Universal Owner Initiatives

The ETA's Gamble

Can the Energy Transition Accelerator's Coal to Renewable Strategy Work?

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Contents

Universal Owner Initiatives is a London and Berlin-based think tank that aims to transform the financial sector around climate change and biodiversity by providing systemically impactful data analysis. We are philanthropically funded and work closely with asset owners, asset managers, and regulators.

Executive Summary

As the Energy Transition Accelerator (ETA) aims to enact a seismic shift in our power landscape—converting coal power plants to renewable energy sources—it finds itself navigating a complex landscape of multifaceted negotiations, substantial capital transfers, and diverse risk management. This challenging mission of transformation is laden with risks that could threaten the ETA's ultimate success.

Our investigation focuses on two main areas. Firstly, in a worst-case scenario, an unintentional rise in coal market value spurred by the ETA could extend the lifespan of existing plants and de-risk new coal construction projects. The outcome of this would be a staggering **22 billion tonnes of CO2** increase against a baseline of non-intevention. In CO2 terms equivalent to preserving 145m acres of US forest from agriculture. Secondly, if the ETA opts to use the least stringent method for emissions avoided calculation, they risk inflating their estimate for emissions avoided by **one-third** and compromising the credibility of ETA offsetting claims.

The report finds:

- Heeding the lessons of Germany's coal phase-out, the ETA should be wary of the trap of bilateral negotiations, which could escalate the price tag of coal power plants **sixfold**. Worse yet, overpaying for coal plants could increase their value, prolong their lifetimes, and lead to an additional **8bn tonnes** of CO2. Instead, national governments could generate artificial markets through reverse auctions, to purchase coal plants at bargain prices, effectively avoiding market price inflation.
- The paper introduces a novel concept: 'Discounted Offsetting' (DS). This innovative methodology brings a probabilistic perspective to avoided emissions incorporating the economic, political, and regulatory factors that can close a plant before its technical lifetime has expired.
- Using DS, the ETA can more accurately assess avoided emissions and scrutinize project impact, enhancing the credibility of emissions offset claims and enabling more reasoned forecasting of the ETA's potential impact on aggregate global emissions.
- We calculated the probability-adjusted lifetime emissions from planned coal plants within Emerging Markets and Developing Economies (EMDE) will reach 15 billion tonnes of CO2.
- Although the ETA has explicitly stated that this market is not within its purview, our analysis suggests it could inadvertently distort market dynamics and increase plants' lifetime emissions by **14bn tonnes of CO2**.
- In light of this, we strongly recommend the ETA consider incorporating plants in various construction stages into its strategy.
- The governments of participating developing countries are set to play a central role in managing ETA funds and executing projects. While respecting sovereignty, there must be strong and consistent externally validated standards across all jurisdictions.
- In light of this and other risks, the ETA should consider going beyond generating offsets, and create an international body to manage capital distribution, project oversight, and emissions calculations. Such an organization should be rigorously transparent, accountable, and independent from the buyers and sellers of its emissions offsets.

Introduction

The global climate crisis has reached a critical point, with the potential to cause irreversible damage to ecosystems, economies, and societies. A rapid shift from fossil fuels, particularly coal, to renewable energy sources is imperative to limit global warming and achieve the Paris Agreement's goal of keeping the temperature increase well below 2ºC. According to the IPCC, global investment of $4 to $6 trillion annually is required to transform the economy at a pace consistent with the 1.5ºC target. The Energy Transition Accelerator (ETA) framework offers an approach to fast-track the transition of coal power plants, as we must retire one coal plant per day from now to 2030.

The Energy Transition Accelerator (ETA) has the potential to be a critical player in the race against climate change. The ETA can directly accelerate the transition from fossil fuels by funding developing countries to buy and retire existing coal plants and replace them with renewable energy resources. This approach contrasts starkly with traditional climate finance mechanisms, which typically focus on funding new renewable projects rather than directly tackling the decommissioning of existing fossil fuel infrastructure.

The ETA was launched in November 2022 at COP 27 by US Climate Envoy John Kerry in partnership with the Rockefeller Foundation and the Bezos Earth Fund. The ETA plans to provide concessionary capital to EMDEs through the voluntary carbon markets to facilitate the decommissioning of coal-fired power plants and promote the adoption of clean energy technologies until 2030, possibly extending to 2035.[1]

The ETA's systems are still being designed, but it seems likely EMDE governments will receive funding to finance renewable infrastructure and compensate coal plant owners for decommissioning their assets. Accompanying transition credits would be sold to wealthy sovereign states and companies seeking to offset their emissions, providing a financial incentive to hasten the plant's closure. The ETA's ambitious timeline for coal decommissioning contrasts favorably with similar initiatives, such as the Glasgow Financial Alliance for Net Zero (GFANZ).[2]

Details on the ETA are still to emerge, but John Kerry did lay down two principles for the purchase of credits:

- "To be closing down or transitioning existing fossil fuel facility that is providing power."
- "For the actual deployment of renewables that will replace current dirty sourcing."

The ETA's financial innovations will hopefully mark a shift away from debt-based climate funding to developing countries in the context of the need for large-scale climate action. Developing countries have struggled to mobilize the necessary resources to support energy transition and mitigation efforts. This is partly due to the 2009 Copenhagen commitment to mobilizing **$100 billion annually** by 2020 to assist developing nations not materializing.

Oxfam puts the 'true value' of climate funding to developing countries at $21-24.5bn, while debt repayment sees $31bn of annual outflows in the opposite direction. Loans represent over 70% of public climate finance to developing countries, further contributing to heavy sovereign debt burdens.[3] Meanwhile, the COVID-19 pandemic and Russia's invasion of Ukraine have exacerbated pre-existing economic woes, and the IMF now estimates that half of low-income countries are currently in debt distress or at high risk of it. When core public services and state solvency are at risk, EMDE governments are less likely to increase debt burdens to decommission coal plants. The ETA's current plans have alluded to both concessionary loans and advance purchase commitments for emissions offsets, to kickstart more steady streams of private finance to EMDEs.

1: For clarity, here is a list of the IEA definition of Emerging and Developing countries we are working from, and for comparison non-OCED countries.

2: This is not a full account of GFANZ's proposed standards, but it is an extremely low bar which makes the mistake of suggesting moving bad to less bad is good: "At a minimum, coal phaseout plans should demonstrate a positive absolute emissions reduction over the expected lifetime of the asset relative to its expected operation without such a plan." Financing the Managed Phaseout of Coal-Fired Power Plants in Asia Pacific, June 2023, Pg 42

3: See: https://www.oxfam.org/en/press-releases/true-value-climate-finance-third-what-developed-countries-report-oxfam

Challenges the ETA faces

Navigating the Risks to the ETA's Approach

While the potential of the ETA is promising, here we argue that there are eight risks and challenges that need to be considered.

