

Designing Coal Retirement Mechanisms for Equity and Impact



He who rides a tiger is afraid to dismount.
Chinese proverb

Phasing out coal from the electricity sector is the single most important step to get in line with the 1.5-degree goal.

U.N. Secretary-General António Guterres

International Climate and Policy Campaign

1. Executive Summary

Coal-burning is the world's largest source of electricity production. It is also the largest source of carbon emissions. If the world is to avoid catastrophic levels of climate disruption, it has to stop—soon. Power generated from unabated coal plants must be reduced 80 percent below 2010 levels within this decade, and eliminated entirely by 2040, to keep the Paris Agreement's 1.5 degrees Celsius (2.7 degrees Fahrenheit) temperature goal within reach.

Neither natural attrition nor market forces will cause coal plants to retire fast enough to meet these goals. Ambitious, creative public policies are urgently needed. Towards this end, in addition to the traditional regulatory approaches, governments, funders and other stakeholders have begun to advance innovative financial mechanisms to facilitate retirements. These include “pay for closure,” debt refinancing, and asset purchasing (“bad bank”) mechanisms.

If they are well-designed and implemented, these coal retirement mechanisms hold much promise. They can unlock retirement opportunities, ensure that retired plants are replaced with clean energy, support a just transition for affected workers and communities, and provide a means for benefits and costs to be fairly distributed among stakeholders. But they can also go badly wrong by wasting public resources on expensive or illusory emissions reductions, or by neglecting the voices and interests of workers, communities and other stakeholders.

In order to be effective and politically credible, these retirement mechanisms must be intentionally designed with two core values in mind: equity and impact. They must deliver substantial climate and other public benefits, and they must do so in ways that are broadly seen as fair, equitable, and reparative. That requires both clear policies for avoiding ineffective or inequitable outcomes, and inclusive and transparent processes for negotiating solutions and defining overall objectives.

To maximize equitable outcomes and inclusive decision-making, coal retirement mechanisms should:

1. Prioritize the interests of stakeholders over those of owners.
2. Prioritize retirements of the dirtiest plants, and those in the most vulnerable and most polluted communities.
3. Use inclusive processes to ensure a just transition.
4. Support site cleanup and reuse.
5. Ensure that worker protections and community benefits are actually delivered.

To maximize impact, coal retirement mechanisms should:

1. Support retirement, not divestment.
2. Support retirements only in jurisdictions that have stopped building new coal plants.
3. Benchmark “early retirement” against the 1.5°C global phase-out pathway and the expected retirement dates of individual plants.
4. Replace coal generation only with clean resources—no coal-to-gas.
5. Use competition to limit the risk of overpaying for closure.
6. Front-load payments to accelerate retirement.
7. Ensure that proposed agreements, and the assumptions underlying them, are subjected to public scrutiny and comment.
8. Avoid creating carbon credits or offsets.
9. Limit leakage and perverse incentives.
10. Catalyze, and not impede, broader reforms.

2. The Coal Retirement Imperative

Coal as a source of electric power is in terminal decline. Increasingly more expensive than renewable energy, it is also rapidly losing political support due to its disastrous effects on the global climate, local environments, and public health. As a result, financing for new plants is becoming increasingly scarce, the pipeline of proposed plants is shrinking fast, and retirements of existing plants are growing steadily in countries that belong to the Organization for Economic Co-operation and Development (OECD).

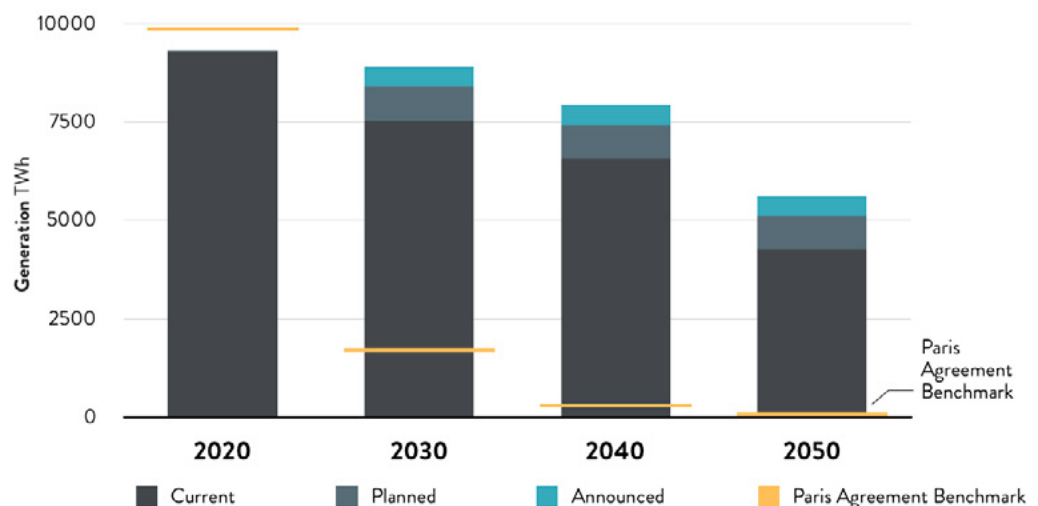
Still, coal remains the largest source of electric power generation around the world,¹ and the largest single source of carbon dioxide pollution.² Even if no new coal plants were ever built, the continued operation of the existing fleet would ensure a catastrophic level of climate disruption. In fact, U.N. Secretary-General António Guterres has pointed out that phasing out coal from the electricity sector is “the single most important step” the

world must take to stay within the Paris Agreement’s 1.5°C temperature goal. To meet that target, power from unabated coal plants must fall 80 percent below 2010 levels by 2030, with developed countries ending their coal use by that year and the rest of the world closing their plants by 2040, at the latest.³

