NOT THIS WAY

WHY COAL TRANSITION OFFSETS ARE A DEAD END

RECLAIM Finance

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TABLE OF CONTENTS

EXECUTIVE SUMMARY

Limiting global warming to 1.5°C — or even staying below 2°C — demands a full phaseout of coal power worldwide by 2040. This means that hundreds of relatively young coal plants in Asia will need to be shut down well before the end of their technical lifespans. While a range of initiatives has emerged to enable the early closure of these plants, progress has been sluggish. Reasons for this include opposition from powerful coal interests, politicians' concerns about energy security, and a lack of finance. In response to the latter, some have turned to carbon offsets to bring in extra funding to buy out and shut down plants.

The two leading programs to promote and put into practice "transition credits," or more accurately, coal transition offsets (CTOs), are the Rockefeller Foundation's Coal-to-Clean-Credit Initiative (CCCI) and the Singapore government's Traction Coalition. Both aim to create «high integrity» offsets from the emissions avoided by closing coal plants and replacing at least some of their output with renewables. Both also aim to ensure a just transition for coal workers and impacted communities.

An analysis of proposed CTO mechanisms and the two pilot projects selected by the CCCI and Traction, however, shows significant problems in the theory and application of the CTO concept that will likely undermine its objective of reducing global emissions. These problems, such as uncertainties around whether offsets are really key to future project closures, and the quantification of avoided emissions, are inherent to the design of offset systems. Thoughtful oversight of individual projects and strict conditions on how offsets are used, as the proponents of CTOs are promising, might reduce abuses of the system, but nearly four decades of experience with offsetting shows that they cannot make the problems go away.

LOW-INTEGRITY OFFSETS AND THE FAILED EFFORTS TO FIX THEM

The carbon offset industry has struggled with credibility issues since its inception. CTOs will face the same conceptual and methodological flaws as other offset categories, with their issuance managed by the same players that run the existing offsets market, and following the same processes.

The core of the issue is the industry's chronic inability to answer two basic questions:

1. Would the project have happened without offsets (is it "additional")?
2. How many offsets should the project be allowed to produce?

Analyses of both regulated programs and the voluntary offsets market show that, time and again, market players have answered these questions in a way which favors offset quantity over quality. According to a comprehensive peer-reviewed study, less than 16% of all offsets issued up to 2024 are likely to represent real emissions reductions — suggesting that bogus offsets representing 4.4 billion tonnes of CO2 have been generated, an amount just under that of US fossil fuel CO2 emissions in 2023. A European Commission study of the Kyoto Protocol's Clean Development Mechanism (CDM), the single largest source of offsets, found that only 2% of its projects had a high likelihood of being additional, while 85% had a low likelihood of representing real emissions reductions. Meanwhile, financial data company MSCI judges that three-quarters of voluntary market projects carry significant risks of failing to deliver claimed benefits.

The promoters of CTOs believe that the failures of the offset market can be overcome. One of the proposed solutions favored by both the Rockefeller Foundation's CCCI and Singapore's Traction coalition is to seek the seal of approval of the Integrity Council for the Voluntary Carbon Market (ICVCM). The ICVCM, the latest offsetting industry effort to raise standards, evaluates the methodologies used to decide whether projects can generate offsets and how many offsets projects should be eligible to issue. While the council has, to its credit, rejected many widely-used methodologies, it has also greenlit some controversial ones. Furthermore, the council does not oversee how methodologies are applied. So even where CTOs are required to be ICVCM-compliant, this will not guarantee high quality.

The endemic failures of offsetting do not stem from malfeasance (although this clearly exists) but from fundamental failings in program design. **Many analysts have concluded from their years of experience that the problem is less a lack of competence or good intentions in the design and implementation of offsetting programs, and more that the very concept of offsetting is intrinsically flawed.** It is a near impossibility to prove definitively that offset revenue is a decisive factor in driving a project. Quantifying the counterfactual scenarios of what emissions would be if the offset-funded shutdown did not occur is inherently uncertain. And all market participants have a financial incentive to maximize offset volumes. Multiple reform efforts have done little to correct these systemic issues.

WILL CTOS CUT GLOBAL EMISSIONS?

The purpose of retiring coal plants early is to reduce global emissions. But offsets were not designed to reduce emissions overall — only to shift the location of emissions reductions. When offsets do not represent real emissions

reductions, their net effect in most cases is to increase overall emissions. This is certainly the case when offsets are used by polluters as a way of meeting obligations under cap-and-trade schemes or other mandated reductions.

When offsets are used by companies to claim their products are "carbon neutral" or "low carbon" or to meet voluntary targets, the impact on global emissions of bogus offsets is difficult to assess. Perhaps the company would not have made these claims or adopted targets, and would not have cut its emissions without offsets being available; or perhaps the claims do not enable it to sell more products. But there is no doubt that these types of claims are made in the hope of gaining a competitive advantage, meaning offsets are intended to enable higher sales — which will result in higher emissions when offsets are bogus.

For instance, the Rockefeller Foundation is supporting an initiative for large US corporations to buy CTOs to decarbonize their value chains. Yet, encouraging companies to buy offsets they can advertise as high quality makes it less likely that these companies will pressure their suppliers and customers to make real and long-lasting changes.

The emissions reduction potential of CTOs is also reduced by the fact that, under the only methodology to have been approved for coal offsets, one which the CCCI and Traction have committed to using, just 10% of the output of a coal plant must be replaced by renewables. Even after a decade this threshold rises only to 40%.[1] This leaves ample room for power to be replaced by output from other coal and gas plants, undermining the supposed climate benefit of shutting the coal plant. Two other methodologies that are still under development require all of a coal plant's output to be replaced by renewables 3-5 years after plant closure. The reason for the low ambition of the approved methodology appears to be concerns that it will be too difficult to find projects that achieve higher thresholds for replacement renewables.

CTOs, like other offsets, also create perverse incentives for policymakers to not mandate coal phaseouts. Regulatory requirements to close or reduce production at coal plants, might be quicker and more cost-effective approaches to cutting emissions than relying on offsets, but would render additionality claims non-credible. The possibility of earning CTO revenue may also delay retirement decisions or discourage alternative financing arrangements that could achieve similar or better outcomes at lower cost.

FINANCIAL CONTRADICTIONS

The CCCI claims that closing coal plants could generate billions of tonnes of credits, compared to a current offset market size of roughly 200 million tonnes per year.[2] Meanwhile Traction estimates that CTOs would need to be sold at multiples of current offset prices to make coal plant buyouts viable. This means that any large-scale application of coal offsets would rely on the glaring contradiction of simultaneously raising prices while flooding the market with credits.

Proponents assert that this circle can be squared as corporate buyers will be willing to pay premium prices for a high-quality product. But in the likely event that CTOs suffer from the same credibility issues as other offsets, the risk of buyers walking away from deals will be high.

The anticipated financial structure for CTO deals adds further strain on their viability. Coal plant acquisitions require large sums upfront, yet offset revenue may not start to arrive until many years after plant closure. Bridging this timing mismatch will require complex forward contracts that will only increase transaction costs and risks.

LESSONS FROM CTO PILOT PROJECTS

An analysis of the CCCI and Traction pilot projects — two relatively small coal plants in the Philippines — illustrates how the idealized CTO model may play out in practice. These projects reveal the same concerns that haunt offsetting more generally — a lack of transparency, shaky claims of additionality, inflated emissions benefits, and weak accountability around social impacts.

Both projects were already on track for early closure before CTOs entered the picture. The SLTEC power station on Luzon Island, was bought out in 2022 in order to be shut down in 2040 (although there are reasons to doubt if it would have continued generating power after 2040 without the buyout). The Mindanao coal-fired power plant (CFPP), is proposed for a buyout under an Asian Development Bank (ADB) program. CTOs are supposed to accelerate these retirements.

Additionality questions: The Mindanao CFPP project highlights how murky assumptions about closure dates can be. Sources suggest the plant was intended for closure before 2030 and even as soon as 2026 under an Asian Development Bank (ADB) coal retirement program without the need to sell offsets. If so, CTOs are unlikely to speed up its retirement. Worse still, the possibility of earning offset income could delay closure as the involved parties hold out for a more lucrative deal.

Emissions quantification: The company backing the SLTEC CTO deal claims its early closure would avoid 19 million tonnes of CO2 over a decade. But this rests on the highly questionable assumptions that the plant would operate

consistently between 2030 and 2040 at a capacity factor far higher than other coal plants in the Philippines; that plant ageing won't increase downtime for repairs and maintenance; and that growing penetration of cheap renewables and batteries will not erode demand for SLTEC power.

Just transition: Advocates argue that CTO deals will channel funding into measures such as retraining workers and compensating coal-dependent communities. Yet the track record of offset projects in delivering social benefits is weak. Without robust oversight and enforcement there is little reason to believe CTOs will succeed on social issues where previous offset deals have failed.

ALTERNATIVE APPROACHES FOR COAL RETIREMENT

The most important short-term actions to reduce coal emissions do not involve trying to close deals now to shut down individual plants as much as a decade or more in the future, as is the case with proposed coal buyouts (either with or without offsets). What must be prioritized instead is the removal of barriers to the rapid deployment of renewables in coal-dependent economies, and government and investor actions to push utilities and coal plant operators to exit coal completely over the medium term. If coal plants are closed before renewables are able to take their place, especially in contexts of rapidly rising power demand, generation will likely increase at existing, expanded, or even new coal or gas plants.

In many contexts, coal emissions may be more effectively reduced in the short term by lowering production at coal plants to make way for growing renewable output rather than pushing politically difficult plant closures. Instead of plant-by-plant transactions, utility-level engagement can enable coordinated retirement and replacement planning that optimizes grid reliability and integration of renewables.

In a context of rapidly growing renewables and the decreasing economic viability of coal plants, other opportunities for closing coal plants will arise that can achieve system-wide emissions reduction. One is to push coal plant owners and investors to renegotiate power purchase agreements (PPAs). Analysis of coal plants in Pakistan and Vietnam suggests that financial restructuring could enable these plants to be closed and replaced with renewables in the mid-2030s while maintaining investor returns, and without requiring concessional finance or offset revenue. Pakistan's recent cancellation of five oil-fired power plant contracts demonstrates that PPAs are not sacrosanct once their terms are clearly too onerous to be sustained.

RECOMMENDATIONS FOR STAKEHOLDERS

For development finance institutions and governments:

- Stop pushing offset-dependent coal plant retirements.
- Prioritize technical assistance for regulatory reform, grid modernization, and renewable energy deployment over individual plant buyouts.
- Focus efforts to close individual plants on facilitating PPA renegotiations and supporting just transition planning, rather than compensating private investors for stranded assets.
- Where buyouts are pursued, employ transparent auction mechanisms rather than confidential bilateral negotiations that risk overcompensating coal plant owners with public money.
- Ensure strict enforcement of restrictions on building or expanding coal plants for companies and jurisdictions involved in coal transition offset deals.
- Adopt regulations to phase out coal power on a sectoral basis rather than relying on voluntary plant-by-plant approaches.
- Adopt robust coal policies that end all direct and indirect financial services for new and expanded coal projects and the companies developing them, and phaseout all coal finance by 2030 in the OECD and by 2040 in the rest of the world, with exceptions for support for coal decommissioning and just transition activities.

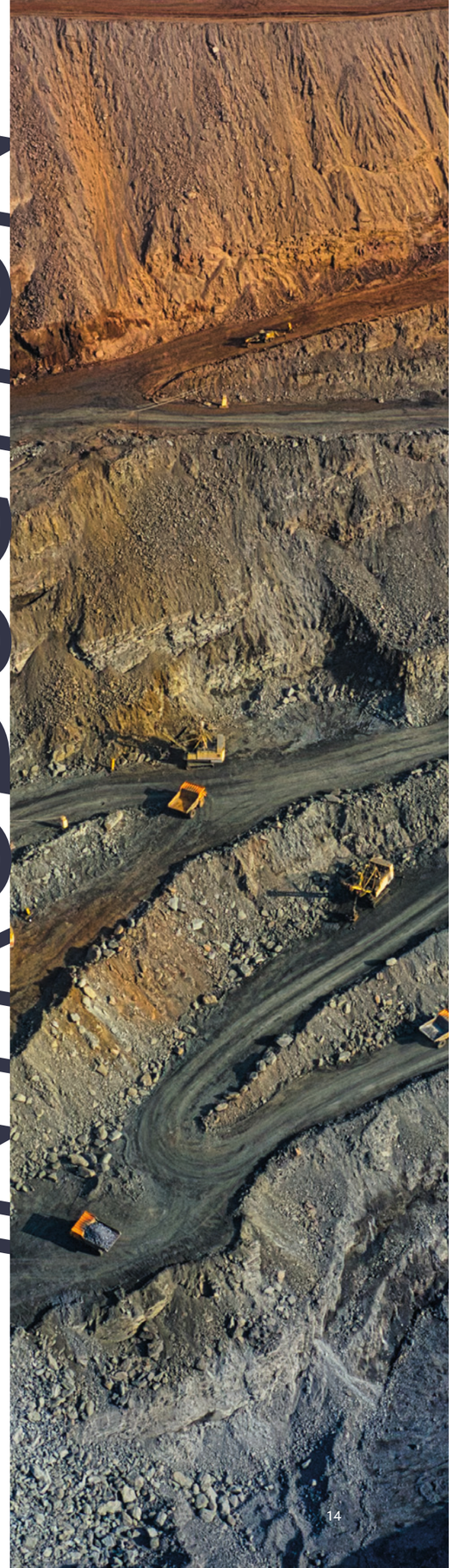
For private financial institutions and owners of coal plants:

- Recognize that coal plant investments carry inherent stranding risks in a decarbonizing economy.
- Engage constructively in contract renegotiations with power buyers rather than seeking full compensation through public mechanisms, or via offset sales.
- Adopt robust coal policies that end all financial services for new and expanded coal projects and the companies developing them, and phaseout all coal finance by 2030 in the OECD and by 2040 in the rest of the world, with exceptions for support for coal decommissioning and just transition activities.

GLOSSARY

ACI	Asia Carbon Institute
ADB	Asian Development Bank
CCCI	Coal to Clean Credit Initiative
CDM	Clean Development Mechanism
CCPs	ICVCM Core Carbon Principles
CCS	Carbon capture and storage
CFFP	Coal-fired power plant
CIF-ACT	Climate Investment Fund – Accelerating Coal Transition
CO2(e)	Carbon dioxide (equivalent)
CPI	Climate Policy Initiative
CTO	Coal transition offset
DFI	Development finance institution
ETM	Energy Transition Mechanism
ETMPH	ETM Philippines Holdings
ETS	EU Emissions Trading System
GFANZ	Glasgow Financial Alliance for Net Zero
GWh	Gigawatt-hours
HRW	Human Rights Watch
ICVCM	Integrity Council for the Voluntary Carbon Market
IFC	International Finance Corporation
IPP	Independent power producer
ITMO	Internationally Transferred Mitigation Outcome
JBIC	Japanese Bank for International Cooperation
JETP	Just Energy Transition Partnership
JI	Joint Implementation
MAS	Monetary Authority of Singapore
MDB	Multilateral Development Bank
MoU	Memorandum of Understanding
MtCO2	Million tonnes CO_2
NDC	Nationally Determined Contribution
PACM	Paris Agreement Crediting Mechanism
PDD	Project Design Document
PPA	Power purchase agreement
PSALM	Power Sector Assets and Liabilities Management Corporation
SLTEC	South Luzon Thermal Energy Corporation
SPV	Special Purpose Vehicle
Traction	Transition Credits Coalition
TSVCM	Taskforce on Scaling Voluntary Carbon Markets
VCM	Voluntary carbon market

INTRODUCTION



In recent years, governments, financial institutions, foundations and NGOs have launched a web of interrelated initiatives that seek to shut down coal plants in developing countries before the end of their economic lifetimes. The rationale is obvious — coal power is the single largest global source of CO2 emissions. IPCC scenarios from 2022 show that to stay under 1.5°C and even 2°C, the use of coal power must end by 2040 and be be replaced mostly with wind and solar.[3] The problem is particularly acute in Asia, which is home to most of the world's existing and planned coal plants, and some of the most coal-dependent economies. Asian coal plants have an average age of only 15 years; by comparison the average coal plant in North America was built more than 40 years ago.[4]

These coal retirement initiatives, and in particular the well-known Joint Energy Transition Partnerships (JETPs) launched by governments at COP26 in 2021, have generated many studies on how to finance coal closures and replace their power, and have held numerous consultations on how to ensure a just transition for coal workers and communities.[5] But for various political, legal, financial and other reasons little progress has been made in terms of actual agreements to close coal plants.[6]

A shortage of affordable finance for buying out independent coal plant owners and making them and their investors whole is only one part of the problem, yet it is the issue that has received most attention from governments and financial institutions and is at the core of the various coal retirement initiatives (see Annex 1). In response to this shortage of finance, some influential actors are advocating for the use of carbon offsets to unlock early coal retirements. These proposed coal offsets have been named "transition credits,"[7] but in this report we use the more accurate term "coal transition offsets" (CTOs) (see Box).

