Universal Owner Initiatives

Refinancing coal

Do private decommissioning funds have misaligned incentives?

April 2022

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Executive Summary

Thermal coal is the world's most carbon-intensive fuel source, yet remains responsible for generating a third of the world's electricity. South East Asia is home to a disproportionately large percentage of new coal plants, at the same time that many of these countries lack the financial capability to overhaul their – often ailing and indebted – energy systems. What is the solution?

One increasingly loud answer has emerged from the private financial sector: a 'coal decommissioning fund'. The crux of the idea is simple. Private investors would put money into a joint investment fund to buy-up coal assets. With the benefit of the low cost of capital available to them, they would be able to make market rate returns from these assets as well as retiring them before the end of their technical lifetime. These funds thus promise to unite monetary advantage and climate mitigation: 'to generate a positive, measurable and environmental impact, alongside a financial return for investors'.

We interrogate the challenges and limitations inherent in the idea of a private decommissioning fund, focusing on two high-profile examples.

The Asian Development Bank (ADB) intends to leverage public finance to de-risk a private fund designed to buy out coal plants in South East Asia. It is launching a pilot in Indonesia, Vietnam and the Philippines, and has partnered with leading financial institutions such as Prudential and HSBC.

In 2021, Citibank floated a different proposal under the name 'Coal to Zero' (C20). It envisaged an entirely private fund targeting coal mines, prioritizing four jurisdictions: Indonesia and South Africa, as well as two advanced economies, Australia and the United States. While the C20 has since run aground, it serves as an essential point of reference for understanding the general challenges faced by any private decommissioning fund.

Key findings

We show that the ADB and C20 schemes suffer from two inherent contradictions:

- One, their raison d'etre is to secure market rate returns, in this case around ~10-12%. This creates a series of misaligned incentives, including the need to operate ruinous coal assets for over two decades.
- Two, as private funds, investors cannot legislate to force owners to sell on their own terms, and cannot integrate their work into a national transition strategy. This means investors risk over-compensating coal owners, and that they cannot focus upon the key systemic 'blockages' to the transition.

We reveal what this means in practice, using the ADB and C20's own plans:

- The ADB scheme risks massively over-paying for coal plants. The buy-out price described in the scheme's founding paper describes a buy-out price that is, megawatt for megawatt, **3.5 times** more than the price at which South East Asian coal plants have sold for on the open market. Compared to Germany's state-engineered auction for coal plants, it is **16 times** more expensive.

- **The ADB and the C20 schemes defy a 1.5C pathway for unabated coal.** If ADB scheme was applied to targetted countries Indonesia, the Philippines and Vietnam, it would generate **2bn tons** more CO2 than is compatible with the IPCC's net zero trajectory – surpassing the region's carbon budget by **166%**. The C20 intends to retire coal mines even later still.
- **These schemes are value destructive.** If we put the social cost of a ton of carbon $100, the coal mines targeted by the C20 scheme would, on average, generate social costs of **$865m** every year. These costs are far greater than the economic value of the asset. Looking at the coal plants targeted by the ADB scheme, we estimate that they generate costs – via their emissions – that are **33 times** greater than their economic value.
- **These schemes abdicate the just transition.** Both the ADB and the C20 claim that they will channel a fraction of their revenues towards the just transition. But the ADB does not spell out exactly how much it will apportion to this end, and the C20 appears to relegate this to a last priority. States will almost certainly have to step in to cover most of the cost.

There is a better alternative. We argue that the South African proposal for 'Just Transition Transaction' offers a more viable solution:

- In this model an international public fund grants a loan to South Africa to redress systemic blockages to the transition: to refinance its national utility so that it can bear the cost of writing-off coal assets, and to fund the just transition. The interest payments on this loan are offered at concessionary rates proportional to the emissions reductions the country achieves. The key here is that, as a public fund, it would accept the avoided social costs of emissions as remuneration, meaning that the loan itself does not need to generate a return. It can therefore be spent strategically as part of a coordinated national transition, on what is most helpful, not what is most profitable.

What is the case for a decommissioning fund?

There are two principal arguments that might be cited in favor of establishing a coal decommissioning fund: that it is an effective means of abating emissions, and that it is an equitable means of doing so.

Abating emissions: South East Asia

Firstly, coal decommissioning funds could be an effective means of abating greenhouse gas emissions (GHG). This is because coal is highly carbon-intensive, and the economics of coal are declining. Therefore the cost per ton of CO2 avoided could be low. Further such funds can benefit from the fact that it is increasingly cheaper in the long-term to build new renewables than to continue to operate existing coal plants[1]. Carbon Tracker estimates that the levelized cost of new renewables is now lower than the long-run marginal cost of 77% of existing coal plants worldwide, a figure that will rise to 98% by 2026.[2]

Because it is carbon-intensive and uneconomical, the IEA's Net Zero scenario submits that coal should witness the steepest decline of any energy source over the next decade. In this model, unabated coal should account for no more than 8% of global electricity generated by 2030 – more than a four-fold contraction. But the scale of this task varies by region, and is particularly difficult in South East Asia.

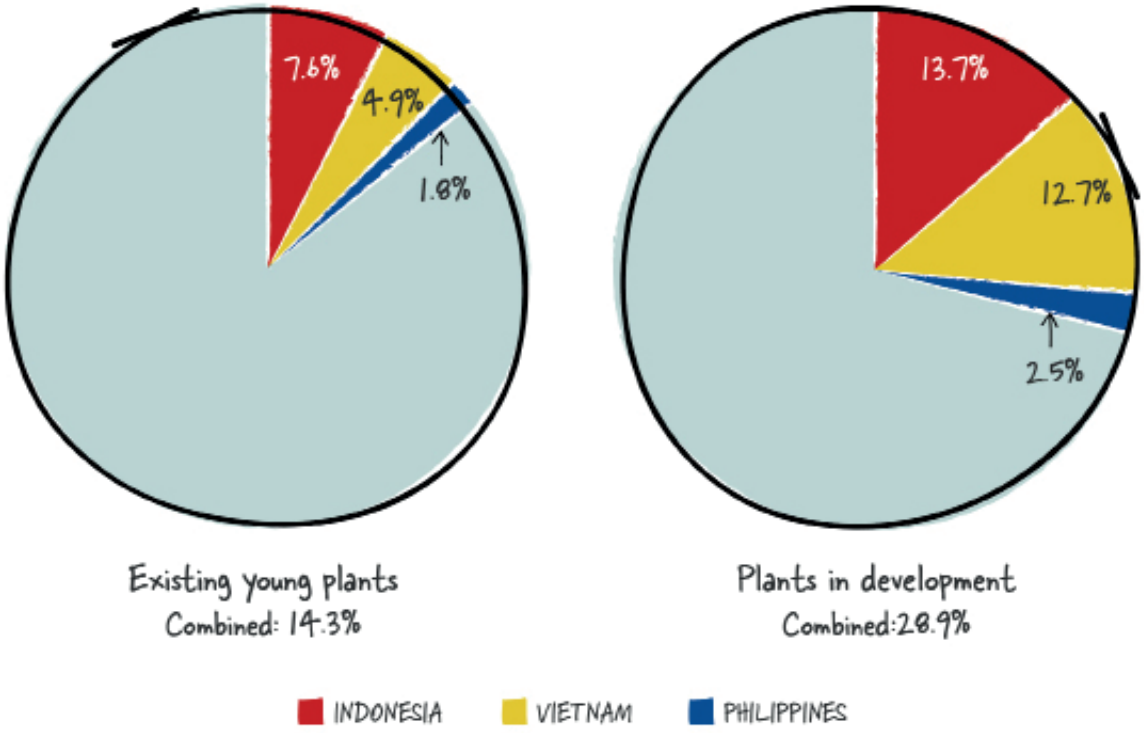
Outside of China, eight South East Asian countries account for 30% of the world's coal capacity[3], with 64% of young coal plants having at least 20 years of life remaining, and 65% of the world's planned coal capacity in the region. India is responsible for the largest share of this coal capacity, but it is far from alone. Indonesia and Vietnam together account for more of the world's coal capacity than India. The underlying reason for this growth is that coal has been seen as a relatively cheap, reliable, and scalable way of meeting the soaring energy needs of these rapidly growing countries. Take the case of Vietnam: its GDP has grown nearly 600% since 1990, at the same time as its population has expanded by 42%. The result is that energy use has skyrocketed by 1408%, with coal soaring to take on the majority of this load.