Attrition alone will not meet these targets. Many of these plants are relatively young, and will need to be retired well before the end of their engineered lifetimes. Nor will market forces do the job. It is already cheaper to build renewable capacity with battery storage than to operate almost 40 percent of the world’s existing coal capacity, and this “uneconomical” share of global capacity will increase to almost three quarters by 2025. But over 90 percent of the world’s coal plants operate in regulatory environments that partially or completely insulate them from competitive pressures, or are bound by long-term contracts that impede retirement.⁴

World’s Coal-Based Power Generation Incompatible with Paris Agreement Benchmarks

Climate Analytics⁵



3. New Policy Option: Coal Retirement Mechanisms

What’s needed, then, are ambitious and creative public policies aimed at both accelerating and smoothing the transition from coal to clean energy. In the past, national governments, subnational governments, and utility regulators have used a range of policies to accelerate the phase-out or reduce the utilization of existing coal power plants and begin to transition to clean energy. In some cases, they have simply mandated closure. In others, they have reduced the incentives to continue operating by disallowing the owner from earning a profit, imposing a carbon price, taxing coal, eliminating subsidies, or raising pollution control standards. They have also

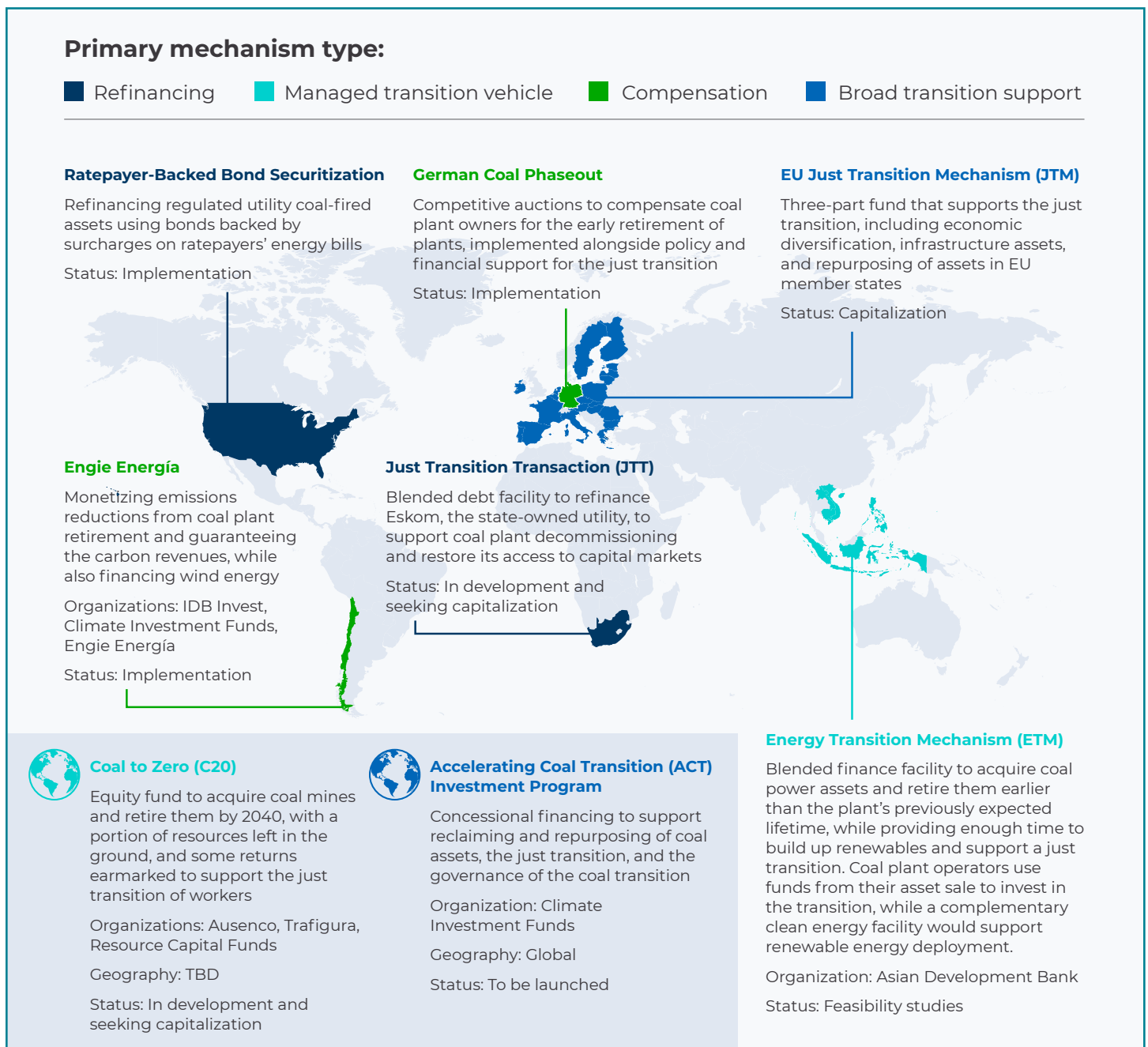
used renewable portfolio standards, feed-in tariffs, and competitive planning and procurement to increase investment in clean energy and move coal offline.⁶ However, these approaches have had less success in noncompetitive environments, and have often failed to address the interests of workers and communities who are harmed by the reduction in coal production and generation.

