REPORT

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FINANCING COAL PHASE-OUT

Public development banks' role in the early retirement of coal plants

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SUMMARY

Limiting global average temperature rise to 1.5°C requires stopping the construction of new coal power plants and the early retirement of a large number of existing plants before the end of their technical lifetimes. This presents a major challenge as coal supplied more than one-third of global electricity generation in 2023, with Southeast Asia, China, and India accounting for the largest share of current coal capacity in operation. Early retirement of coal assets, coupled with the expansion of renewable energy, is crucial to advance the decarbonisation of the global power sector. Early retirement can facilitate significant emissions reduction and holds economic and sustainable development advantages. Given the diminishing cost of renewables and energy storage and the potential for public health benefits, there is an overwhelming case for swiftly phasing out coal in line with long-term decarbonisation pathways. However, there are a number of barriers to the phase-out of existing plants that prevent market forces in favour of renewables and limit sustainable development gains.

A growing number of policymakers and public development banks, including multilateral development banks and other bilateral development finance institutions, are actively exploring strategies to accelerate the retirement of existing coal plants, extending beyond the exclusion of coal from direct financial support. With the support public development banks can provide, from advisory services and technical assistance to different forms of financing, they are uniquely positioned to help address these barriers and support countries with the transition to decarbonised electricity systems. However, these efforts may carry risks of unintended adverse impacts, such as indirectly supporting new natural gas capacity. Other forms of engagement, such as transition finance and compensation payments, may also pose unique risks depending on how they are used. The risks include moral hazard and inefficient use of public funds, and setting perverse incentives, which could impede coal phase-out.

This report reviews the instruments that public development banks have at their disposal to help address barriers and the associated challenges and risks, and examines existing phase-out initiatives as case studies. It underscores the importance of seeking firm commitments from partner country governments and other stakeholders to stop future fossil fuel investments, reduce current pipelines to avoid emission leakage and moral hazard risks, and prevent backtracking on coal phase-out in the event of political turnover. The report breaks down the instruments by the stakeholders that public development banks may engage with, considering their different roles in the power system: national policymakers,

utilities, and independent power producers (IPPs). National policymakers are the ultimate decisionmakers on a country's fossil fuel phase-out ambition and power system reforms; therefore, engagement often aims to strengthen policymaking and support ambition. On the other hand, engagement with power producers, whether utilities or IPPs, also requires a different approach to address distinct transition barriers. Based on a review of existing literature and interviews with experts and practitioners, the main considerations for public development banks when engaging in coal phase-out efforts are:

When engaging with national governments, public development banks should:

- → Assist countries in defining ambitious and Paris-aligned long-term low-emissions development strategies before further engaging stakeholders on coal phase-out. Ensure that early retirement efforts are consistent with these long-term strategies.
- → Assist governments in building their capacity to set coal phase-out targets and plan and implement the early retirement of coal-fired power plants. For example, through knowledge sharing, targeted technical assistance, and initiatives supporting just transition planning.
- → Provide financial support to support ambitious energy policy and institutional reforms. For example, through policy-based lending and technical assistance.
- → Support the issuance of sustainability-linked sovereign bonds that contribute to transforming local economies towards low-emissions and climate-resilient systems.
- → Seek to increasingly engage with national development banks to facilitate the transition from coal.

When engaging with utilities, public development banks should:

- → Avoid pursuing buyouts of coal plants at the asset level but instead support utilities in changing their business model to enable them to attract private capital for renewable energy investments.
- → Avoid moral hazard and ensure that transition finance does not undermine climate objectives by addressing loopholes that may lock-in business-as-usual pathways and defining ambitious key performance indicators.
- → Continue to focus on efforts to finance the win-wins of renewable energy, energy storage, and smart grids, as well as supporting decommissioning and remediation.

When engaging with IPPs, public development banks should:

- → Consider buying out IPPs only under very limited circumstances (i.e., when there is a government commitment to coal phase-out to avoid emission leakage).
- → Facilitate legal review of power purchase agreements (PPAs) and support innovative financing mechanisms to terminate, replace, and potentially restructure PPAs.
- → Engage through transparent and competitive market mechanisms to overcome information asymmetry and ensure public funds are used efficiently.

This report may be read in conjunction with a separate publication, Caution on co-firing, retrofits, and carbon credits for retirement: considerations for public development banks on coal phase-out risks. The separate publication presents the outcomes of additional analysis on risks associated with rapid coal phase-out, such as co-firing alternatives, repurposing of coal plants, and the use of carbon offset credits.

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ABBREVIATIONS

ACT	Accelerating Coal Transition
ADB	Asian Development Bank
AFD	Agence Française de Développement (French Development Agency)
AfDB	African Development Bank
AIIB	Asian Infrastructure Investment Bank
APAC	Asia-Pacific
C2C	COP26 Coal to Clean Power Transition Statement
CIF	Climate Investment Funds
CRF	Carbon Reduction Facility
CSP	Concentrated solar power
EBRD	European Bank for Reconstruction and Development
EIB	European Investment Bank
ESMAP	Energy Sector Management Assistance Program
ETM	Energy Transition Mechanism
EU ETS	European Union Emissions Trading System
GFANZ	Glasgow Financial Alliance for Net Zero
GHG	Greenhouse gas
GW	Gigawatt
IDBG	Inter-American Development Bank Group
IEA	International Energy Agency
IFC	International Finance Corporation
IPP	Independent Power Producer
IsDB	Islamic Development Bank
JBIC	Japan Bank for International Cooperation
JETP	Just Energy Transition Partnership
KEPCO	Korea Electric Power Corporation
KEXIM	Export-Import Bank of Korea
KfW	KfW Development Bank (German Promotional Bank)
KPI	Key performance indicator
kW	KiloWatt
LCOE	Levelised Cost of Electricity
LRMC	Long-Run Marginal Cost
MDB	Multilateral Development Bank
MUFG	Mitsubishi UFJ Financial Group
MW	MegaWatt
MWh	MegaWatt hour
NABE	National Energy Security Agency (of Poland)
NDB	National development bank
NNCPC	No New Coal Power Compact
PLN	PT Perusahaan Listrik Negara (Indonesia State Electricity Corporation)
PPA	Power Purchase Agreement
PPCA	Powering Past Coal Alliance
PT SMI	PT Sarana Multi Infrastruktur (Indonesian Infrastructure Development Bank)
PV	Photovoltaics
SLB	Sustainability-linked bond
SOE	State-owned enterprise
WBG	World Bank Group

/\ 01 INTRODUCTION

To avoid the worst impacts of climate change, "rapid and far-reaching transitions across all sectors and systems are necessary to achieve deep and sustained emissions reductions" (IPCC, 2023). One necessary key measure is the decarbonisation of the electricity system. In the International Energy Agency's Net Zero Roadmap, which is modelled to be consistent with limiting global average temperature rise to 1.5°C, emissions in the electricity sector fall by 95% by 2040 (IEA, 2023e). In this scenario, the share of coal in global electricity generation falls from 36% in 2022 to 13% in 2030 before a complete phase-out by 2040 (IEA 2023). This means that not only should there be no further coal power plants built, but that a large number of existing power plants should be closed before the end of their technical lifetimes – in other words, they must be retired early.

In recognition of this fact, a growing number of policymakers and public development banks (including multilateral development banks and other bilateral development finance institutions) have started to explore options to accelerate the retirement of existing coal plants. The good news is that thanks to rapid reductions in the cost of renewable energy and storage technologies, renewable zero-carbon solutions are increasingly cheaper than not only building new coal plants but also operating existing coal plants. Early coal plant retirement would lead to significant economic savings in energy production (IRENA, 2021). Taking into consideration the additional public health and climate benefits of reduced emissions means that there is an overwhelming economic and sustainable development argument for a rapid coal phase-out. The IMF estimates that these benefits could yield a net gain of approximately US$ 78 trillion through the end of the century (Adrian et al., 2022).

There are, however, in many cases, a number of financial, regulatory, and political barriers to coal phase-out of existing plants, preventing the realisation of these savings. With the support public development banks can provide, from advisory services and technical assistance to different forms of financing, they are uniquely positioned to help address these barriers and support countries with the transition to decarbonised electricity systems. For some of these efforts, there are risks that need to be mitigated. If early retirement efforts are not framed in the context of the long-term decarbonisation of the power sector, they may end up indirectly incentivising new natural gas capacity and, therefore, increasing stranded assets and carbon lock-in risks in the medium term. There is also a limited risk of having unintended adverse impacts and slowing the coal phase-out effort. Finally, for other kinds of finance, including compensation payments and transition finance, there are unique risks, from moral hazard to inefficient use of public funds, which require special consideration and careful management.