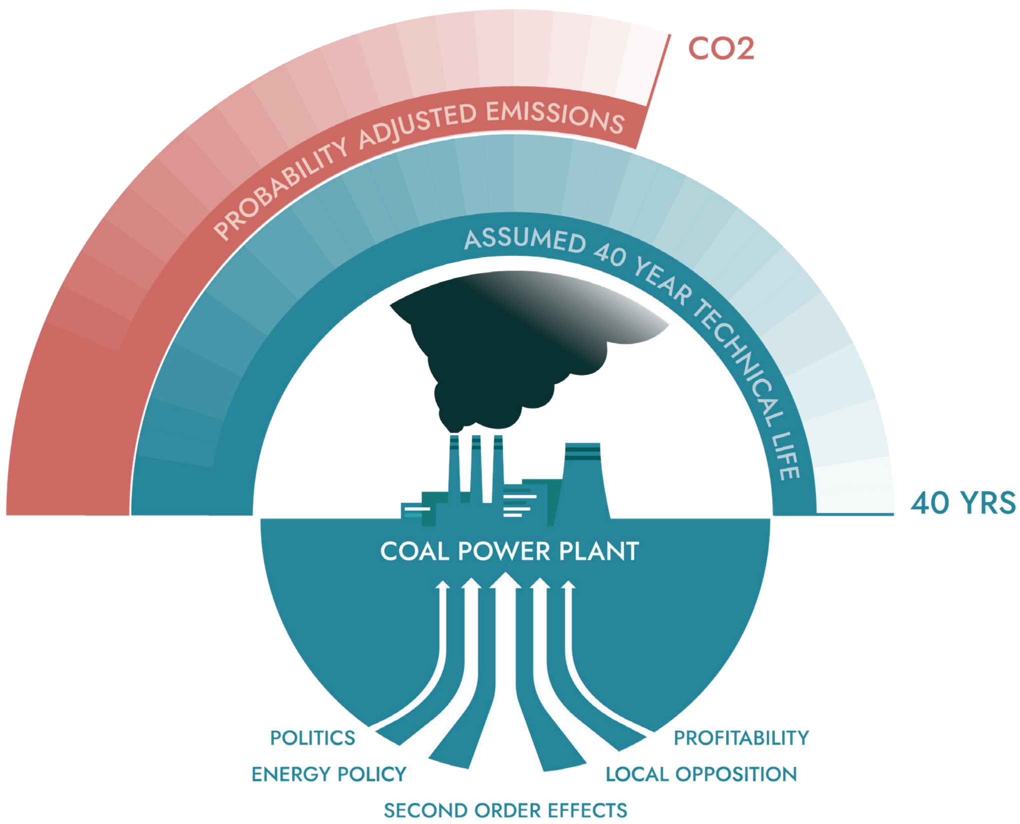
- The global carbon market has long been criticized for its opacity, inconsistency, and susceptibility to exploitation. A known risk involves the misappropriation of offset tokens, leading to inadequate climate action. There is a further risk of intermediaries benefiting at the cost of real ground-level climate action. Such a scenario has precedent. For instance, the Clean Development Mechanism, a precursor to the ETA, fell into disrepute when it became apparent that it was being widely gamed.
- The ETA assumes offset purchases will unlock vital financial flows to developing countries. However, the offset markets have offered only a trickle of capital so far. However, this runs against current evidence from the offset markets, which have produced only a trickle of capital so far. Despite many analysts anticipating exponential growth, with Morgan Stanley suggesting the market will increase in value to $250bn by 2050, the carbon offset market is still relatively small. It accounted for only 279 Mt in 2022, with credit issuance declining by 21% from 2021. The voluntary carbon market was valued at an estimated $2bn in 2021. This pales in comparison to the global traded value of emissions trading schemes permits - $851bn.
- At all stages and an on all projects, the ETA will face the challenges of complex and sensitive diplomacy with multiple stakeholders. Each successful plant closure and the energy transition will require effective coordination between the ETA's international body, the host government, the plant's owner and its surrounding community (including plant workers).
- Conflict between any of these stakeholders could prevent or derail a project. Encouragingly, the ETA plans to re-skill and transition plant workers to the renewable energy sector. This process will be crucial for securing community consent, assuaging opposition, and building and operating new renewable infrastructure. GFANZ's coal phase-out initiative similarly emphasizes retraining and community support schemes in its guidelines. Data suggests that a successful transition will actually multiply jobs, but it will necessarily be a complex and extensive process.[4]
- Host governments are likely to have significant responsibility, receiving ETA funds and overseeing plant closures as part of their broader energy transitions. It is crucial that they are offered all necessary support in managing these processes, but also held to consistent international standards. As part of this diplomatic challenge, there will be particular pressure on the success of early projects, which must serve as a proof of concept, not a deterrent, to potential partners.
- There is the conundrum we call the '1:1 ratio fallacy'. This refers to the assumption that purchasing one offset credit will equate to reducing one ton of CO_2. However, such a reduction is not guaranteed due to many factors, such as the non-permanence of decommissioning (i.e., plants can be mothballed and re-opened). There is also potential for emissions leakage, i.e., closed power plants increasing the demand on other plants to increase output. The risk here is producing offsets that in reality do not happen, while allowing another company or country to emit the equivalent emissions for reductions that are not happening. At worst, this would create an illusory sense of progress while aggregate global emission levels remain unchanged.[5]

4: See Appendix 3 for examples taken from TransitionZero data on Indonesian coal power plants.

5: See Appendix 2 for this argument in more detail.

- While the ETA is yet to announce its methodological approach, it must be judicious in selecting or learning from existing standards and protocols. This is a crowded space of standard-setting initiatives, such as ICVCM, SBTI, and Race to Zero. Offset schemes must go through rigorous verification and processes often fall short or are caught out. For example, while Verra is often used as a standard-setter for verification, its reliability and effectiveness have been the subject of high-profile criticism.
- The existing methodologies could be problematic for the ETA regarding how it calculates avoided emissions of coal plants. But, irrespective of its selected method, the ETA must counter the reputational damage and distrust from recent offsetting scandals. For instance, despite not being a nature-based initiative, the ETA may benefit from taking steps to distance itself from nature-based offsetting.
- There is also a significant risk in the potential for financial volatility. High reliance on voluntary carbon markets produces a risk of oversupply. The ETA could unlock a flood of offset credits from retiring coal plants, saturating the voluntary carbon market. The market has seen oversupply issues before, such as the 2012 price crash in the EU Emissions Trading System (ETS). The ETA must be careful not to repeat history by allowing supply to outstrip demand, devaluing transition credits, and undermining the financial viability of the projects it aims to support.
- The scheme must always replace coal with renewables and not leave power production gaps. In such events, another coal plant, or perhaps even a gas plant, can fill this void. Replacing a coal power plant with a gas plant that emits roughly half the emissions per kWh could produce no additionality. For example, if the gas plant operated for double the lifespan that the retired coal plant would have, net emissions remain roughly unchanged or worse.[6]

6: How to balance energy grids and ensuring a 'base load' of reliable energy is a highly complex and country and region-specific issue, addressed in detail by other subject matter experts such as the IEA, and TranzitionZero. This report does not engage with this.



Discounted Offsetting

What is it?

Discounted Offsetting (DS) is an innovative new method for estimating the future emissions prevented by an ETA project. The ETA envisions a "methodology designed to operate at a broad or jurisdictional scale while steering carbon finance to discrete projects". Even if ETA offsets are calculated at the national level, this will still require accurate figures for the emissions avoided by every individual plant closure.

To create emissions offset credits from a plant closure (or a series of them), it is crucial to predict the amount of emissions offset as accurately as possible. It is impossible to precisely calculate the emissions saved by an ETA project or an individual coal plant closure - the future is always uncertain. But discounted offsetting (DS) arguably gives a more realistic estimate than existing methods[7]

How does it work?

To estimate the emissions saved by an ETA plant closure, we want to know how much CO2 the plant would have otherwise gone on to emit in a baseline scenario of non-intervention.