In response to the challenge of closing plants in non-competitive markets, governments and stakeholders have begun to advance innovative financial approaches to accelerate and ease the transition from coal to clean

energy. Recently, financial approaches have been used to accelerate closures in Germany and in US states like New Mexico. And new mechanisms are being explored by Climate Investment Funds (CIFs),⁷ the Asian Development Bank (ADB),⁸ and several private sector actors.⁹

These retirement mechanisms fall into three broad categories. First, some mechanisms use grants to “pay for closure.” These payments can be provided in the form of cash, debt forgiveness, or even concessional rates on new debt to finance replacement renewable energy. Second, other mechanisms refinance existing loans at lower

rates, so owners do not need to continue operating their plants to pay off outstanding debt. Low-cost capital for refinancing can come from the government or multilateral financing institutions, from investors (through the issuance of green bonds), or from ratepayers (through “ratepayer-backed bond securitizations”).¹⁰ Third, still other mechanisms are ownership-based. They use a “bad bank” model to purchase plants or mines and expedite their closure. Investors in the “bad bank” are paid back from revenues the plants earn before they retire, and the existing owners must invest the proceeds in new renewable energy projects as a condition of sale.¹¹



RMI Map¹²

Coal retirement mechanisms expand the universe of policy options available to policymakers to accelerate closures. They are flexible and modular; they can be tailored and combined in numerous ways to overcome the particular barriers to closure facing any individual plant or fleet of plants. For example, refinancing can be done at the plant or portfolio level.¹³ Public and private funding can be blended to lower the cost of debt in refinancing mechanisms,¹⁴ or the cost of capital in “bad bank” mechanisms.¹⁵ And transactions can be structured to address the incentives and obligations of any type of owner—including state-owned enterprises, regulated monopolies, independent power producers operating under long-term power purchase agreements, and merchant operators.¹⁶

To be effective, these mechanisms must address the full range of issues associated with the rapid transition from coal. In addition to accelerating retirement, they must also facilitate the transition to clean energy, address the

social and economic effects of the transition, allocate benefits and costs fairly, and include the concerns of marginalized and vulnerable populations who are affected by the transition—and who are often excluded from these decision-making processes.

Mechanisms that do not address this entire suite of issues are unlikely to earn broad public support. Worse, they risk setting bad precedents that can jeopardize the prospects of using similar policy approaches elsewhere. Because these approaches are unfamiliar and relatively unproven, the successes and shortcomings of each early effort will be seen to define the opportunities and risks of subsequent initiatives. Mechanisms that fail to deliver real climate benefits, drastically overpay for carbon reductions, or produce outcomes that are perceived to be unfair risk poisoning the well for other efforts to use coal retirement mechanisms to accelerate closure.

4. Designing for Equity and Impact

In a recent paper, RMI, the Sierra Club, and Carbon Tracker proposed a three-pronged strategy for using financial mechanisms to accelerate coal phase-outs. We argued that these mechanisms should: 1) accelerate plant closures; 2) reinvest in clean energy to replace the retired capacity; and 3) invest in a just transition for affected workers and communities.¹⁷

But even within this framework, a lot can go wrong. Scarce public resources may be wasted for little benefit, plant owners may be overcompensated or rewarded for bad behavior, and the interests of workers and communities may be neglected. Also, resources and costs may not be well-balanced across the elements of the package, nor fairly allocated among the broad range of stakeholders with divergent interests.

To avoid these pitfalls, coal retirement mechanisms must be designed to advance two bedrock values: equity and impact.

That is, they should deliver substantial climate and other public benefits, and they must do so in ways that have equitable outcomes, repair damage to affected communities and ecosystems, and are seen as fair by those who are affected.

Focusing on equity means providing benefits to affected

workers and communities that reflect their own priorities. It means ensuring that plant owners pay a fair share of the costs, and are not gifted with windfall profits. It means prioritizing closure in marginalized communities that bear disproportionate pollution burdens. And it means making key decisions—such as how benefits, costs, and risks will be distributed, and how sites will be reused—through inclusive, participatory, and transparent processes in which all stakeholders have a voice, including those who have historically been marginalized or excluded.