This report endeavours to explore these barriers and provide recommendations for policymakers and public development banks to navigate these challenges and barriers, including addressing moral hazard and maximising the efficient use of public funds to accelerate countries' energy transitions. The analysis is based

on a literature review of existing resources on the transition away from coal and other topics related to transition finance, the outcomes of a workshop held on the sidelines of the Finance in Common Summit 2023 with representatives of development banks and experts from civil society organisations, and twelve bilateral interviews with experts and practitioners.

A notable barrier and important challenge in transitioning away from coal are the social aspects and repercussions, including lost jobs and the broader impact on regional economies. Addressing these justly will require finding solutions for social safety nets, retraining and reskilling efforts, and more general interventions to support economic diversification away from coal. While these challenges are significant, they are not the focus of this report. Another challenge in phasing out coal globally is the concentration of existing and planned coal capacity in China. The recommendations in this report do not address coal power generation in China specifically, given the limited direct role public development banks would play in supporting its phase-out due to the current ownership structure of Chinese coal power plants.

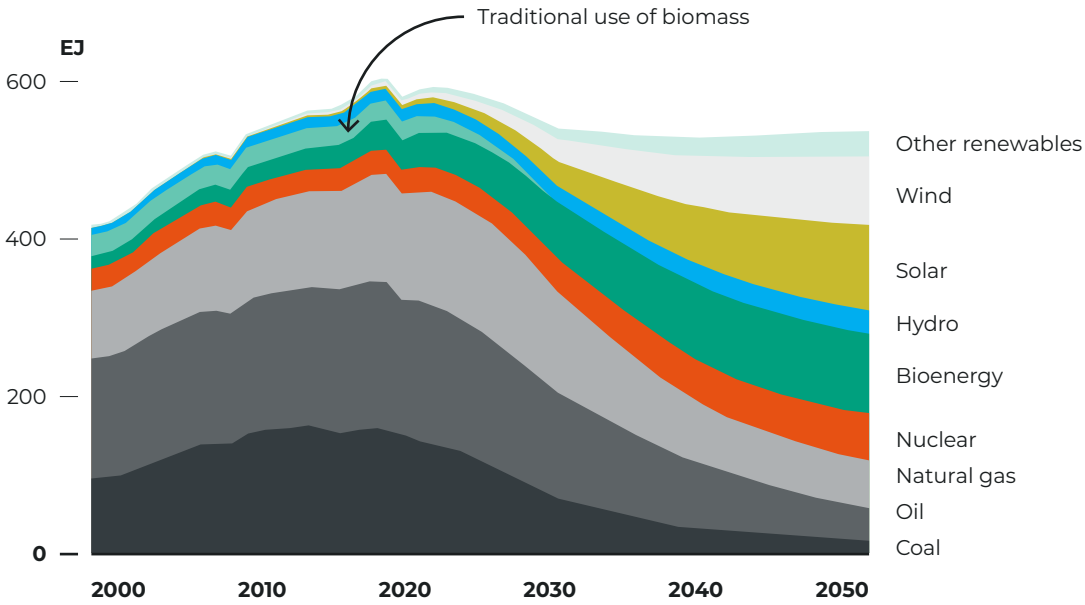
The report begins with a discussion of the current role of coal in the power sector. It then reviews the potential savings that can be made with investments in renewable-based systems, and the barriers preventing some countries from realising those savings. It continues with a review of the instruments that banks have at their disposal to help address these barriers and the risks associated with some of them. It also presents how policymakers and public development banks can best engage with different stakeholders to bring about the necessary early retirement. This report builds on the levels of consideration for managed phase-out identified by the Glasgow Financial Alliance for Net Zero Asia Pacific Network (GFANZ APAC): the government level, the entity level, and the asset level (GFANZ APAC, 2023). In the sections below, bank instruments are explored according to the stakeholders that public development banks may engage with, considering their different roles in the power system.

/\ 02 BACKGROUND

2.1 CURRENT GLOBAL USE OF COAL IN THE POWER SECTOR

Coal-fired power generation is the single largest contributor to global temperature rise, and its phase-out is paramount to reaching climate mitigation targets. All scenarios compatible with meeting the Paris Agreement's 1.5°C temperature target and avoiding the worst impacts of climate change require a rapid decline in coal use and the retirement of coal plants before the end of their technical lifetime. The IEA's Net-Zero Emissions by 2050 Scenario calls for a global decline in unabated coal-fired generation of around 55% by 2030 compared to 2022 levels and a complete phase-out by 2040 (IEA, 2022a) **(→ Fig. 1)**. Analysis by Climate Analytics finds that "phasing out coal from the electricity sector is the single most important step to get in line with 1.5°C" (Yanguas Parra et al., 2019). Efforts to phase out coal, which should be led by developed countries based on the common but differentiated responsibilities principle, need to accelerate sevenfold for its share in electricity generation to be close to reaching zero by 2030 (Boehm et al., 2023). International climate finance and technical assistance will be crucial to support developing and emerging economies' transition.

Fig. 1
Shift in total energy supply in a net-zero scenario



Source: Adapted from (IEA, 2022b).

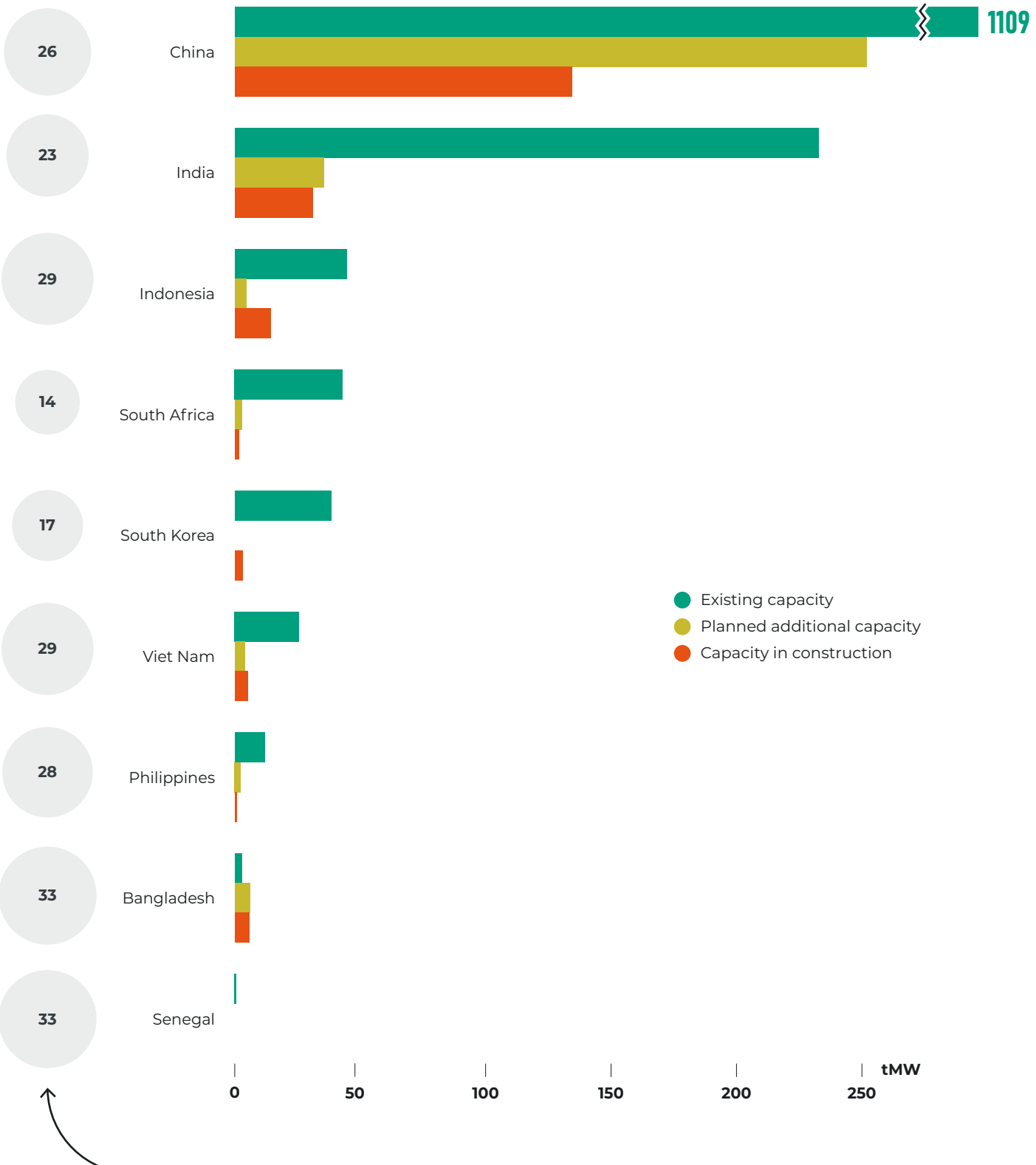
Coal supplies more than one-third of global electricity generation today. Coal capacity in operation reached 2,095 GW globally in 2023 (Global Energy Monitor et al., 2023) – generating what is projected to be an all-time high in coal demand (IEA, 2023b). While coal demand is projected to plateau and decline globally, without additional efforts, this decline will not happen soon enough to reach climate objectives.