The concept behind CTOs maintains that project proponents can quantify exactly how many tonnes of CO2 emissions are avoided by shutting down a coal plant early and replacing its output with clean energy, at least in part. A credit would then be created for each tonne of avoided emissions and then sold to governments and corporations as an easy and cost-effective way to meet their climate targets. This would generate an additional source of finance to make the buyout and eventual decommissioning of the coal plant viable.

The two most active promoters of the CTO concept are the Coal to Clean Credit Initiative (CCCI) led by the Rockefeller Foundation; and the Transition Credits Coalition, also known as Traction, led by the Monetary Authority of Singapore (MAS), the island nation's central bank. The CCCI was launched in June 2023 to "set a new comprehensive standard for the use of carbon finance to incentivize a just transition away from coal-fired power plants to renewable energy in emerging economies."[8] It works closely with two of the most influential entities in the global offsetting industry, standard-setter Verra and consultancy and developer South Pole.

Traction was launched six months after the CCCI. It has more than 30 members, including major offsetting industry service providers as well as global private financial institutions and multilateral development banks (MDBs) (see Annex 2). Traction's aim is to kick-start the CTO market by promoting the "transition credits" concept, bringing together potential offset sellers and buyers, and exploring potential financial structures. While the CCCI is envisaged as continuing to oversee the implementation of CTO projects,[9] Traction is scheduled to terminate its work with the release of a final report at COP30.[10]

Both these initiatives work closely with each other and with other CTO proponents such as the Asian Development Bank (ADB). The Rockefeller Foundation is a member of Traction, and both the CCCI and Traction have chosen the SLTEC (South Luzon Thermal Energy Corporation) coal plant in the Philippines as a pilot project.

THIS TIME IT WILL BE DIFFERENT

Both the CCCI and Traction claim repeatedly that mechanisms will be put in place to ensure that CTOs will be "high integrity" and "high quality," meaning that they will represent genuine emissions reductions with guarantees of a just transition for workers and communities impacted by coal closures. This is an implicit recognition of the numerous scandals that have afflicted the global offsetting industry since its birth in 1989, and of the research showing that most of the billions of offsets generated have not represented actual emissions reductions. The most comprehensive study, which looked at almost a billion offsets across the main crediting initiatives — around a fifth of total offset issuance — found that less than 16% are likely to be backed by reduced emissions.[12]

The Achilles heels' of the offsetting industry have been non-credible claims of additionality (that projects are only happening because they are able to get offset income) and exaggerated claims of the quantity of emissions reductions. There is no clear reason to believe that the CCCI and Traction can surmount these weaknesses — numerous efforts to weed out low-quality offsets have failed over the past decades. These efforts have involved many of the same market players as these CTO initiatives, and the same incentive structures and the same conceptual problems will be present for CTOs as in the past.

The only two proposed CTO projects for which information is available are the SLTEC power plant and another on Mindanao Island which Traction is working on with the ADB and the Philippines government. A review of the — often contradictory and inconsistent — information for these two proposed CTO deals gives rise to serious concerns over the accuracy of the claims made for their additionality and the volume of emissions they will avoid.

This briefing reviews the extremely poor record of almost 40 years of international carbon offsetting and explains why efforts to solve its shortcomings have repeatedly failed. It shows why it is unlikely that CTOs represent a qualitative break from this record.[13] And it also looks at what is needed to ensure coal plants are closed early in such a way that provides the global emissions reduction benefits that this is supposed to achieve.

BOX: CONFUSING CREDITS WITH OFFSETS

The terms "carbon offsets" and "carbon credits" are often used interchangeably. This creates confusion as the allowances issued under regulated cap-and-trade markets like the European Union's Emissions Trading System (ETS) are also often termed carbon credits.[14] Yet these two types of instruments are different in nature — an allowance represents a tonne of CO2 that is emitted to the atmosphere under a system where emissions are capped; an offset represents a tonne of CO2 that has supposedly not been emitted or has been removed from the atmosphere. In this report we use the term "carbon credits" as a generic term for both types of instruments, and favor using "coal transition offsets" (CTOs) as a more accurate term for what proponents of the concept call "transition credits."

THE PROBLEMS OF OFFSETS ARE STRUCTURAL, NOT EXPERIENTIAL, AND THEREFORE OFFSETS HAVE LIMITED POTENTIAL FOR REFORM.

Danny Cullenward and David G. Victor, 2020[11]

01

FAILED MARKET: THE GLOBAL OFFSETTING INDUSTRY

The offsetting market has generated billions of tonnes of credits that are unlikely to represent real emission reductions.

International carbon offsetting started with a deal in 1989 to plant trees in Guatemala to offset emissions from a new coal plant in the US.[15] The global market fully took off in the early 2000s, with the emergence of the UN-regulated Clean Development Mechanism (CDM) and the parallel proliferation of the web of exchanges, project developers, consultants and other companies and non-profits that make up the global offsetting industry.[16] Since these early days, advocates for the market have promised that it would lower the costs of climate mitigation in the developed world, boost funding for clean development in low-income countries, and cut emissions.[17] The goal of generating cheap offsets for buyers in developed countries has generally been met, even if not at the scale initially projected. However, an obvious consequence of making offsets cheap has been to undermine the goal of transferring large amounts of finance for clean development.[18]

Even when working as intended, offsetting is a zero-sum game that allows reductions in one place to be cancelled out by increases elsewhere. But offsets have not worked as intended, and a majority of offsets are unlikely to represent genuine emissions reductions. The result is that offset buyers have been able to cut their emissions only on paper by way of purchasing supposed "emissions reductions" which, in reality, lead to a net increase in global emissions.[19]

A. REGULATED OFFSET MARKETS

1. The Clean Development Mechanism (CDM) and Joint Implementation (JI)

The CDM, established under the 1997 Kyoto Protocol and administered under the UN climate convention, has generated more offsets than any other program. It allowed companies in wealthy countries which had adopted emissions reduction targets under the Protocol to buy offsets from projects in developing countries which were not subject to targets. A related mechanism called Joint Implementation (JI) allowed the purchase of offsets from former Soviet bloc countries.

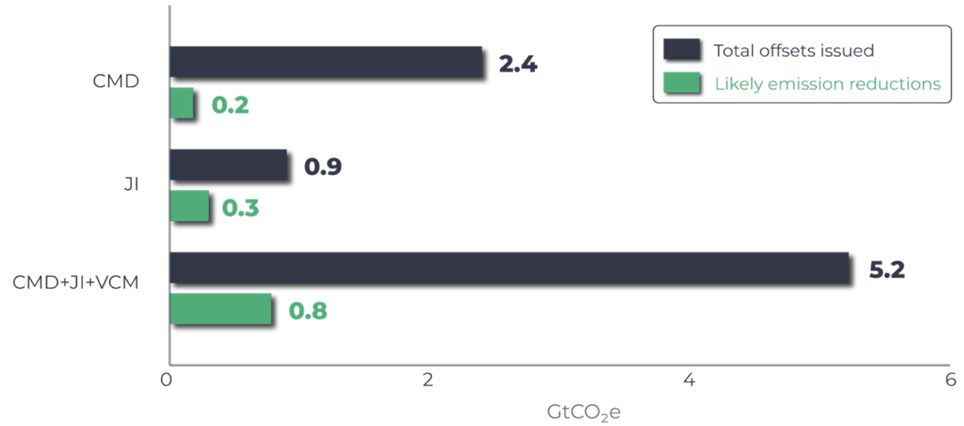
Between their first issuance in 2002 and the end of 2024, the CDM and JI

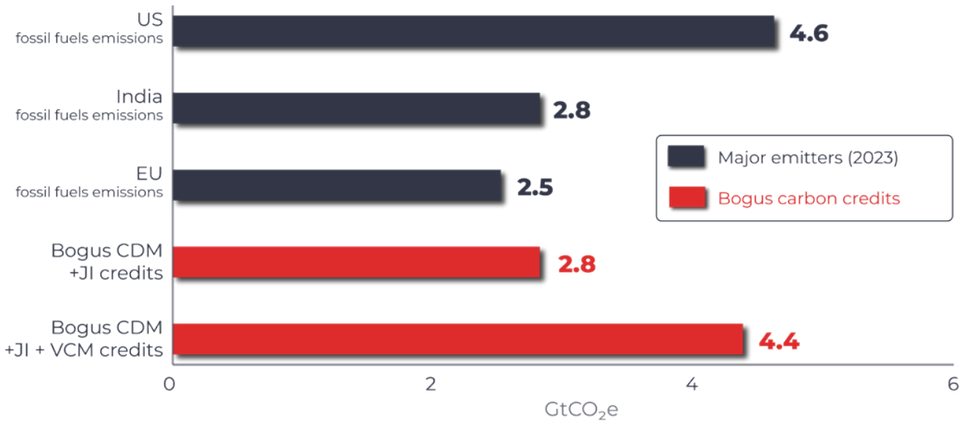
generated 3.3 billion credits from almost 8,000 projects, each one supposedly representing one tonne of CO2 equivalent avoided or removed from the atmosphere (see Figure 1).[20] These Kyoto schemes together issued almost two-thirds of all offsets generated up to 2024. They have now been superseded by the Paris Agreement Crediting Mechanism (PACM) established under Article 6.4 of the agreement (see below).[21]

Numerous think tank and academic studies have shown deep, systemic problems with the CDM and JI.[22] Most significant is that the great majority of their projects were likely non-additional. And even when projects might only have happened because of the availability of offset income, the volume of emissions they have reduced or removed has likely often been greatly overestimated. A comprehensive study prepared for the European Commission in 2016 reviewed thousands of CDM projects and found that only 2% of the projects and 7% of the credits they could generate up to 2020 had a "high likelihood" of being additional and of having emission benefits that were accurately estimated.[23] Similarly, a study of JI estimated that 80% of its offsets came from "project types of low or questionable environmental integrity".[24]

These studies indicate that the CDM and JI likely generated 2.8 billion tonnes of fake credits — and therefore may have been responsible for

Figure 1: Total volume of credits and likely real and bogus emission reductions under offset schemes





Notes: CDM = Clean Development Mechanism. CDM "emission reductions" = credits issued up to 2020 with "high likelihood" of additionality and accurate quantification (Öko-Institut, 2016).

JI = Joint Implementation. JI "emission reductions" = credits issued up to 2015 from project types "likely to be truly additional and not overcredited" (Kollmuss and Schneider, 2015).

VCM = Voluntary Carbon Market. CDM+JI+VCM "emission reductions" = "real emission" reductions extrapolated from 16% of "real emission reductions" in sample of 1 billion credits issued up to 2024 (Probst et al., 2024).

Country emissions data from IEA for 2023.

increasing global emissions by the same amount as the total CO2 emissions of India in 2023. Concerns over the quality of CDM and JI offsets led the European Union to mostly ban their use for compliance with the EU's Emissions Trading System (ETS) after 2013. However, by that time more than a billion offsets, mainly from the CDM, had been used by European companies for ETS compliance.[25] EU companies are therefore likely responsible for around a billion tons of CO2 emissions above what they have "officially" released.

The debacle of the Kyoto offsetting mechanisms offers a salutary lesson to those who are now advocating for CTOs and who believe that the problems of offsetting can be fixed with new rules and increased oversight. The CDM was regulated by a UN-appointed board that adopted increasingly complex, expensive — and unsuccessful — procedures to try to fix additionality and other problems.[26] Likewise, California and Australia have two of the largest national/state-level offset schemes, both governed by experienced regulators who are supposed to have learned from the CDM's failures. And for both, studies show that most approved offsets are likely bogus.[27]

Paris Agreement Article 6: CDM 2.0?

The complexity of the procedures created by the CDM's UN-appointed Executive Board to ensure its credits represented real emissions reductions, as well as its arcane jargon, meant that very few people outside the industry fully understood the processes behind issuing offsets. This likely helped insulate the CDM from effective oversight despite its obvious failures.[28] The new market mechanisms under Articles 6.2 and 6.4 of the Paris Agreement look likely to be even more impenetrable to outside observers.[29] CTOs could be traded under both articles.

Article 6.2 allows governments to trade supposed emissions reductions known as Internationally Transferred Mitigation Outcomes (ITMOs). Governments can buy ITMOs to help meet the targets in their Nationally Determined Contributions (NDCs), which set out their Paris Agreement commitments. The UN will not oversee the integrity of ITMOs — they will instead be approved through government agreements.

Article 6.4 creates the Paris Agreement Crediting Mechanism (PACM) as a centralized market mechanism with a structure and approval processes like those of the CDM. It will be governed by a UN-appointed Supervisory Body similar to the CDM's Executive Board. Just as under the CDM, any developer can apply to have a project registered by the Supervisory Body if it follows an approved methodology. And just as under the CDM, the Supervisory Body will rely on supposedly inde-

pendent auditing and verification agencies to vet projects and methodologies for approval.[30] Its units are referred to as 6.4 Emission Reductions (A6.4ERs).

The initial set of rules for Article 6 were finally agreed at COP29 in Baku. Indications from the early transactions based on these rules are not encouraging. Brussels-based NGO Carbon Market Watch estimates that, of the first batch of Article 6.4 credits, "only one in every 26 is likely to represent real emission reductions." These credits are from a legacy CDM cookstove project and have been reissued under the PACM. Carbon Market Watch estimates that "nearly 1 billion repackaged CDM credits with questionable credentials could flood the nascent Article 6 market."[31]

Concerns have also been raised about the quality of ITMOs from the early Article 6.2 projects. Swiss development NGO Alliance Sud has criticized apparent gross over-crediting of ITMOs for a cookstove project in Ghana,[32] as well as a South Pole-coordinated program to deploy e-buses in Bangkok that "would have most certainly happened" without selling offsets.[33]

The proponents of coal transition offsets are hoping that Article 6 will create a large source of demand for CTOs and are encouraging governments to sign agreements that

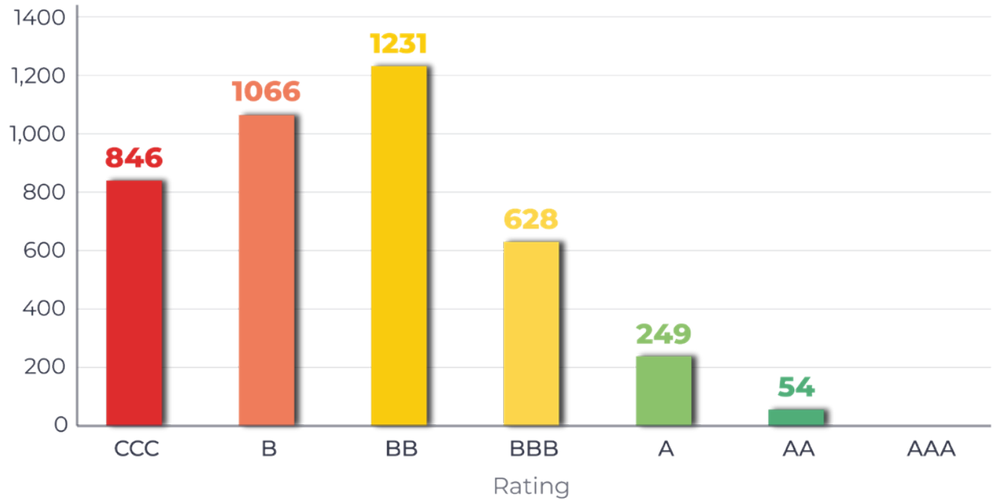
would allow them to be traded as ITMOs.[34] Singapore's MAS implies that Article 6's "integrity requirements" will help ensure the high quality of CTOs,[35] although there is no independent quality mechanism under Article 6.2 and no reason to believe that the PACM's approval procedures will be any more effective than the CDM's.[36]

B. THE VOLUNTARY OFFSET MARKET

What is commonly referred to as the voluntary carbon market (VCM) exists alongside and interacts with the regulated (or "compliance") markets. As of the end of April 2025, 2.1 billion tonnes of voluntary offsets had been issued.[37] With the sunsetting of the CDM — and the fact that its successor mechanisms under the Paris Agreement are just starting to ramp up — the VCM is currently generating the great majority of new offsets.[38]

The integrity of VCM offsets is supposed to be ensured by mostly non-profit "carbon registries" which help develop and approve methodologies for a huge range of different project types and then certify individual projects as complying with the methodologies. The two largest are Verra, which has issued 59% of all VCM offsets, and Gold Standard which has issued 17%.[39] The same registries and other VCM players such as project developers, consultants, auditors and traders

Figure 2: MSCI ratings for registered VCM projects



Notes: Data as of September 2024. Source MSCI, 2025.

are also involved in creating, vetting and brokering offsets in the regulated markets.