Focusing on impact means eliminating significant amounts of carbon and other pollutants more rapidly than would have happened anyway. It means not wasting public money by overpaying for reductions. It means ensuring that claimed reductions are real and additional, and not offset by increased emissions elsewhere on the grid or in other sectors. And it means facilitating broader reforms in the electricity sector that may be necessary to achieve climate and other public policy goals.

Equity and impact are bound together in multiple ways. First, because the burdens of climate change fall heaviest on the poorest and most vulnerable, wasted mitigation efforts harm them the most. Maximizing impact, therefore, advances climate justice. Second, overpaying owners for closure not only wastes limited public resources, it is also fundamentally unfair. In many cases, owners invested in plants with full knowledge of their disastrous climate and public health effects, and their stranded asset risks. It violates both the “polluter pays” principle and basic

intuitions of fairness to allow them to now profit from closure. Third, there is the matter of opportunity costs. Every dollar wasted on illusory reductions or overpayments to owners is a dollar that could have gone to helping workers and communities thrive after the transition. Finally, advancing equity is critical to enhancing impact. Even the most ambitious retirement transaction may not gain political support if owners profit unduly, communities are not well-supported, or the transaction is otherwise seen as fundamentally unfair.

To deliver high-impact, equitable outcomes, coal retirement mechanisms must be intentionally designed with those outcomes in mind. That requires both clear policies for avoiding ineffective or inequitable outcomes, and inclusive and transparent processes for negotiating solutions and determining the allocation of benefits, costs, and risks across stakeholder groups.

Can paying for retirement ever be fair?

Some critics have challenged the whole notion of using financial mechanisms as ethically suspect. They see these mechanisms as potential bailout schemes that allow plant owners to evade the consequences of their bad decisions. After all, many of these investments occurred with full knowledge of the urgency of the climate crisis, the dire public health effects of burning coal, and the near certainty that the facilities would become more expensive than cleaner alternatives long before they would be taken out of service. Wouldn't it be more fair, they ask, for regulators to simply force these plants to retire and put the costs on shareholders, who have explicitly assumed that risk?⁵⁷

It's a good question. There is no doubt that owner accountability should be an important consideration when evaluating policy options to speed retirement. But the desire for accountability should be tempered by two other equity concerns. First, there is the imperative to take urgent, immediate, and effective action to address the risks coal poses to public health and our climate. Regulatory approaches that require owners to absorb the costs of retirement and a just transition for workers and communities may not be politically feasible in the near-term. Owners may have excessive influence over government regulators; they may even be the government itself. Or, they may have legal claims to cost recovery and expected returns that could take years to resolve. If financial approaches can be used to circumvent these barriers and achieve the most critical outcomes in a timely manner, should we let the desire for polluter accountability stand in the way?

Second, prioritizing accountability may not actually serve the interests of those who are most harmed by the continued operations of a coal plant—both locally and globally—and who therefore have the strongest interest in seeing it retire early. Someone who struggles

to breathe whenever the wind blows from the plant is unlikely to be overly concerned with whether the costs of closure are borne by shareholders, customers or taxpayers. Nor do the world's most climate-exposed people have much invested in the allocation of these costs among foreign interests. In both of these scenarios, the people who suffer the worst effects just need to see the plants shuttered, so that the harm being caused to them will recede.

A rigid focus on accountability may also not be in consumers' best interests. They, not owners, are often the primary beneficiaries of well-structured mechanisms. In rate-regulated markets, refinancing can relieve customers of the obligation to buy expensive power from uneconomical coal plants, and provide investment capital to allow those plants to be replaced by cheaper renewables. Similarly, direct payments for emissions reductions can be passed on to customers in the form of reduced electricity bills, rather than retained by owners as windfall profits.⁵⁸

From an equity perspective, there are multiple ways that financial mechanisms can go wrong. But that is true with regulatory approaches as well. The advantages and disadvantages of using financial mechanisms should always be carefully weighed against those of using other regulatory approaches. And that comparison must include a clear-eyed assessment of the political feasibility of implementing each option. Because the interest in accountability may conflict with the need for urgency and ambition, and even environmental or climate justice, financial mechanisms should be an available option to accelerate closure. Accountability is important, but impact, effectiveness, speed, and fairness to workers, communities, and other stakeholders should be prioritized.

5. Key Design Principles to Achieve Equity and Impact

A. Designing for Equity

Owners, consumers, workers, frontline communities, taxpayers, and the public may all have different interests and preferences regarding coal retirements. Coal retirement mechanisms must ensure the fair allocation of costs and benefits among these groups.

The closure of a coal plant or mine can be particularly disruptive to local communities, causing job losses, reductions in local tax revenue, and the loss of social services and local amenities. Equitable outcomes must therefore prioritize the needs of workers and communities. Owners should pay a fair share of the costs, and should not reap undue profits. And decisions on the allocation of costs and benefits should be made through transparent and inclusive processes in which all stakeholders have a voice, including those who have historically been marginalized or excluded.