1 Carbon Tracker, 2020, How to waste over half a trillion dollars: The economic Implications of deflationary renewable energy for coal power Investments

2 Carbon Tracker, 2021, Do Not Revive Coal, p.13.

3 Our analysis using data from GEM Coal Plant Tracker.

South East Asia's share of new global coal capacity (excluding China)



Fairness: North-South climate finance

Helping developing economies in South East Asia to phase-out their coal fleets could be a contribution to a globally equitable climate transition.[4] This can only be achieved by a significant transfer of funds from the global North to the global South. The global South will bear the brunt of the damages wrought by climate change despite their small share of emissions and benefits from GHG emissions historically. A figure for North-South transfers was agreed at $100bn per year by the G77 group in Copenhagen in 2009[5]. It has never been met, despite suggestions by the IEA that clean energy investments in emerging and developing countries need to increase to over $1tn per year by the end of the 2020s.[6]

Developing economies are already struggling to raise transition funds, with 80% of global climate mitigation finance currently flowing to advanced economies.[7] This is pertinent as most decarbonization pledges made through the UNFCCC are officially conditional on the receipt of trillions of dollars of climate mitigation funds.[8] We saw this conditionality at COP26, with South Africa releasing a 'range' in which its decarbonization would fall, and declaring that 'where we arrive in this range depends on the support we get'. Clear incentives for western financial interventions exist, which may have inspired these private decommissioning funds.

4 For reference, see Fleurbaey et al., 2014, Sustainable Development and Equity, IPCC AR5.

5 Sophie Yeo, 2019, Where climate cash is flowing and why it's not enough, Nature. There is much dispute as to whether and what kind of non-concessionary funding contribute to this headline figure. The OECD put North-South contributions to the $100bn at $71bn for 2017, whereas Oxfam put It at between just $19bn and $22.5bn.

6 IEA, 2021, Financing Clean Energy Transitions In Emerging and Developing Economies, p.14.

7 TCD IMF, Re-channelling Special Drawing Rights for a Climate Resilient and Just Transition, p.9-10.

8 Fleurbaey et al., 2014, Sustainable Development and Equity, IPCC AR5, p.295.

Emissions trading: Part of the solution?

One respect in which the incentives of these schemes can potentially move closer to the public interest, is if the ADB and C20 earn carbon credits for avoided emissions. Proposals for the ADB scheme, in particular, place great emphasis on carbon credits – perhaps because it is easier for the ADB to verify avoided emissions at the point of generation than it is for the C20 to prove it at the point of supply. Both The ultimate progenitor of the ADB scheme, Donald Kanak, chairman of the Asian arm of the insurer Prudential and author of a white paper on the scheme, and is one of the leading institutional backers of the ADB scheme, HSBC, suggest that the fund could only retire coal plants in 10-15 years if they either received full public funding, or receive carbon credits for the years of coal-fired combustion avoided by early retirement. Yet Kanak is candid that whether the fund will be able to benefit from carbon credits is unknown.

This question involves several cascading points of uncertainty. At the moment Vietnam and Indonesia are in the midst of formulating emissions trading schemes, but the same is not true of the Philippines and most of South East Asia. But it is far from clear how these schemes will be structured, if emissions caps and permits will be set at an effective level, if they will credit avoided future emissions, or if they will be designed to accommodate an emissions reduction on the scale of the retirement of 50% of the country's coal fleet. The ultimate catch for the ADB scheme is that their financial structure – their balance of equity, debt and grants – will depend upon their expected carbon credit revenues. Yet they have to decide upon the structure in the near-future, despite lacking clarity on whether and to what extent they will actually be able to benefit from carbon credits. Prudence would suggest erring on the side of caution and structuring the fund such that it does not rely on this uncertain revenue stream. If the scheme will not benefit from carbon credits, however, their already prolonged 10-15 year retirement dates could extend yet further into the future.

What are the limitations of the ABD and C20 schemes?

Additional value: Potential leakage effects

The 'additional value' of a project is what effect it brings about *additional* to what would have happened in its absence. In our case, this is primarily a question of what the emissions of coal plants would have been in the baseline scenario, minus what the emissions would be if the plant was bought by a decommissioning fund and retired early. There are two critical assumptions that have to be made to calculate this difference:

- What the baseline scenario really is?
- What difference closing a coal asset will make to that baseline?

What is the baseline scenario?

What the baseline scenario is, depends on two uncertain factors: the economics of coal, and energy regulation. Carbon Tracker estimates that it is already cheaper in the long-term to replace exiting coal plants with solar PVs in Vietnam, and that the same will be true of Indonesia by 2025, and the Philippines by 2030.[9] We might therefore reason that market forces alone will drive spluttering coal plants out of existence, and that purchasing these assets could actually end up prolonging their life. Indeed, this is a concern. But the majority of South East Asian coal is operated by state-owned utilities or entangled in long-term power purchase agreements,[10] at the same time that these countries do not yet have the grid capacity to support new renewables at scale. This means that whether coal assets will be exposed to market forces depends on political factors; whether these states will reform their energy system.

It is far from implausible that some degree of reform will take place. Vietnam, for example, has already proscribed the construction of new coal plants and is trialing new power purchase agreements that enable corporations to leapfrog established utilities and buy directly from renewable producers. In September 2021, Indonesia committed to scrapping new coal-fired plants in the planning stage and increasing the share of renewables in new generation additions to over 50%.[11] In the long-term, these countries stand to gain economically from expediting the transition away from coal, and have an obligation to do so under the Paris Agreement.

Two things follow. First, there is a reasonable likelihood that these reforms will take place, in which case the emissions in the baseline scenario would fall. The retirement timelines put

9 Carbon Tracker, 2020, How to waste over half a trillion dollars: The economic Implications of deflationary renewable energy for coal power Investments, p.25.

10 On these challenges, see IEEFA, 2021, ADB Backs Coal Power Retirement In Southeast Asia.

11 Baker Mckenzie, 2021, PLN's New 2021-2030 Business Plan: High hopes and 'greener' projects.

forward by the ADB and C20 schemes would thus offer less – potentially significantly less – emissions reductions additional to this baseline. In general, it should not be assumed that the baseline scenario is one in which coal assets simply run to the end of their technical lives. Rather, it is necessary to establish a range of possible scenarios, including technological, market, and political factors, to attach a probability to each of these scenarios, and then average this out to generate the expected emissions of a plant, region, or country.

Second, neither the ADB nor the C20 scheme focus on the main blockage to the climate transition in South East Asia: the regulatory and financial reform of these countries' energy systems. If these countries were given a cushion to bear the cost of prematurely writing off their coal assets – including to support workers and communities affected by this economic dislocation – they would have every reason to do so, as it would be to their long-term advantage. We later make a case for why this counts in favor of a public fund, which could offer this cushion to a nationally coordinated energy transition.

What difference will closing a coal asset down make?

When a coal plant or coal mine closes, we cannot simply subtract the emissions of these assets from the baseline scenario. First, in the case of a coal plant, that generation capacity will simply be replaced. If it is replaced by renewables this would represent something of the order of a twentyfold drop in emissions compared to the original coal plant, whereas if it was replaced by natural gas this would be closer to a twofold drop. Worryingly, the governments of Vietnam, Indonesia, and the Philippines are all depending – to some degree – on expanding natural gas imports over the coming decades. Any calculation of the additional value of closing a coal plant in these countries will be seriously undermined if there is a significant likelihood that it will be replaced by, or retrofitted as, a gas-powered plant.