The voluntary market is at least as prone to scandals and the production of bogus offsets as its regulated sibling. One recent example is a 2023 study which concluded that more than 90% of the forest offsets issued by Verra (which make up around 40% of its total offsets) were "'phantom credits' and do not represent genuine carbon reductions."[40] Verra emphatically rebutted these claims, but also stated that it was revising its forest methodologies.[41] Verra's long-time CEO stepped down only a few months after this scandal emerged.[42]

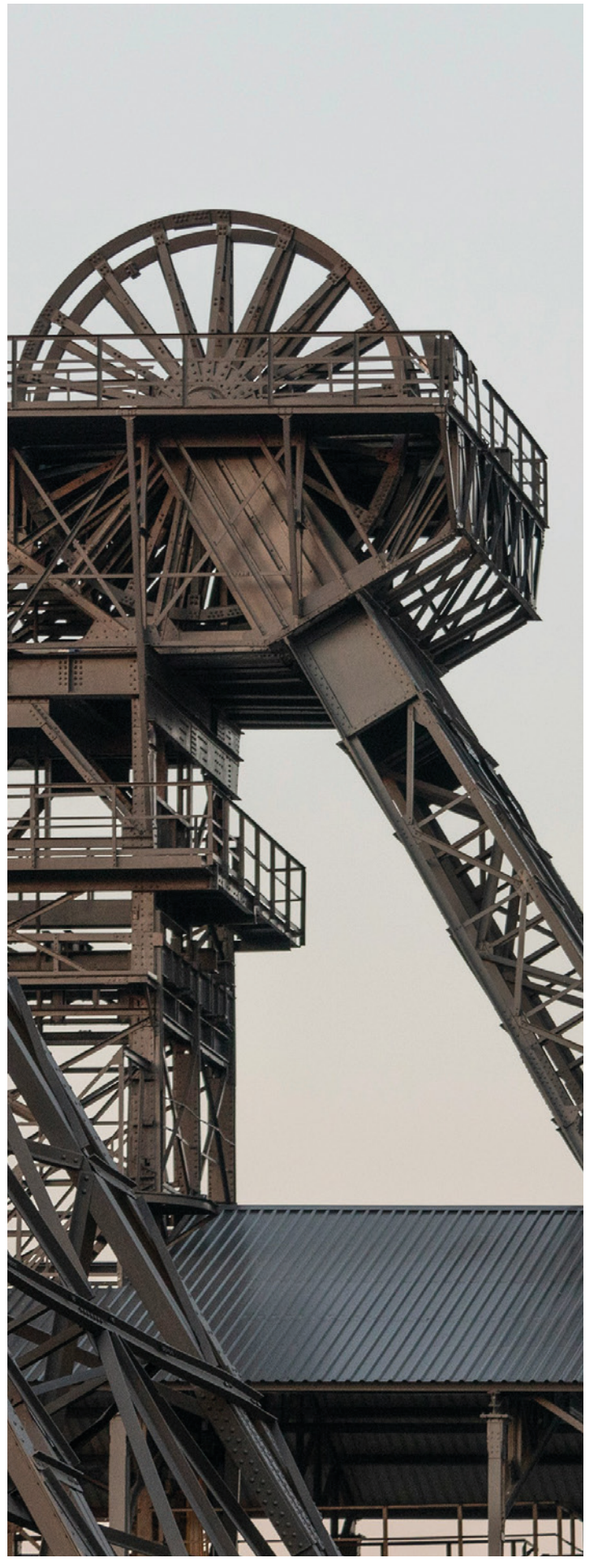
Six months after the departure of Verra's chief executive, the co-founder and head of South Pole, the world's largest offset project developer and consultant, was also replaced.[43] South Pole had been under scrutiny for massively inflating the benefits of its flagship Kariba forestry project in Zimbabwe. The Kariba project, one of the world's largest generators of offsets, had been certified by Verra, who suspended the project after a long exposé in the New Yorker magazine in 2023.[44] In September 2025, Verra finally completed an internal review of the project's carbon accounting set off by the New Yorker article and announced that the project had generated more than 15 million "excess" (i.e. bogus) offsets.[45]

Financial data firm MSCI recently established a rating system for offset projects across six criteria, including additionality and the accuracy of credit quantification. In 2024, MSCI reviewed 4,000 VCM projects. None merited an AAA rating (a "very high likelihood" of delivering project goals) and only 7% scored an A or AA (a moderate to high likelihood).[46] Three-quarters of the projects were rated CCC ("significant risks" of failing to provide claimed emissions benefits or to support positive social and/or environmental outcomes while upholding legal and ethical standards) (see Figure 2).

The ICVCM and other efforts to fix the VCM

The offset industry has long been aware that its repeated scandals harm the growth of the market.[47] Various initiatives have been undertaken to try to ensure offset quality, including the Gold Standard which was originally created by WWF in 2003 to create procedures for "premium quality" CDM credits.[48]

Currently, the most prominent standard setter for voluntary offsets is the Integrity Council for the Voluntary Carbon Market (ICVCM).[49] The ICVCM is intended to provide a seal of approval for offsets "that deliver additional, high-quality emissions reductions with real environmental and social impact and will allow the market to scale with integrity."[50] The council released a set of 10 Core



Carbon Principles (CCPs) in 2023.[51] Carbon registries can submit the methodologies they use for different project types to the ICVCM to decide if they are compliant with the CCPs. The ICVCM does not review individual projects.

As of the end of August 2025, the ICVCM had approved 28 methodologies to be labelled as CCP-compliant. It had also, however, rejected 33 methodologies developed by Gold Standard, Verra, and other registries.[52] These include methodologies that are responsible for some of the most egregious abuses of the offsetting system and include all eight renewable energy methodologies that had applied for CCP approval.[53] Renewables projects, mostly hydropower and wind, have repeatedly been shown to be the least likely project type to be additional, as these are common technologies built on a huge scale globally without any need for offset income.[54]

Registries have declined to submit numerous forest-related methodologies for ICVCM approval, presumably believing that they could not meet the CCPs. MSCI calculates that these forest methodologies, together with the rejected methodologies, would rule out from CCP labelling almost half of the voluntary offsets available as of mid-2024. Overall, MSCI estimates that less than 20% of issued credits would eventually receive a CCP label.[55]

Yet even this low percentage might give an optimistic impression of how many credits are "high quality," since some believe that ICVCM is not properly enforcing its standards. Two long-time offset consultants resigned from their roles on expert panels in 2024 due to their concerns that three forest methodologies approved by the council did not meet the CCPs.[56] The experts wrote that "that the current methodologies could lead to large volumes of credits not backed by any actual emission reductions."[57]

The conundrum faced by the ICVCM is that its goal is to both ensure the high quality of offsets and catalyze a massive increase in the size of the offset market.[58] These dual goals are in conflict. Prioritizing "quality" would exclude most existing offsets and likely most future ones. A quality-focused ICVCM would likely mean that CCP-compliant offsets become a high-priced boutique product in a sea of cheap junk offsets. Meanwhile, prioritizing volume means compromising on quality and allowing lax approval procedures. This is the same issue faced by all previous and existing offset mechanisms and registries — which have invariably come down on the side of volume, just as the ICVCM seems to have done in the case of the three forest methodologies mentioned above.

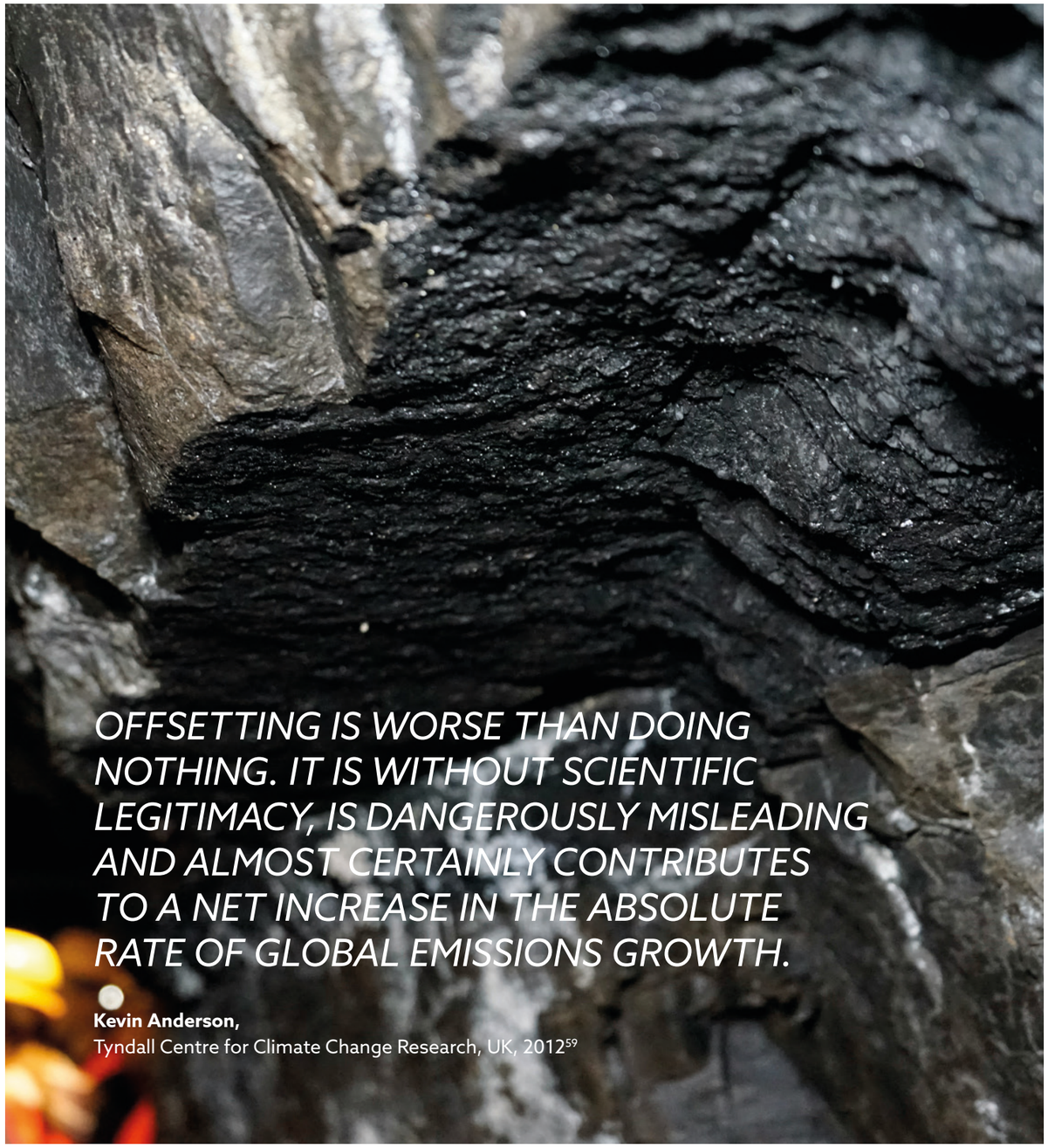
02

THE INHERENT FLAWS OF OFFSETTING

The global offsetting market has failed because of its inherent problems: its benefits are impossible to prove and all market players are incentivized to exaggerate them.

Various promoters of carbon offsetting have admitted many of the industry's problems over recent decades.[60] But these deficiencies have repeatedly been treated as technical issues and the assertion made that with the right safeguards in place, large volumes of "high-quality" offsets can be guaranteed.[61] Traction and the CCCI repeat this belief and the phrases "high quality" and "high integrity" are sprinkled liberally throughout their documents.[62] Yet both fail to acknowledge that the offsetting industry has repeatedly attempted to solve its integrity problems, and that these attempts have proven ineffective.[63]

The question must be asked why repeated reform efforts have failed to ensure large volumes of "high-quality" offsets. Many analysts have concluded from years of experience that rather than a lack of competence or good intentions in the design and implementation of offsetting programs, the problem is that the very concept of offsetting is intrinsically flawed.[64] The study of additionality in the CDM commissioned by the European Commission, for example, concluded that: "Many of the shortcomings identified in this study are inherent to crediting mechanisms in general".[65] Barbara Haya of the Berkeley Carbon Trading Project explains that "several fundamental and inherent characteristics of the offset market work together creating the perfect conditions for poor quality."[66]



Cynthia Giles, a former senior official at the US Environmental Protection Agency's enforcement office, notes that offsets are a "textbook example of an idea that sounds good in theory but does not work in practice."[67] She explains that the offsetting concept combines three insurmountable and fatal flaws that are common to underperforming environmental programs: it wrongly assumes that fraud by market participants is rare despite the large amounts of money to be made and lack of effective controls;[68] it assumes that strong oversight will stop cheating when the fundamental problem is poor program design; and it fails to recognize the inevitable impact of every market participant benefiting from overstating the carbon benefits of offset projects and mechanisms.

Giles concludes that offsetting programs:

> *"are based on inherently unmeasurable outcomes and require many individualized decisions, both of which create opportunities for cheaters. And those complications mean that there is no way to counteract pressure from all directions to overclaim benefits [...] the dismal performance of offset projects is not just predictable, it is inevitable."* [69]

A. TRYING TO PROVE THE UNPROVABLE

Non-additionality is the most pervasive cause of low-quality offsets. To represent an emission reduction, the impact of an offset must be additional to what would have happened without the offset program. It must not have been possible to build the dam, for instance, without income or some other stimulus from offset sales; or, the shutdown of the coal plant must have been viable. But for most projects (including coal retirements) it is impossible to know if or when they would have happened without the ability to sell offsets.

It is important to note that projects are usually far along in the development process before they are approved for credits. A 2008 study found that 76% of all CDM projects had already been completed by the time they received approval to sell credits.[70] While it is easy for a developer to argue that it would not have started a project without the hope of gaining offset income, it is generally impossible for an evaluator to definitively disprove it.

Many factors go into the decision by a developer to move forward with one project rather than another, and at this time rather than later — supportive government policies, affordable financing, available technology at the right price; a contract to sell the project's services once built, public support, and many more. The potential ability to sell offsets and so generate more income for a project might indeed have been the tipping point for a developer's go/no-go decision. But it is also possible that potential offset income was seen as gravy on top of a deal that was already sufficiently attractive to secure funding.

B. PERVERSE INCENTIVES AND MORAL HAZARDS

Another inherent problem is that offset schemes create various types of perverse incentives that dissuade the adoption of policies. If an emission reducing action is required under law or regulation, it cannot be considered additional. This creates an incentive for offset supporters to lobby against climate-friendly policies.[73] Governments may also be disincentivized from bringing in legislation if they think this may reduce developers'

OFFSETS ARE AN IMAGINARY COMMODITY CREATED BY DEDUCTING WHAT YOU HOPE HAPPENS FROM WHAT YOU GUESS WOULD HAVE HAPPENED.

Dan Welch, Ethical Consumer magazine, 2007[71]

THE FUNDAMENTAL PROBLEM WITH OFFSETS IS THAT WE CAN'T OBSERVE WHAT DOESN'T HAPPEN. THE OFFSET PROJECT IS MAKING A CLAIM: IF YOU DIDN'T PAY US, WE WOULDN'T DO THIS THING. IT'S A COUNTERFACTUAL CLAIM THAT'S FACTUALLY UNOBSERVABLE.

Danny Cullenward, Stanford University, 2020[72]

access to offset income (and their own access to taxes and foreign currency).[74]

Such perverse policy incentives are real even if it is rarely possible to prove when they have impacted policy development, and likely never possible to quantify in terms of emissions impact. In the 2000s, some Latin American countries are believed to have refrained from adopting clean energy policies because of the fear that this would reduce their ability to benefit from CDM funds for renewables projects.[75] US regulators under the Obama Administration admitted that they took into consideration potential loss of income from California's offset program when assessing regulations to capture methane from abandoned coal mines.[76]

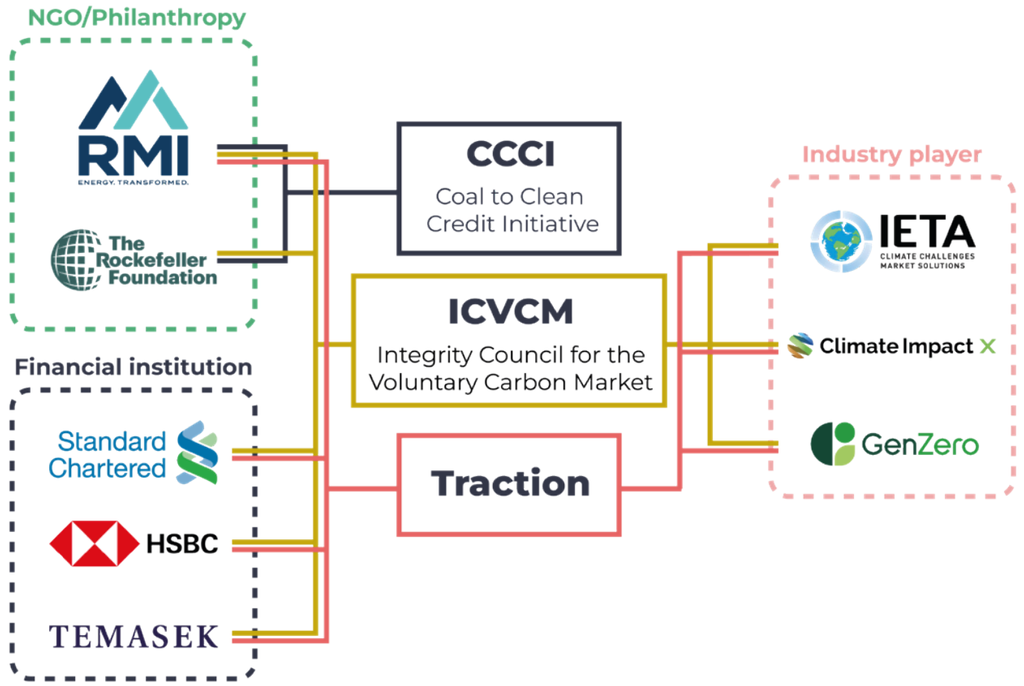
Coal transition offsets will create — and indeed may already be creating — some significant perverse incentives. Perhaps the clearest is that they may dissuade governments and power plant owners from adopting goals or policies to shut down coal plants, as these would render CTO projects non-additional. If a government or utility sees the prospect of bringing in tens or hundreds of millions of dollars via selling offsets, they may well not want to sabotage this with a strong coal phaseout policy.