1. Prioritize the interests of stakeholders over those of owners. The overall objectives of a retirement transaction will depend on its specific circumstances and the preferences of those who are affected. But a bedrock principle should be that consumers, workers, and host communities will be the primary beneficiaries. The goal should be to leave them better off—paying less for electricity; living in cleaner, more vibrant communities; working in higher-quality, more rewarding, and better paying jobs.

The benefits that accrue to owners, on the other hand, should be minimized. To vindicate the “polluter pays” principle and avoid the moral hazard of overcompensating owners for bad decisions, owners should receive only the least support necessary to secure closure.

For example, where the government provides direct support for reduced emissions, those payments should be passed on to stakeholders in the form of cheaper electricity, or used to support a just transition for workers and local communities, not retained by owners as windfall profits. The same is true where refinancing the debt of an expensive coal plant enables its replacement by cheaper renewables.

Colorado’s new securitization law sets statutory limits on the ability of owners to profit from retirements, while ensuring that benefits flow to consumers and the public. Under the law, a utility earns no returns on the retirement transaction, and cannot own more than 50 percent of the new resources that replace a retiring plant.

Independent clean energy companies will own—and profit from—the rest. Colorado’s policy also ensures that customers benefit from the savings unlocked by refinancing coal debt, and creates a mechanism for proceeds from securitization to go directly to communities affected by coal plant retirement. These community transition funds are administered separately, with significant input from affected communities as to how those funds will be spent.¹⁸ While this statutory regime has the potential to deliver substantial consumer and community benefits, it has not yet been implemented.

2. Prioritize retirements of the dirtiest plants, and those in the most vulnerable and most polluted communities. In addition to contributing to global climate-change pollution, coal plants and mines can also emit a toxic stew of dangerous pollutants into the surrounding air and water.¹⁹ Too often, these facilities are concentrated, along with other public health threats, in poor, racially or ethnically marginalized communities, compounding the negative effects on those who are least able to endure them.

Generally speaking, the worse a facility’s effects on human health, and the more those effects fall on marginalized or politically disempowered communities, the stronger the equity case for early retirement. Prioritizing the closure of these plants also advances equity, because these environmental justice communities are often the ones most in need of the clean energy investment, redevelopment funding and just transition assistance that should accompany closure.

One might expect that allocating payment for closure on a competitive basis would naturally prioritize the oldest, least efficient, and therefore dirtiest plants for early retirement. But that is not necessarily so. In the first round of the German hard coal auction, for example, newer, less polluting plants secured payments ahead of older, dirtier ones.²⁰ If competitive processes are to consistently deliver non-carbon, equity-based benefits, those benefits must be explicitly weighted in the design of the mechanism.

3. Use inclusive processes to ensure a just transition. As noted above, transparent and inclusive decision-making processes are essential to maximize impact. But they are also critical to equity. Achieving fair outcomes for affected workers,²¹ communities and other civil society groups requires transparent and inclusive decision-making processes that engage all affected stakeholders in program

design from the earliest stages, and empowers them to articulate and achieve their own vision of a flourishing and prosperous future. The goal should be to gain consensus among relevant stakeholders on the terms of closure, the design and siting of clean energy replacements,²² transition priorities and the plans for achieving them.²³

Too often, governments have overlooked this essential procedural requirement by making side deals with owners, without labor and other stakeholders at the table and before addressing their transition needs. In Alberta, for example, the government negotiated a payment package for coal owners in secret, without simultaneously addressing the needs of labor and other stakeholders.²⁴

Stakeholders should have a role in crafting the financial mechanisms used to accelerate retirement. In turn, these innovative financing tools can serve these processes by helping to facilitate agreement among stakeholders with divergent interests. They are flexible tools that can allow costs and benefits to be allocated among stakeholders in virtually limitless ways, opening new avenues for negotiation and compromise.

4. Support site cleanup and reuse. Coal plants and mine sites often pose significant environmental hazards and public health risks long after they close. The surrounding lands and waters are often significantly altered and degraded, and contaminated with toxic ash, tailings and industrial chemicals.

Left vacant and polluted, these sites are a considerable liability. But with proper restoration and remediation, they can often be returned to valuable uses. For instance, the fact that these sites are already connected to the grid makes them attractive candidates for clean energy or storage facilities, or other high-energy uses like data centers.²⁵ And because coal plants typically need ready access to water for cooling, many plants occupy waterfront sites that are attractive for restoration to natural habitats, or conversion to commercial, recreational or light industrial uses.

For this reason, the Climate Investment Fund's Accelerating Coal Transition (ACT) Program is prioritizing the reclamation and repurposing of the lands and infrastructure of retiring facilities as a core area of support.²⁶ Similarly, Project Garuda in India has proposed a reverse auction mechanism, in which bids would include the aggregated costs of building new renewable capacity and decommissioning the old coal plant site, thus allowing the cost of decommissioning to be spread out over the term of the new renewable power purchase agreement.²⁷

Decisions on how these facilities should be repurposed to maximize local benefits should be made in accordance with a shared vision that is developed through the kinds of inclusive processes discussed above.