Various factors can trigger plant closure - bad management, the owners facing financial trouble, regulation, hostile politicians or local protests, machinery failure, and more.

DS integrates these economic, political, financial, and technological factors to produce a sophisticated estimate of a plant's annual probability-adjusted closure rate - the likelihood of it shutting down in a given year.

Combined with data on a plant's annual emissions and Power Purchasing Agreements (contracts to supply energy), this value predicts its likely total CO2 emissions in a baseline scenario and how much would be prevented by shutting it down now.

If ETA offsets are calculated on an aggregated, national level, the sum of these plant-level calculations will inform a model of what a target country's future emissions profile would be without ETA funding, based on its current energy grid, emissions targets, and the degree of support behind them.

Why is discounted offsetting important?

Currently, various approaches have been used to estimate these prevented emissions. 'Avoided emissions' may involve a simple calculation of average annual emissions x remaining technical lifetime. Alternatively, prevented emissions have been defined by the average lifespan of past figures or even arbitrarily estimates by plant owners themselves.

These approaches cannot capture the full range of factors affecting plant output and closures. By neglecting many of the reasons plants shut down, they can significantly exaggerate the emissions prevented through their decommissioning.

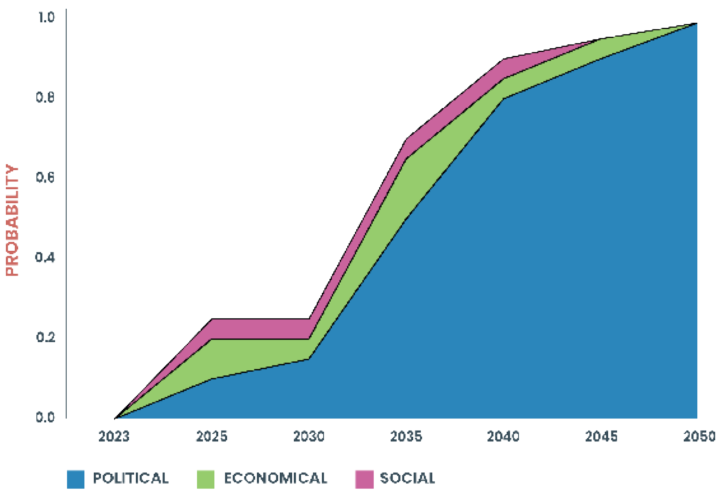
It is vital that carbon offset credits accurately reflect the emissions that an ETA project prevents because these credits are essentially permits for the purchaser to emit that much CO2. Discounted offsetting could enable the ETA to create the most accurate carbon offset credits possible.

7: GFANZ provides a useful summary of different organizations' coal decommissioning proposals and methodologies, Pg 31 - 51.

Imagine a theoretical coal plant designed to operate for 30 years with a buyout cost of $100 million. During its projected lifespan, this plant would emit a total of 20 million tonnes (MT) of emissions. Using straightforward calculations, the offset price would be set at $5 per tonne, derived from the formula $100 million divided by 20 MT. Now, let's introduce a variable: suppose there is a 50% likelihood that the same coal plant would cease operations within the same timeframe. This probability would halve the emissions avoided to 10 MT (calculated as 20 MT divided by 2), effectively doubling the price of the avoided emissions to $10 per tonne. Such an adjustment in price and avoided emissions provides a more accurate and equitable depiction of the potential real-world scenario.

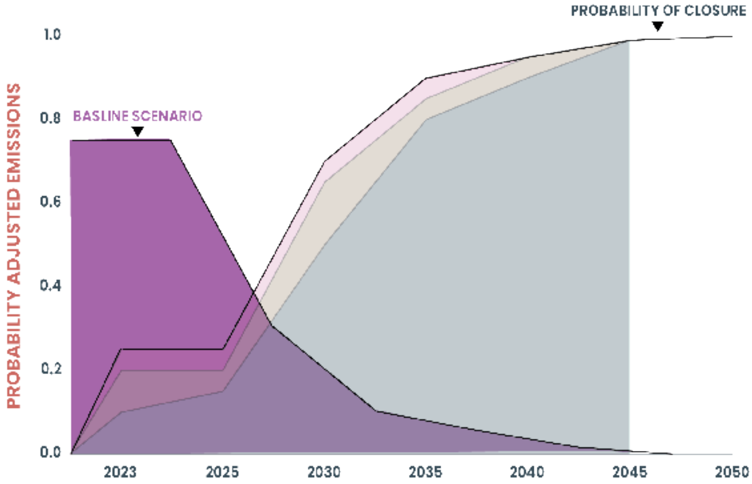
The DS methodology, as illustrated in the figure below, sketches the cumulative probability that a plant will close prematurely. The graphs below show how we have estimated, at the time of assessment[8], the cumulative political, economic, and social factors that might vary plant operation timelines.

Closure probability



Unlike technical lifespan estimation, DS scales annual emissions by the probability of closure, summing these over the entire theoretical lifespan to achieve a baseline estimate. This innovative approach embraces the complexity and uncertainty of future projections, shaping a more robust vision of resulting emissions.

Total emissons



8: As new data becomes available, we believe these probabilities should be updated just before assessing a coal plant's avoided emissions, for example, using a Bayesian Inference.

A DS beta version - Indonesian coal power plants

In what follows, we set out some tentative calculations for the probability-adjusted emissions of Indonesia's coal power plants. We aggregate three factors that might intervene to shorten a coal plant's life for a simplified illustration of what a DS calculation could look like. Though the probabilities in this early example are rudimentary, the method behind them is superior to others. Additionally, we suggest that a trained machine learning algorithm that used the DS method could make better, or as close as possible, future predictions.

We applied DS to 81 Indonesian coal power plants. To do so, we first defined 'variables' that our research suggested materially affect the expected lifetime and, thereby, emissions of coal plants. In this case, we created bespoke methodologies to analyze:

A) The level of political support for decommissioning coal and renewable energy. This included high-level climate change commitments and coal phase-out dates and any indicators that could cause doubt about their strength.[1]

1: See Appendix 3 for more detail.

B) The long-term profitability of the coal power plants.[2]

C) The level of local opposition to each coal power plant. To create this metric, we aggregated every identifiable criticism of all the plants from the media, NGOs, academics, industry press, and other sources.[3] Using these variables[4] we then:

1) Estimated the annual probability of closure, summing over each closure variable (1+2+3). In this case, we have given equal weight to each variable.