Global patterns of coal use vary greatly in different regions. In 2023, the European Union and the United States accounted for roughly 25% of global coal demand, while China, India, and Southeast Asia comprised 75%. This imbalance is expected to grow; while coal consumption is decreasing in the European Union and the United States, estimates suggest that an additional 557 GW of coal generation capacity are planned (including plants announced, pre-permitted, and permitted) or in construction, mainly in China (392 GW planned or in construction) and other Asian countries (e.g. India, Indonesia, Viet Nam, Bangladesh, South Korea, and the Philippines) **(→ Fig. 2)** (Global Energy Monitor et al., 2023). Emerging and developing economies in Southeast Asia tend to have younger fleets of coal plants, with many years left in their potential technical lifetimes. Although, in some fleets, older units exist and may be targeted for retirement or repurposing, with low system reliability impacts. On average, for example, in the region, coal plants in China and Indonesia are only thirteen years old, and in Viet Nam, the average age is eight years old (IEA, 2022a). The IEA highlights a need for "greater policy efforts and investments [...] to reduce coal demand in economies where energy needs are growing fast" (IEA, 2023c).

Coal plants have historically had an operating lifetime of 46 years on average globally, but can operate for 50-60 years or longer (Cui et al., 2019).

Fig. 2

Coal existing capacity, future capacity in selected countries, and average remaining lifespan of existing plants



Average remaining plant lifetime (excluding future capacity) in select countries. The Global Energy Monitor assumes a plant's operational lifetime is 40 years. Five more years of operation are assumed for plants already 40 years or older. Lifetime data is calculated as a simple average.

Source: (Global Energy Monitor, 2023).

2.2 NEED TO CONSIDER LONG-TERM DECARBONISATION PATHWAYS

The pace and scale of retiring coal plants early will vary across countries for a variety of reasons, including the age of the fleet, structure of the grid, growth and shape of electricity demand, readiness to deploy both intermittent and dispatchable renewable energy sources, and the broader policy and investment climate. Early retirement should be planned within the context of comprehensive national long-term decarbonisation pathways to facilitate a smooth transition away from coal and safeguard against risks of locking-in new fossil generation capacity or exacerbating energy security concerns.

In countries where projected electricity demand growth can be met in the near-term through scaling up renewable energy sources, improved grid connections and management, as well as energy storage solutions, early retirement of coal-fired power plants should help drive investment in more renewable energy capacity. However, in the context of countries that are still planning to build new fossil fuel power plants, for example, due to significant electricity demand growth and constraints for deploying new renewable energy capacity, early retirement of coal power plants must be carefully managed to ensure that it does not lead to new fossil fuel electricity generation capacity.

Substituting coal power plants with new fossil fuel capacity can, in some circumstances, lead in the short term to GHG emission reductions, especially if the new capacity is fuelled by natural gas. However, any new construction of fossil fuel-powered plants today presents medium-to-long term carbon lock-in risks or increases the likelihood of stranded assets. The result is counterproductive to the decarbonisation of the energy system.

The early retirement of coal plants is a clear example of the need for countries to prepare and implement long-term strategies, as recommended by the Paris Agreement. Climate policy needs to shift its focus away from short-term emission reductions to consistency with long-term decarbonisation pathways.

2.3 RENEWABLES ARE INCREASINGLY A CHEAPER ALTERNATIVE

The planned expansion of coal and continued operation of coal plants make less and less economic sense. Renewable energy is increasingly a cheaper alternative to coal, not only for new power generation but also for existing coal plants.

The global average levelised cost of electricity (LCOE) of utility-scale solar photovoltaics (PV) was US$ 49 per MWh for projects completed in 2022 (IRENA, 2023). When considering additional storage to address intermittency issues, the global weighted average LCOE was around US$ 120 per MWh for solar PV (DNV, 2022), close to the LCOE of coal, which ranged between US$ 17 and US$ 190 per MWh over the past years, depending on the jurisdiction (IEA, 2020; Huang et al., 2021; IRENA, 2023). The average global costs in 2022 of selected renewable sources of electricity (IRENA, 2023) and coal (IEA, 2023d) are compared in → **Table 1**. Although solar PV and wind – as "variable renewable energy" have disadvantages (e.g. intermittence) compared to "firm power" offered by coal in centralised inflexible energy systems, current prices for solar PV, including storage, are lower than those for new coal-fired power plants (Lazard, 2023). Combined with other options to respond to the intermittent nature of renewables, such as demand response and smart grids, the costs of running a renewable-based system are steadily falling.

Building new renewables is also increasingly cheaper than running existing coal plants, including in the United States (Solomon et al., 2023), the European Union (Panetta, 2022), China, Viet Nam, and India (Gray et al., 2020). By 2030, the average long-run marginal cost (LRMC) of operating a coal unit is expected to be higher than the LCOE of renewable energy in all major markets (Gray et al., 2020), enabling a clear shift away from coal generation. Indeed, if all electricity markets worldwide were competitive, coal-fired power plants would quickly become unprofitable and close down, which would result in trillions of dollars in global savings (Way et al., 2022).

Tab. 1
2022 Global levelised cost of electricity

Electricity source	Levelised cost of electricity (US$/MWh)
Coal	17-190
Solar CSP	118
Offshore wind	81
Solar PV	49
Onshore wind	33

Source: (IRENA, 2023).

"Virtual" power plants bundle decentralised demand response, renewable energy, and energy storage options so as to match demand and supply in the electricity grid, rather than relying on fossil fuel assets to meet fluctuating demand (Next Kraftwerke, no date; Reuters, 2023).

In some countries, the rapid drop in the cost of renewable energy and energy storage, combined with growing options for demand response and "virtual" plants, have led a growing number of utilities to not only reduce the number of proposed coal power plants but also shelve or cancel existing projects. Additionally, they are increasingly mothball or retiring existing plants. According to the Global Energy Monitor (2023), global planned coal capacity has fallen by

72% since 2015. China stands out as an outlier, with its pipeline accounting for the majority of planned additional capacity, including announced, pre-permitted, and permitted plants (Global Energy Monitor et al., 2023). Improved integrated resource planning has led utilities to increasingly decide to close plants early and replace them with renewables. As the cost of renewable energy and battery storage continues to fall, this trend will only accelerate, especially if national policies and international investors provide the right enabling conditions.

While analysis of global average costs clearly indicates that renewable energy sources now offer both cheaper and cleaner options for electricity supply, various barriers and market distortions prevent this from being the case everywhere. These barriers will be even more challenging to overcome as electricity demand rises in the coming years.

Integrated resource planning is a long-term roadmap that utilities use to assess future electricity needs and plan to meet future needs. The planning covers both demand-side measures (energy efficiency and conservation), as well as supply-side measures (generation, transmission, and distribution additions) (Greacen et al., 2013).

/\ 03 BARRIERS TO COAL PHASE-OUT

A transition towards a clean, renewable-based energy system and rapid phase-out of coal makes economic sense, even without considering negative externalities like climate change and public health impacts. Coal phase-out involves halting the construction of new coal plants, retiring plants progressively starting with those that would require retrofits to meet emission standards or that are near the end of their lifetime, reducing coal plant utilisation rates, and ultimately retiring all remaining coal plants, including those not yet at the end of their lifetime, referred to as early retirement. In many instances, significant barriers to the transition prevent early coal retirement. These barriers exist on the government policy, utility, and individual plant levels. RMI estimates that 93% of coal plants globally are insulated from market competition through long-term contractual agreements to buy coal-generated power or non-competitive tariffs (Bodnar et al., 2021).