Second, there is the problem of leakage. A local cut in the supply or demand of coal will, respectively, create a fall or rise in the price of coal to which the global market will respond. If coal plants are closed, depressing the demand for coal and therefore reducing its market price, global demand for coal will increase. If coal mines are closed, the reduced supply of coal will create a hike in prices that other producers will ramp-up production to benefit from. The extent to which these adjustments occur depends on the relative price elasticity of coal supply and demand. There is general reason to believe that the coal supply is less elastic. Why? On the demand side, coal is readily substitutable for other sources of energy.[12] Consumers can move between these different sources of energy in response to price changes. On the supply side, this is not the case. Miners cannot readily move between different forms of resource extraction in response to price movements. This means the regulation of fossil fuels on the supply-side is likely to be more effective, as miners cannot easily ramp-up production to benefit from this hike

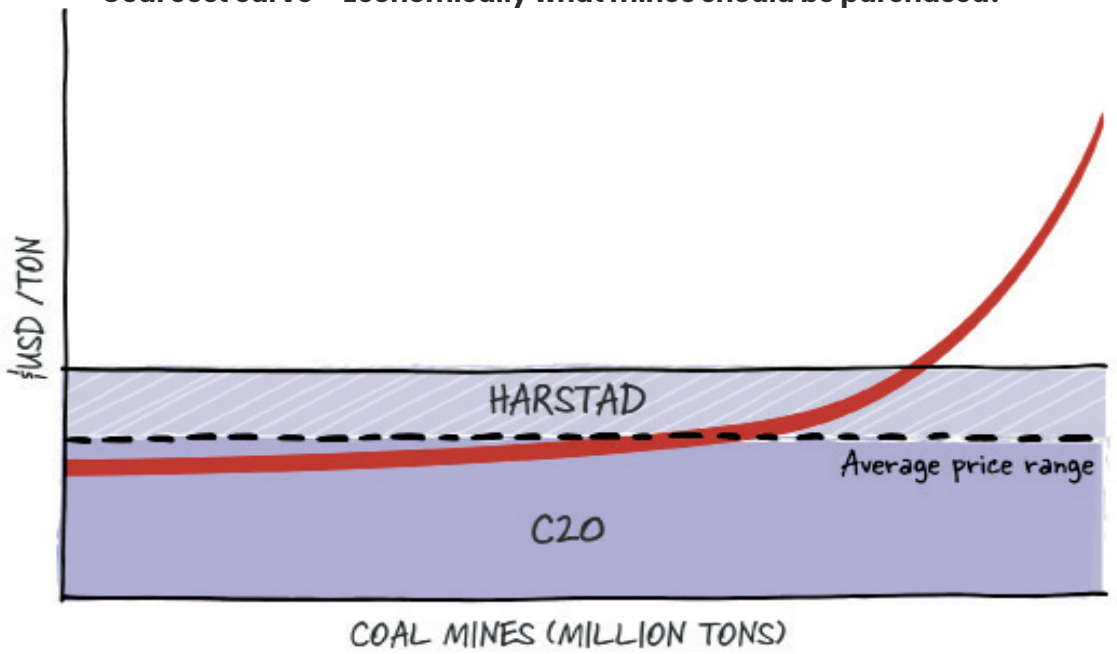
12 Paul Collier and Anthony J. Venables, 2014, Closing coal: economic and moral Incentives, Oxford Review of Economy Policy, 30(3), especially p.497-498.

in coal prices.[13]

Any analysis of the additional value of retiring coal assets will have to take into account two problems with the C20 scheme. The first is that, as Harstad has argued, because of the risk of international leakage it would be most effective to target mines with a high marginal cost that would be made economically viable by an increase in coal prices.[14] But the C20 scheme cannot do this because it will not be able to run mines on the far right of the coal supply curve at the rate of profit necessary to sustain market returns. Instead, by its own admission, the C20 has to target mines with healthy economic profiles.

The other, more serious problem is one of international fairness. If coal mines in a developing country – like Indonesia or South Africa – are targeted for closure, they will suffer a supply chain shock at the same time as the C20 squeezes returns from these mines for international investors, and coal producers in the developed world ramp-up their output to benefit from the price hike. It would effectively amount to a transfer from poor to rich countries. This is a problem with the C20 scheme in a way it is not for the ADB scheme because it aims to close coal mines while doing little to replace this lost economy activity – resulting in a net loss in terms of employment, the value chain connected to it, and the country's tax base and exports. ADB, meanwhile, intends to recycle buyout funds into investments in new clean energy generation, which, in the long run, should provide lower-cost energy and new employment.

Coal cost curve – Economically what mines should be purchased?



13 See also, on the benefits of supply-side measures, Fergus Green and Richard Denniss, 2018, Cutting with both arms of the scissors: the economic and political case for restrictive supply-side climate policies, Climatic Change, 150, p.73-87; Michael Lazarus and Harro van Asselt, 2018, Fossil fuel supply and climate policy: exploring the road less taken, 150, p.1-13 Peter Newell and Andrew Simms, 2020, Towards a fossil fuel non-proliferation treaty, Climate Policy, 20(8), p.1043-1054.

14 Bard Harstad, 2012, Buy Coal! A Case for Supply-Side Environmental Policy, Journal of Political Economy, 120(1), p.79. See also the response to Harstad In Collier and Venables, 2014, Closing coal.

The leading proposal for coordinated supply-side cuts to fossil fuel production, the 'Fossil Fuel Non-Proliferation Treaty', is expressly designed to address precisely this problem. It emphasizes burden-sharing, on the premise that 'the costs of action should not be borne disproportionately by those who have greatest ability to pay' and reflect 'historical responsibility' for emissions.[15] Nine countries account for the vast majority of the world's coal production: China, the USA, India, Australia, Russia, Germany, Poland, Indonesia, and South Africa. Proponents argue that the USA, Australia, and Germany should take the lead, followed by the upper-income economies of Russia and Poland, while South Africa, Indonesia, and India should have to act last. It is therefore striking that the C20 claimed to subscribe to the principles of the Fossil Fuel Non-Proliferation Treaty.[16] For if the C20 scheme targeted the closure of mines in Indonesia and South Africa, as it proposed to, the basic principles of fairness at the heart of that treaty would demand that it do far more to offset this negative shock. But the question is two-fold: does it have the interest to do this at the expense of returns, and can it reach the market rate returns necessary for the scheme's viability while offsetting this loss? Neither seems likely.

An equivalent question of fairness can be put to the ADB scheme. It intends to leverage public finance to de-risk its investment pool, turning early-retirement coal plants into a financial asset with market-rate returns. The context in which 'blended finance' schemes of this kind have become increasingly popular is twofold.[17] First, the fact there is neither enough climate finance flowing into the global South, nor a large enough stock of assets with which can sustain competitive market returns. Second, there has been an enormous rise in the private wealth in the global North, with the ratio of capital stock to national income rising to over 600% in rich countries.[18] The idea is therefore to attract the vast sums of private capital sloshing around the global North into climate finance schemes across the global South by, effectively, using public funds to guarantee market-rate returns. The obvious drawback is that it secures private gains by socializing the losses, at the same that that the cost of the just transition falls upon public accounts.

Absolute value: Net social value and Paris-alignment

Additionality is a relative standard. The merit of a decommissioning fund, on this view, is what it achieves relative to what would have happened in the default scenario. But this is an inadequate tool of evaluation. *Any* reduction in emissions relative to the baseline would entitle a fund to the accolade of 'additionality'. It also does not tell us how it measures against alternative interventions, though we can imagine applying the same standard to competing possibilities to ask what, in each case, their cost per unit of additional CO2 avoided is. Yet this is a question of efficiency. Of utmost importance is impact: will it curtail coal at a scale and pace commensurate with the threat of climate change? Any climate mitigation project that falls short of this *absolute* standard deserves serious scrutiny.

15 Newell and Simms, 2020, Towards a fossil fuel non-proliferation treaty, Climate Policy, p.1047-1049.

16 In a privately circulated brief, the C20 claims that as part of Its 'climate accountability regime', It Is committed to the 'principles and best practices' of, among other things, 'The Fossil Fuel Non-Proliferation Treaty'.