2) Have a cumulative probability of closure that is applied over the estimated remaining life of the power plant

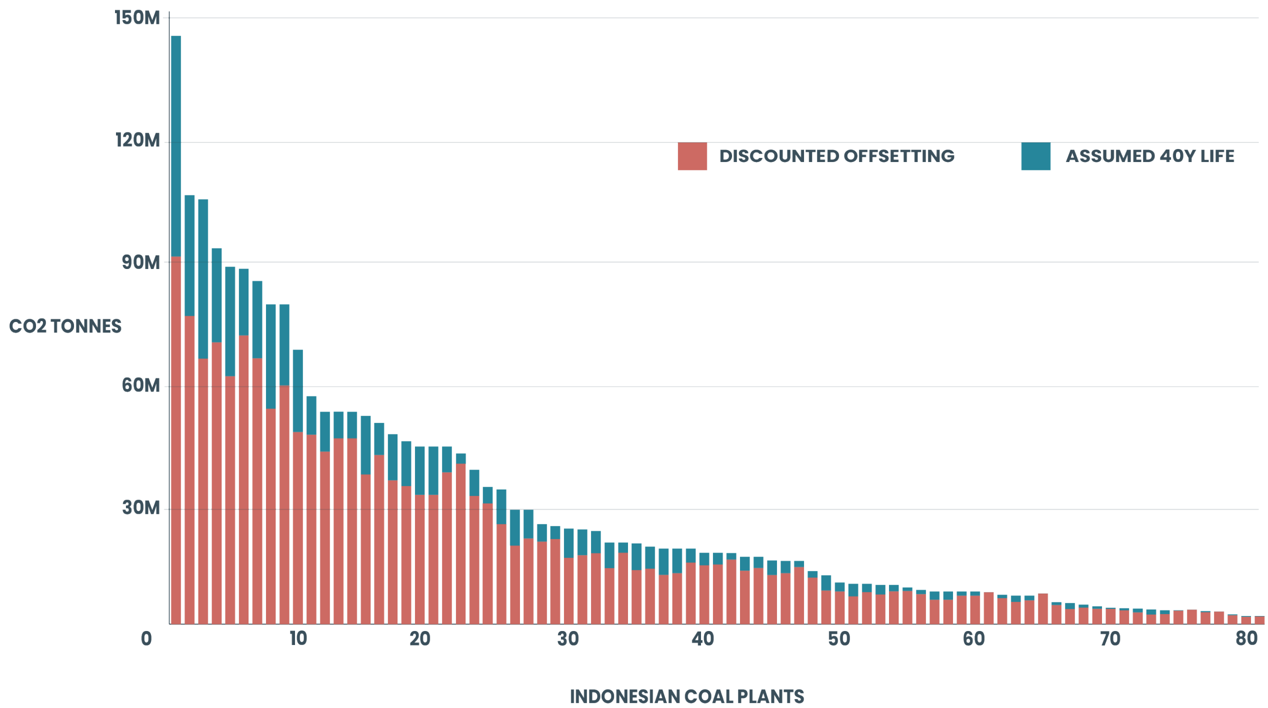
3) This probability is then used to scale the estimate of the total emissions from that plant over its lifetime.

2: This data was taken from TransitionZero's website, www.transitionzero.org

3: See Appendix 2 for more detail.

4: See Appendix 4 for more detail.

Comparing cumulative emissions - each bar represents a coal power plant



Redlines for the ETA

Overpaying for coal plants
The ETA must avoid activities that could inadvertently inflate the value or demand for coal power plants and resulting increased GHG emissions. This can occur if the ETA overpays for these plants.

It is then essential that governments disbursing ETA funding construct artificial markets for acquiring coal power plants and employ reverse auctions - or similarly proven methods - to ensure fair and competitive market pricing. Host governments should avoid individually engaging in opaque negotiations with coal plant owners, which has been shown to unnecessarily inflate compensation for plant decommissioning (see p.15.) This more transparent approach would avoid the perception and possible reality of some plant owners receiving preferential treatment.

Exaggerating offsets
The ETA must avoid a scenario where corporations inaccurately claim they offset carbon emissions equivalent to the coal plant's cumulative emissions until the end of its technical life. This ignores likely political, financial, and social reasons for earlier coal closure dates and future second-order effects. Such claims could leave the scheme open to greenwashing accusations and the criticism continually leveled at the offsetting carbon market, as the ETA purchases and outcomes will occasionally have unintended consequences.

Distributing funds without action
Participating coal plant owners should only receive funds based on planned steps and demonstrated progress. Offset contracts could stipulate that, instead of receiving funds in a single lump sum, plant owners are paid in stages, with payments conditional on evidenced progress.

Inappropriate coal plant owners
ETA funds must not be given to coal plant owners who are likely to reinvest the funds in other coal projects directly or otherwise seek to game and exploit the initiative.

Given the carbon lock-in of any gas power plant built today, any additional gas and fossil fuel infrastructure should be equally concerning. Therefore, participating governments must understand the parent companies and subsidiaries of the entities they approve for decommissioning funding.

A comprehensive due diligence process on potential recipients of funds is needed to mitigate this risk. Likewise, partner governments themselves should be screened for governance and anti-corruption standards, to ensure they will use ETA funds in good faith, for their intended purpose

Regulatory and legal restrictions on fossil fuel reinvestment
In addition to prior due diligence on coal plant owners and staggered, action- based payment, there should be a legal framework that ensures plant owner compliance. Participating plant owners should be contractually bound to use funds for decommissioning and transitioning to renewable energy and permanently cease fossil fuel investments.

Host governments should be required to demonstrate that this legal and regulatory architecture is in place before receiving funds.

Projecting a scenario where the ETA goes wrong

The ETA coal strategy has noble intentions, but this alone is not enough. If the ETA's systems are designed ineffectively, it risks creating a range of perverse incentives that could undermine its cost-effectiveness and work against its goals. Pessimistic scenarios could see:

1. An influx of new capital **overpaying for coal plants** would inflate the market value of existing power plants.
2. The ETA strategy could **inadvertently de-risk investments** for future coal power plants if bailouts become an accepted convention.
3. The lifespans of **existing power plants might extend** as owners keep them operational while waiting for ETA-like buyouts.

In this hypothetical scenario, we concentrate on how the collateral impact of points (2) and (3) could exacerbate global GHG emissions.

Projecting the coal construction pipeline

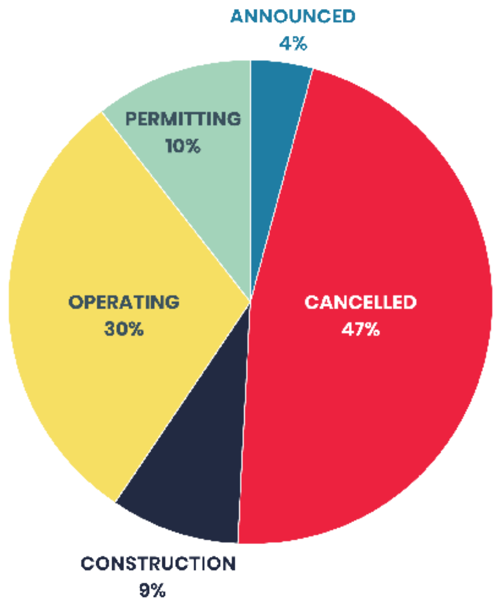
John Kerry's vision for the ETA focuses on transitioning existing fossil fuel facilities to sustainable alternatives by 2030 or 2035, notably excluding the subject of plants currently under construction. Yet this approach, we contend, should be reconsidered. There are two significant reasons for this - (1) the behavioral implications for investors/plant owners and (2) the sheer volume of potential greenhouse gas emissions from developing countries coal construction projects.

(1) The ETA's focus on buying out operational plants may unwittingly encourage problematic behaviors in the industry. If the ETA gains momentum, investors in coal plants under construction may find comfort in the safety net it offers. Countries and private entities may assume they can sell a failing or uneconomic plant to a wealthier nation, reducing the threat of financial loss and encouraging riskier investments. This scenario also opens the door to the creation of a secondary market. Building and selling coal plants to affluent countries could become a lucrative business model in such a landscape, incentivizing further construction. Moreover, as the climate crisis intensifies, it seems plausible that the ETA or similar schemes will have to intervene to decommission any operational coal plant, further stoking the illusion of a safety net.