On the national policy level, a number of political economy factors serve as barriers to an accelerated coal phase-out. These barriers are primarily in place to support incumbent industries and technologies, such as through electricity market design, fossil fuel subsidies, or other planning processes, often related to the economic and employment relevance of coal in coal-dependent regions, and sometimes corruption (Shockling et al., 2022). Other barriers can be found on the utility level. In many instances, transitioning to renewables and rapidly phasing out coal is hampered by business model inertia. Utility management may be unfamiliar with renewables-based business models, which imply different expertise, notably in grid management and alternative options needed to make a business case for renewables. This may be explained in particular by the fact that renewables are often more decentralised than a coal-based electricity system. Building renewables to enable an early retirement of coal plants also requires an upfront investment, which may be challenging for utilities with poor financial health. In many developing and emerging economies, utilities also face challenges in recovering costs of the existing system, leading to high debt levels, that serve as an important barrier to renewable expansion and, therefore, coal retirement.

In other instances, the barriers are related to specific plants run by independent power producers (IPPs). In many countries, governments have encouraged private investment in energy systems by contracting private companies to build coal plants. Through power purchase agreements (PPAs) with IPPs, governments agree to buy electricity from the plants for a set number of years. These agreements, which sometimes represent significant amounts of countries' grid capacity, lock in profits for coal plant investors and shield them from competition from other power producers.

/∧ 04 THE ROLE OF PUBLIC DEVELOPMENT BANKS

4.1 SUPPORTING ENERGY ACCESS AND DECARBONISATION

Public development banks – national, bilateral, regional, and multilateral – have a mandate to fulfil public policy objectives. Historically, many public development banks, as part of their commitment to support sustainable development and energy access, have supported the construction of coal assets in low- and lower-middle-income countries over the last two decades, directly and indirectly (Steffen and Schmidt, 2018; Sauer et al., 2022). Some public development banks still support the development of gas infrastructure today, for the same reasons. A large part of their role involved de-risking and enabling private investments in contexts with high perceived risk (Steffen and Schmidt, 2018). Given their historical involvement in financing coal capacity additions, public development banks have an important role and responsibility to incentivise and enable coal phase-out. In addition, they are increasingly supporting sustainable development goals and protecting global public goods of climate and nature by incorporating climate change into their strategic priorities and financing schemes.

Since 2022, the G20 Independent Review of MDB's Capital Adequacy Frameworks, the COP27 decision, the G20 Independent Experts Group Report of Strengthening the MDBs, the Bridgetown Initiative and the Summit for a New Global Financing Pact all called for a reform of the global financial architecture and for multilateral development banks to review their mandate and increase their investing capacity to address climate emergency and accelerate impact.

The current multilateral development bank (MDB) reform process provides the opportunity to shift the focus of public development banks' activities from coal exclusion to decarbonisation and coal retirement. However, MDBs often lack policies that allow the financing of coal plant retirement, and only a handful of these banks mention support for phase-out.

To support countries with their energy transition – both renewable expansion and the early retirement of coal plants, public development banks have a variety of instruments at their disposal to help address barriers to the transition **(→ Fig. 3)**. By providing countercyclical lending and filling financing gaps, they can work to address market failures, incubate markets, and promote structural transformation to foster growth (Xu et al., 2019). Public development banks are increasingly working with international partners to scale up efforts to support the early retirement of coal plants. This includes a shift towards actively supporting governments in developing and implementing low-emissions and climate-resilient transition pathways through concessional finance and technical assistance (Bendahou et al., 2022).

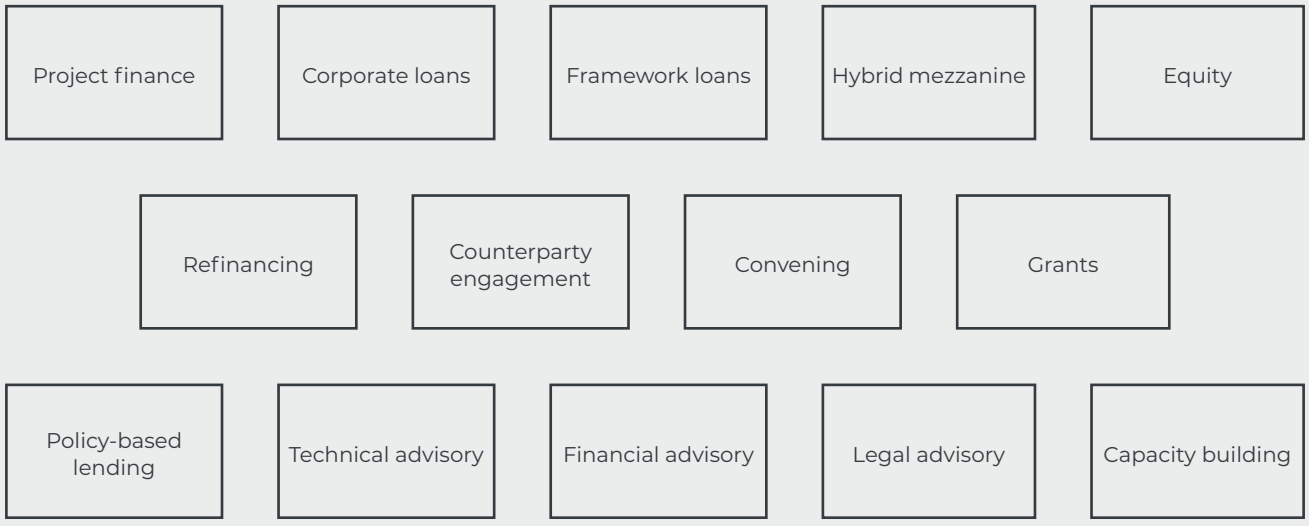


Fig. 3
Public development bank instruments

Source: Authors based on review of public development bank instruments.

4.2 SPEARHEADING INITIATIVES FOR THE EARLY RETIREMENT ;OF COAL

In addition to their traditional instruments, public development banks, led by MDBs, have started several initiatives to support the early retirement of coal assets:

- The Climate Investment Funds (CIF), a multilateral fund to which six major multilateral development banks contribute, created the Accelerating Coal Transition (ACT) investment programme. This program supports developing countries, including the Dominican Republic, India, Indonesia, North Macedonia, the Philippines, and South Africa, in their transition away from coal through concessional financing and technical assistance;
- The Asian Development Bank (ADB) is piloting its Energy Transition Mechanism (ETM), a debt restructuring/refinancing instrument aiming at incentivising coal operators to decommission coal-fired power plants before the end of their useful lives through concessional loans via a

Carbon Reduction Facility (CRF) and a Clean Energy Facility (CEF). It is currently being piloted in Indonesia, where an agreement was reached in December 2023 for the early retirement of the first plant to benefit from this scheme in the country, Cirebon 1 (ADB, 2023b). The ETM extends to Viet Nam, the Philippines, as well as Pakistan and Kazakhstan, where pilot programs have not yet started;

→ The Inter-American Development Bank's (IDB) private sector arm, IDB Invest, placed a monetary value on the emissions eliminated via the early retirement of coal-fired power plants through its Carbon Reduction Bonus initiative in Chile while financing renewable energy projects.

4.3 AVOIDING MORAL HAZARD, PERVERSE INCENTIVES, AND GREENWASHING RISK

Many public development bank instruments focus on promoting and supporting renewable expansion, which can support a gradual phase-out of coal. However, other instruments, notably potential compensation payments and transition finance, carry significant risks, including moral hazard, perverse incentives, or greenwashing. These risks involve the potential misallocation of limited public resources, by supporting business as usual or even by delaying the transition of the energy sector. Each aspect requires special consideration, especially in the context of early coal phase-out efforts. These potential conflicts with overarching decarbonisation goals are detailed in this section.

Indirect support to new natural gas capacity

In electricity grids where the construction of new fossil fuel electricity generation capacity (notably natural gas-fired) is planned, supporting coal power plant decommissioning may indirectly support new fossil fuel capacity, thereby contributing to stranded assets or carbon lock-in risks in the future. These risks can be mitigated by ensuring that early retirement efforts are framed in the context of long-term decarbonisation pathways rather than short-term emission reduction objectives.