C. HOW THE VESTED INTERESTS OF THE OFFSETTING INDUSTRY DRIVE DECISIONS

Theoretically, the inherent uncertainty that afflicts offsetting accounting might be expected to result in a rough balance between decisions that go in favor of those with an interest in maximizing offset generation, and decisions that go against. But this is not what happens — the people who make significant offset-related decisions are invariably attached to companies and institutions with a financial or political interest in ensuring the large-scale generation of offsets.

The registries, developers, consultants, traders and other offsetting industry players form a relatively small and tightly intertwined group involved in setting offsets policy and overseeing its implementation. The same names of individuals and entities show up repeatedly on the bodies responsible for approving specific projects and methodologies and the rules and procedures of registries. They also show up on the governance and advisory boards for voluntary quality assurance bodies like the ICVCM, and for regulated programs like the CDM and California's offsetting scheme. They now also make up many of the participants in the Traction coalition and are involved in the CCCI (see Figure 3 and Annex 2).

Figure 3: Entities with multiple connections with CCCI, Traction and ICVCM



Notes: Only includes entities with links to two or more of the offsetting initiatives. Links are defined as membership of the entities or senior staff serving on governing or advisory boards/panels, or a funding relationship.

The bias of offset decision-makers is sometimes due to direct financial interests — for example because a fee on each offset they certify is a key source of income for registries.[77] Other times, the financial interest may be less direct but still represent a conflict of interest, as when forest conservation NGOs that sell offsets helped write the rules for California's forest sector offsets.[78]

A group of offset market analysts explained some of these conflict of interest issues in comments to

the Taskforce on Scaling Voluntary Carbon Markets (TSVCM), the Carney-led predecessor to the ICVCM:

> *"Administrators make decisions about project eligibility and carbon accounting approaches under political pressure by both buyers and sellers of offsets that benefit from lenient rules and more trading. In voluntary markets, registries writing offset protocols benefit financially from larger but lower-quality markets, as do many of the experts who participate in protocol development stakeholder workgroups."*[79]

Cynthia Giles and Cary Coglianese, director of the University of Pennsylvania law school Program on Regulation, noted in an editorial in the journal Science in July 2025 that:

> *"Despite many claims today that auditing is vital to assuring carbon credit integrity, auditors have been required all along and have failed to prevent substantial credit overclaiming. It is rarely acknowledged that all of the credit overclaiming projects that have stirred so much controversy were ratified by third-party auditors under the same auditor selection and payment system that offset advocates rely on today. Auditor-approved projects have ignored registries' directives to be conservative and have instead chosen methods and assumptions that produce more credits."* [80]

There are some academics and NGOs, like Carbon Market Watch, that are critical of offsets and have the necessary expertise both to understand and participate in industry processes and to highlight their shortcomings. In general, however, it is the industry that has the staff capacity and financial resources to do this, meaning it is the offsets industry that controls what the offset industry does and how it does it.[81]

D. THE INTENTIONS OF OFFSET BUYERS

The uncertainty that impacts offset supply is repeated on the demand side. For offsets to reduce emissions globally, not only must each offset represent a real one-tonne reduction in emissions (or an emissions removal), but the final buyer must not use the offset as a reason to avoid taking an emission-reducing action. If offsets are used to meet mandated emission reductions, as is the case in California's cap-and-trade scheme, or government targets such as in country NDCs or the EU's 2040 target, then the buyers are clearly using offsets to avoid reducing emissions.

In the case of polluters who purchase offsets to meet voluntary targets or to enable them to make claims of carbon-neutral or low-carbon products or services, it is generally impossible to know exactly what the polluter would have done without the availability of offsets.

In the best case, a purchaser may intend to go beyond their own ambitious cuts, or to offset residual emissions for which no reduction options are available. In this case, a genuine offset will reduce global emissions. However, the buyer may also want the offset because they want to persuade their customers of their climate credentials without reducing their emissions. This greenwashing appears to be the key motivation for many corporate purchasers.[82]

A study published in Nature Communications analyzing the purchases of the top 20 corporate buyers of offsets between 2020 and 2023 showed that all but one had used offsets to claim carbon neutrality or meet decarbonization targets, even though almost 90% of their purchases were cheap, low-quality offsets which "carry a high risk of not providing real and additional emissions reductions."[83] The top buyer of voluntary offsets between 2002 and 2024 was Delta Airlines. The remaining top five were oil majors Shell, Eni, Chevron, and Primax Colombia, a gas service station company that claims to be carbon neutral.[84]

Between 2022 and 2024, Shell used offsets from forestry and renewable energy projects to label more than 20 cargoes of LNG as carbon neutral, presumably intending to dissuade efforts to shift from LNG to clean energy.[85] Both these project types have a high likelihood of non-additionality. French major TotalEnergies has also claimed to have sold carbon-neutral LNG. The first shipment, made in 2020 (and possibly others), was offset with credits from a Chinese wind project and from South Pole's discredited Kariba forestry project — again, projects that are very likely to be non-additional.[86]

Governments are envisaged to become major buyers of CTOs through Article 6. When a government buys a likely bogus Article 6 offset rather than cutting emissions at home, the result will be an increase in global emissions.

BOX: THE OFFSETTING INDUSTRY'S POOR RECORD ON SOCIAL ISSUES

One justification for the claim that CTOs will be able to command premium prices is that their accompanying coal closures will include comprehensive just transition plans developed in consultation with workers and local communities.[87] Such plans should cover issues like payouts, retraining, and replacement jobs for workers; the replacement of lost income for local governments; and guaranteed ongoing funding for programs to rehabilitate polluted lands and mitigate legacy health and livelihood harms to local communities.

There are strong reasons, however, to be skeptical that such plans will turn out to be genuinely consultative or that there will be meaningful accountability for failures to implement them. There is a long record of human rights abuses and other negative social impacts from land-based offsetting projects which going right back to the first project in Guatemala in 1989.[88] It is also unclear how a genuinely consultative just transition process can be guaranteed in authoritarian contexts. The most obvious example of this in the context of CTOs is Vietnam, where activists have been imprisoned simply for criticizing the construction of coal plants.[89]

Theoretically, registries could refuse to issue credits if just transition agreements are not respected. But experience shows that, despite extensive scrutiny and numerous promises, registries have failed to hold project developers to account for breaking social agreements. In February 2024, Human Rights Watch (HRW) released the results of a two-year investigation into the Verra-certified Southern Cardamom forestry project in Cambodia. HRW's research showed that the project had led to forced evictions of local Indigenous people and a loss of access to traditional farming and foraging territories.[90]

According to HRW researcher Luciana Téllez Chávez:

> *"Verra's inaction for years in the face of the multiple red flags seriously calls into question its oversight and accountability mechanisms [...] These findings raise concerns about whether other carbon offsetting projects across the globe that were approved by Verra are causing harm to the very communities that most depend on forests for their livelihoods."*

In December 2024, Carbon Market Watch filed a complaint with the ICVCM claiming that the review by Verra of HRW's allegations does not comply with the ICVCM's grievance procedures.[91] Journalists who visited the Southern Cardamom forestry project area in early 2025 reported that the project "continues to threaten Indigenous livelihoods with land restrictions and arrests, leaving land disputes unresolved and highlighting broader flaws in global carbon credit markets."[92]

Problems with Verra's procedures for reviewing allegations of negative social impacts at the projects it certifies were also illustrated at a soil carbon project in northern Kenya. Indigenous rights group Survival International flagged problems with the project's consultations with local communities in 2023. In response, Verra suspended issuances of credits from the project, but reinstated them eight months later following an internal review. However, Verra was forced to suspend the project again in May 2025 after a ruling from the Kenyan Supreme Court.[93]

03

COAL TRANSITION OFFSETS: MEET THE NEW OFFSET, SAME AS THE OLD OFFSET

Their proponents claim that coal transition offsets will be “high quality” and “high integrity”. But a review of the CTO proposals shows that they are likely to be just as subject to gross overcrediting as other offset types.

Several related initiatives have arisen since the start of this decade to design, finance, and implement the early retirements of coal plants (see Annex 1).[94] But for various reasons (see Box), little progress has been made in terms of actual agreements on coal plant closures.[95]

The idea of coal transition offsets has emerged in response to the slow progress of these coal retirement initiatives. The aim is to bring in a new source of revenue for deals to buy out and retire coal plants.[96] As the two most significant CTO initiatives, the CCCI and Traction, work closely together and with various NGOs, banks, and carbon industry entities. Both have chosen a coal plant near the city of Batangas in the Philippines as a pilot project. Traction is also working with the ADB on another Philippines coal plant.

Both the CCCI and Traction repeatedly imply that they can move beyond the chronic problems of past and present offsetting schemes. The expressions "high integrity" or "high quality" appear no less than 60 times in the 66 pages of Traction's 2024 interim report.[97] Yet the envisaged procedure for issuing CTO is essentially the same as for any other VCM project type: A project developer works with a registry to produce a methodology; the project developer submits a Project Design Document (PDD) to the registry; and a third-party auditor assesses whether the PDD follows the methodology. However, for decades this process has consistently failed to weed out non-credible claims in PDDs, mainly for the reasons of uncertainty and conflicts of interest explained above.

BOX: KEY OBSTACLES TO THE EARLY RETIREMENT OF COAL PLANTS

- The political power of coal lobbies in coal-dependent countries, and legal and policy frameworks supporting coal plants staying open even when this is not economically optimal.
- Political, financial, and other restraints — such as the need for grid upgrades — on the rapid deployment of renewables, even when this is economically beneficial.
- Political concerns over the energy security implications of closing power plants on heavily coal dependent grids with fast growing power demand.
- Concerns over the employment and economic impacts of closing coal plants and the knock-on effects of this on employment and profits from coal mining and transport.
- Contractual obligations for utilities to buy power from independently owned coal plants and severe penalties for breaking these power purchase agreements (PPAs).
- Expectations from coal plant owners and financiers that they make back all the money they hoped to gain when they agreed to develop/finance plants.
- A shortage of affordable finance for buying out independently owned coal plants and compensating workers and communities.
- The still relative newness of the concept, and the complex financial and political negotiations involved in putting together deals. Furthermore, each individual deal is unique with different financial players, power sector contexts, and local political and social actors.

A response from CTO proponents to the charge that they are exaggerating likely emission benefits is to stress that offsets will only be issued on an "ex post" basis.[98] This means that offsets will be made available for sale by registries only after the coal plant has been shut down. As is the normal practice with offsetting, CTOs would be issued on an annual basis based on the project developers' estimates of avoided emissions using the approved methodology. These estimates would be reviewed by a third-party auditor and the relevant registry before a final decision on the amount of CTOs to be released. But time and again this process has been shown to result in inflated estimates of emissions reductions.

Furthermore, since annual offset issuances are decided after a project has been implemented, they are based on the difference between what has happened (e.g. a coal plant has shut down) and the unknowable "what might have happened" had the project not occurred (e.g. would the plant have shut down? If so, when would it have shut down? How much power would it have produced? What would its emissions have been?). Methodologies for CTOs will contain many formulas that give the impression of scientific certainty for calculating avoided emissions, but decisions on which formulas to include and what values to plug into them to define "what might have happened" will always be subjective.

Another problematic argument is that the overestimation of potential avoided emissions is not a problem because the "true" benefit will be decided later — this misleads the public, investors, and decision-makers on how to prioritize between projects. Moreover, if the issuance process were to result in sharply reduced credit volumes compared to those used in financial projections, investors in CTO-based plant buyouts, and any insurers or others involved in guaranteeing future offset income streams, are unlikely to be impressed. And undoubtedly, should it become clear that future offset income is regularly exaggerated, the ability of future CTO deals to raise funds will be impacted.

"Leakage" is another chronic problem that has been inadequately dealt with in PPDs. Here, a project may reduce emissions in one place only to see them increase elsewhere in the same region. In the case of CTOs, leakage would result in cases where shutting down one coal plant resulted in increased output from other fossil fuel plants on the same grid, or the development of new fossil fuel generators. This is particularly a concern on grids where coal plants are running at low capacity factors and have a significant potential to increase generation, as is the case in Indonesia.[99] Leakage would also occur if coal that would have been burned in a plant that is closed is instead diverted to other plants.[100] In the longer term, the prevention of leakage

should also be ensured by policies to phaseout all coal power, as has been recognized by the Glasgow Financial Alliance for Net Zero (GFANZ).[101]

CTOs are also vulnerable to the perverse incentives that impact offsetting more widely. For example, CTOs would create an incentive to not shut down coal plants outside of CTO-based retirement mechanisms if stakeholders believe they could earn more revenue from offset income than from other financial arrangements. Furthermore, one method of proving additionality in the Verra coal retirement methodology (see Box) is that coal retirements without CTOs should not be "common practice." This therefore also creates an incentive to not shut down coal plants outside of offset schemes. And, because CTO deals are supposed to be linked with building renewables to replace lost coal power, and these renewable projects will also be able to generate CTOs, an incentive to delay building some otherwise viable renewables projects because of the lure of the extra offset income may be created.

There is also a risk that coal retirements that might have been possible without offset income could be delayed due to stakeholders pursuing the additional revenues to be gained from generating offsets. There are various reasons why offsets may introduce additional complexity and uncertainty into coal retirements, such as the need to go through the offset project registration and issuance processes, the need to secure long-term offset-purchase agreements, and the likely complicated financial and insurance structures involved to deal with the timing mismatch between the need for upfront finance to buy out coal plants and the long delay before offset income will start to be realized after the plant is closed.

Traction and the CCCI both note the benefits of seeking compliance with the ICVCM's Core Carbon Principles (CCPs). However, this is only a proposal and would be rendered moot if the ICVCM ultimately rejects coal retirement methodologies. While the CCCI would be able to refuse to work with projects that are not using ICVCM-approved methodologies, this would not stop CTOs outside of the CCCI moving forward with these methodologies. Traction will not be around to enforce any quality criteria if it wraps up as scheduled at the end of 2025.[102]

And even if any CTO methodologies are approved by the ICVCM, this does not ensure that the application of the methodology will be high integrity. In any case, the conflicts of interest common in offsetting processes will be repeated when the ICVCM reviews these methodologies. Many of the entities involved in the ICVCM are also members of Traction, and the Rockefeller Foundation is an important ICVCM funder.[103]

BOX: CTO METHODOLOGIES

Verra, the Gold Standard, the Asia Carbon Institute (ACI), and the ADB have all been working on methodologies to be followed in order for projects to be registered as eligible to generate CTOs.[104] The only CTO methodology to be completed at the time of writing was approved by Verra in May 2025.[105] It was developed by the CCCI with support from South Pole, RMI, and the Climate Policy Initiative (CPI).[106]

The Verra/CCCI methodology allows projects to generate CTOs even when only 10% of the lost coal power output is replaced by "clean energy".[107] The percentage must increase to 40% by the end of the 7-10 year first crediting period. Remaining power would come from the grid. In both the Philippines and Indonesia, around four-fifths of grid power is currently from fossil fuels. Given that the purpose of the CCCI is to move from "coal to clean," it is remarkable that this methodology allows coal generation to be mainly replaced by power from other coal plants and fossil gas.