(2) Emerging Markets and Developing Economies (EMDE) face significant climate implications from prospective coal power plants. If all these plants are built and operate for an average of 40 years, they could emit 37.7 billion tonnes of CO2 well into the 2060s. This would consume about 9% of the IPCC's carbon budget for a two-third chance of limiting warming to 1.5°C.[9]

9: 420 GtCO2 for a two-thirds chance of limiting warming to 1.5°C, https://www.ipcc.ch/sr15/chapter/chapter-2/

What has happened to coal plants 8 years after being planned?

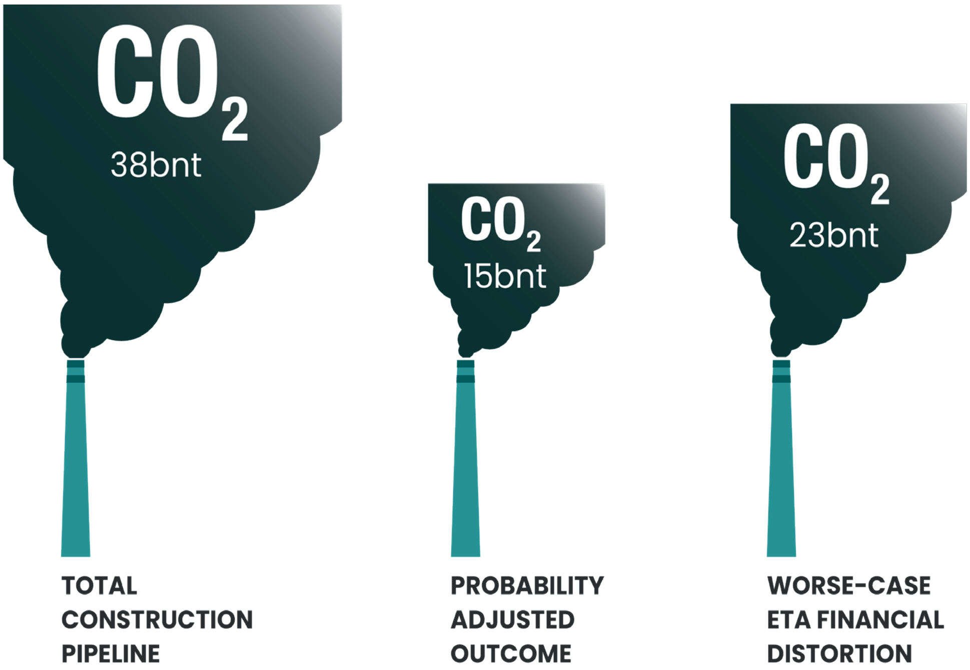


We conducted an in-depth analysis of the coal plant construction pipeline under a baseline non-intervention scenario, focusing on ETA-targeted countries. Our findings revealed that nearly half (47%) of the coal plants within the pipeline were canceled before reaching completion. The probability of a plant's completion can be assessed by considering its stage of development. For example, if a plant under construction were projected to emit 80 million tonnes (MT) of CO2 throughout its lifespan, we must consider a cancellation rate of 9% starting from the construction phase. This adjustment would reduce the emissions by approximately 73 million tonnes through the concept of discounted offsetting.

Stage in 2014 - 2022>	Proposed	Announced	Pre-permit	Permitted	Construction
Number of coal units/plants canceled by 2022	574	61	504	171	66
% canceled between 2014-18	45%	82%	51%	56%	9%

By applying this methodology and utilizing data from 2014 to 2022, we estimated the potential lifetime emissions of coal plants at 37 billion tonnes if all were built. But, taking into account the cancellation rates at various production stages and early closures driven by political factors, we derived a probability-adjusted figure of 15 billion tonnes for total lifetime emissions.

An analysis of 25 recently canceled projects disclosed a multifaceted interplay of planning, financial, and political factors leading to cancellation. A significant 70% faced economic challenges, while over half (55%) were shut down solely for financial reasons. Furthermore, we explored a hypothetical worst-case scenario to understand the potential risks if the ETA inadvertently made coal plants financially more secure. In this scenario, we assumed that half of the usually canceled in-operational coal plants (for financial reasons) remained operational. By accounting for the proportionate increase in coal plants that subsequently became operational and applying the DS methodology, we assessed the total lifetime emissions under this assumption.



The ETA overlooking coal construction pipeline, while potentially financially de-risking the construction pipeline, and operation plants could potentially increase the probability-adjusted **CO2 by 14bn tonnes.** This could be a critical mistake. Instead, we recommend a more proactive approach: buy out plants at later stages of development. Namely the plants in the construction stage that have a 91% chance of being built and the permitting stage with a 50% chance.

To avoid encouraging new coal plants and effectively de-risking current ones, the ETA could stipulate that its support will not extend to plants proposed after its launch. In effect, the ETA should establish a cut-off date that outlines the scope of a potential buyout. Compensation paid to prospective plant owners would be proportionate to expenditure and probability of closure. For example, the investors/owners of a permit-stage plant would be paid less than those of an equivalent plant development, fully completed and ready to come online. This would reflect both the lower costs of the permit-stage plant and its 50% (average) probability of being canceled before completion. These adjustments would help maintain a sense of equity between plant owners and avoid inflating coal plant valuations by overpaying.

Projecting the operational life of coal plants

The most used method[10] of calculating the remaining life of an operational plant involves deducting its age from 40 years and then multiplying the result by its annual CO2 emissions. Yet, this approach needs to capture the nuanced reality facing contemporary coal plant operations. Historically, coal plants have averaged a lifetime of 46 years.[11] However, given the mounting policy response

10: This is an emerging field. The standard method is our interpretation of what is begin proposed by GFANZ, RMI and others. See also our previous report 'Refinancing Coal', critiquing the approach of the Asian Development Bank (ADB) and other private financial institutions.

11: Oxford Smith School, Pg 13

to climate change and the falling costs of renewable energy, the past only sometimes serves as an accurate predictor of the future.
Our recent analysis for the period 2014-22 reveals that 1.4% of plants ceased operation within eight years, and though 17% were either suspended or mothballed at some point, 88% of these resumed operations. This indicates that regardless of a plant's operational status, there remains a considerable probability that it will return to service, further emphasizing the need for the ETA to consider transitioning new or soon-to-be-built coal plants.

To better understand a plant's potential lifetime, we have devised a forward-looking methodology incorporating 'discounted offsetting.' This approach aims to create a detailed picture of each plant and its potential for operational longevity.

Ideally, the ETA methodology for calculating emissions offsets from a plant closure would consider:

1. A detailed understanding of the coal plant (age, efficiency, embedded technologies, input, and fixed costs, long-term profit).
2. Understand the plant's place in the broader national energy grid and a detailed understanding of the grid's capacity, i.e., there are plants in China and Indonesia that could be decommissioned with little grid-level impact.
3. The political situation in the countries, their energy policies, attitudes towards coal and coal-phase-out dates and the reliability of these dates i.e., are they broad announcements, a published strategy or proposed or passed laws?
4. Lastly, the local opposition to the coal plants, which as our research found, correlates with early closures.

The ETA could also benefit from employing machine learning techniques to generate estimates of plant lifespan systematically and associated avoided emissions to assign transition credits accurately. However, acknowledging the limitations of this data, we sought to illustrate what a calculation might look like and how the ETA could influence operational plants' lifetime emissions.