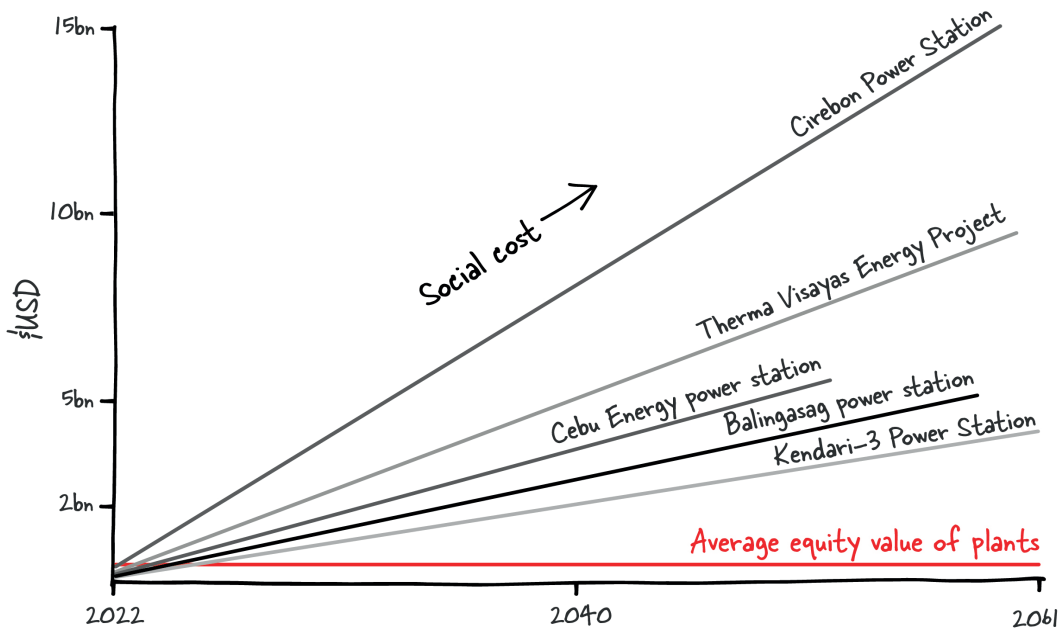
17 Daniela Gabor, 2021, The Wall Street Consensus, Development and Change, 52(3), p.429-459.

18 Thomas Piketty, Capital In the Twenty-First Century, p.204-248.

One absolute standard is 'net social value'. Consider a first approximation of the social cost of a coal plant.[19] The carbon intensity of unabated coal plants varies only slightly, producing between 94,000 and 101,000 kilograms of CO2 per terajoule of energy generated. Taken globally the average coal plant generates 1.55 million tons of CO2 per annum. At a carbon price of $100 that would put the annual social cost of the average coal plant's emissions at $155 million, or over a decade $1.55bn.[20] We can make a parallel calculation for coal mines targeted by the C20: operational thermal coal mines located in Indonesia, Australia, South Africa and the United States. For every year of operation, assuming a $100 carbon price, these mines generate an average social cost of $866m.

It is doubtful that coal plants and coal mines have ever generated returns in excess of these costs. Indeed, we compared the equity value of five South East Asia coal plants with their lifetime social costs. The results were striking: their social costs are some 33 times greater than their economic benefits. They are catastrophically value destructive. Again, it is already cheaper across most of the region to replace coal plants with renewables. This means that renewables would generate more economic value while eliminating coal power's titanic social costs. There is therefore an overwhelming case for closing these plants as soon as practically possible – not running them until 2040.

Coal plant equity value vs. social cost



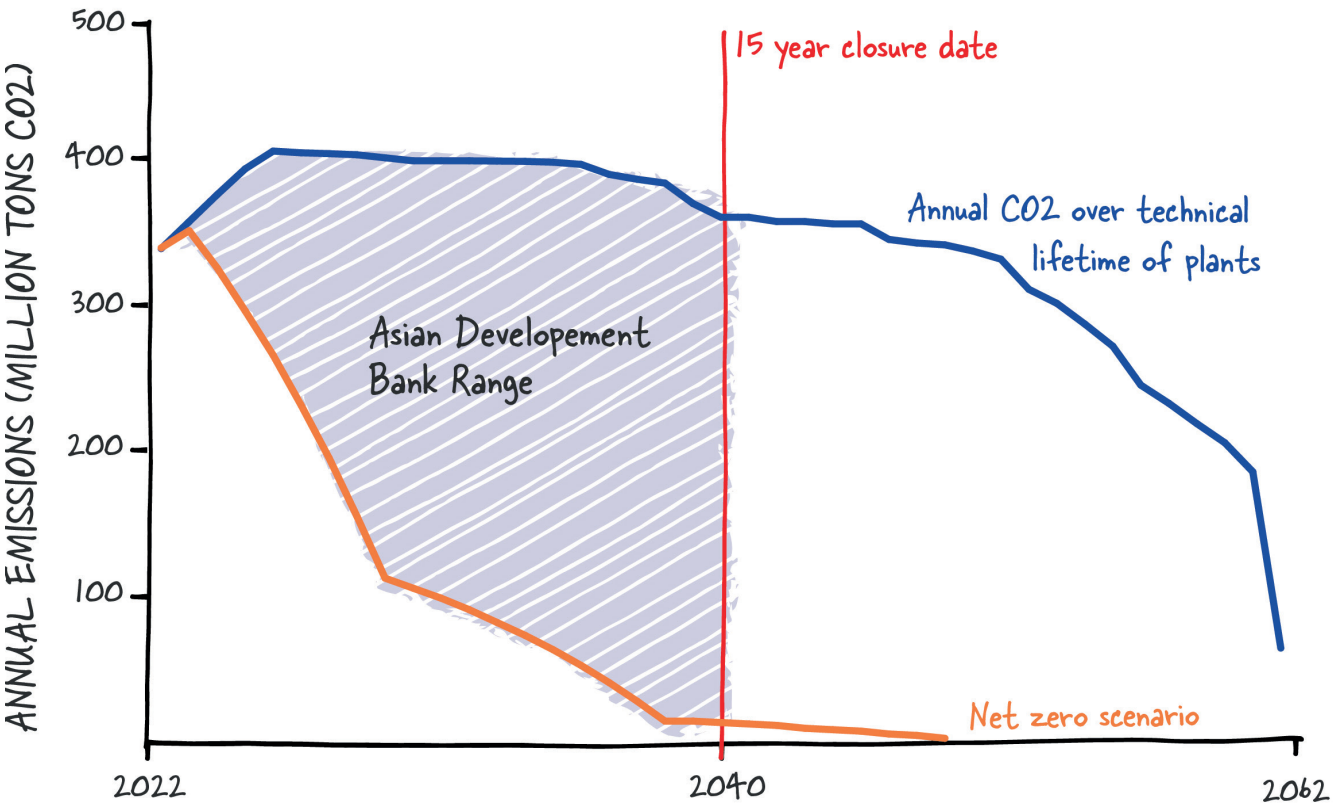
19 These figures are taken from the Global Energy Monitor's coal plant and coal mine databases.

20 We take this figure from Robert Pindyck, who In light of the deficiencies of Integrated assessment models, reaches an \We stimate of the average social cost of carbon through an analysis of a survey of experts. See Robert Pindyck, 2019, The Social Cost of Carbon Revisited, Journal of Environmental Economics and Management, 94, p.140-160. This also aligns with the figure reached by the Stiglitz-Stern commission on carbon prices.

A second absolute standard is Paris-alignment. If an intervention sets an asset, country or region on a course that *contradicts* a 1.5C pathway, then it can have little justification. Is this true of the C20 and ADB scenarios?

The ADB scheme intends to retire coal plants 10 to 15 years after purchase, which would place the date of retirement around 2035-2040.[22] In order to judge the Paris-alignment of this timeline, we model what would happen if the entire the Indonesian, the Philippines and Vietnam fleet conformed to it. We then compare this to IPCC's 1.5C scenario for unabated coal power. We find that the ADB timeline overshoots the IPCC scenario by 2bn tons of CO2, or by 166%. Given that the ADB scheme hopes to retire 50% of the coal capacity of the countries it targets, this would make it infeasible for these countries to stay within their carbon budget for coal. Instead of this 'decommissioning fund' helping to secure Paris-alignment, it would actually *block* it. Now, the C20 scheme falls behind even this timeline. One of its planning documents suggests that it would retire coal mines in 2045, a later document cites the year 2040. This would presumably include the mines it purchased in Australia and the United States, yet according to the IEA *all* unabated coal should be eliminated in advanced economies by 2030 at the latest.