By contrast, under the draft Gold Standard methodology, credits can only be issued once the renewables project built to replace the coal plant reaches 50% of the plant's capacity — the renewables project must generate 100% of the coal plant output within five years of it being closed.[108] The draft ACI methodology also allows credit issuance to start once the replacement renewables project reaches 50% of the coal plant capacity, although it requires the project to generate 100% of the coal plant output within three years of closure.[109]

Another distinction between these methodologies is that Verra includes both waste incinerators and biomass power plants in their definition of renewable energy technologies that may replace coal plants, despite concerns over their environmental sustainability and carbon emissions. The Gold Standard and ACI drafts both exclude these technologies.

The Gold Standard draft methodology is the only one that takes account of potential leakage due to the diversion of coal from now-closed plants to other plants. If project developers cannot demonstrate that this coal will be taken off market, they must reduce their avoided emissions calculation by 20%.

Verra and the Gold Standard draft allow for credits to be issued both from shutting a coal plant and from the output of associated renewable projects. ACI, by contrast, describes this practice as double counting and does not allow crediting from renewable plants built to replace lost coal power.

The methods for judging the additionality of CTO-financed coal retirements in the Verra and draft Gold Standard and ACI methodologies[110] follow the general approach of other methodologies and as such have similar problems — especially the impossibility of knowing what might have happened if the CTO deal did not take place. The Verra methodology requires project proponents to determine the "most plausible" scenario that would have occurred in the absence of a coal plant being approved for offsets, which is — despite the many formulas and criteria laid out by Verra — ultimately just a best guess of what might happen over the next 10 years and beyond.

Clearly what seems "most plausible" to someone with financial or other interests in the outcome of such a decision, no matter how well meaning, might be expected to be different from the perspective of someone without a stake in the decision. One additionality test proposed by both Verra and the ACI that has been criticized in previous methodologies[111] allows a project to be judged as additional if it was not "common practice" in the local region over the past decade. This makes little sense as a test in a context where early coal retirements are still a new concept, and where the plant closure being assessed may not happen for a decade or more into the future (as in the case of the Traction model).

A. INCREASED SUPPLY, PREMIUM PRICES, UNCERTAIN DEMAND

If offsets-based coal plant closures were to be massively scaled up — which they must be to make a dent in the global coal fleet — it would produce far more offsets than the global market is likely to be able to absorb. The Rockefeller Foundation talks of the potential to generate "billions of tons" of CTOs.[112] Yet annual global offset retirements have plateaued over the past four years at around 200 million tonnes.[113]

BloombergNEF has forecast that demand will soar to between one to two billion offsets in 2030.[114] But to retire the volume of offsets projected by the CCCI would mean that CTOs a large part of the global offset market would be taken up by CTOs alone, even at the upper end of the BNEF projection — which is ten times the current market size.

The CCCI and Traction both expect that offset demand will be spurred by the start of trading under the Paris Agreement's Article 6 and an air travel offsetting scheme called CORSIA.[115] But for both of these programs there is much uncertainty over potential demand, and forecast purchases are relatively small compared to the billions of offsets that the CCCI is hoping to put on the market.[116]

The CCCI and Traction also hope that CTOs will sell for multiples of current offset prices. The chief executive of the company that operates SLTEC, the pilot project for the CCCI and Traction, says that he expects CTOs to be priced at over $50 per tonne.[117] By contrast, RMI has forecast that SLTEC could be closed for US$16-27 per tonne of CO2.[118] But even the lowest of these prices is still far higher than the average offset price in 2024 of US$4.80 per tonne.[119] As of mid-September 2025 nature-based offsets could be bought for just US$0.17 per tonne, 71% down from the start of the year.[120]

The key assumption behind the optimism of CTO proponents that they can simultaneously flood the market with a new type of offset while charging premium prices, is that CTOs will be uniquely high quality and will have an attractive story to tell of the just transition element of coal retirements. But as is explained below there is no clear reason to believe that CTOs will be of any higher quality and less prone to scandal than other offset types, and there is little reason to be confident in the outcomes of the social programs that are supposed to be built into CTO projects.

To try to ensure CTO demand, the Rockefeller Foundation is supporting an offset buyers' club called the Kinetic Coalition.[121] This coalition is working with large US corporations including Amazon, Meta, Morgan

Stanley, McDonald's, and PepsiCo, to encourage them to buy CTOs and other energy sector credits to offset their value chain emissions.[122] The governments of Singapore, the UK, and Kenya have co-founded another alliance to promote corporate demand for "high-integrity" credits called the Coalition to Grow Carbon Markets.[123] If these buyers' clubs meet their goals and pump up demand for high-priced offsets, these will likely be used by these corporations to justify dialing back on their climate commitments[124] — especially in light of the planned massive expansions of data centers.[125]

Another suggestion to ensure high prices for CTOs is for buyers to blend them in their portfolios with much cheaper renewable energy offsets. This proposal is made by Climate Impact X, a Singaporean company that trades in "trusted carbon credits" and is owned by a group including the Singapore bank DBS, the carbon broker GenZero, and the UK-based bank Standard Chartered.[126] The obvious problem with this idea is that, even if it were

BOX: THE TRANSITION CREDITS COALITION (TRACTION)

Traction was launched by the Monetary Authority of Singapore (MAS) in December 2023.[127] Its members include major US, UK, Japanese and Singaporean banks, the ADB, the World Bank, the Gold Standard, the Rockefeller Foundation, and offset industry players (see Annex 2). US NGO RMI initially provided the secretariat for Traction and continues to provide technical help.[128] Traction aims to kick-start the CTO market by promoting the coal offsets concept, bringing potential offset sellers together with buyers, and exploring potential financial structures. It is scheduled to sunset with the release of a final report at COP30, which is intended to "serve as a playbook to scale the implementation of transition credits."[129]

The interests of the parties in the coalition vary. The ADB and World Bank have for decades been committed to promoting offsetting markets, and the ADB is now working on a methodology for generating CTOs for sale under the Paris Agreement's Article 6.[130] Private banks have long been involved in trading offsets and are interested in advising and lending for CTO deals.

MAS is interested in CTOs as Singapore intends to use Article 6 to meet part of its Paris Agreement emissions reduction target,[131] and because it plans to become a global hub for carbon trading.[132]

Furthermore, Singaporean companies can use offsets that meet Article 6 rules to reduce the amount of carbon tax they need to pay. The reduction is currently capped at 5% of carbon tax liabilities, but this may be changed in future "to align with international developments."[133] Singapore's strategic interest in access to offsets explains the presence in Traction of its sovereign wealth fund Temasek, and the Temasek-owned carbon broker GenZero.[134]

believed that CTOs will by their nature indeed be high quality, it would cause an increase in global emissions if buyers were to blend them with large quantities of very likely bogus renewables offsets.

B. THE TRACTION FINANCIAL MODEL

A potential structure for a CTO-financed coal retirement is outlined in a report commissioned by MAS from consultants McKinsey.[135] It explains how a CTO transaction could work using an illustrative model of a deal to retire a fictional 1 GW coal plant in Indonesia. The plant is assumed to be investor-owned and to have a Power Purchase Agreement (PPA) with a utility that lasts for another 15 years. Under this model, a corporate entity known as a Special Purpose Vehicle (SPV) is established to buy the plant in order to shut it down. It is assumed that the SPV buys the plant now at a price that is attractive to the existing owner.

To earn the revenue to pay off its investors, the SPV continues operating the plant for another decade. The plant is then shut down, five years before the end of the PPA. A new clean (or cleaner) power source is built to replace the lost power over these five years.

Under McKinsey's model, the SPV would not have earned enough money from running the plant for 10

years to cover the buyout costs. The proposed solution is to sell offsets for the five-year period after the SPV closes the plant. Each offset would represent one tonne of CO2 avoided compared to the scenario in which the original owners continued running the plant until the end of the 15-year PPA.

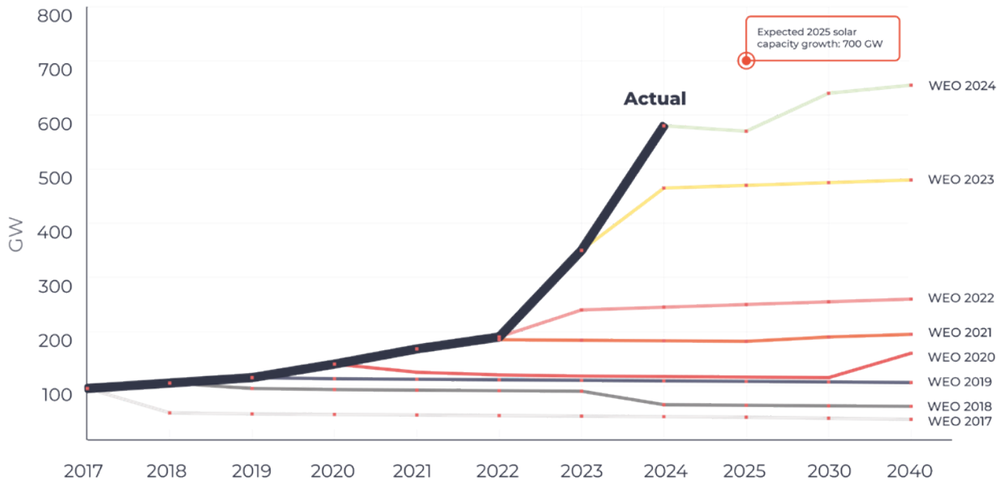
This simple model hides much complexity and uncertainty, leaving many questions unanswered. Can it be known for sure that this coal plant would not be shut down within the next 15 years under one of the several non-CTO based models for coal retirement that are under development? Or even simply under new market conditions or changing regulations? Is it certain that the extra income brought in from offsets is the key factor making the deal viable? Maybe it would have been shut at the same time as the closure date assumed under the Traction model (in which case the CTO transaction is non-additional)? Or perhaps earlier (in which case the CTOs are actually delaying the plant's closure)? Maybe it would have stayed open but operate at a declining capacity?

The model assumes that the utility will replace the coal power with renewable energy after 10 years under the CTO deal, and that without the CTO deal it would not have replaced the plant with renewables before 15 years. But if we take 2025 as the year the deal closes, might the utility and

the current owner not have agreed to replace the coal plant with solar and batteries at some point before 2040 — even in the absence of the CTO deal — if this was cheaper than the coal power and encouraged by government policies?[136] No one can be certain now of the relative prices of coal and clean energy over the next 15 years, but solar and batteries are already cheaper than coal in many cases, their costs continue to fall and deployment to rise, at rates that continuously soar past the projections of even the most optimistic analysts (see Figure 4).[137]

Similarly, no one can know how political and legal pressures to shut down coal plants may grow by 2040, as the toll of death and destruction from climate disasters

Figure 4: Consistent underestimations of actual global solar capacity growth in IEA World Energy Outlook 2017-24



Source: Katsua Research, 2025. Note that IEA has made similar gross underestimations of PV capacity growth back at least as far as 2002.

grows. Neither can it be known how other economic factors might come into play, such as declining access to affordable insurance for coal plants (according to the head of the Philippines' department of energy, the country's coal plants are already struggling to obtain insurance).[138]

McKinsey correctly identifies what it terms "timing mismatch" as a key problem that offset-financed coal retirements need to resolve. Under the McKinsey model, the SPV needs the offsets revenue to help buy the plant. But offsets are issued annually during the "crediting period" when emissions are supposedly being avoided. This means that the SPV would not have offsets to sell until a decade after it needs the money, and it would take five years from then to earn all the projected income.

McKinsey proposes new futures and insurance products to solve the timing mismatch problem, such as forward contracts to buy a certain number of credits at a specified date and price. But it is far from clear that buyers would want to pay now for expensive offsets to be delivered in a decade's time, especially given the high risk that expected offset volumes may not be realized. In fact, McKinsey admits that buyer interest in forward offset contracts "is likely to be low," dampening both demand and prices.[139]

BOX: THE COAL TO CLEAN CREDIT INITIATIVE (CCCI)

The CCCI describes itself as a "consortium of global experts, led by the Rockefeller Foundation and supported by the Climate Policy Initiative and South Pole." It was launched in June 2023 to "set a new comprehensive standard for the use of carbon finance to incentivize a just transition away from coal-fired power plants to renewable energy in emerging economies."[140] It also aims to "promote broader carbon market development, by growing the supply of high-integrity credits and setting clear standards for buyers."[141]

The CCCI hopes to strike deals by 2030 to retire 60 coal plants.[142] Achieving this within five years seems highly optimistic. Each deal would require complex negotiations between existing plant investors and operators, the new plant owners, offset buyers, renewable project developers, utilities and governments, unions/workers, and communities.

No coal plants have yet been closed down by the various Asia-focused coal retirement mechanisms that have emerged since 2021, for reasons that are not just financial but also political, economic, legal, and technical.[143] Bringing offsets into proposed coal closures introduces further layers of complexity in terms of the need to secure offset buyers (especially complex given the timing mismatch issue discussed above) and to deal with the time-consuming process of proving additionality and getting registered as an offset project.

To date, only the SLTEC plant in the Philippines has been publicly named as a CCCI candidate.[144] To put the number of 60 plants into perspective, only six countries in the world have more than 60 operating coal plants.[145] China and India together have nearly 1,500 coal plants but are unlikely to host any CTO retirements for the foreseeable future.

04

THE PHILIPPINES PILOT PROJECTS

A close look at the two coal plants chosen as pilot projects by Traction and CCCI reveals major uncertainties over their claimed emission reduction benefits.

The CCCI and Traction have both selected the SLTEC (South Luzon Thermal Energy Corporation) plant to pilot the CTO concept. Traction has also chosen a plant on Mindanao Island as a pilot project. Both plants are unusual in that they were already announced as subject to early retirement mechanisms, and the offset deals are supposed to shut them down sooner. Each of the plants has its own unique features: SLTEC was owned by a company that decided to phaseout coal and pivot to renewables; and the Mindanao CFPP is the only publicly-owned coal plant in the Philippines (see Boxes for key data on both).

A close look at the limited reliable information available on these pilots shows some of the issues that emerge when the McKinsey illustrative model hits the real world. The lack of reliable available information — and questions over the veracity of emissions avoidance claims made for the existing early retirement schemes — also cast doubt on whether CTO deals will involve the transparency, accountability and credibility that both Traction and the ICVCM claim to be key to "high-quality" offsets.[146]

A wide range of dates are given for when the coal plants would close in the absence of early retirement measures, with the original non-offset based early retirement agreements, as well as with the more recently proposed CTO deals. This is not to say that any of these dates is necessarily "wrong" or misleading; it is impossible to know when plant operators or regulators decades hence may decide that a plant has reached the end of its the technical/economic life. This will depend on many factors including how much will be invested in maintaining the plant, how it will be operated, and whether and when it might be refurbished. The inconsistencies in these dates, however, emphasize that parties to offsetting deals do not and cannot know exactly when a plant might shut decades into the future, and so cannot calculate avoided emissions with meaningful accuracy.

The CTO methodology that CCCI developed with Verra (see Box) requires utilities and governments to have public commitments to not build new coal plants or expand existing ones.[147] CCCI and Traction have both stated that they will use this methodology, and have separately said that entities and jurisdictions involved in CTOs should have committed to "no new coal" policies.[148]

While the Philippines government announced a moratorium on new coal plants in 2020, this allows plants supposedly approved before the moratorium to still move forward.[149] The country's energy department said in December 2024 that it expects new plants totaling 4-6 GW to be built in the coming years.[150] Similarly in Indonesia — the other country that has most often been mentioned as suitable for CTO transactions — 6.3 GW of new grid-connected coal is planned by 2034,[151] with even higher levels of "captive" coal plants proposed to supply the mining industry.[152]

A meaningful application of the "no new coal" criteria for CTOs must stipulate "build no new coal" not just "have a commitment on paper to not build new coal".[153] The Mindanao coal plant seems a particularly unsuitable CTO pilot project from this perspective, since its operator, AboitizPower, is planning to build a new 150 MW coal unit on Cebu Island.[154]

BOX: SOUTH LUZON THERMAL ENERGY CORPORATION (SLTEC) COAL PLANT

Location:	Barangay Puting Bato, Calaca, Batangas.
Installed capacity:	270 MW
Date completed:	2016
Discussed closure dates:	2030 (CTO proposal) 2040 (Energy Transition Mechanism) 2055 (end of technical life according to ACEN press release)[155] 2065 (end of technical life according to ACEN web site)[156]
Avoided CO2 emissions from plant closure:	50 million tonnes (ETM) 19 million tonnes (CTO)
Average annual emissions:	2 million tonnes CO_2 (ACEN number for ETM) 1.9 $MtCO_2$ (ACEN number for CTO) 1.66 $MtCO_2$ (Climate TRACE for 2021-24) 1.6 $MtCO_2$ (TransitionZero)
Average annual generation:	1.80 GWh (ACEN web site) 1.55 GWh (Climate TRACE) 1.32 GWh (TransitionZero)
Average capacity factor:	86% (ACEN) 65% (Climate TRACE) 56% (TransitionZero)

Development and ownership

SLTEC was developed by AC Energy (ACEN), the energy subsidiary of Ayala, the largest conglomerate in the Philippines.[157] Just as the plant was being completed, Ayala decided to take ACEN public with the goal of turning it into a regional renewable energy leader.[158] This pivot would require selling off ACEN's coal plants and using the proceeds to develop renewable projects.