5. Ensure that worker protections and community benefits are actually delivered. Coal retirement mechanisms should ensure that promises made to workers and communities are kept throughout the closure and transition processes. Closure should not allow owners to evade their responsibilities to provide healthcare, pensions and other agreed-upon benefits. This has been a major transition issue in the United States, where coal-mining companies have used bankruptcy and other legal strategies to shed their pension, healthcare and environmental cleanup responsibilities, or foist them off on the public.²⁸

This could be a particular vulnerability of competitive closure mechanisms. By allocating compensation to the lowest bidders, they can create incentives for owners to cut corners when implementing their transition obligations. These risks can be ameliorated by enumerating the key transition responsibilities in binding contracts,²⁹ and by providing oversight and recourse mechanisms for stakeholders to ensure that these commitments are upheld.

B. Designing for Impact

1. Support retirement, not divestment. The most basic prerequisite for public support of a coal retirement mechanism is that it actually accelerates retirements. As the economic, environmental, and reputational costs of owning coal assets mount, more and more owners have been divesting or spinning their coal assets off into separate companies. Such schemes should not be eligible for support unless the new owner is obligated to close those plants on an expedited basis. Thus, international energy company E.ON's effort to shield shareholders from the liabilities of the coal fleet by putting them into a new company (Uniper),³⁰ and Finnish energy company Fortum's attempt to meet its climate objectives by selling, rather than retiring, some of its plants, should not be eligible for support.³¹

2. Support retirements only in jurisdictions that have stopped building new coal plants. Support from coal retirement mechanisms should only be available in countries and subnational jurisdictions that have stopped building new plants, and have made firm, policy-based commitments not to restart. Absent such a requirement, there is a significant risk that the retiring plants will simply

be replaced with new ones elsewhere on the grid. That would both eliminate the climate effects of the funding and undermine the credibility of the mechanism.

3. Benchmark “early” retirement against the 1.5°C global phase-out pathway and the expected retirement dates of individual plants. To maximize impact, coal retirement mechanisms must pay due attention to both the 1.5°C global coal phase-out pathway and the “business as usual” retirement schedule of any plant that is being considered for support.

The International Energy Agency (IEA) has determined that to keep the 1.5°C goal within reach, coal power must be reduced 80 percent below 2010 levels by 2030. Developed countries must end their coal use by then, and the rest of the world must do so by 2040 at the latest. Subcritical plants in all countries must close by 2030.³² These benchmarks should define the overall goals of the mechanisms. Thus, Germany’s retirement mechanisms are fundamentally flawed, in that they establish a 2038 overall retirement date—eight years after the IEA says all of Germany’s plants should be shuttered.³³

Similarly, what counts as an “early retirement” of a plant (or system of plants)³⁴ that is seeking support must be determined by a rigorous assessment of the expected retirement date(s) under a “business as usual” scenario. Owners may have unrealistic expectations for how long they can continue to operate their plants. They may also have strong incentives to claim they will run them much longer than they actually will, and considerable skill at hiding their real intentions, especially where their contracts are not subject to public scrutiny. Owners should not be paid for closures that would have happened anyway.

Last year, for example, the German coal company LEAG was granted compensation payments of up to €1.75 billion for agreeing to retire its lignite mines “early.” However, leaked documents later revealed that its proposed closure schedule matched its own internal planning for closure from 2016.³⁵ So Germany is paying LEAG to do exactly what it was planning to do anyway.

To avoid this, coal retirement mechanisms must carefully model the economics of coal retirement candidates and the plant characteristics, regulatory requirements and market forces that will push them toward closure.

4. Replace coal generation only with clean resources—no coal-to-gas. The early retirement of the world’s coal plants is both an urgent climate imperative and an enormous opportunity to reduce emissions quickly and cheaply. Replacing retiring coal plants with gas power

squanders that opportunity. Coal-to-gas transitions lock in emissions from new plants for decades to come, and simply cannot generate enough emissions reductions to keep the goal of 1.5°C within reach.³⁶ Accordingly, publicly supported coal retirement mechanisms should clearly define the clean energy resources that are eligible for support, and should not finance gas power or other thermal resources as replacement capacity. And they should ensure that the power output and system services provided by the retiring plant are replaced with clean energy resources, so that they do not create space for the increased operation of existing coal and gas plants.³⁷

5. Use competition to limit the risk of overpaying for closure. Plant owners may seek to game regulations and oversight processes to inflate the perceived value of existing coal plants. Coal retirement mechanisms will need to be carefully designed, and their administrators vigilant, to avoid providing excessive subsidies or paying for closures that would have happened anyway.

Allocating public support competitively can help contain these risks. Germany’s pay-for-closure mechanism for hard coal, adopted in 2020, provides important lessons. Payments in the hard coal mechanism are allocated through a reverse auction system that reduces costs by creating competition between plant owners for closure assistance. Each auction round also has a maximum bid price, further limiting the risks of overpayment and incentivizing owners to put forward bids that reflect the real-world value of their assets.