ADB coal emissions trajectories



24 The 10-15 year figure is cited by both Kanak and the ADB.

Pricing Coal: Lessons from Germany

We do not need to judge the ADB and C20 schemes entirely theoretically because we have already witnessed various endeavors to decommission coal around the world from which lessons can be learned. One case stands out in particular. In July 2020 the German Bundestag ratified a law to phase out the country's coal by 2038, with a 2030 deadline now a political possibility. At the heart of the law are two mechanisms to eliminate Germany's coal fleet.

Hard coal plants were to be phased out using a series of reverse auctions running from 2020 to 2026. In these auctions the state sets the MW capacity it will purchase and a maximum price per MW that it will not exceed. Coal plant owners then submit prices at which they would be willing to sell. The state will purchase those plants starting from the lowest prices offered and going up to the highest – excluding those above the price cap – until it reaches the MW capacity that it committed to retiring at the auction. Crucially, the state increases the competitive pressure to sell by decreasing the maximum bid price accepted over time. In addition, per the phase-out law, any plant that retires after 2030 will receive no state compensation.

Lignite coal plants were phased-out in a settlement arrived at through private bilateral negotiations between the government and two private plant operators: RWE and LEAG. RWE was awarded €2.6bn to close 5GW of coal generation capacity before 2030, while LEAG was awarded €1.75bn for 3GW of capacity.

At the time of writing, Germany has completed three hard coal auctions. If we aggregate together the data released by the German Ministry of Economic Affairs, we find that the average price that it paid per MW of capacity retired was around $90,000. In stark contrast, the German government claims that under its planned compensation for RWE and LEAG's lignite coal plants, it will pay $545,000 per MW[25]. That is more expensive by a factor of six. Now, there is an important caveat: the lignite plants are entwined with mining facilities that would have to be jointly retired, and the compensation is – to no little controversy – designed to cover the rehabilitation costs of these mines. But this is scarcely a sufficient explanation for the vast difference between the size of these two buy-out prices. Instead, this reflects the different methods used to retire these two different kinds of coal plants.

Crucially, the German coal auction does not attempt to evaluate the market price of hard coal plants. It is not recompensing coal owners a sum equal to what they would lose in future revenue or equal to the market value of their assets. Instead, it redefines the property rights of coal owners, creating an artificially competitive process that forces them to sell under compromised terms. Owners must close their plants by 2038 at the latest, must sell before 2030 or face no compensation, and if they do sell, must place a bid below the auction cap at a price that can beat their peers. Given the profound moral hazard of gifting coal owners full compensation, this is arguably a reasonable approach.

This example stands in almost diametric opposition to the German government's method to arrive at buy-out prices for lignite plants. It drew up a private methodology mainly based on an estimate of the lost revenue of these plants and then used this as the basis for bilateral negotiations with both RWE and LEAG. There are two problems with this approach, negative and positive. Negatively, it means the government is not doing what it did in the case of the German coal auction: forcing owners to sell on compromised terms. The EU has since judged that this itself violates the bloc's state aid rules:

> "Given that there is no right under German law to be shielded from legal changes – not even until investment costs have been amortised – and that the protection of property rights does not cover turnover and profitability prospects, the Commission also considers it very likely that the compensation granted by Germany goes beyond appropriate expropriation compensation."

Positively, it means that the German government had to create a complex model to estimate the value of these plants. A key assumption of these estimates is that lignite companies should receive compensation equal to four or five years of plant profits. Yet does this reflect the years of plant operation lost by LEAG and RWE by entering the agreement? Internal business plans analyzed by the Oko-Institut suggest not.[26] Each of the four plants LEAG agreed with the German government to retire (in 2028 or 2029) in exchange for €1.75bn were originally planned to retire a year earlier than that (in 2027 or 2028).[27] At the same time, the German government estimated the four or five years of annual profits 'lost' by these plants on the basis of 2017-2019 power and carbon prices.[28] If it had used up-to-date prices, those profit rates would have been considerably lower.

What this emphasizes is the basic but fundamental point that prices paid for coal assets will depend on the process used to arrive at those prices. If the state is willing to proscribe the terms and length for which coal assets can be run, it can engineer a competitive buyout process that minimizes the price that has to be paid to coal owners. But if it uses a private methodology to estimate the market price of these assets – undisclosed to the scrutiny of civil society – and negotiates prices bilaterally, it will tend to inflate the compensation paid to coal owners. Indeed, Ember has estimated that without three dubious assumptions, the formula used to estimate lignite coal payments would have fallen from €4.4 billion to just €343 million – an order of magnitude difference. At worst this can become actively counter-productive, creating an artificial demand for coal assets and propping up the market. Such are the dire financial straits of coal, this charge has been levied against both the lignite and the hard coal compensation packages.

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

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

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

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

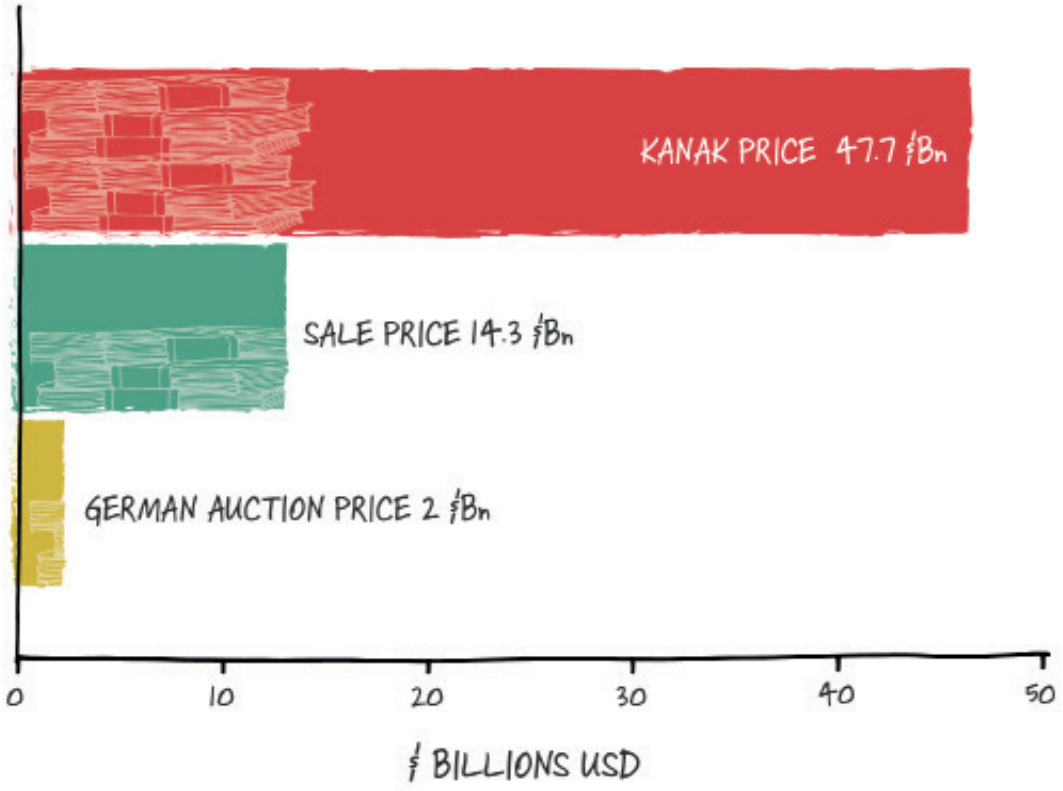
It is therefore alarming that the ADB scheme rules out the possibility of purchasing coal plants via a reverse auction in favor of private, negotiated settlements with individual owners. The reason offered is that an auction of this kind requires state legislation to redefine the property rights of coal plants owners to simulate competition, forcing the sale of assets at depressed prices. But without a mechanism of this kind, there is a high risk of over-paying. Two challenges issue from this limitation:

At worst this can become actively counter-productive, creating an artificial demand for coal assets and propping up the market. Such are the dire financial straits of coal, *both* the lignite and the hard coal compensation packages have been criticized for It is therefore alarming that the ADB scheme rules out the possibility of purchasing coal plants via a reverse auction in favor of private, negotiatead settlements with individual owners. The reason offered is that an auction of this kind requires state legislation to redefine the property rights of coal plants owners to simulate competition, forcing the sale of assets at depressed prices. But without a mechanism of this kind, there is a high risk of over-paying. Two challenges issue from this limitation:

- The ADB fund would have to formulate its own methodology for estimating coal prices.
- All purchases would depend on the unconstrained and voluntary agreement of owners.