Moral hazard

A common tenet of environmental policymaking is the "polluter pays principle" (Wand and Hicks, 2022). Various proposals to compensate owners of coal power plants, for example through buyouts, turn this principle on its head: instead of pricing the negative externality of pollution and greenhouse gas emissions and holding polluters accountable, compensation payments pay polluters not to pollute. Such efforts risk providing a perverse incentive to slow down coal phase-out efforts

in order to be paid to do so at a later date or, at worst, could provide an incentive to increase coal power to be paid to shut it down. Even if the incentives provided are minor compared to the overall economic rationale for retiring coal early in favour of renewable expansion, the prospect of receiving compensation for early retirement could signal to investors in coal plants and their associated value chains that there is a reduced risk of asset stranding. Although investors may have limited financing options to develop coal, they could consider it safe to invest in coal expansion because they perceive that public financial institutions will to bail out assets that need to be retired as part of the transition. While compensation payments may be necessary in some cases to enable a faster coal phase-out and alleviate the burden on customers and taxpayers, they could slow down coal phase-out efforts if managed badly. Therefore, policymakers and public development banks need to carefully consider the incentive structures created by their interventions to avoid undermining coal phase-out efforts.

Perverse incentives of transition finance

While climate finance can support, for example, renewable energy that enables an accelerated retirement of fossil fuel power plants, transition finance is a potentially broader category of finance, which comes with its own risks. There is no consensus on a definition of transition finance, nor technical criteria for qualifying sectors or technologies (Tandon, 2021; OECD, 2022). However, the OECD refers to transition finance as finance "intended to decarbonise entities or economic activities that: (i) are emissions-intensive, (ii) may currently lack economically viable and credible low- or zero-emission substitutes in all relevant contexts, but (iii) are important for future socio-economic development" (OECD, 2022) . Given the nature of long-term goals and the profile of pathways towards decarbonisation, multiple stakeholders have pointed out that transition finance represents a greenwashing risk, for example, to continue financing business as usual under the guise of supporting high emitters to change (OECD, 2022). Measuring the effectiveness of transition finance, whether for a country or a utility, requires a robust understanding of what the entity would have done without such financing and ensuring that the investments made with the additional available financial resources genuinely lead to a clear deviation from the baseline scenario. Depending on how incentives and performance indicators are set, there is a high risk of allocating scarce public resources to initiatives that potentially inadvertently undermine climate goals or result in little impact.

The Glasgow Financial Alliance for Net Zero (GFANZ) uses a broader definition and considers anything that finances the transition to be transition finance, including financing companies that are already aligned, and the development of climate solutions.

Given the ongoing scarcity of international public funds, it is important to ensure that international climate finance is deployed efficiently to mobilise private capital. Moral hazard concerns and perverse incentives may undermine engagement in early coal retirement and present reputational risk. In the following sections, we explore various proposed measures and suggest guidance for the context in which they are best suited, how they may be prioritised, and, in some cases, avoided.

/ Λ 05

ENGAGING WITH NATIONAL GOVERNMENTS

Public development banks can engage with national governments to support them in addressing domestic barriers to coal phase-out and its replacement with clean energy sources. Common barriers on the national policy level include fossil fuel subsidies, technical capacity in government organisations, electricity market design, minimum local content regulation, and other political economy considerations. In Indonesia, for example, government policies require local coal mining companies to sell at least 25% of their supply directly to PT Perusahaan Listrik Negara (PLN), the state-owned electricity company. Domestic coal prices are capped at US$ 70 per tonne for power plants, which is below current international market prices. These indirect coal subsidies prevent renewables from offering a cost-competitive alternative to fossil fuels. In addition, policies introducing minimum thresholds for domestically produced materials and services of renewable power generation, such as solar PV, lead to solar panels with higher average prices in Indonesia (Shockling et al., 2022). In such cases, fiscal, industrial, trade, or energy system reforms at the national level, including the reform or introduction of wholesale electricity markets, are key to rebalancing market forces in favour of renewables (Fletcher and O'Niell, 2022). Public development banks can play a key role in assisting national governments to address these barriers and supporting reform processes, while ensuring they do not undermine the socio-economic considerations driving the support for coal (e.g. energy affordability and access, local industry development, etc.).

It is important for public development banks to consider government commitments to coal phase-out in countries of intervention to avoid emission leakage and assess to what extent financing will bring forward phase-out targets. Commitment to coal phase-out should be principally at the national government level to send a strong signal to market actors. However, long-term political will and commitment to coal phase-out at the government level are still lacking **(→ Annex)**. In some developing countries, this may be due to the lack of financial and technical resources to transition, which public development banks can help address.

In the context of coal phase-out efforts, Just Energy Transition Partnerships (JETPs) emerged to provide developing countries with financial and technical resources to support raising decarbonisation ambition in the energy sector, with an initial focus on countries with coal-dependent electricity sectors. The first was launched at COP26 in 2021 by South Africa with support from France, Germany, the United Kingdom, the United States, and the European Union, known as the International Partners Group (IPG), which should benefit from US$ 8.5 billion over three to five years, for its just transition away from coal. The concept has been extended to other countries. In November 2022, the Indonesian government announced a US$ 20 billion JETP, with the IPG co-led by Japan and the United States, and in December 2022, US$ 15.5 billion was announced for Viet Nam's JETP (IEA, 2023a). In June 2023, Senegal launched an additional JETP with the support of France, Germany, the United Kingdom, Canada, and the European Union (Senegal and

International Partners Group, 2023). Public development banks may support these partnerships by channelling international and national public funds. They may also facilitate discussions and coordination between partners in a given country, as with the Asian Development Bank supporting the formation of the Indonesian JETP Secretariat as well as technical discussions on financing aspects. It should be noted, however, that these partnerships have been slow to materialise and lack effectiveness to date, as financial resources have not flowed as quickly as needed or at the promised scale (Curtin et al., 2024). As such, they may have less impact on countries' energy transitions than expected when launched, considering the volumes of committed funds, which are significantly below the estimated resource needs, and the limited share of concessional finance and grants. For more effective JETPs, multilateral development banks could support country-led engagement and be further involved in designing and implementing JETP packages, including through direct financing, non-monetary technical and coordination capabilities, and support in mobilising other sources of capital at the project level (Curtin et al., 2024).

5.1 TECHNICAL ADVICE FOR POLICY REFORM

There are many ways in which public development banks can engage with national governments to support the early retirement of coal assets to address the abovementioned barriers. Such engagement can take the form of policy-based lending, support with sovereign bond issuance and other forms of results-based finance. It may also involve capacity building and technical assistance in the context of energy policy reform and technical support and concessional finance for other supporting measures in the transition away from coal, such as accompanying social measures and environmental remediation. Such support should prioritise developing countries with limited financial resources and often increasing debt burden, rather than the highest-emitting rapidly growing economies (Manych et al., forthcoming).

Public development banks should increasingly seek to provide unearmarked finance to government budgets, which would be disbursed only following ambitious policy and institutional reforms, known as **policy-based lending**. In the context of the early retirement of coal, such structural reforms would have to contribute to addressing existing energy market distortions and policies that currently support coal. This could help create the right enabling environment and incentives for the investments needed to transition to a low-emissions, climate-resilient economy.

Several public development banks, including multilateral development banks (AfDB, ADB, IDB, and WBG) and bilateral development banks (e.g. AFD), currently offer policy-based lending, which may include policy dialogue and technical

cooperation in addition to conditional loan disbursement. In recent years, multilateral development banks' policy-based lending specific to energy sector reforms frequently included policy goals, such as increasing energy access, implementing market structure or tariff reforms, and expanding supply, transmission, and distribution infrastructure reforms. Pursued policy actions should be country-owned and credibly linked to results indicators that support a low-emissions climate-resilient development pathway and a just transition. In parallel with concessional financial support, technical assistance must be readily available to meet countries' policy needs identified in country dialogue (Neunuebel et al., 2022).

Overall, supported energy sector reforms fall into one of four categories: energy market design and governance, state-owned enterprise (SOE) utilities governance, support for specific energy sources, and energy transmission and distribution.

Support for fossil fuel subsidy reform is worth highlighting as an example, as global fossil fuel subsidies reached a record US$ 7 trillion in 2022 (IMF, 2023). Such a reform can be challenging, as countries would still have to protect low-income and vulnerable populations from a disproportionate burden of energy costs (Zhou et al., 2023). Technical assistance from public development banks could help countries reform fossil fuel subsidies while maintaining the required energy affordability for their populations.