The market-led ETM: Bringing forward SLTEC closure to 2030

In November 2022, ACEN sold its equity holding in SLTEC to a special purpose vehicle (SPV) called ETM Philippines Holdings (ETMPH). This transaction follows the ADB's Energy Transition Mechanism (ETM) model but was wholly financed by the private sector (although with an equity investment from the Philippines government pension fund).[159] ETMPH is required to close the plant by 2040, 15-25 years ahead of estimates of its economic lifespan.[160] The buyers are supposed to fund a just transition plan for the plant's workers and local communities.[161]

ACEN remains closely involved in the plant — it is contractually required to buy power from ETMPH until 2040 and will continue to operate and maintain it. ACEN also has an option to repurchase the plant at any point between 2030 and 2040, supposedly as insurance in case the new owners are unwilling to shut it down. [162] A holding company under ACEN is also one of the three investors in ETMPH.[163]

The proposed offsets deal: Accelerating SLTEC closure to 2030?

A year after the ETM deal closed, ACEN announced a collaboration with the CCCI and MAS to try to use offset revenues to bring forward the closure date of SLTEC to "as early as" 2030.[164] Keppel, a Singaporean infrastructure developer and asset manager, and GenZero, the Singaporean carbon trader, are set to help ACEN develop an economic model for using transition offsets to replace SLTEC with renewables and storage.[165] Mitsubishi Corporation have also signed onto this deal, seemingly with an interest in benefiting from the sale of CTOs in Japan.[166]

For the deal to move forward, ACEN would need to exercise its option under the energy transition mechanism to buy back its equity in SLTEC and reassume direct ownership.[167]

According to ACEN, decommissioning SLTEC in 2030 will cost nearly US$2 billion.[168] The bulk of these funds would be spent on a 1.4 GW solar plant with 1.6 GWh of battery back-up, which ACEN claims would more than replace the power from the coal plant.[169]

ACEN says that foregone cash flows from SLTEC after 2030 would cost it US$48-75 million annually, which could be replaced by selling CTOs at US$16-25 per tonne of CO2. ACEN also says that building out the renewable power and batteries would require a subsidy of US$300-450 million, equivalent to US$18-27 per tonne of CO2.[170]

It should be noted that selling offsets from not emitting CO2 at the closed coal plant while also selling them from not emitting CO2 from the plant's renewable replacement would appear to be double counting. Although this is allowed by the Verra methodology, it is excluded by the draft ACI methodology which explicitly describes this as double counting and states that credits should only be generated from the coal closures.

Keppel appears to expect the government of Singapore to buy any credits generated by this deal under Article 6 of the Paris Agreement.[171] ACEN's CEO, Eric Francia, says he also hopes to get "a few" other governments and corporations interested in buying the "high-quality" credits.[172]

The importance of ensuring a just transition for coal workers and communities is repeatedly emphasized by Traction. Journalists who visited the SLTEC plant in mid-2024, however, reported that no local consultations on closing the plant early had been undertaken.[173] There are reasons for concern about the seriousness with which ACEN may approach negotiations with the communities living beside SLTEC — a 2021 report for the independent review body of the World Bank's International Finance Corporation (IFC) documented local health and livelihood impacts from the coal plant and "gaps in community grievance mechanism and stakeholder engagement."[174]

A. THE SLTEC PRIVATE-SECTOR ETM

SLTEC was completed in 2016 by ACEN, one of the largest Philippines energy companies. In 2022, ACEN committed to net zero by 2050 and to only producing renewable power from 2025 onwards.[175] As part of its fossil fuel divestments,[176] ACEN sold its holding in SLTEC under a deal structured similarly to those promoted by the ADB's Energy Transition Mechanism (ETM). SLTEC was bought by a special purpose vehicle (SPV) which is supposed to retire the plant by 2040.[177]

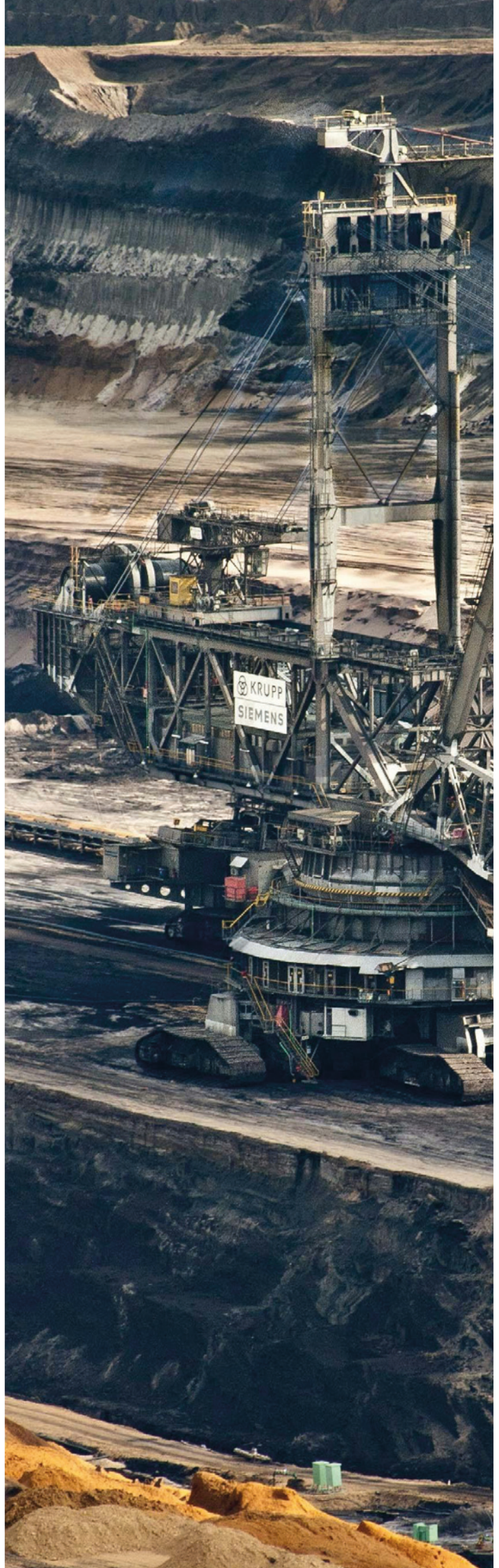
There are serious reasons to doubt the claimed emission benefits from this ETM deal. ACEN and others state[178] in numerous places that a 2040 closure of SLTEC will avoid 50 million tonnes of CO2. A more reasonable upper estimate of avoided emissions would be 30 million tonnes, and there are good reasons to believe that the ETM may have zero emissions benefit.

No offsets are intended to be produced by this 2040 closure, so any gap between claimed and actual benefits is largely symbolic. But the fact that so little attention has been paid to producing consistent and accurate claims by the various parties involved in and reporting on this deal sends an alarming signal about the reliability of claims made by these parties in the ongoing CTO discussions. The questions around the volume of emissions avoided by this deal also illustrate the many uncertainties that will impact estimates of the climate benefits of the SLTEC and other coal offset deals.

The claim that the ETM avoids 50 million tonnes of CO2 implies annual emissions of 2 million tonnes for 25 years, which assumes that the plant would have stayed open until 2065 in the absence of the ETM.[179] But ACEN has also stated that the plant would shut in 2055 — while claiming that 50 million tonnes of CO2 would also be avoided with a 2055 closure. Consultants for ACEN[180] and others[181] have stated SLTEC will reach the end of its technical life in 2055 or 2056.

Using a 15-year life for the plant after 2040 would imply 30 million tonnes of avoided CO2 from the ETM using ACEN's annual emissions number. But this assumes that SLTEC would have produced two million tonnes of CO2 a year for the rest of its life. A reasonable estimate of avoided emissions from SLTEC should also consider that the plant's annual production can be expected to decline over time. This is partly because SLTEC would likely face increasing competition from cheaper clean energy, especially as, since 2020, renewable power must be given priority for dispatch into the Philippine grid.[182] Another reason is that coal plant output tends to drop significantly as plants age.[183]

Even ignoring the likely decline of SLTEC's production over time, an estimate of 30 million tonnes of CO2 avoided over 15 years appears unreasonably high. ACEN's claim of annual CO2 emissions of 2 million tonnes seems to be based on an assumption that SLTEC operates at an annual capacity factor of 86%, a remarkably high number by Philippines and international standards.[184] Capacity factor is a measure of how much time a plant operates relative to its maximum capacity — an annual capacity factor of 100% would mean that a plant was generating at its full power for the whole year without any downtime due to repairs, or reduced output due to periods of low grid demand. PEMC, the government body that oversees the Philippines power market, cites capacity factors of coal plants in the country in 2023 as ranging from 58% to 69%, and as averaging 65% in 2024.[185]



Two independent estimates of SLTEC's emissions are in-line with these typical Philippines coal plant capacity factors. One calculation based on satellite measurements gives average SLTEC emissions in recent years as 1.66 million tonnes of CO2; another, using information in contracts and typical Philippines coal sector parameters, estimates 1.6 million tonnes.[186]

Further still, it is possible that SLTEC would have shut in 2040 regardless of the ETM — meaning that the ETM may not have reduced any emissions. Before the ETM, SLTEC only had guaranteed power sales until 2041, according to a consultant's report pro-

duced for ACEN in 2021.[187] After that, according to this consultant, SLTEC's power would be sold on the spot market. It is hard to credibly claim with certainty in 2025 that ACEN would be able to profitably sell SLTEC power from 2041 to 2055 (or even to 2065) given current trends of rapidly falling renewables and storage costs.

Another concern about the ETM is that the Philippines energy department has used it as a rationale to promote a voluntary approach to coal retirements rather than adopting regulations to mandate them.[188] As a report from Neyen Consulting and Kora Climate acknowledges, government-led coal phaseouts may achieve faster results than voluntary plant-by-plant offsetting approaches.[189]

B. THE SLTEC OFFSET DEAL

At the end of 2023, ACEN announced a collaboration with the CCCI and MAS to develop a pilot project to bring forward the closure date of SLTEC from 2040 to "as early as" 2030.[190]

While there might be less uncertainty in an estimate of SLTEC's avoided emissions between 2030 and 2040 than between 2040 and 2065, there is still no way to produce a definitive number. And even though ACEN has reduced its estimate for annual CO2 emissions avoided by closing SLTEC by 5%, from 2 million tonnes to 1.9 million tonnes per year,[191] it still looks like the parties developing the project are using an unrealistically high estimate of what SLTEC's power production would be after 2030.

There is also uncertainty around whether the SPV that now owns SLTEC would keep the plant open until 2040 in the absence of the CTO deal (and, if open, still generating at very high levels). ACEN has a stake in the SPV and is the buyer of ACEN's power. It would therefore seem to be in a good position to push for a renegotiation of its PPA to replace some or all its power with renewables, especially as ACEN is now a major renewables developer (and a company with a stated aim to get out of coal).

ACEN was likely aware of the prospect of getting offset income for accelerating the retirement of SLTEC when it negotiated the ETM deal.[192] The ETM enabled ACEN to profit from the ETM buy-out, and then potentially again from the CTO deal — benefiting from this latter deal because an ACEN-controlled holding company is an investor in the SPV that now owns SLTEC. Also, the CTO deal involves ACEN activating the provision in the ETM allowing it to buy back ownership of SLTEC, meaning that ACEN would receive the income from CTO sales.[193]

Another way in which ACEN would benefit from the CTO deal is through the proposal that some of the offsets to be generated will come from the 1 GW or bigger solar and battery (and possibly wind power) project that ACEN intends to build to replace SLTEC's power.[194] ACEN claims that it will require US$300-450 million in offset income to deploy this renewables and storage project.[195]

Aside from the issue of double counting the emissions reductions from both closing SLTEC and building the renewables, it is also unclear why ACEN should require such a massive amount of offset income to build this clean energy project when other renewables projects in the Philippines are being built without offset income. Another solar and battery megaproject, the 3.5 GW MTerra Solar project, is now under construction in Luzon without any offset revenue (or concessional finance).[196]

It also does not seem consistent that the renewables part of a coal retirement project should be able to receive offset income given that Verra and Gold Standard stopped approving most grid-connected renewables projects for offsets in 2020 because of their blatant lack of additionality.[197] And, as noted above, the ICVCM has also said that renewable energy offsets — which make up nearly a third of the VCM — will not be able to use its CCP label because of additionality concerns.[198]

BOX: THE MINDANAO STEAG COAL-FIRED POWER PLANT (CFPP)

Location:	Villanueva, Misamis Oriental, Northern Mindanao.
Installed capacity:	232 MW
Date completed:	2006
Discussed closure dates:	2026 (Department of Energy) 2031 (end of BOT concession) 2036 (early retirement date cited by TransitionZero) 2046 (end of useful life, lower bound) 2051 (end of useful life, upper bound)
Avoided annual CO_2 emissions from plant closure:	7 million tonnes (ETM) No information found (CTO)
Average annual emissions:	1.43 $MtCO_2$ (Climate TRACE for 2021-24) 1.62 $MtCO_2$ (TransitionZero)
Average annual generation:	1.33 GWh (Climate TRACE) 1.46 GWh (TransitionZero)
Average capacity factor:	65.5% (Climate TRACE) 72% (TransitionZero)

Development and ownership

This plant on Mindanao Island is currently the only government-owned coal plant in the Philippines. It was developed by STEAG State Power under a build-operate-transfer (BOT) concession. STEAG State Power was majority owned by German energy company STEAG GmbH. AboitizPower, the largest coal plant owner in the Philippines,[199] was originally a minority shareholder in the plant operator, but increased its stake in 2022 and then again in 2024 and now owns 85% of what is now called SPI Power.[200]

The BOT contract ends in 2031 when it is to be taken over by the Power Sector Assets and Liabilities Management Corporation (PSALM), a state-owned entity responsible for disposing of legacy publicly-owned power assets.[201] PSALM currently buys the power from the Mindanao plant and has an option to buy out the BOT concession.[202]

The ETM proposal

Since 2021, PSALM and the ADB have been exploring options for the "early retirement and repurposing" of Mindanao CFPP under the ADB's ETM. The selection of the plant for the ETM was confirmed in an investment plan from the Philippines government and a joint ADB-World Bank initiative called the Climate Investment Fund-Accelerating Coal Transition program (CIF-ACT).[203]

The latest version of the CIF-ACT plan, published in May 2024, contains few details on the proposed plant closure. It gives a brief financial summary showing a total cost of US$476 million financed with a blend of concessional debt funding from the ADB and the Climate Investment Fund, as well as commercial sources.[204]

It is not clarified if any of this US$476 million is earmarked for funding replacement power. The plan suggests that the power plant site could be repurposed as a solar park, but no details are given.

The CIF-ACT plan forecasts financial closure for the ETM in the second quarter of 2026, but does not give a planned date to shut the plant.[205] The Philippines Department of Energy, however, in its 2023-2050 Energy Plan, claims that the ETM "will finance the plant's retirement as early as 2026".[206] In July 2024, the Manila Standard reported government officials as saying that preparations for "retirement or repurposing" of the plant in 2026 had already started.[207]

In February 2025, another media source implied that the Department of Energy had decided "to accelerate the retirement of the Mindanao coal plant to 2026 from 2031."[208] It is unclear if this refers to the ETM bringing forward the retirement to 2026 from 2031, or if the ETM brought the retirement forward from an unspecified date to 2031, and then the proposed offsets deal will bring it forward to 2026.

The CTO proposal

The ADB began working with PSALM at the end of 2023 to explore the feasibility of generating offsets from the Mindanao plant.[209] Traction states that "transition credits could provide the financing needed to cover the economic loss (buy-out price and foregone privatization proceeds) and associated plant decommissioning and Just Transition costs" for Mindanao CFPP.[210]

Traction also states that its "business-as-usual" scenario — i.e. the counterfactual scenario of what would happen without the Mindanao plant being able to sell offsets— involves PSALM selling the plant to a private company when the current BOT contract expires in 2031. It implies that the private company would continue to run the plant until the end of its "useful life" in 2046 or 2051.[211] This appears inconsistent with the government's claims that the plant may close as early as 2026 through the ETM and apparently without offset income.

Reclaim Finance and CEED visited Mindanao CFPP in January 2025. No community members or local government officials or energy experts spoken to there were aware of any plans to close the plant in 2026, or of what just transition plans might include whenever the plant might be closed.