In both cases, these challenges are reinforced by the fact that South East Asian coal depends heavily on state tariffs and long-term power purchase agreements. The terms of these arrangements are so opaque to outside analysis that a fund would find it difficult to assess the financial health of coal plants. Similarly, the book values of plants on the balance sheets of these companies bear little relation to their actual market value. Coal plant owners have every incentive to exploit this information asymmetry to game any buyout process and maximize their compensation. In any case, in light of their out-of-market support, these owners have no incentive to voluntarily sell to a fund unless they are offered sums well above their true market value. A dilemma follows. If the fund then operates these plants on a market basis, they will receive a revenue stream inferior a buyout price that reflected out-of-market support; if they enter into new power purchase agreements, they may lock in coal assets by sheltering them from future market pressures.

The cost of buying South East Asian coal at different prices



These concerns are not purely hypothetical. Donald Kanak in a white paper discussing the proposal at length, offers an estimated buyout price for South East Asian coal plants. It is instructive to compare these figures to those realized in the German coal auction. In many ways, this is a crude comparison stacked in favor of the German auction: South East Asian plants are far younger and face neither the same level of competition nor environmental regulation as European coal owners. But the sheer size of the difference is concerning. Kanak suggests a lower-bound buy-price of $1m per MW, and an upper-bound buyout price of $1.8m per MW.

The first of these figures is 12 times higher than the average buyout price of the German coal auction; the second is some 21 times higher. At the absolute least, this suggests that any methodology and mechanism put forward to buyout coal assets should be placed in the public domain and subject to rigorous independent scrutiny from civil society.

Misaligned incentives

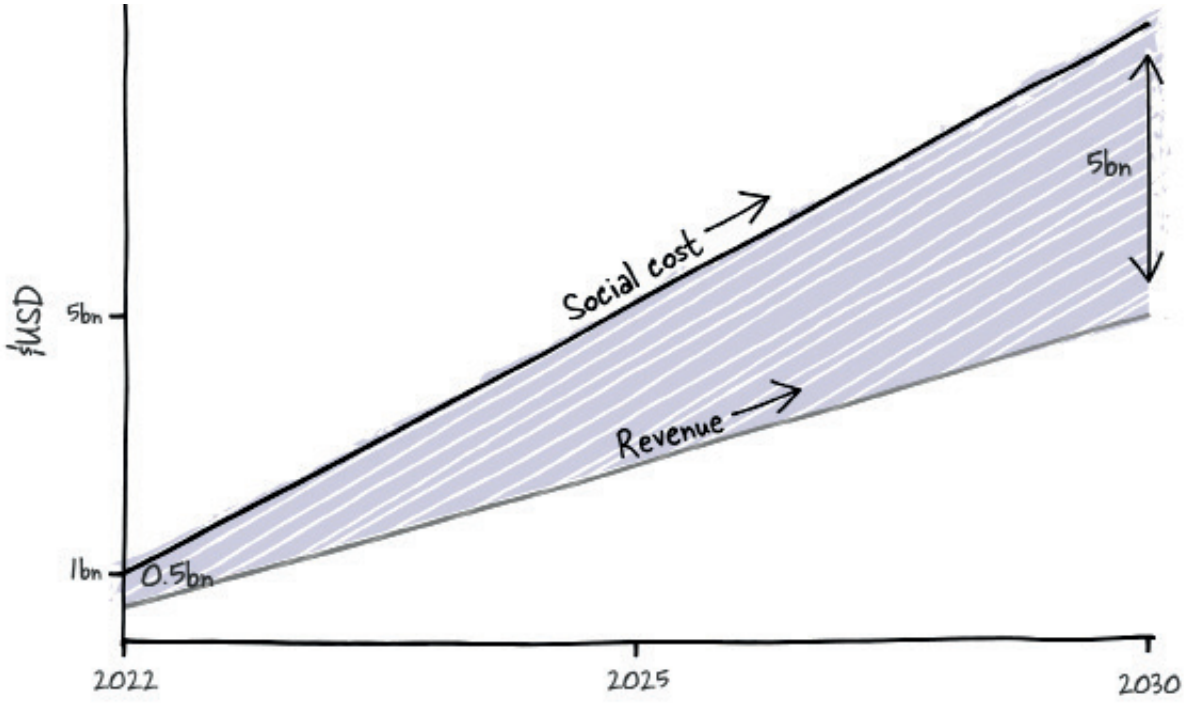
A vehicle established to phase-out coal should, plainly, have incentives commensurate with that task. In this regard, we run up against a fundamental contradiction in the ADB and C20 schemes. As investment vehicles, their raison d'etre is to secure market-rate returns for their funders. They must maximize their revenue and profits extracted from the production and combustion of coal and minimize any cost that would undercut that flow of returns. What benefit they have as 'decommissioning' vehicles is simply that they enjoy lower borrowing rates, which means they can refinance coal assets and pay down their debts at a faster rate than their original owners. Otherwise, their incentives are orthogonal to the actual task which gives them their name.

Firstly, if every year that these assets continue to operate comes at a vast net social loss *and* they can be replaced by lower-cost renewable capacity, then there is an overwhelming case that they should be retired as soon as possible. It would serve the global public good and deliver cheaper energy to local citizens in the long run. But the incentives of these funds are not set by the absolute standards of the global public good or the Paris Agreement, but by the market. C20 proposes operating coal mines until 2040-45, and the ADB scheme intends to operate plants deep into the 2030s. They can do nothing else: these are the dates at which the value extracted from these assets will have accumulated to meet market-rate returns.

In this sense calling these projects 'decommissioning funds' is a misnomer. Their purpose is not different in kind from other coal investors: to produce and combust coal to generate a profit. What is different is a matter of degree, of how long they will run their assets into the future: for one to two decades, instead of two to three. It is worth noting that from 2016 to 2020, Citi lent over $6bn to coal companies. This activity has not stopped.[29] In September 2021, Citi led a facility to helped raise $313m for Yancoal, in loans that will run until 2024 and 2026. Yancoal owns 909m proven reserves of coal, most of which is thermal coal. From 2016 to 2020, HSBC, a key backer of the ADB scheme, lent $3.4bn to coal power companies alone – owners of the very plants the ADB scheme presents as a problem. This is not only a problem of credibility for these actors, but raises serious conflict of interest questions.

29 The gross figures that follow are from Rainforest Action Network et al., 2021, Banking on Climate Chaos: Fossil Fuel Finance Report 2021.

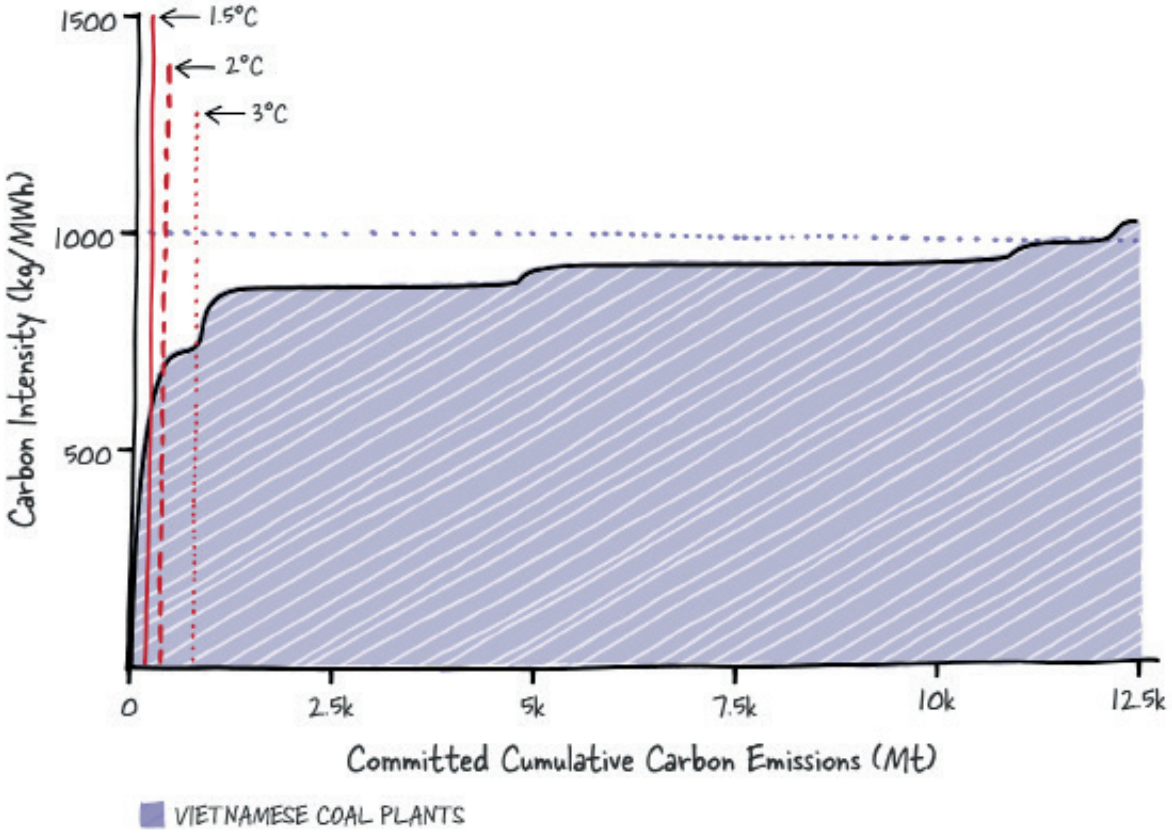
Cumulative revenues vs. cumulative social costs: 5 Indonesian and Philippines coal plants