Similarly, a **carbon price** may serve as a valuable instrument to support coal phase-out, yet it is difficult to introduce in some jurisdictions. In such instances, policy-based loans, coupled with technical assistance aimed at implementing carbon pricing policies, would support countries in these efforts. In Indonesia, for example, in a scenario with a relatively moderate carbon price of 30 US$ per tonne of CO_2 and a rapidly falling cost of renewable energy consistent with global trends, a cost-optimised system has a significantly smaller role for coal until 2040, and a substantially larger role for renewables – notably solar PV, with lower overall system costs (Ordonez et al., 2022). Indonesia introduced an intensity-based emissions trading system in early 2023, but the current carbon price remains low, at 4.50 US$ per tonne in late 2023, and is politically challenging to increase (Rachman, 2023). Coal use in Indonesia benefits from multiple other government subsidies, reaching "2.3 billion US$ of fiscal support for coal-fired power consumption per year (2016-2017 average)" (Suharsono and Gencsu, 2019). Addressing subsidy distortion should form the basis of pubic development bank engagement and reform efforts at the national policy level. Technical assistance and capacity building can support countries in these reform efforts.

Public development banks should also consider, depending on local counterparty capacity, supporting the issuance of **sustainability-linked sovereign bonds** that contribute to the transformation of local economies towards low-emissions and climate-resilient systems. Governments may issue such bonds to raise funds. But if linked to achieving energy and climate-related targets that would not have been set with the same level of ambition in a business-as-usual situation, they could provide governments with further incentives to engage.

Chile is a positive example of sovereign sustainability-linked bond issuance. The Chilean government issued its first sustainability-linked bond in March 2022, aligned with its nationally determined contribution (NDC), with a set of key performance indicators (KPIs) that consider the trajectory of cumulative greenhouse gas (GHG) emissions and Chile's national GHG budget, as well as the share of renewable energy in national electricity generation (Mielnik and Erlandsson, 2022). Considering that coal accounts for 20-25% of Chile's energy consumption and the targets set (e.g. renewable energy share of 50% by 2028 and 60% by 2032), this can provide an additional incentive for the early retirement of coal. Public development banks could, therefore, contribute to the early retirement of coal in other developing countries by supporting similar issuance of sustainability-linked bonds with robust KPIs.

Public development banks may also support the issuance of sovereign green bonds and transition bonds, depending on the country context and bond issuance frameworks in place. However, when doing so, caution should be taken to not set the wrong incentives. For example, KPIs linked to emission reductions, rather than to all new capacity being based on renewable energy, may lead to the unintended effect of promoting new natural gas capacity, thereby increasing stranded asset or carbon lock-in risks down the road. In supporting the issuance of such bonds, development banks should provide the technical assistance needed to ensure the establishment of sufficiently robust KPIs, which contribute to coal retirement and do not allow for continued or increased emissions.

In addition, to support for government policy reforms through policy-based lending and sustainability-linked sovereign bonds, public development banks should prioritise **technical assistance and advisory services** to build government capacity to plan and implement the early retirement of coal-fired power plants within their broader coal phase-out efforts. Compared to investments in energy infrastructure, capacity building is cost-effective (European Commission, 2020). Capacity building can be provided through:

- → **Support to long-term strategies:** Public development banks have a key role in supporting the development of countries' long-term, low-emissions and climate-resilient strategies (MDBs, 2023), which are essential to assess the appropriateness of early coal retirement. Public development banks may also support long-term power sector planning exercises, e.g. through integrated resource planning.
- → **Knowledge sharing:** Public development banks may establish platforms and programmes for governments to access the knowledge they lack to implement their energy transition based on best practice or experience and lessons learned in other countries. Knowledge shared by the Climate Investment Funds' Accelerating Coal Transition (ACT) Program, for instance, aims at helping governments prioritise and identify the most suitable plants within a country for early retirement, as well as

evaluating options to repurpose coal-related energy infrastructure ahead of dedicated feasibility studies. The programme's focus areas include building technical and institutional capacities and helping governments develop "transformation strategies and economic and social development plans" (CIF, 2023).

→ **Targeted technical assistance:** Public development banks can assist governments in overcoming barriers they may currently lack the local capacity to address, particularly in the context of early retirement, such as unlocking coal-related contractual agreements, as elaborated on in the following sections. Public development banks can also help governments mitigate the financial impacts of the early closure of young coal fleets by identifying new tax sources (Zhou et al., 2023). Moreover, as mentioned by experts in interviews, development banks can leverage the existing knowledge they often have of the energy sector in a country, and sometimes of the coal assets they have financed in the past, to target technical assistance where it is most needed within governmental and non-governmental institutions, for the country's transition away from coal. Depending on local context and identified lack of expertise, capacity building in the energy sector may need to target energy and finance ministries and regulators, state-owned energy companies, civil society, and research and academic institutions (European Commission, 2020). When it comes to finance ministries and regulators, for example, according to experts' views, it will be important to support these decision-makers in assessing and managing the related systemic climate risks and the overall consequences of early coal retirement. These may include consequences on domestic green supply chains and macroeconomic imbalances from impact on fiscal revenues and balance of payments.

→ **Initiatives supporting just transition planning:** Public development banks, depending on their experience with developing such schemes, may set up initiatives in line with existing just transition guidelines aimed explicitly at technically and financially supporting a just energy transition. Examples of related capacity building include the World Bank's Supporting Energy Transition in Coal Regions initiative, which provides both financing and advice to countries willing to transition away from coal to design comprehensive social protection packages, reskilling programs, and environmental remediation plans (World Bank, 2021). Technical assistance from public development banks for just transition schemes, which is ideally designed and implemented by governments, employers, and workers themselves, is critical to reduce the transition's impact on coal-dependent workforce, local communities, and society as a whole, in addition to countries' economic development. The Asian Development Bank recently launched a

Just Transition Support Platform, which is another example aimed at "building the capacity of ADB's developing member countries to strategically plan, implement, and finance just transition, to manage any negative impacts, and increase benefits from the transition to net zero." (ADB, 2022) Similarly, EBRD has a Just Transition initiative that includes "policy activities and commercial financing to support those who stand to lose economically from a green economy transition" (World Bank Group, 2020).

5.2 ENGAGING WITH NATIONAL DEVELOPMENT BANKS TO STRENGTHEN THEIR ROLE IN COUNTRY TRANSITION

Beyond engaging with national governments, multilateral development banks and other international financial institutions should also seek to engage with national development banks in facilitating the transition away from coal. This engagement can primarily materialise as on-lending between multilateral development banks and national development banks (NDBs) but also as technical assistance. Non-financial support that MDBs most prominently provide to NDBs includes project preparation, convening, and advisory services (Marodon et al., 2023). MDBs can, for instance, support NDBs in structuring financial arrangements and due diligence, developing and implementing reporting frameworks, and complying with international climate standards. Recent climate-related transactions between MDBs and NDBs have mainly aimed at supporting green investment, recovery from natural disasters or economic distress, or infrastructure development across different sectors. On the other hand, NDBs can be valuable partners for international development banks as they may provide knowledge of the national context and facilitate relationships with local stakeholders that MDBs might not have (Ahlgren et al., 2023).

The Asian Development Bank's on-lending to the Indonesian national development bank, PT Sarana Multi Infrastruktur (PT SMI), which manages the Just Energy Transition Partnership country platform and nationally implements the Energy Transition Mechanism, illustrates such engagement. In the Energy Transition Mechanism's (ETM) financial model, a loan facility and low-cost funding would have to be provided to retire coal-fired power plants in Indonesia. PT SMI received technical assistance and grants to conduct the required analysis, but consultations have shown that some MDBs may lack the policies that would allow financing coal-fired power plants' retirement when needed and would mainly want to finance renewable energy development, which is not necessarily where their investments are most needed. → **Chapter 7** provides further information on the ETM's pilot in Indonesia.

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ENGAGING WITH UTILITIES

In addition to lending to governments, public development banks also engage and lend to the private sector, notably electric utilities, some of which may be state-owned. For public development banks, utilities are a key partner in coal reduction and phase-out efforts, leveraging their ability to provide energy through a larger portfolio of projects. In many emerging markets and developing economies, like in Southeast Asia, state-owned or investor-owned vertically integrated utilities own and operate a significant proportion of coal fleets. Thanks to the nature of their vertical integration, they can optimise their portfolio to meet the energy needs of their service areas. This means that when public development banks engage with utility-owned coal-fired power plants, the utility level is the appropriate level of consideration – rather than the individual asset level. The ability to reshuffle portfolios, shift plants into capacity reserves, retire them fully, and repurpose plants is more closely linked to the overall balance sheet and financial health of the utility itself overall, rather than the particularities of any individual asset and the assumptions made when that asset was built. Given the broad scope of their remit, (vertically integrated) utilities can develop electricity system transition plans that integrate early retirement of coal assets alongside the expansion of clean technologies in a manner that facilitates bankable investments – from private as well as public sources of finance – in their portfolio.