Applying a stripped-down version of DS globally, we developed a methodology to suggest the likelihood that a given country would close down coal faster. We focused only on political commitments to climate change, especially regarding coal phaseouts and their reliability based on political sentiment and past behavior.[12]

We then studied the reasons behind the premature closure of 20 operational coal power plants. We found 46% closed for purely financial reasons rather than through forms of political opposition. This finding is significant because it allows us to say that effectively an equal number of operational coal power plants will close early for political reasons as they will for financial reasons.[13]

If then the ETA inadvertently refinanced coal plants or drove back up their market value, or led to the expectation of buyouts, such that it removed the financial risks that lead to early closures in the market, we estimated it could cause to an additional **8 bnt tonnes of CO2.**

12: We cannot accurately predict political futures. However, we adjusted our probabilities based on political realities, political statements, and other available data.

13: This observation was helpful for methodological reasons, although the two cannot be truly disaggregated as coal plants are part of a political economy.

Why pricing coal plants is critical

Germany's plan to phase out coal provides salient lessons about the use of decommissioning finance for the ETA. It demonstrates how the mechanism chosen to calculate the buyout price can significantly impact the overall cost of the transition.

In 2020, the German Bundestag passed legislation targeting a coal phaseout by 2038 or as early as 2030. The scheme involves two strategies for different coal types - hard coal and lignite. The German government employed a series of reverse auctions for hard coal plants beginning in 2020. Here, the government established the MW that capacity it planned to retire and set a maximum price per MW it was prepared to pay. Coal plant owners submitted prices they would be willing to sell for.
The state purchased the plants starting with the lowest prices, moving up until the designated MW capacity for retirement was achieved. Prices above the capped maximum are excluded. With this approach, the government cleverly built competitive pressure, reducing the maximum bid price over time.

In stark contrast, the phaseout of lignite coal plants followed a more conventional approach: bilateral negotiations between the state and the two major plant operators, RWE and LEAG. Compensation awarded to these operators was substantially higher than the rates achieved in hard coal auctions. RWE received €2.6bn to close 5GW of coal generation capacity before 2030, while LEAG received €1.75bn for 3GW of capacity.[14]

A comparison of the two methods presents a remarkable disparity. Data from the German Ministry of Economic Affairs suggests that the government paid an average of $90,000 per MW of capacity retired in the reverse auctions for hard coal plants. In contrast, compensation for RWE and LEAG's lignite coal plants amounted to approximately $545,000 per MW – a staggering six times the hard coal price.[15,16]

The lignite compensation has been controversial, partly because it was designed to cover the rehabilitation costs of the mines associated with the lignite plants. However, this aspect cannot explain the sizeable price difference alone. It seems more likely that it reflects the different mechanisms used to retire these two coal types.

The hard coal reverse auction approach created an artificially competitive environment by redefining the property rights of coal owners. It did not attempt to evaluate the market price of hard coal plants or offer coal owners a sum equal to their potential future revenue. Instead, it created an environment that encouraged competitive selling under constrained conditions.

The lignite coal plants' phaseout, however, relied heavily on a private methodology mainly based on estimating the lost revenue of these plants. This valuation led to bilateral negotiations between the state, RWE, and LEAG, creating a less competitive environment. The European Commission has since ruled that the compensation granted to these lignite coal plants likely goes beyond appropriate expropriation compensation, violating the bloc's state aid rules.[17]

14: Oko-Institut, 2020, Analysis of power plant closure plans for Germany's mining district.

15: Bundesministerium für Wirtschaft und Energie, 2020

16: Client Earth, 2020, Coal phase-out compensation for LEAG, p.6.

17: European Commission, 2021

Average auction MW price for hard coal (Germany)	Average auction MW price for thermal coal (Germany)	Ember's fair MW price for lignite	Kanak's price per MW (South East Asia)
$62,000	$287,000	$42,875	$1,000,000-$1,800,000

Ember argues that the formula used to calculate the buyout for lignite plants relied on three problematic assumptions:

1) That no fixed costs could be avoided by early closure,
2) That the compensation period should last four to five years (rather than a reasonable three), and
3)That forward power and CO2 prices would reflect those from Jan-'17 to Dec-'19, when in actuality, CO2 prices were rising and forward energy prices were in decline.

Ember estimated that, with these assumptions corrected, the formula used to calculate the buyout for lignite plants would have shrunk from €4.4 billion to a mere €343 million.[18]

This distinction has wide-reaching implications, especially considering potential coal phaseouts in regions like South East Asia, where coal still plays a growing role in the energy mix.

If opaque methods are employed – ones susceptible to manipulation by interested parties – there is a risk of artificially inflating the value of coal assets.

Overpaying for these assets would not only be an inefficient use of public funds but could also inadvertently prop up the coal market. Transparency in methodology and mechanism for coal asset buyout prices is crucial.

Several factors compound this issue. The coal sector heavily depends on state tariffs and long-term power purchase agreements (PPAs).

These contractual arrangements can be so convoluted that external evaluators find it difficult to assess individual plants' financial viability accurately.

Additionally, the book values of these plants on corporate balance sheets often bear little resemblance to their actual market value.

Coal plant owners are inherently motivated to leverage this information asymmetry to maximize their compensation in any buyout process.

Without a transparent, fair, and rigorous evaluation mechanism, these owners would have little incentive to sell unless offered sums significantly above the true market value.

An example is Donald Kanak's white paper that influenced the Asian Development Bank (ADB). It suggested a possible buyout price for South East Asian coal plants at a lower bound of $1m per MW and an upper-bound price of $1.8m per MW.

This comparison, though skewed in favor of the German auction, shows that Kanak's lower bound is **12 times** higher than the average buyout price from the German coal auction; the upper bound is a staggering **21 times** higher.

Germany's case study underscores the importance of rigorous, transparent, and competitive methods for determining buyout prices during coal phaseouts.

The German experience highlights the pitfalls of private negotiations and opaque methodologies that may lead to inflated compensation payouts.

Conversely, the competitive reserve auction employed in the hard coal auctions presents a more equitable and cost-effective model.

18: Ember, 2021, Analysis of German lignite compensation, p.4-5.

Conclusion

The ETA could channel vast and urgently needed private capital flows into coal phaseouts and renewable energy infrastructure. However, the priorities of corporate credit purchasers and plant owners may not align with the ETA's. Some ETA host governments may be susceptible to lobbying, bribery, or their own internal corruption. There is a severe risk that any of these interested parties will use their influence to exaggerate the accounting of carbon offsets and weaken oversight of transition projects. The ETA's stakeholders could mitigate these risks by creating a strictly independent, international body to oversee offset calculations, due diligence and monitoring of projects, and ensure funding is distributed to and by partner governments based on evidenced progress. Our research suggests the ETA should:

Address the Immensity of the Coal Construction Pipeline

The sheer scale of the coal production pipeline, from both the proposed plants and those already under construction, demands attention. These developments are incompatible with a 2C outcome or the transition timeline set by the IEA for 2040. Ignoring the burgeoning coal pipeline could lead to influencing it but not adequately addressing it, a deleterious result.

Employ Discounted Offsetting (DS)

The ETA could consider the merits of some form of 'Discounted Offsetting.' This approach can help calculate the number of emissions offset more accurately while also adding legitimacy to the developed firms that will be claiming emissions offsets. The assumption that decommissioning a coal plant equates to lifetime emissions offset risks inflating the actual offset achieved and may discredit the ETA.