Secondly, not only do these funds have misaligned incentives when it comes to their continued operation of coal assets, but also with respect to *which* coal assets they prioritize the purchase of in the first place. The lowest value coal assets are those which are most carbon-intensive, that produce more emissions for each dollar generated. This maps onto their ratio of costs and benefits: they produce more costs via emissions for each dollar of benefit. But carbon intensity is also a marker of economic inefficiency, and these assets tend to generate lower profits. We saw in the case of the C20 scheme ideally it should purchase high marginal cost mines, the reason being that it would be *these* assets that the premature retirement of mines would help to make profitable – by decreasing the supply of coal it would push up its price and make previously uneconomical reserves viable. By targeting these mines, it would forestall this supply-side leakage. But it cannot do this, for it has to purchase low marginal cost mines that promise the highest returns to investors.

A similar logic applies to the ADB scheme. In 2018 a team of researchers at the Oxford Smith School estimated the proportion of South-East Asian countries' coal plants whose lifetime emissions are compatible with a 1.5C scenario. The results for Vietnam, one of the prime targets for the ADB fund, are reproduced below. It shows that only the very *least* carbon-intensive coal plants in Vietnam are consistent with the country's carbon budget under a 1.5C scenario; the other 87% of comparatively more carbon-intensive plants are all incompatible with that standard. *Yet it is precisely these highly profitable low-emitting plants that the ADB scheme would prioritize purchasing to maximize its returns.* In other words: its incentives would push it towards retiring the only plants in the country that are consistent with a 1.5C world, while treating the other 87% of plants as secondary.[30]

Vietnam Carbon Lock-in Curves



Thirdly, central to the ADB scheme is recycling buy-out funds into new renewables. But this has the unfortunate upshot that the sums the fund pays into new renewables are directly dependent on and proportional to the amount paid to coal owners for their plants. Yet in reality the compensation given to coal owners should be minimized. They are knowingly responsible for the grossly harmful activity, and to offer them large compensation packages creates a dangerous moral hazard. It sugagests that, in the future, investors can knowingly invest in dangerous activities safe in their knowledge that if the state does intervene to curtail the activity, their profits will be protected.

30 The data and graph is a replication of one produced by the Oxford Sustainable Finance Programme at the University of Oxford Smith School of Enterprise in the paper Carbon Lock-in Curves and Southeast Asia, p.18

Fourthly, because these funds are investment vehicles acting in the interests of their funders, they have an incentive to maximize the share of their income going to capital over labor. This takes on a special concern in the case of a decommissioning fund because it intends to help retire these plants and lay-off its workers. A basic and widely recognized principle is that the climate transition should be a *just* one, that it can support, retrain and reconstruct those communities currently depending upon the fossil fuel economy. The ADB and C20 schemes both claim that some fraction of their returns will be rechannelled to support the just transition, but neither specifies what this would amount to as either a fraction of its income or in absolute terms. At the same time, the Rocky Mountain Institute (RMI), rightly, suggests that states will have to step in to cover most of the social costs of this transition. But if international investors are supported by state financing to extract value from coal plants that continue to operate *despite* their enormous social costs, should they be able to dislocate these communities without meeting the cost themselves? If so, the public interest would be injured on all three grounds.

Taken together, this suggests that the fact the ADB and C20 schemes would violate a 1.5C scenario, and operate despite generating enormous harms, is not just incidental. It is a mistake in their blueprint that cannot easily be remedied. Instead, it follows from the intrinsic design of these proposals, the idea of a private fund, buying of individual coal assets, and running them down for a profit. They do promise significant additional emissions reductions. But this is because South East Asian states lack coal phase-out policies, meaning that the baseline scenario against which these schemes are judged is one in which coal is untethered, free of any concerted attempt to allay its operation. Accordingly it is important to ask whether a different intervention, led by a public and not a private fund, could do better.

Could a public fund work better?

A public fund would, by its nature, be able to act on the public good and not just private returns. As we have seen, an effective asset-purchasing scheme requires concerted intervention by the state in whose jurisdiction it operates. In Germany, the state redefined the property rights of the owners of hard coal plants, setting a deadline for eliminating all plants, and offering constrained and diminishing compensation leading up to that date. It was this which made a reverse auction possible. For the same reason, a state would have the authority to retire coal assets in the near-term, instead of drawing out their emissions over the next two decades.

Absent the need to profit from these plants, it could prioritize the retirement of the most carbon inefficient units, instead of the least, and minimize the compensation paid to coal owners. Perhaps more importantly still, a public fund would be able to act not at the level of individual entities – buying coal assets piecemeal, one-by-one – but at the level of the entire system. It could integrate the phase-out of coal into a national transition strategy so that it dovetailed with its vision of the just transition, the build-out of new renewables, and its economic circumstances.

A public fund therefore begins to assume several intrinsic virtues lacking in a private, investor-based fund. But what might its design be? The simplest option would be for South East Asian states to legislate to progressively outlaw coal, while setting up not a coal decommissioning fund, but a fund to attract global climate finance to a program of renewable investment. This would bypass the need to combust coal for decades into the future, avoid enormous social costs and, in the long-run, provide the country with cheaper electricity. Given that renewables promise far better returns than coal – especially with supporting grid reform – there is no reason why this would not offer better returns to investors and thus attract larger amounts of capital. This capacity would be designed to come online in sync with the phase-down of coal.

Despite all this, a plan of this kind risks misallocating scarce public funds. Renewables projects in South East Asia are cost-effective enough that they have the potential to attract large sums of private capital, as long as there is the grid reform, tariff structure, and state economic incentives and subsidies to support it. Transversely, writing-off coal plants – the majority of which sit on the balance sheets of national utilities – is a significant fiscal burden in the short-term. Developing countries will be loath to let go of this sunk capital and the coal value chain built around it. It may therefore be strategically prudent to focus public funds on reforming the energy system, and meeting the economic and social cost of winding down coal, such that a renewables programme can then mobilise private capital.

Another option would be the creation of an international decommissioning fund by a coalition of states. If the principal reason why international investors are able to support the premature retirement of coal assets is their lower cost of capital, the borrowing rates available to the governments of rich countries is significantly lower still. This alone would allow an international fund to achieve earlier retirements. But add to this the fact that an international public fund would not need to operate these assets up to the point at which they realize market-rate returns. Instead, their aim could simply be to break even. As public actors, they would recognize the enormous net social benefit involved in the premature retirement of these assets. Reducing emissions is a global public good, which raises well-known collective action problems: individual actors are under-incentivized to reduce emissions because they only reap a minuscule fraction of its benefits, which are spread around the world. But a global public fund would not succumb to this problem; it would be of a scale equal to the task.

