replacement costs.

Implications

- A limited set of large plants accounts for a disproportionate share of forecast issuance, meaning the market's realisable scale rests on relatively few transactions – and on the host-government decisions attached to them.
- Transition credit price appreciation may widen the viable pool of plants over time. This calls for a sequenced approach to the market. In practice, the overall picture is likely more challenging due to additional cost (beyond this high-level estimate) squeezing viability.
- The tail may struggle to viably bring transition credits to market. Assets beyond \$50 / tCO_2e may need a different instrument or approach, or should be de-prioritised to enable concessional resources to focus on unlocking supply at the fringe of viability.



Whilst reasonable steps have been taken to ensure that the information contained within this publication is correct, the authors, the Carbon Trust, its agents, contractors and subcontractors give no warranty and make no representation as to its accuracy and accept no liability for any errors or omissions. All trademarks, service marks and logos in this publication, and copyright in it, are the property of the Carbon Trust (or its licensors). Nothing in this publication shall be construed as granting any licence or right to use or reproduce any of the trademarks, services marks, logos, copyright or any proprietary information in any way without the Carbon Trust's prior written permission. The Carbon Trust enforces infringements of its intellectual property rights to the full extent permitted by law.

The Carbon Trust is a company limited by guarantee and registered in England and Wales under company number 4190230 with its registered office at Level 5, Arbor, 255 Blackfriars Road, London SE1 9AX, UK.

© The Carbon Trust 2026. All rights reserved.