Construct Artificial Offset Prices

The ETA and its partner governments must avoid overpaying for coal facilities through bilateral negotiations, which have historically led to inflated coal prices. Overpayment could disrupt the local market and prolong the coal power plants' lifespan, increasing GHG emissions. A viable alternative could be a reverse auction process, similar to those employed in Germany, which would require cooperation with national governments and the creation of artificial markets for coal plant retirements.

Independent Governance

Corporations and other purchasers should be enticed by rigorous carbon accounting and stringent transition project due diligence, despite potential cost increases. A firm governance system can ease fears of credit devaluation due to greenwashing, a major concern for 90% of carbon credit buyers. An authoritative, independent body - with no financial interest in purchasing or selling ETA-related credits - could mitigate the risk of fragmented and weakened standards between jurisdictions. Such governance also prevents individual scandals from tainting the initiative's credibility and credit demand.

Transparency and Accountability

Diligent oversight is crucial for ETA finance, ensuring responsible decommissioning of coal plants and their transition to renewable energy. Transparency curbs corruption and bias and mitigates unanticipated consequences. A public website tracking each coal plant's transition progress could be an effective solution. It could report decommissioning status and renewable infrastructure progress, enhancing public trust and scheme credibility.

Appendix 1. Systems change

Why would corporations buy into a scheme such as the ETA's? Foremost, they aim to offset their emissions. By acquiring 1 unit of emissions reductions from an external source, corporations can effectively bolster their 'net zero targets', emitting an additional unit over their predetermined limit. This leads to two coexisting net zero budgets: one embodying a corporation's share of a national industry's decarbonization journey towards net zero and the other validating excess emissions via external offsets.

However, for this approach to hold water, the equation must balance: for every unit of 'emissions added' by the corporation, a corresponding unit of 'emissions subtracted' must occur through the crediting scheme. Achieving this 1:1 ratio is more challenging than it might appear due to these critical considerations.

The Delicate Choreography of a Whole Systems Transition

Firstly, the energy transition is a multifaceted procedure where the order of steps is vital. Consider the evolving role of natural gas in the UK as a case in point. Its future is intertwined with numerous factors, from domestic demand and infrastructure to technology developments, market conditions, and policy support.

A successful transition demands the orchestration of these diverse elements to ensure technologies, assets, and policies synchronously enter and exit the stage, culminating in a cohesive strategy. Ideally, such sequencing should be woven into net zero targets and policies, nudging the correct elements into action at the right time.

With the ETA, the role of credited assets – be it renewable builds or fossil fuel retirements – in the transition strategies of the involved nations remains ambiguous. While the ETA seems to be pushing in the right direction, the same cannot be confidently stated about potential credit-purchasing companies.

If corporations are permitted to offset their emissions without restraint, the sequential integrity of the transition is jeopardized. Companies due for decarbonization in the coming decades might unduly maintain their current business models by leaning on offsets, dampening the urgency for action.

Indeed, the most insightful unit of 'transition' extends beyond a company's emissions at a particular moment, encompassing asset lifetimes and broader national and international transition strategies. For instance, if a company sanctions a high-carbon asset with a 20-year lifespan while seeking a veneer of legitimacy by purchasing avoided emissions credits for the initial five years, the net effect on emissions is dubious. If this perceived legitimacy facilitated the investment, it might paradoxically heighten emissions.

This view, however, still oversimplifies the complexity of the transition. Given its intricate, sequential nature, any delay in parts of a transition strategy can reverberate through the system, impeding other elements. Quantifying these 'whole system' impacts is tremendously challenging but should still be attempted.

Appendix 2 - Indonesia coal plant data

The following uses a slimmed down version of the Discounted Offsetting methodology to estimate the probabilistic impact of the variables local opposition, political opposition and long-term profitability on lifetime emissions of Indonesian coal power plants. Each variable is scaled to be comparable.

Power Plant	Annual CO2 (million tonnes / annum)	Local opposition	Political opposition	Long term profitability	Potential replace-ment jobs onshore wind	Estimated jobs lost from plant closure
Adipala power station	2.5	0.2	0.2	0.2	9,346	858
Amamapare Port power station	0.4	0.3	0.2	-0.4	749	85
Amurang power station	0.2	0	0.2	0	346	39
Bandung Indosyntec power station	0.2	0.1	0.2	0.2	336	39
Bangka Baru power station	0.1	0	0.2	0	356	39
Banjarsari power station	0.5	0.1	0.2	0.2	1,127	143
Banten Labuan power station	1.4	0.3	0.2	0	3,846	390
Banten Lontar power station	1.5	0.2	0.2	0	4,039	410
Banten Serang power station	2.5	0.3	0.2	0.2	8,462	858
Banten Suralaya power station	2.7	0.3	0.2	0.4	8,013	813
Banten Suralaya-3 power station	2.7	0.3	0.2	0.2	8,013	813
Batu Hijau power station	0.2	0.3	0.2	-0.4	339	40
Bengkulu power station	0.5	0.3	0.2	0.2	996	130
Bukit Asam Muara Enim power	0.4	0.1	0.2	0.4	666	85
Celukan Bawang power station	0.6	0.4	0.2	0.2	832	165
Cikarang Babelan power station	0.7	0	0.2	0.2	1,567	182
Cilacap Sumber power station	1.4	0.2	0.2	0	4,248	390
Cirebon power station	2.8	0.4	0.2	0	7,387	858

Embalut power station	0.3	0.2	0.2	0.2	823	78
Indramayu power station	1.6	0.3	0.2	0.2	3,693	429
Kalbar-1 power station	0.5	0	0.2	0.4	1,371	130
Kalteng-1 Pulang Pisau power	0.3	0.1	0.2	0.2	823	78
Kaltim FTP2 power station	0.5	0	0.2	0.2	1371	130
Kaltim Teluk Balikpapan power station	0.5	0	0.2	0.2	1,508	143
Ketapang Smelter power station	0.1	0.1	0.2	-0.4	411	39
Labuhan Angin power station	0.6	0.1	0.2	0.4	849	150
Lampung Sebalang power station	0.5	0	0.2	0.2	1,025	130
Merak power station	0.3	0	0.2	0.2	769	78
Nagan Raya power station	0.5	0.3	0.2	0	812	143
Ombilin power station	0.6	0.3	0.2	0.2	738	130
Pacitan power station	1.5	0.25	0.25	0.25	3,908	410
PLN Paiton Baru power station	2.9	0	0.25	0.25	8,189	858
Paiton-1 power station	2.9	0	0.25	0.5	7630	800
Paiton-2 power station	3.1	0	0.25	0.5	8,189	858
Paiton-3 power station	3.5	0	0.25	0.5	10,236	1,073
Pangkalan Susu power station	1	0.375	0.25	0	1,625	286
Pelabuhan Ratu power station	1.5	0.375	0.25	0	3,917	455
Perawang Mill power station	0.2	0.375	0.25	-0.25	258	46
PLN Paiton power station	2	0.375	0.25	0.25	4,968	520
Pomalaa Nickel power station	0.1	0.375	0.25	0	307	39
Punagaya power station	0.6	0	0.25	0	1,440	163