At COP26, a coalition of developed states came together to lend $8.5bn on concessional terms to South Africa to aid its climate transition. The exact terms and uses of these funds will be decided over the next year. But one of its principal inspirations is a proposal mapped out by the Cape Town think tank, Meridian, named the 'Just Transition Transaction'. This proposal repays careful attention as a model for South East Asia.

A signal advantage of the Meridian proposal is that it recognizes that rebuilding the entire energy system of a developing country can only be understood at a systemic level. In the case of South Africa, the fundamental obstacle to the climate transition is *not* the retirement of any individual coal plant, or whether there is a market for new renewables.

Instead, it is that the South African energy system is, at present, structurally incapable of undertaking the transition. Eskom, the country's national utility, presides over an aging, inefficient and expensive coal fleet. It has run up debts of R400bn, which, despite repeated government bailouts, threaten to spiral downwards into a debt hole that could drag South Africa into fiscal crisis. Added to this financial barrier is a potent social one. South Africa has a coal sector concentrated in the region of Mpumalanga, employing 12,000 workers in Eskom's power stations and some 80,000 workers in coal mining. Any coal phase-out could cast the region into turmoil at a time when the national employment rate already surpasses 30%.

The Just Transition Transaction is so-called because it is conceived of as a grand bargain between the South African state and a multilateral facility established by developed countries. On the one hand, South Africa would receive concessionary debt, giving it the fiscal space to create a financial and social environment that allows It to transition. It would first use this debt to unbundle and recapitalize Eskom to bear the cost of writing-off coal plants from its balance sheet and affect the grid reform necessary to any renewable build-out. It would also create an annuity with the concessional portion of this debt to capitalize on a just transition fund to help support Mpumalanga through the transition. On the other hand, South Africa would be entitled to a concessionary rate on this debt directly proportional to the emissions mitigation it achieves in practice. Meridian envisions this working as follows. If the multilateral facility raised the capital with the backing of the developed country sovereigns at an interest rate of 1.5%, it would then extend this to the South African government at 5.5%. South Africa would receive a concessionary reduction on this interest at a rate of $7 per ton of CO2 that it reduces - relative to the baseline scenario. If South Africa brought its emissions fully into line with its 1.5C national strategy, the debt would become fully concessionary: South Africa would pay interest at a rate of 1.5%.

Essential to this bargain is that the purpose for which capital is lent is not as an investment in an interest-bearing asset. Rather, viewing South Africa's energy system as a cohesive whole, it lends that capital to the South African government so that it can strategically intervene to create the social and financial conditions for the country's just transition. Meridian estimates that given the country's rich renewable potential, it will have little problem in raising the capital necessary for this part of the transition on the market. Yet both elements of this transition, concessionary and non-concessionary, belong to a single national plan, and it is on the strength of this plan that developed countries are willing to lend.

Developed countries are willing to do this because, as governments, they can set the public good of avoided emissions against the cost of conceding the interest on their debt. Indeed, in terms of its social cost, this scheme offers extraordinarily favorable terms: $7 per tonne of CO2 avoided would make this one of the cheapest means of carbon abatement available. At the same time, because these concessionary funds are provided in proportion to the actual mitigation achieved by South Africa, the incentives created by this facility map directly onto their public interest.

Conclusion

In sum, we conclude of the ADB and C20 schemes:

- They exhibit severe problems around fairness. By choosing South Africa and Indonesia as two of its four targets, the C20 scheme would damage these economies, squeeze profits from these mines for international investors, and hike prices to the benefit of developed country mines. The ADB scheme depends on the socialization of its losses by public de-risking funds. Neither scheme is able to fully support the transition of workers and communities connected to the assets they intend to decommission.
- They violate two absolute standards of climate action. These assets would continue to operate for decades in order to provide the ADB and C20 funds with market returns. But these profits are dwarfed by the social cost of emissions which they inevitably depend on. In the case of the ADB scheme, these costs are 33 times greater than the financial benefits. Both schemes blow past a 1.5C trajectory for unabated coal in South East Asia.
- They risk massively over-paying coal owners. Coal assets can only be bought at a reasonable price if states introduce a phase-out policy foreclosing possible future returns, forcing owners to sell under compromised terms. Without this, any buy-out depends on transparent price discovery and bilateral negotiations. South East Asia is not a promising target for this given its dense web of tariffs and power purchase agreements, allowing owners to conceal the true financial value of their assets and demand prices factoring in the subsidies they currently enjoy.
- They founder on a contradiction intrinsic to their design. As private funds buying out individual assets, they have to run those assets on a market basis to secure returns for their investors, and cannot integrate their efforts into a coordinated national strategy designed to overcome systemic hurdles to the transition. This means they cannot retire coal assets early enough, buy the most polluting assets, or support a just transition.

In contrast, we conclude that the Just Transition Transaction proposal has four virtues absent in the ADB and C20 schemes, it:

- takes a systems-level perspective of the energy transition, focusing on dissolving the critical barriers to broader reform.
- works at a scale commensurate with the systemic character of the challenges, collaborating with states on the basis of their coordinated transition strategies.
- involves public actors willing to accept the social benefit of avoided emissions as part of the compensation for their capital.
- sets incentives directly aligned with – in fact, defined by – the actual reduction in emissions related to the baseline scenario, up to a 1.5C pathway.

Appendix 1

Indonesian coal companies	% revenue from coal	$m market capitalization	$m revenue	Price to tangible book value per share
PT Baramulti Suksessarana Tbk	100%	805	331	4.1
PT Harum Energy Tbk	100%	1,996	158	4.3
PT Alfa Energi Investama Tbk	100%	44	76	1.7
PT Golden Eagle Energy Tbk	100%	45	15	0.9
PT Borneo Olah Sarana Sukses Tbk (BOSS)	100%	7	12	-4.6
PT Bara Jaya Internasional Tbk	100%	84	3	-
PT Bumi Resources Tbk	100%	351	790	-0.7
PT Resource Alam Indonesia Tbk	100%	95	72	1
PT Bayan Resources Tbk	100%	6,081	1,395	4.9
PT Toba Bara Sejahtra Tbk	100%	655	332	2.6
PT Bukit Asam Tbk	100%	2,234	1,234	1.5
PT Atlas Resources Tbk	90%	54	42	-2.1
PT Trada Alam Minera Tbk (TRAM)	90%	174	314	-
PT Adaro Energy Tbk	90%	5,401	2,535	1.6
PT Mitrabara Adiperdana Tbk	90%	306	201	2.1

Appendix 2

Plant	Remaining lifetime	MW capacity	2020 revenue per year ($m)	Social cost per year ($m)	Plant equity value ($m)	Kanak's value estimate ($m)[44]	Social cost over the remaining lifetime ($m)
Balingasag power station[31]	37	165	109	134	93	165-297	4,962
Cebu Energy power station[32]	30	246	150	179	821	246-443	5,424
Therma Visayas Energy Project[33]	39	340	165	238	231	340-612	9,298
PT Cirebon Electric Power[34]	38	1,584	117	390	690	1,584-2,851	14,820
Power Kendari[35]	40	100	0.5	100	88	100-180	4,000

The annual social cost of carbon for each plant is applied by multiplying its emissions by a $100 carbon price. For each plant, we then establish its lifetime social cost by multiplying this annual figure by its scheduled remaining lifetime. We then, again for each plant, divide this lifetime cost by their equity value. This gives us the ratio of social costs to economic benefits for each plant. We take the $100 carbon price from Robert Pindyck's judicious survey, which also aligns with the figure reached by the high profile Stiglitz-Stern report.

Donald Kanak, the progenitor of the ADB scheme, estimated that each MW of South East Asian coal capacity could be bought out for between $1m and $1.8m. We multiply these figures by the MW capacity of each plant to show the range of what their buy-out prices would be if Kanak's figures were applied.

31. Balingsag power station: Revenue Page 7, Equity Value
32. Cebu Energy Power social cost: Revenue Page 7, Equity Value (world bank)
33. Therma Visayas Energy Project: Revenue Page 7, Equity Value (ijglobal)
34. Cirebon Power Station: Revenue Page 260, Equity Value (world bank)
35. Kendari-3 Power station: Revenue Page 474, Equity Value (ijglobal)

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About Universal Owner Initiatives

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

More information can be found here: https://www.universalowner.org/

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Driving investor impact