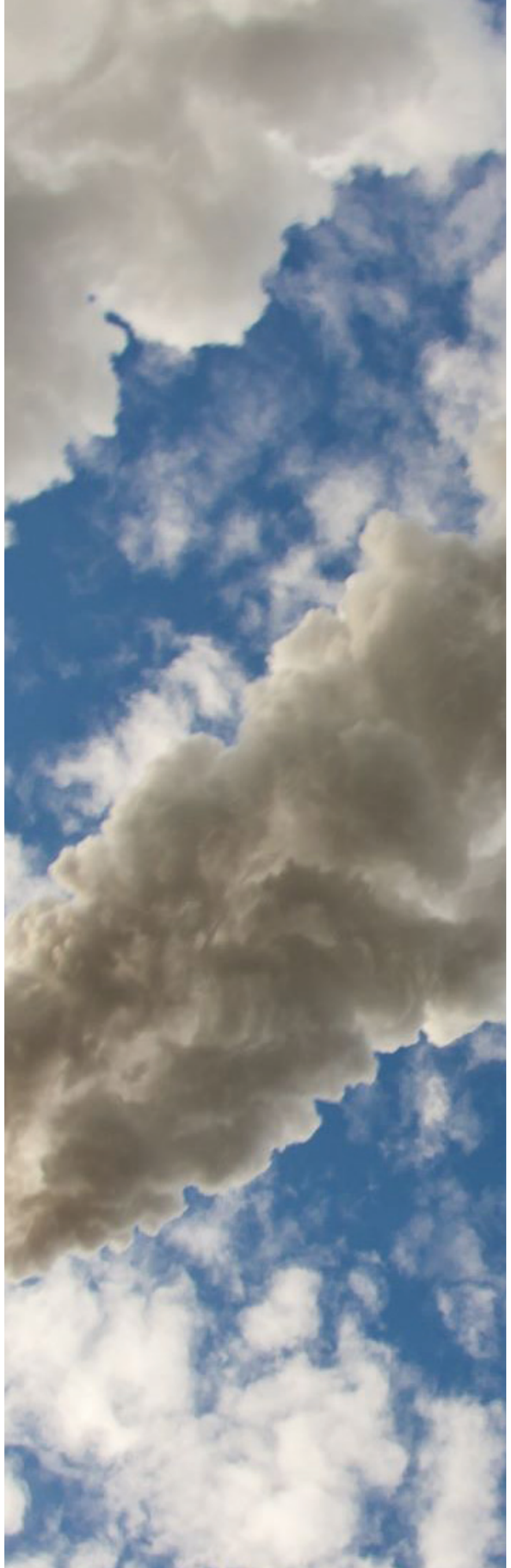
Further uncertainty over the closure date of Mindanao CFPP arose in February 2025 when the government announced that its retirement might have to be delayed for "a few years" to make up for the power lost while an ageing hydro complex on Mindanao is rehabilitated.[212]

C. MINDANAO COAL-FIRED POWER PLANT (CFPP)

Little information is publicly available on the proposed structure of the Mindanao offset deal, and what is available is confusing and contradictory. Transparency is supposed to be a key feature of Traction deals and their "high-quality" CTOs, but it is certainly not a feature of the discussions around closing Mindanao CFPP.[213]

Numerous overlapping dates have been stated and implied by the government and the ADB/World Bank initiative known as CIF-ACT (and others) for when the plant would close without the ETM, when it would close with the ETM, and when it would close if it were able to bring in extra funding from selling offsets. The Philippines Department of Energy indicates that the "business-as-usual" (i.e. no ETM) closure date for the state-owned plant is 2031 when the contract with its operator, now called SPI Power, ends. The ETM would bring this forward to 2026 by buying out the contract.[214] If this were the case, it would seem at this point to be impossible for a CTO to bring the ETM closure date forward by more than a few months.

The brief financial outline of the project published by CIF-ACT in 2024 says that the ETM aims to use a combination of commercial and concessional finance to close the plant, although it does not give a date for



this.[215] The document also discusses "a potential BOT buyout" which must mean closure before the BOT ends in 2031, presumably without offset income as this is not mentioned. This again gives very little time for a Traction-coordinated deal to close the plant even earlier and sell offsets.[216]

Traction claims that the "business-as-usual" scenario without a CTO deal is that PSALM would sell the plant to a private company when the AboitizPower concession expires in 2031. Traction implies that this private company would continue to run the plant until the end of its "useful life" in 2046 or 2051.[217] This seems, however, to completely ignore the proposed ETM deal.

Even if, for the sake of argument, the ETM deal under discussion is ignored, is it likely that a private company would buy a coal plant in 2031 and operate it until 2046 or 2051 when coal power may well be economically unviable and politically toxic? Besides, there has been an ETM deal under discussion for several years, and the parties involved seem to believe that the plant can be closed before 2031 without offset income.

Another unusual aspect of the Mindanao coal retirement is that AboitizPower increased its stake in the plant operator twice since Mindanao CFPP was named as an ETM candidate. It must be asked why AboitizPower would ramp up its equity in the operator of a plant that it knew was slated to soon be shut down. One possible answer is that AboitizPower thought that compensation under the ETM and then potentially under the CTO would be sufficiently lucrative to make these investments beneficial.

There also do not appear to be any projections available on how many offsets might be generated by a CTO deal for Mindanao CFPP, and at what price they would need to be sold to make the deal appear additional. CIF-ACT claims that closing the plant through the ETM would save 7 million tonnes of CO2 but without giving the time period for these reductions.[218] Climate TRACE estimates average annual CO2 emissions from the plant as 1.43 million tonnes. If (emphasis added) the ADB is using a similar emissions estimate this would imply the ETM would close the plant around five years early — consistent with a "business-as-usual" closure in 2031 and the ETM advancing the closure to 2026 — again raising the question of why a CTO deal is necessary.

05

A PATH FOR RETIRING COAL AND CUTTING EMISSIONS

Policymakers and financial institutions should deprioritize initiatives to buyout individual coal plants with public money and offsets and instead focus on reforming energy policies to promote the rapid build out of sustainable energy.

The central claim behind CTOs is that early coal retirements are not happening because of a lack of affordable finance. But, as various analysts have argued, the key obstacle in the way of early coal retirements becoming an effective tool for cutting emissions is not a lack of finance for individual plant closures. Instead, what is holding back a rapid decline in coal emissions are the numerous political, institutional, and legal barriers that stand in the way of renewables replacing coal at scale.

A basic principle for any credible coal retirement deal should be that it must reduce net emissions.[219] That means:

- *Globally:* No generation of tradable offsets — either real or bogus — that polluters can buy to dodge regulatory or public pressure to reduce their own emissions.
- *Locally/regionally:* No replacing retired coal plants with other coal generation or other high-carbon sources like fossil gas, hydrogen, ammonia, or biomass.

The only way to meet this principle, especially in contexts of rising energy demand, is to ensure that these closures happen in a context of rapid uptake of renewables and grid improvements. Fortunately, renewables are now competitive with coal almost everywhere, and are the fastest growing source of power worldwide.[220] Further, as think tank Ember notes, "near-continuous solar power, available every hour of every day of the year [is now] an economic and technological reality in sunny regions."[221]

When renewables gain sufficient momentum in coal-dependent countries it should bring in a self-reinforcing cycle:

- Falling power prices.
- Falling generation at existing coal plants.
- Economic power shifting from the dirty to clean energy industry.
- Greater political and public confidence that coal is not needed for energy security.
- More investment in increasingly cheap renewables.
- Increasing pressure on coal plant owners to renegotiate their contracts with utilities, encouraging them to accept lower buyout costs.

The potential benefits of this dynamic taking hold suggests that we may have placed too much focus on negotiating and financing individual coal retirements in recent years. Instead, governments, financial institutions and philanthropies should prioritize their short-term efforts on supercharging renewables now, especially solar and battery deployment. As renewables take off on a large scale, this should make coal retirements cheaper and more politically feasible in the medium and longer terms.

Current coal retirement mechanisms usually aim to shut down coal plants only after 2030, and even as late as 2040. Shifting the priority of near-term efforts from plant-by-plant deals to broader power system changes would therefore be unlikely to delay coal's decline.

A. OBSTACLES TO REDUCING EMISSIONS IN COAL-DEPENDENT ECONOMIES

1. False solutions

a. *Retrofitting coal plants with carbon capture and storage technology*

(CCS). Experience with these projects globally has been one of massive costs and poor performance.[222] In a world with rapidly falling prices for renewables and storage, it is difficult to see how it could ever make economic or climate sense to add CCS to a coal plant rather than to decommission it and replace it with renewables.

b. *Converting coal plants to partially or wholly burning biomass, usually forest products*. Co-firing of coal with biomass is a key part of Indonesia's energy and climate strategies. Analysts have shown that ramping up biomass co-firing in Indonesia will only prolong the lifetime of coal plants, as well as having negative impacts on forests, climate, and pollution.[223] For reasons including the time taken for trees to regrow, life-cycle analyses show higher emissions from biomass-fired power plants than from coal plants. Burning biomass at a large scale leads to the destruction of forests with consequent impacts on biodiversity and local livelihoods.[224]

c. *Co-firing coal with hydrogen and ammonia*. Due to the high energy inputs required to produce hydrogen, and additional inputs needed to then convert it into ammonia, neither of these options are anywhere close to being economically viable.[225] It will likely be vastly more effective in terms of reducing emissions to generate electricity directly from renewables rather than using renewables to produce hydrogen. As with biomass, these forms of co-firing are more likely to extend the lifetime of coal plants than accelerate their retirements.[226]

The Japanese government has been one of the biggest promoters of extending the lifetimes of coal plants with these expensive and environmentally damaging technologies.[227] This is of concern given the role of Japanese financial institutions and corporations in Traction and the proposed SLTEC deal, as well as in the long-delayed Cirebon-1 ETM transaction in Indonesia (see Box).

The clear downsides of these co-firing strategies have not stopped them from being promoted within CTO deals. Climate Impact X, the Singaporean offsets exchange owned partly by Standard Chartered and Temasek's subsidiary GenZero, is proposing multi-coal plant CTO projects that would involve some plants being closed using offsets while others are converted to natural gas or co-firing. These repurposed plants, Climate Impact X suggests, could also generate offsets.[228]

2. The risks of PPA buyouts

One of the biggest obstacles to early coal retirements in Southeast Asia is the large number of privately financed plants built in the past two

decades under long-term power purchase agreements (PPAs). In Indonesia, 14.5 GW — almost a third of the country's coal capacity — has been developed under PPAs, mostly since 2006.[229]

These PPAs were designed to entice investors with very favorable terms. They typically contain take-or-pay clauses which oblige utilities to buy power regardless of whether it is needed. PPAs also allow investors to extract punitive damages from governments in international courts if the terms of the PPA are broken, even if this is just by adopting measures which would harm coal plant profitability such as carbon taxes or laws to reduce pollution.[230]

Coal retirement mechanisms, including those based on CTOs, have mostly focused on buying out investors in coal plants at a level that fully compensates them for lost revenue from the plant not running until the end of its PPA. The ADB's ETM is based on bringing in a blend of private and public concessional funding to buy out these investors.

But this model carries serious risks. It may create a moral hazard, incentivizing companies to build, expand, or buy plants, simply to profit from a later buyout.[231] Buyouts may also overcompensate coal plant owners who will want to negotiate for as high a level of compensation as possible, including by overestimating how long their plants would otherwise run or downplaying the risks of being forced into renegotiations by changing power sector economics.[232]

This issue becomes particularly problematic when scarce concessional finance is involved. As law professor Anatole Boute at the Chinese University of Hong Kong has pointed out, ETMs can amount to "reversed climate finance" — with funds from developed countries compensating investors from those countries for closing their polluting assets in developing economies.[233] The long-discussed Cirebon-I ETM in Indonesia (see Box) is a clear example of reversed climate finance. If the deal is ever finalized, the current owners and investors in Cirebon-1, mostly Japanese and Korean corporations and banks, would be bought out at a price which that make them whole for lost income via large amounts of concessional finance, mostly from the ADB, as well as market-rate private bank loans.[234]

Given the high risk that PPA buyouts will fail to cut emissions while wasting public money, NewClimate Institute and Institute for Climate Economics (I4CE) conclude that "only under exceptional circumstances" should public finance be used to buy out independent power producers (IPPs).[235] Such circumstances include when:

- Coal IPPs credibly commit to stop building new coal plants and to phase out existing ones. This would need to include all the parties in the often-complex web of private and public companies and investors involved in IPPs.
- Buyouts are conducted transparently through a market-based mechanism such as a reverse auction,[236] rather than via opaque bilateral deals between development banks and IPPs — as has been the case for the Cirebon-1 ETM.

BOX: THE CIREBON-1 ETM BUYOUT

The first ADB ETM to make progress was for the 660 MW Cirebon-I plant on Java. The ADB signed a Memorandum of Understanding (MoU) in 2022 with the plant's owners and Indonesian utility PLN to close the plant in 2035, seven years before the end of its PPA.[237] The deal was initially hoped to be concluded at the end of 2023, then in 2024, but has still not been finalized as of late September 2025 — showing the difficulties involved in bringing coal retirement deals to finalization.[238]

NGOs in Indonesia and elsewhere have long criticized the Cirebon deal, including that the negotiations on the MoU to close Cirebon-I were happening while its owners were building the 924 MW Cirebon-2 plant next door.[239] Furthermore, local communities had criticized the owners of Cirebon-I since its construction began in 2008, "with allegations of corruption, harassment and human rights violations, on top of accusations of gross negligence that have brought about widespread environmental destruction after its operations began in 2012."[240] "It is grossly unfair that [policies like] the ETM incentivize large companies but exclude the community from the conversation. Compensation goes to the [conglomerates]," said Dwi Sawung Rukmono, a campaigner at Indonesian NGO, WALHI, in 2023. "How about accountability to the people directly affected by the operation of these coal plants?"[241]

Both Cirebon plants are owned by a consortium of two Korean companies, an Indonesian company, and Japanese conglomerate Marubeni, its largest shareholder. The plants were mainly financed by Japanese financial institutions including MUFG, SMBC, and Mizuho banks, as well as the Japanese government's Bank of International Cooperation (JBIC), and the Export-Import Bank of Korea.[242]

MUFG is one of the banks mandated by the ADB to finance — at market rates — the proposed ETM for Cirebon-1.[243] This means that MUFG may profit from financing:

1. Cirebon-I at a time when the climate impacts of coal plants were already well known[244]
2. Cirebon-II at a time after the signing of the Paris Agreement, and
3. the early closure of Cirebon-I.

MUFG is a member of Traction, indicating that it is also hoping to benefit from CTOs — whether through trading offsets, buying offsets to "reduce" its emissions, or through facilitating the buyout of other coal plants it has invested in.

Meanwhile, the ETM buyout would mean that Marubeni and the other owners of Cirebon-I would be rewarded with public and private money for financing a project with serious and well known social, environmental, and climate impacts. They would also no longer face the risk of not receiving payments on the PPA between 2035 and 2042, a time when there may be political pressure to shut down coal plants due to severe climate impacts and the availability of far cheaper renewables power.

B. SOLUTIONS FOR REDUCING EMISSIONS IN COAL-DEPENDENT ECONOMIES

1. Removing barriers to renewables

Before — or at least in tandem with — developing individual plant-based coal retirement mechanisms, governments must clear the roadblocks holding back the rapid acceleration of sustainable energy deployment. Without this, phasing out coal will be a slow and arduous process, and will risk only shifting emissions between different fossil fuel power plants.