Rembang power station	1.5	0.25	0.25	0.25	4,461	410
Shenhua Guohua power station	0.8	0.25	0.25	0.25	1,537	195
Sinar Mas Jambi Lontar power	0.2	0.25	0.25	0	273	48
Sulawesi Mining power station	0.3	0.5	0.25	0	749	85
Sulbagut-1 power station	0.2	0	0.25	0	515	65
Tabalong power station	0.5	0	0.25	0.5	1,371	130
Tabalong Wisesa power station	0.1	0	0.25	-0.25	411	39
Takalar power station	0.5	0.125	0.25	0	1,152	130
Tanjung Awar-Awar power station	1.7	0.25	0.25	0.25	4,342	455
Tanjung Jati B power station	2.8	0.5	0.25	0.25	9,346	858
Tanjung Kasam power station	0.3	0.25	0.25	-0.25	480	85
Tarahan power station	0.5	0.125	0.25	0	1,025	130
Teluk Sirih power station	0.5	0	0.25	0	827	146
Cilegon PTIP Power Station	0.2	0	0.25	0.25	513	52
Purwakarta Indorama Power	0.2	0	0.25	0.25	336	39
MSP Pulau Obi power station	0.2	0	0.25	-0.5	455	49
Cemindo Gemilang power station	0.3	0	0.25	0.25	769	78
Indo Bharat Rayon power station	0.2	0.375	0.25	0.25	410	47
Weda Bay power station	1.1	0.375	0.25	-0.5	2,994	325
Xinxing Ductile Iron Pipes Co Captive power station	0.2	0.125	0.25	0	438	49
Jinchuan Group WP&RKA power	0.2	0.125	0.25	-0.5	599	65
Delong Nickel Phase II power	0.6	0.25	0.25	0	1,555	176
Delong Nickel Phase I power	0.1	0.5	0.25	0	345	39

Appendix 3 - Discounted Offsetting and politics

The following are illustrative examples of how country-level political analysis can inform Discounted Offsetting (DS) calculations on the national and international levels. We are cognizant that it is highly approximate, but it is superior to effectively ignoring politics when considering avoided emissions. In this application of DS, each country is given a Political Commitment Score (PCS) from 0-10, based on its commitment to phasing out coal use in legislation, government policy, and among the wider public. A perfect 10 would require a clear and swift timeline for completely phasing out coal power, backed by concrete legislation, detailed accompanying regulation, and a strong consensus among both political elites and the general public.

Vietnam – 8/10

At COP26 in 2021, Vietnam's Prime Minister Pham Minh Chinh pledged to phase out coal use by the 2040s. Transitioning away from coal power is part of a broader commitment to reach net-zero emissions by 2050. This very explicit commitment, announced to the international community, is key to Vietnam's high PCS. Further, in December 2022, Vietnam negotiated a $15.5 billion Just Energy Transition Partnership with G7 states and international investors to fund coal plant decommissioning and renewable energy development over three-five years; and, in May 2023, Prime Minister Pham Minh Chinh signed off on Power Development Plan 8 (PDP-8), a $134.7 billion USD strategy to reduce coal to 19% of power supply by 2030, down from nearly 50% at present. These measures suggest the sincerity of the COP26 pledge.

High levels of state ownership in the energy sector, through SOEs such as Vinacomin, Petrovietnam, and EVN, reduce the potential influence of coal industry lobbying against the phase-out; a survey of 43 energy experts ranked business resistance as the least important barrier to the energy transition. However, there is evidence of resistance from conservative civil servants within the Ministry of Industry and Trade (MOIT) who, skeptical about the reliability of renewables, allegedly lobbied for a less ambitious PDP-8. US climate envoy John Kerry has warned that "some forces are fighting to keep coal" in Vietnam. While pro-renewable factions currently seem to have the upper hand in the Politburo and National Assembly, with the broad backing of the general public, this division among political elites limits Vietnam's PCS to a high 8.

India – 5/10

At COP26, India's representatives successfully lobbied to change the Glasgow climate pact's resolution to "phase-out" coal to a less definitive "phase down". Accordingly, India has no binding deadline for ending coal power within its long-term commitment to net-zero emissions by 2070. As of August 2022, India's Nationally Determined Contribution commits it to 2030 goals of reducing the emissions intensity of its GDP by 45%, relative to 2005 levels, and supplying half of its electricity through non-fossil fuel-based energy sources. This commitment to a rapid increase in non-fossil fuel power generation has met some skeptical reactions: non-fossil fuel energy sources account for less than 20% of power generation, which has not changed for over a decade. Furthermore, the NDC's focus on the emissions intensity of GDP, rather than total emissions, is likely to allow a short-term increase and long-term maintenance of coal burning if India continues on its projected path of rapid economic growth.

India's recognition of climate change and commitment to decarbonization is attenuated by a dedication to rapid economic growth and a desire for equity with developed economies that released vast GHG emissions during their own industrialization. There is strong support for climate action among the general public: 64% of Indians want more government action on climate, and 74% believe they are personally affected by climate change. However, there are concerns about Prime Minister Modi's close ties to the industry, i.e., to billionaire coal developer Gautam Adani. In September 2022, tax authorities raided the offices of six non-profits that had criticized a highly controversial Adani coal mine in the Hasdeo Arand forest. A low PCS of 5 reflects India's limited targets for reducing coal, its tense contests over coal in the international sphere as well as its fraught civil society space.

Appendix 4 - Calculating Discounted Offsetting

The maths of the methodology

- Each plant is given a 0-4 score for profitability, local opposition, political pressure.
- Each cause score is multiplied by a base scale multiplier.
- This gives the annual probability of closure for each cause.
- The full version of this tool would use machine leanring to estimate this multiplier using historical data.
- In this simplified case the multiplier was estimated and each cause was given equal weighting, then summed to give the probability of closure per year P.

$$P = P_{Profit} + P_{LO} + P_{Political}$$

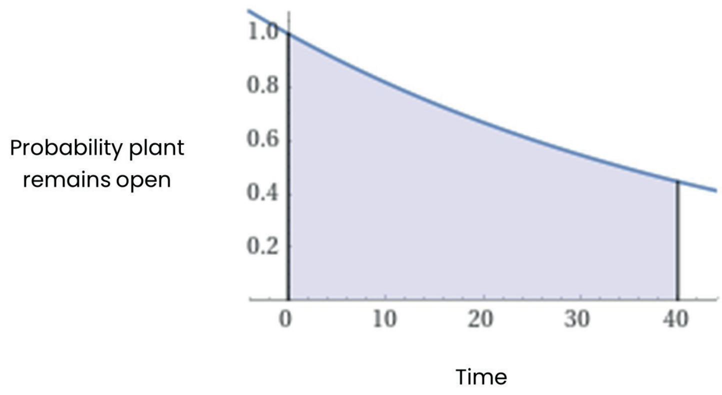
- The annual probability of closure is inverted to give the probability that the plant remains open, and was the projected over time, t.

$$(1-P)^t$$

- This function is then integrated over the remaining life of the plant, from the present to the end of its technical life, T, to give the probability adjusted proportion of the crude emissions estimate (decommission at the end of technical life).

$$\int_0^T (1-P)^t \, dt$$

- As a visual aid, the area under the line here is an example of this calculation applied to an example where P=2% and T=40 years



About Universal Owner Initiatives

Universal Owner is a London and Berlin-based think tank that aims to systemically transform the financial sector around climate change and biodiversity through data-driven analysis. It provides data and thought leadership to asset owners, asset managers, and philanthropic organizations.