In their interactions with utilities, public development banks can help utilities overcome specific barriers to renewable expansion and early coal retirement. These barriers include business model inertia, lack of expertise with renewable-based electric systems, high debt levels, inability to recoup investment costs, and the upfront costs of renewables. Overcoming barriers would help achieve medium- to longer-term savings through accelerated coal retirement.

6.1 MOBILISING CLIMATE FINANCE AND RESTRICTING FOSSIL FUEL SUPPORT

On a project level, public development banks can help accelerate the shrinking of the future pipeline and closure of existing plants primarily by continuing to develop and promote financial instruments to support renewable energy, battery storage, transmission and grid infrastructure, as well as demand response and smart grids. Further, it is important to ensure that the scope of coal exclusion policies does not prevent project financing for plant decommissioning, site remediation, and site repurposing/redevelopment.

At the same time, it is essential to end the flow of financing to new coal projects not only on a project level but also on a counterparty level in the case of unearmarked finance. While many banks, including MDBs, have made progress in expanding exclusion lists to cover coal since 2015 **(→ Annex)**, indirect finance through

financial intermediaries continues to flow. Denying financing to counterparties, including utilities, that are building new coal is a further important measure to address indirect financing of coal (Fuchs et al., 2021). While the International Finance Corporation (IFC) updated its policy to require "a commitment from FI [financial institutions] clients to not originate any new coal projects from the time the IFC becomes a shareholder" (IFC, 2023), such an overall counterparty assessment is not yet standard practice for all development banks nor for other kinds of financial instruments, which can be a reputational risk (Erlandsson, 2020). Sembcorp, a Singapore-based energy company that builds energy infrastructure in several countries, benefitted from the IFC as an anchor investor in its S$675mn sustainability-linked bond issuance. To avoid paying higher interest on the debt, instead of retaining ownership of plants, the company simply spun coal assets off into a separate company, which it continued to finance. Critiques called this measure "carbon footprint arbitrage" and "financial engineering" to artificially reduce the company's footprint and allow it to achieve the targets linked to the bond (Erlandsson and Rimaud, 2022; Ruehl, 2022). Multilateral development banks recently issued joint guidance on the Paris alignment of intermediated finance that could contribute to addressing such risks **(→ Annex)**.

6.2 SUPPORTING WITH IMPROVED INTEGRATED RESOURCE PLANNING

Integrated resource planning is a long-term roadmap that utilities use to assess future electricity needs and plan to meet future needs. The planning covers both demand-side measures (energy efficiency and conservation), as well as supply-side measures (generation, transmission, and distribution additions) (Greacen et al., 2013).

Vertically integrated utilities have a number of different resources at their disposal to meet energy demand. Drawing on their portfolio, vertically integrated utilities have the ability to take a more systemic view of power systems. Robust integrated resource planning has become a valuable tool to inform decision-making. Integrated resource planning can help highlight the costs of both building new coal plants and operating existing ones and the potential savings from reducing the operations of existing plants or shutting them before the end of their useful life, compared with a portfolio of other options to meet energy needs. There are a growing number of integrated resource plans that bring forward coal plant closures across the United States, including PacifiCorp (Walton, 2019) and Xcel Energy (Moylan et al., 2019), as well as elsewhere, such as Eskom in South Africa (Department of Minerals and Energy, 2024). Public development banks can support the development of efficient integrated resource planning and robust scenario modelling through technical assistance to utilities and may leverage financing to advocate for ambitious planning. Essential factors to consider in integrated resource planning include electricity demand forecasts, renewable energy resources (existing, in the pipeline, and future potential), demand response potential, environmental policies, transmission infrastructure, and current and projected generation of the existing fleet **(→ Fig. 4)** (Mai et al., 2013; Gonzalez, 2019; Bonugli and Ratz, 2021).

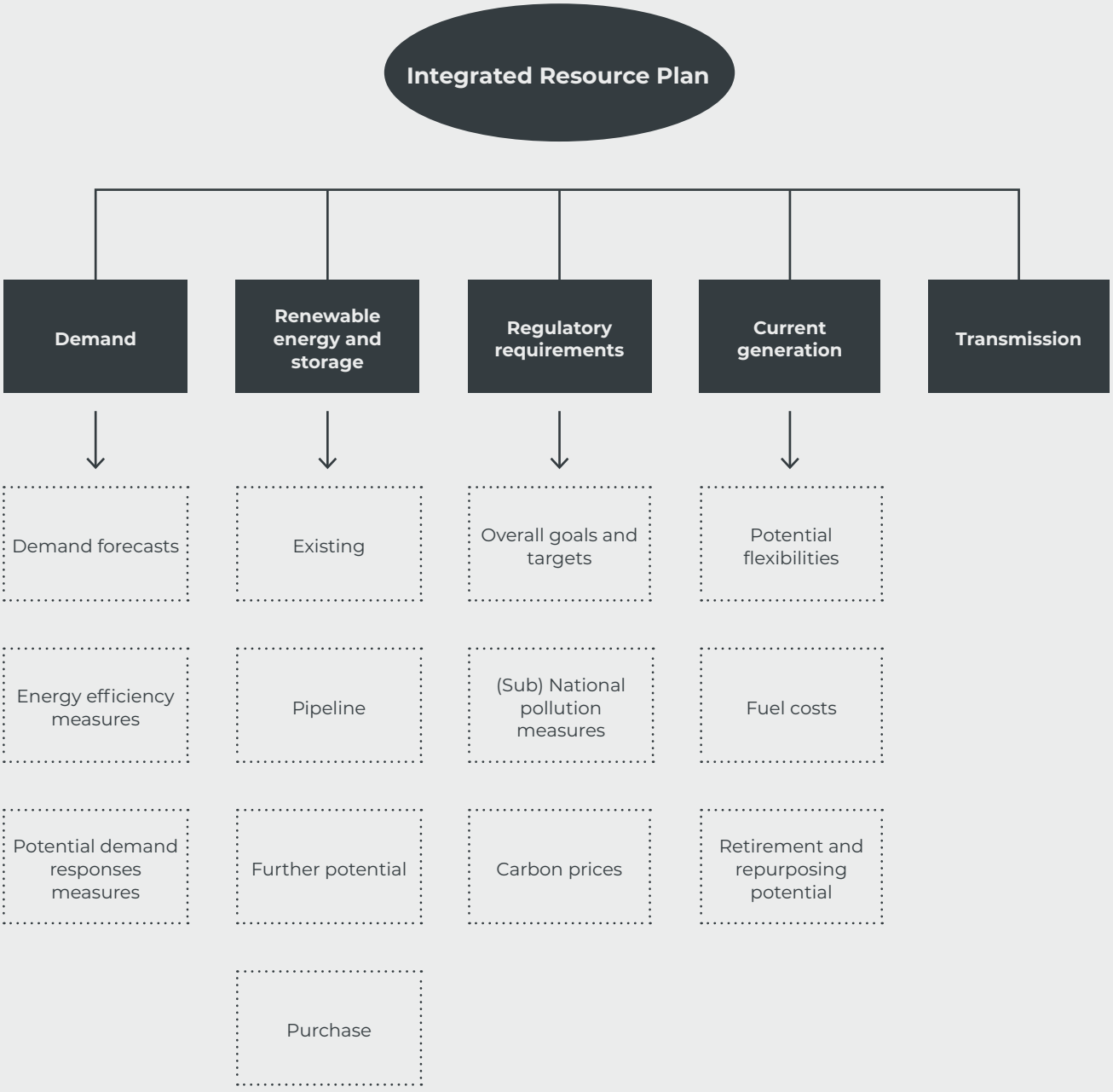

Fig. 4
Considerations in Integrated Resource Planning

Source: Authors.

Although developing integrated resource planning is easier in developed countries where electricity demand has plateaued or is at least not growing as quickly as in developing countries, integrated resource planning can highlight options for vertically integrated utilities around the world. It can enable not only overall utility targets for renewable energy generation but also facility by facility closure dates as called for by investors (Climate Action 100+, 2022), and civil society (McCully and Meister, 2021). One such option, capacity reserves, is explored further in → **Box 1**.