A joint report from NewClimate Institute and the Institute for Climate Economics (I4CE) notes that early coal retirements should be embedded in "comprehensive national long-term decarbonisation pathways to facilitate a smooth transition away from coal and safeguard against risks of locking in new fossil generation capacity or exacerbating energy security concerns."[245]

Writing for the World Economic Forum, William Macpherson and Gopi Rengasamy argue that governments "can do the most to accelerate coal phase-out by sending long-term signals to industry that they are committing to the transition."[246] These signals include moratoria on new coal, removing barriers to renewable deployment, and tightening the screws on coal with policies and regulations such as carbon taxes, lifetime limits for coal assets, and stricter pollution standards.[247]

Similarly, Thang Nam Do and Paul J. Burke of the Australian National University write that for Indonesia and Vietnam "prioritizing the uptake of renewable energy, along with ceasing the construction of new coal plants, would be a more feasible and conducive approach than a strong focus on the early closure of existing coal plants."[248]

Fortunately, sustainable energy, and especially solar with batteries, is now gaining momentum across Southeast Asia and many other parts of the continent. In 2024, 8% of electricity in the Philippines came from geothermal power, and 4% from solar and wind.[249] But solar is now the fastest growing power source in the country with nearly 800 MW installed in 2024 — around the same as the country's total solar capacity at the end of the previous year.[250]

The government target to increase the share of renewables generation to 35% by 2030 does not seem at all ambitious[251] given the cost advantages of renewables and the 160 GW of proposed solar and wind projects in the pipeline.[252] When completed in 2027, MTerra — a 3.5 GW solar and storage project — will supply a tenth of the capacity of the Luzon grid, which dominates power supply in the Philippines.[253]

Renewable developers in the Philippines, however, as in many other countries, face significant policy barriers. The Department of Energy warned in late 2024 that over 100 renewables projects were stuck in limbo awaiting grid impact studies and permits.[254]

Indonesia, by contrast, is far behind with a power sector dominated by the politically and economically powerful coal industry. In 2022, just 0.2% of its electricity came from solar and wind, compared to a global average of 13%.[255] Despite multiple studies showing pathways for the large-scale deployment of renewables in Indonesia,[256] obstacles including inadequate grid investments, a lack of workforce training, and complex policies and regulations have so far kept progress slow.[257] The latest national plan calls for only 10.6 GW of solar and wind by 2030, 60% less than called for in the November 2023 JETP investment plan.[258]

Yet Indonesia may be on the brink of a sea change. In August 2025, President Prabowo announced that Indonesia's electricity would come entirely from renewables by 2035.[259] In the same month, the government announced a plan to deploy 100 GW of solar power and 320 GWh of batteries, with the majority as decentralized systems in rural areas.[260] By contrast Indonesia's current total installed capacity of power plants is just over 100 GW.[261] A strong indication that Indonesia is about to experience solar take off was given by the announcement in June 2025 of a China-Indonesia joint venture to build a solar panel factory near Jakarta with an annual capacity of 1.6 GW.[262]

Pakistan shows that this kind of change can happen fast. In just a few years,

solar has exploded from almost nothing to the country's largest source of generation.[263] Annual imports of Chinese solar panels jumped 475% between 2022 and 2024, reaching 17 GW (with 1.25 GWh of batteries). Another 10 GW were imported in just the first four months of 2025. By comparison, the total installed capacity of the Pakistan coal fleet is 8.45 GW; the Philippines coal fleet is around 12 GW.[264]

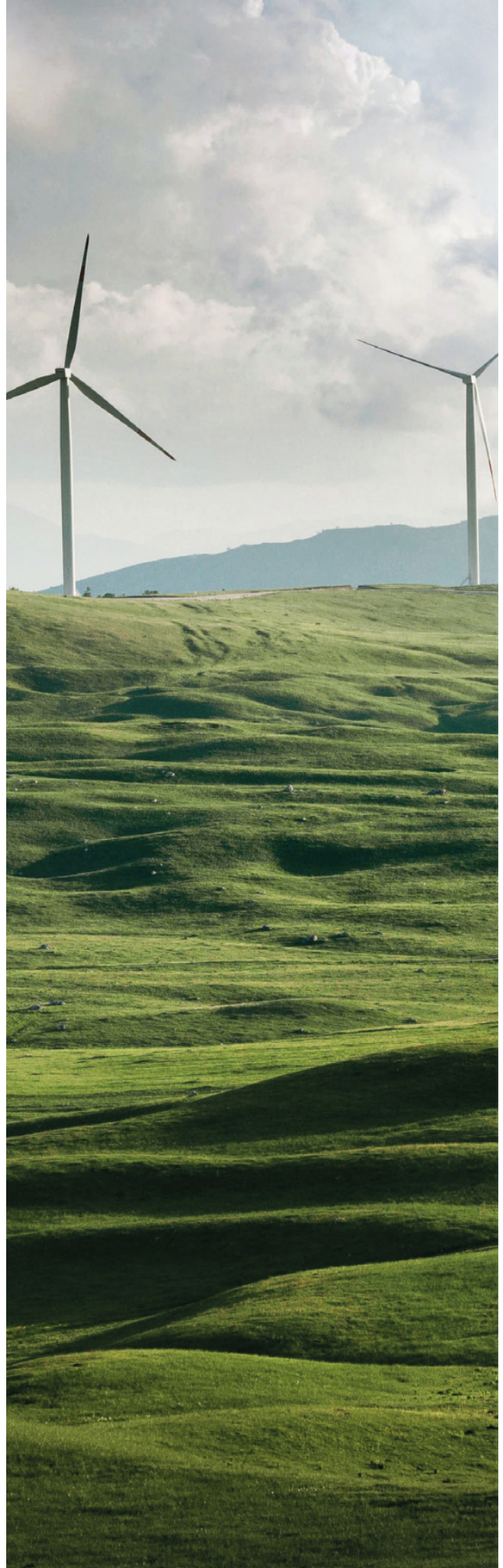
Once policy barriers to renewables are removed, finance is likely to follow. As consulting firm EY states, an enabling environment in in Asia:

"will unlock clean energy finance at competitive terms and contribute toward the growth of the global green economy. The potential opportunity is immense, there are huge solar and wind resources across the region, and accelerating its deployment can bring a range of benefits from energy security to mitigating climate change risks."[265]

As clean energy starts to boom in coal dependent countries, political and financial pathways for early retirements of coal plants should start to open up. The approaches listed below can help ensure that these retirements are successful — and describe some key pitfalls to avoid.

2. Making coal plants flex

In the near term, coal plants can be re-engineered to operate more



flexibly, which would help integrate more solar and wind into the grid. Instead of running at a relatively steady capacity around the clock, modern plants can be adapted to be ramped up only when clean power is unable to meet demand. Done right, this could be a low-cost and rapid method of supporting high levels of renewables penetration while reducing coal emissions.[266]

That said, flexible coal should be treated strictly as a transitory solution until renewables with smart grids can fully take over power supply. This strategy may be especially relevant in countries like Indonesia, where a fleet of young, supercritical coal plants exists. These are more technically suited to being modified for flexible operation.[267]

While the label of coal repurposing can be used for the co-firing approaches described in the false solutions section above, it can also describe using the legacy infrastructure at retired coal plants to facilitate renewables.[268] Scores of coal-to-clean projects have already been implemented, mostly in the US, Europe, and Australia.[269] These take advantage of the interconnection, electrical gear, and land base of decommissioned coal plants to install clean energy hubs. According to modeling of repurposing projects in the US, coal-to-clean conversions cost less than maintaining ageing plants and lead to increases in employment and local tax revenues.[270]

3. Renegotiations with haircuts

The ETM model, as illustrated by the troubled Cirebon-I case, leans heavily on using scarce public funds to potentially overcompensate owners of coal plants through PPA buyouts that may not result in emissions benefits for up to a decade or more. A better approach would be to push coal plant owners to face the reality that plunging solar and storage costs threaten the long-term viability of their PPAs. Developers and investors took risks in financing coal plants in a fast-warming climate. Now, some will need to accept what financiers refer to as "haircuts"— lower than projected returns. That could mean closing plants before current PPAs end without buyouts that cover the full amount of lost future revenue; converting coal PPAs into renewable PPAs; or changing contract terms so that coal plants can run less without utilities having to pay for power they do not need.

The World Economic Forum analyzed 10 coal plants in the Philippines and found their lifespans could be cut by an average of almost eight years through common financial restructuring and without the need for concessional finance or offset income, while not foregoing future revenues.[271] But this would still leave the plants operating after 2040, which is incompatible with a 1.5°C trajectory.[272] The implication is that, in many cases, coal plant owners and investors will need to accept haircuts if coal plants are to close on time.

In other countries, however, it may be possible for coal plant owners to shut plants on a 1.5°C trajectory without having to accept haircuts. A study on IPPs in Pakistan and Vietnam found that it would be financially attractive for their owners to restructure their PPAs so that they can shut the plants in the mid-2030s and replace them with renewables without the need for any concessional finance or offset sales.[273]

Governments have already forced IPPs to accept financial haircuts. Pakistan cancelled contracts with five oil-fired IPPs in 2024 with only partial compensation.[274] Ghana earlier renegotiated six PPAs with gas IPPs.[275] In both countries, the PPAs were forcing governments to pay for electricity — or generation capacity — they did not need and could not afford, leading the governments to stop paying.[276]

Meanwhile, solar is rewriting power economics. In Pakistan, the solar surge has cratered demand for power from recently built coal plants. The PPAs for these Chinese-owned plants require the government to make large payments just for their capacity to be available, even if the power is not needed. But the government is refusing to pay and so is building up huge arrears with the IPPs. The 1,320 MW Sahiwal coal plant, one of the largest in Pakistan, operated at a capacity factor of only 42% in 2022 — which then dropped to just 18% in 2023.

According to the Islamabad-based Sustainable Development Policy Institute (SDPI), the government owed Sahiwal around US$450 million at the end of 2023.[277] As solar and batteries undercut coal across Asia, more IPPs will face the same reckoning.

Regardless of future threats to their revenue, forcing IPPs to accept haircuts will not be easy. Governments and MDBs like the World Bank and ADB must step up. They need to provide legal and technical assistance to help utilities to participate effectively in complex PPAs negotiations,[278] and help push IPPs and their debtholders into renegotiating in good faith. MDBs and governments that pushed PPA structures — and financed coal long after the need to cut global emissions was clear — have a responsibility to lead these efforts.[279]

The top 10 international financiers of coal in Indonesia, Pakistan, and Vietnam since 2010 include the state-run Japan Bank for International Cooperation (JBIC) and the Export-Import Bank of Korea, as well as the ADB.[280] These institutions need to go just beyond promoting the concept of PPA renegotiations and begin renegotiations in their role as lenders to IPPs. Another top 10 financier of coal in these countries is the Japanese megabank SMBC which, like the ADB, is a member of Traction — and a financier of Cirebon-1. Both SMBC and

the ADB should accept haircuts on their coal investments rather than seeking to profit from their unwise financing decisions via offset sales. The ADB and World Bank also need to strengthen their coal policies as these still allow these MDBs to indirectly finance new coal projects.[281]

Chinese state-owned banks were also top supporters of coal plants in Indonesia, Pakistan and Vietnam. Beijing is now turning away from financing coal internationally, and has become a major exporter of clean technologies. It is also encouraging its clean energy companies to set up manufacturing facilities overseas.[282] China may see that it is in its own interest to renegotiate PPAs for the coal plants its companies and financial institutions have supported and to create more space for renewables deployment.

4. Concessional finance should focus on planning, removing barriers, and a just transition

While MDBs and governments have a role in facilitating PPA renegotiations, their concessional financing should be focused on technical support for the broad power sector reforms needed to make renewables the default choice. This means removing fossil fuels subsidies and creating policy frameworks that support renewables and grid improvements. Other roles for public sector funders — and philanthropies — are to directly finance renewables and grid upgrade projects, especially the smaller, decentralized projects that are least likely to attract commercial finance. They should also support planning and implementation of just transition measures.

MDBs and other development finance institutions (DFIs) typically have long-standing relationships with state-owned utilities. These utilities commonly buy power from IPPs and own their own generation fleets. As the NewClimate Institute and I4CE emphasize, utilities are often the most appropriate focus for DFI engagement, rather than engaging with IPPs on a plant-by-plant basis.

Working at the utility level allows planning and operations to be done at the system-wide level, making it possible to integrate renewables and ramp down coal generation. In engaging with utilities, DFIs can provide technical and legal expertise, help manage high debt levels, and fund the upfront costs of renewables.[283]

RECOMMENDATIONS FOR STAKEHOLDERS

For development finance institutions and governments:

- Stop pushing offset-dependent coal plant retirements.
- Prioritize technical assistance for regulatory reform, grid modernization, and renewable energy deployment over individual plant buyouts.
- Focus efforts to close individual plants on facilitating PPA renegotiations and supporting just transition planning, rather than compensating private investors for stranded assets.
- Where buyouts are pursued, employ transparent auction mechanisms rather than confidential bilateral negotiations that risk overcompensating coal plant owners with public money.
- Ensure strict enforcement of restrictions on building or expanding coal plants for companies and jurisdictions involved in coal transition offset deals.
- Adopt regulations to phase out coal power on a sectoral basis rather than relying on voluntary plant-by-plant approaches.
- Adopt robust coal policies that end all direct and indirect finance for new coal projects, phaseout all coal finance by 2030 in the OECD and by 2040 in the rest of the world, with exceptions for support for coal decommissioning and just transition.

For private investors and owners of coal plants:

- Recognize that coal plant investments carry inherent stranding risks in a decarbonizing economy.
- Engage constructively in contract renegotiations with power buyers rather than seeking full compensation through public mechanisms, or via offset sales.

ANNEX 1. INITIATIVES TO PROMOTE EARLY COAL RETIREMENTS

Name	Purpose	Founders and main stakeholders	Other stakeholders
Just Energy Transition Partnerships (JETPs) Launched 2021	To funnel money towards developing countries for the energy transition.	G7 countries (minus Japan), JETP recipient countries (Indonesia, South Africa, Vietnam, Senegal)	Include JETP secretariats, technical partners like RMI, Climate Policy Initiative (CPI), development banks and aid agencies.
Energy Transition Mechanism (ETM) Launched 2021	To buy out and retire coal plants with blended finance (concessional and commercial capital)	ADB	Indonesia, Philippines, Vietnam, Pakistan, Kazakhstan.
Coal to Clean Credit Initiative (CCCI) Launched 2022	To set standards for coal offsets generation and purchases, and catalyse offsetting-based deals.	The Rockefeller Foundation, Global Energy Alliance for People and Planet (GEAPP)	South Pole, RMI, CPI
Transition Credits Coalition (Traction) Launched at COP28 in 2023, scheduled to end at COP30	To kick-start coal offsets by exploring financial structures for coal offset deals and matchmaking between offset sellers and buyers.	Monetary Authority of Singapore	See annex 2
Accelerating Coal Transition Investment Programme (ACT) Launched 2021	To promote the transition out of coal by funding technical and policy assistance for governments and the private sector, and supporting just transition activities. Provides funding under JETPs.	Climate Investment Funds (CIF), World Bank	G7 countries pledged US$2 billion for ACT in 2021. ACT countries are Dominican Republic, India, Indonesia, the Philippines, South Africa, and North Macedonia.
Coal Asset Transition Accelerator (CATA) Launched 2021	To design asset-specific financial mechanisms that can create the business case for an urgent coal-to-clean transition. Provides technical assistance to plant owners, governments and financiers.	Carbon Trust, Climate Smart Ventures (CSV), RMI	Technical partners include University of Cape Town, Green Finance and Development Center (Pakistan).
Clean Energy Bridge	To source and develop transactions that repurpose coal PPAs, with a focus on attracting capital.		Has identified 2,448 coal power units in 55 countries as potential candidates. Initial focus on Morocco.

ANNEX 2: KEY MEMBERS OF BODIES PROMOTING CTOS AND SETTING OFFSET STANDARDS

a. The Traction coalition:

Members of the Traction coalition include:

- Major global financial institutions including Bank of America, Citi, HSBC, Standard Chartered, Mizuho, MUFG and SMBC; Singapore banks DBS, OCBC and UOB and sovereign wealth fund Temasek;
- Multilateral development banks including the ADB and the World Bank's Multilateral Investment Guarantee Agency (MIGA);
- Offsetting industry players including the International Emissions Trading Association (IETA), Climate Impact X, Vitol Asia, the Gold Standard, Asia Carbon Institute, BeZero Carbon, and GenZero (which is a major shareholder[284] in South Pole and has two executives on its board);
- NGOs and philanthropies, including the Rockefeller Foundation, WWF Singapore, and RMI (which originally acted as the Traction secretariat and is now a technical consultant).

b. Coal to Clean Credit Initiative (CCCI)

Led by Rockefeller Foundation. CCCI developed the coal transition offset methodology approved by Verra with technical and process support from South Pole (largest global offsetting consultancy) and RMI.

c. ICVCM governing board, expert panel, distinguished advisors and funders

The Rockefeller Foundation is a funder of ICVCM.

People with the below entities currently hold governance or advisory positions with the ICVCM:

- Temasek, and its offset broker arm GenZero;
- US NGOs RMI, World Resources Institute (WRI), Conservation International, The Nature Conservancy, and Environmental Defense Fund;
- Standard Chartered, HSBC;
- The International Emissions Trading Association (IETA) and Climate Impact X (owned partly by DBS, GenZero and Standard Chartered).

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on the list of countries with the most coal plants, has 39 (Global Energy Monitor, Global Coal Plant Tracker, data from January 2025).

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CREDITS

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Reclaim Finance is an NGO affiliated with Friends of the Earth France. It was founded in 2020 and is 100% dedicated to issues linking finance with social and climate justice. In the context of the climate emergency and biodiversity losses, one of Reclaim Finance's priorities is to accelerate the decarbonization of financial flows. Reclaim Finance exposes the climate impacts of financial players, denounces the most harmful practices and puts its expertise at the service of public authorities and financial stakeholders who desire to bend existing practices to ecological imperatives.

The Center for Energy, Ecology, and Development (CEED) is a think-do institution that conducts research and advocacy, and partners with communities in promoting ecological justice, energy democracy, and people-centered development. CEED has developed the Philippine and Southeast Asia Fossil Fuel Divestment Scorecards, which campaigners can use to engage financial institutions and their shareholders to move away from coal and gas, and towards renewable energy. CEED also actively works with communities impacted by fossil fuels by empowering and capacitating them to collectively assert their rights to livelihood, well-being, and healthful ecology.

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