But competition is no panacea. A jurisdiction may have only one incumbent plant owner. And even in places with multiple potential bidders, owners with low closure costs can be expected to bid strategically. Rather than seeking only to recoup their estimated foregone profits (which may actually be negative), they may structure their bids to beat competitors with higher closure costs, pocketing the difference as a windfall.³⁸ This may be why Germany still seems to be overpaying for hard coal closures.³⁹ In the first auction round, the government spent €317 million to close 11 unprofitable plants. Collectively, the seven largest plants in the auction had lost over €200 million in the previous two years, and had been generating very little electricity. The European think tank Agora Energiewende estimates that the overall phase-out goals could have been achieved at lower cost, either by increasing renewable energy targets or by increasing the carbon price.⁴⁰

Competitive bidding mechanisms can be further strengthened by requiring the owners of remaining plants, not the government, to pay the winning bidders. Economists Frank

Jotzo and Salim Mazouz have proposed a creative scheme in which the operators of the remaining plants pay the winners based on their emissions in the year following the closure.⁴¹ This could have several important benefits. It could enhance the incentive to retire early and drive down bid prices. It may be more politically acceptable than paying for closure from the public treasury. And it may recapture some increased revenues that owners may see after closure due to increased capacity factors, increased rates, or both. Such an approach, however, may require regulatory reforms that are outside the authority of the mechanism's administrators.

6. Front-load payments to accelerate retirement.

Retirement mechanisms should hasten closures by rewarding early action. Again, the German hard coal mechanism is a useful model. It favors early retirement by imposing a declining cap on the potential payment in successive auction rounds. And it ends payments altogether in 2026; after that, remaining plants are subjected to regulatory closure without compensation. Together, these provisions help create a “race to exit” that prioritizes early closure, and reduces incentives for owners to delay closures in the hopes of securing payments.⁴²

7. Ensure that proposed agreements, and the assumptions underlying them, are subjected to public scrutiny and comment. Public disclosure and participation mechanisms that empower stakeholders to help design and independently evaluate proposed transactions are critical to ensuring that retirement transactions serve the public interest.

In the US, for example, public interventions before state regulators that are implementing coal retirements have been key to maximizing climate and other public benefits, and ensuring that benefits are broadly shared. New Mexico's 2019 coal securitization law enabled an investor-owned utility, PNM, to refinance the debt on its San Juan Generating Station, and commit to retiring the plant in 2022. However, PNM's original retirement plan would have replaced its capacity with a portfolio of resources that included new gas-fired power generation. Environmental groups and other stakeholders intervened in the state regulatory proceeding, providing their own detailed electricity system analysis, and proposing several alternative portfolios that did not include any new gas power. In 2020, PNM's regulators approved one of the intervenors' alternatives, which was shown to meet the same energy, capacity, and flexibility needs as PNM's proposal, while providing superior local development benefits and comparable reliability, cost, and carbon

emissions.⁴³

Conversely, Germany's recent experience with its pay-for-closure mechanism for large lignite facilities highlights the risks of excluding the public from these processes. Because the lignite sector is dominated by only two companies—RWE and LEAG—the government did not use a competitive auction system to allocate payments. Instead, it set compensation through closed door negotiations based on a statutory formula.

Not surprisingly, the negotiated compensation level was set too high. According to an analysis by Ember, the government used overly generous assumptions for power and CO2 prices, underestimated the cost savings for early closure, and paid owners for speculative lost profits that would not have occurred until after the plants were likely to have closed anyway.⁴⁴ The climate and energy think tank Ember estimated that in total, the German government likely overpaid by more than 1,200 percent, providing €4.4 billion in compensation instead of €343 million. The European Commission reached a similar conclusion, making a preliminary finding that these payments violated the European Union's rules against public subsidies (“state aid” rules), and expressing “doubts that the compensation is kept to the minimum required and that the amounts are proportionate.”⁴⁵

German taxpayers may end up overpaying for these retirements because the public did not have the opportunity to scrutinize the government's assumptions and calculations. The relevant materials were only made available after the fact, in response to a public records request by Greenpeace. Had RWE and LEAG been required to justify their compensation in a public process that allowed independent technical experts to intervene—as PNM was required to do in New Mexico—it is doubtful that they could have walked away with such a sweetheart deal.

Similar problems are likely to arise in other countries where coal retirement mechanisms may be implemented. For example, the ADB plans to pilot its blended finance mechanism in Indonesia, Vietnam, and the Philippines. In those countries, plant utilization data is not always available and power purchase agreements with independent power producers are confidential, making it impossible for outside analysts to assess asset valuations, retirement schedules, or other key transaction provisions. There is little opportunity for public accountability in such environments.⁴⁶

8. Avoid creating carbon credits or offsets. For both substantive and political reasons, retirement transactions should not create credits or offsets for sale on carbon

markets, or expand the availability of allowances in capped markets. Substantively, allowing these transactions to generate carbon credits raises three fundamental concerns. First, carbon markets generally do not reduce overall emissions; they simply shift who is doing the reducing. They do this by enabling entities with higher abatement costs to meet their reduction obligations by paying entities with lower abatement costs to reduce emissions for them. A coal retirement mechanism that created carbon credits, then, would not reduce overall emissions—it would simply subsidize emitters with higher abatement costs by affording them access to cheaper credits.

Similarly, in carbon markets like Europe’s Emissions Trading System (ETS), where emissions allowances are traded among regulated entities, coal closure will reduce the overall demand for allowances. Where the public is helping to pay for the reductions, it makes far more sense to capture the carbon reductions from coal retirements than to allow others to use the allowances to avoid reducing their own emissions. For this reason, Germany’s coal law provides that ETS allowances freed up by closed plants will be canceled.⁴⁷

Second, the economics of clean energy replacements are now so compelling that closures can be achieved at a very low (or even negative) cost per ton of avoided emissions.⁴⁸ These extremely inexpensive emissions reductions should be captured for the public benefit, not converted into cheap credits that enable other emitters to avoid the costs of reducing their own emissions.

Third, carbon markets themselves can have severe equity problems. Coal plants and other high-polluting facilities are often disproportionately concentrated in poor communities, and in those of marginalized racial or ethnic groups. By providing the owners of these facilities with a way to avoid cleaning up their operations or closing them down, carbon markets allow these “sacrifice zones” to persist.

Tying coal retirement mechanisms to carbon markets is also problematic politically. To most stakeholders, these mechanisms are at best novel and unfamiliar, and many have questioned their value with regard to both equity and impact (see box). They are far from earning broad political support. Meanwhile, carbon markets—particularly offset schemes that operate across borders—are even more controversial,⁴⁹ with, at best, a mixed track record, and numerous scandals and concrete examples of policy

failures.⁵⁰ Immersing fledgling coal retirement mechanisms in the contentious politics of carbon markets would substantially narrow support and strengthen opposition. If the goal is to establish confidence in these new mechanisms as a policy option, wedding them to carbon markets would be an unfortunate, self-inflicted political wound.

9. Limit leakage and perverse incentives. Coal retirement mechanisms should not facilitate carbon leakage, or create perverse incentives for owners to act imprudently in the future. Leakage is created when payments are simply reinvested in gas or other fossil-fuel infrastructure, either within the system or in a different jurisdiction, undermining the climate benefits of the mechanism. Indiana’s new securitization legislation tries to control leakage by requiring utilities using ratepayer-backed bonds to invest the bond proceeds within the state, with an emphasis on clean energy, and by requiring that investments be assessed by the state utility regulator.⁵¹

Financial mechanisms also should not create expectations of continued risk-shifting that might incentivize owners to act injudiciously in the future. For example, a utility that is using securitized debt to accelerate the retirement of a coal plant might perceive a low risk in investing in a new gas-fired plant, despite evidence that the gas plant will be stranded in the near future, on the assumption that the debt of the gas plant could also eventually be securitized. Containing these risks may require broader sectoral reforms. The ADB and CIF mechanisms both include technical assistance components, which should be used to help countries address these issues.

10. Catalyze, and not impede, broader reforms. While coal retirement mechanisms can create strong incentives to accelerate closure, they are unlikely to be effective at driving more systemic change. Sometimes, it is not outstanding debt or other financial considerations that are impeding a transition away from coal. Instead, it may be an underdeveloped ecosystem for scaling up investments in clean energy. Or it may be poor electricity sector governance—a lack of effective regulation and oversight,⁵² lavish public subsidies,⁵³ inadequate investment in grid modernization,⁵⁴ or an overreliance on long-term contracts that shield incumbents from competition with renewables.⁵⁵ The problem may also be the owners themselves. They may be aggressively fighting climate progress, or refusing to adopt equitable, socially sound clean energy reforms. They may simply be incompetent or corrupt.

Using coal retirement mechanisms where more fundamental change is needed is not likely to be effective. Worse, it may further entrench the power of regressive incumbents and short-circuit more comprehensive reforms. In 2016, for example, Puerto Rico’s state-run electric authority, PREPA, proposed a “transition charge,” similar to securitization, to pay down \$9 billion in debt that had accrued due to years of under-collection, high fuel costs and massive inefficiencies. At the same time, it wanted to rebuild much of its fossil-fuel fleet after it was decimated by Hurricane Maria. PREPA, however, was horribly mismanaged, with the legislature describing it as a “monopoly that regulates itself; sets its own rates without actual oversight ... and whose governance lacks

transparency and citizen participation.”⁵⁶ In response to PREPA’s proposal, a number of social movements opposed the transition fees, reasoning that expanding PREPA’s ability to raise capital would simply empower an ineffective utility and undermine broader reform efforts.

A threshold question for public international funders, then, is whether funding coal retirements will be the most effective way to begin to push coal off the electricity grid. In some countries, concessional funding to help scale up renewable investments, modernize grid infrastructure, or reform electricity sector governance may have a more immediate impact, and be a necessary prerequisite for longer-term progress.

Conclusion

Coal retirement mechanisms can expand the range of options available to policymakers to accelerate and ease the transition from coal to clean energy. But in order to be effective and politically credible, they must be intentionally designed with equity and impact in mind. They must deliver substantial climate and other public benefits at reasonable cost, and they must do so in ways that are seen as fair by those who are affected.

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