Box 1

Capacity reserves

Even before complete retirement, decommissioning, rehabilitation and repurposing of coal plants, capacity reserves may be a first step that governments and vertically integrated utilities could take towards retirement. Using existing coal plants to provide reserve capacity to the electricity system as a safety net to meeting demand enables plants to run at reduced capacity factors with correspondingly lower emissions on the way to final closure. In many countries, often because of energy security concerns, some period of maintaining the availability of coal plants at reduced capacity factors will be a clear preference of utilities and governments before final retirement. Because of the relative inflexibility of coal-fired power plants, they are not well suited to adapt to variable renewable energy generation on the grid on an hourly, or even daily, basis. Coal-fired power plants can, however, potentially be placed into capacity reserves before renewable alternatives, storage and demand response capacities are scaled to a level where they can better guarantee energy security and allow complete coal decommissioning. This should start with those plants running at reduced capacity and efficiency. Commitment to phase-out is crucial for the credibility of such arrangements, preventing backtracking in the event of political turnover.

6.3 ADDRESSING BALANCE SHEET LIMITATIONS

Public development banks can help utilities address various financial barriers, from improving cost recovery to restructuring balance sheets and finding financing to expand renewables and accelerate early retirement.

A significant barrier to utilities shutting down existing coal plants and replacing them with renewables is the high initial upfront cost of renewables. Even when the levelised cost of renewables and storage is lower than the long-run marginal cost (LRMC) of coal, replacing existing coal requires significant new investment, which must be financed. This may be a considerable challenge depending on the utility's balance sheet and cost recovery. The ability to invest to realise these benefits is

more closely linked to the business model, balance sheet, and financial health of the utility itself overall rather than the particularities of any individual asset and the assumptions made when that asset was built.

In many emerging markets and developing economies, utilities fail to recover their costs, often because of operational efficiency challenges – notably network losses, a lack of ability to set cost-reflective tariffs, and poor financial management (IEA 2021). The IEA assessed the financial sustainability of utilities in selected emerging and developing economies, as well as a few developed economies and found that while utilities in the United States, Malaysia, France, China, Viet Nam, Thailand, and Brazil have positive cost recovery ratios of over 1, those in South Korea, Mexico, India, South Africa, and other countries in sub-Saharan Africa fail to recoup their costs (IEA, 2021a). In Indonesia, following government efforts to make electricity tariffs more cost-reflective, connect new customers and reduce operational losses, PLN increased revenues faster than costs. However, operational inefficiencies, obligations from take-or-pay contracts, and under-pricing of electricity still contribute to significant financial losses overall. → **Table 2** presents the challenges utilities face that prevent them from recovering their costs (IEA, 2021a).

South Africa (ESKOM)	Indonesia (PLN)	Other Sub-Saharan Africa	India
Rising operating expenses;	Continued financial losses due to operational inefficiencies;	Significant losses due to under-pricing of electricity;	Revenue shortfalls for state distribution companies lead to growing outstanding dues to generators;
High debt levels with rapidly increasing financing costs;	Expensive legacy take-or pay contracts;	High network losses;	Tariffs still do not reflect costs;
Coal plant outages;	Under-pricing of electricity;	Inadequate bill collection.	Existing thermal power assets continue to be a financial drag;
Delays in bringing new capacity online;	Government subsidy makes up the difference but is not a sustainable solution in the medium to long term.		Less than 2/3 of electricity generation monetised due to losses and billing and collection challenges.
Loss of South Africa's sovereign investment rating which has negatively impacted Eskom's ability to raise capital.			

Tab. 2
Major challenges for electric utility financial stability in select countries

Source: (IEA, 2021a).

If the utility cannot mobilise the upfront capital for renewable investments immediately, there are alternative options, including signing renewable power purchase agreements with IPPs, which can spread out payments over a longer time horizon. Public development banks can provide legal support for contracts, feasibility studies, and guarantees to address perceived risks from IPPs and facilitate such long-term agreements.

If utilities seek to invest in new renewable generation, different financial instruments, including public development bank lending instruments, can support utility refinancing. RMI proposes four mechanisms to refinance utilities to enable them to invest in clean generation assets: single asset refinancing, ratepayer-backed securitisation, asset-backed securitisation, and green bonds (Bodnar et al., 2021). Efforts to restructure debt must carefully navigate challenges to avoid indirect support to new natural gas capacity, moral hazard, perverse incentives, and close KPI loopholes. While there are debates about how green a counterparty must be to issue sustainable debt instruments such as green bonds, without clear commitments in the market the utility operates in to refrain from building new fossil fuel plants; these instruments pose challenges regarding their impact and ability to avoid reputational risk and accusations of greenwashing.

6.4 SUPPORTING UTILITY RESTRUCTURING

For more financially strained utilities, taking on new debt may be a challenge. To address this, a number of instruments have been proposed, including various forms of debt restructuring, as well as “bad bank” or “managed transition vehicle” models in which coal assets are spun or sold-off into a separate entity to be run down separately. Such models, prior to any potential financial and/or technical support from a public development bank, must ensure that there is a clear phase-out plan to wind down the assets and that funds are set aside for decommissioning and site rehabilitation for the heavily polluted sites in the medium to long term.

The “bad bank” model has been implemented in a few European countries, notably in Germany and Poland, where utility management reported being unable to attract private investors because of the association with their legacy fossil fuel assets **(→ Box 2)**. In the German and Polish cases, the energy transition has meant fundamental shifts to restructure business models to enable utilities to attract private capital to finance renewable energy while addressing perverse incentives. Moral hazards and emission leakage risks related to these investments are managed to some extent through national commitments and European regulatory frameworks, notably by the European Union’s Emissions Trading System (EU ETS) coverage.

Germany is a member of the Powering Past Coal Alliance and the No New Coal Power Compact and has signed the COP26 Coal to Clean Power Transition Statement, signalling to national financial actors its commitment to transition away from coal. Although Poland is not a member of either initiative, it has signed the COP26 Coal to Clean Power Transition Statement (Roberts et al., 2023). Since 2010, Poland has cancelled 23 proposed coal plants and closed six additional plants, although one new plant is under construction, with its owner having reached a final investment decision in 2019 (GEM, 2023b). However, countries must cancel emission allowance to address the waterbed effect in the EU ETS, an effect where the closure of one emitter frees up additional emission allowances for others under the common cap (Wehrmann, 2022). Germany announced in 2024 that allowances for 2021 and 2022 were taken off the market and will be cancelled (Wettengel, 2024).

The "bad bank" model could also be considered in the context of developing countries outside of Europe. However, in countries that currently have new fossil fuel capacity in their pipeline (e.g. due to renewable energy supply chain constraints), the application of this model involves the risk of incentivising the substitution of existing coal assets by other fossil fuel assets (notably based on natural gas), thereby exacerbating stranded assets and carbon lock-in risks. Additionally, the lack of cap-and-trade systems similar to the EU ETS in developing countries with young coal fleets presents a large risk of leakage if the same approach is taken without the requisite enabling conditions.

To navigate the challenges of setting up financial models for "bad banks" or "managed transition vehicles" and, more broadly, reforming business models to attract private capital, public development banks can leverage advisory services such as the World Bank's Energy Sector Management Assistance Program (ESMAP)'s "Utilities for the Energy Transition" (ESMAP, 2023b) programme in conjunction with the portfolio of other support options, including financial support, that public development banks have at their disposal.

Box 2

Restructuring utilities for renewable investments: The bad bank approach

In the case of Germany, having insufficiently invested in renewable generation in the 1990s and early 2000s, major German utilities came under increased financial pressure because of their fossil fuel and nuclear-based fleets, which suffered from increased distributed generation and low demand. In 2013, RWE, Germany's largest electric utility, made a loss of €2.3 billion. In 2015, E.On, another sizeable German utility, recorded a loss of €6.4 billion. This contributed to a flight of investors and major losses of market capitalisation between 2011 and 2015: E.On lost 70% and RWE lost 80% (Hörnlein, 2019). This stood in stark contrast to other European utilities such as Enel, Iberdrola, and EDP, which saw rapid valuation gains largely thanks to their early investments in renewables (Reid, 2017). Recognising the need for restructuring, both companies separated their renewables businesses from their legacy plants: E.On spun off its fossil fuel assets into a new entity, "Uniper", in 2014, and RWE spun off its renewables business into Innogy, a new entity in 2016 (Chazan, 2016). Although both restructured their business models again later, E.On ended up with a new business model focused on retail and grid infrastructure in which offloading its fossil assets was a key part of its ability to attract private investment (Wess, 2019).

Almost a decade later, Poland is going through its own restructuring of its state-owned utilities. Finding it difficult for its utilities to raise private finance for renewables, the Polish government has announced a plan to relieve major utilities of their legacy coal assets. Under the plan, the government-owned National Energy Security Agency (NABE) will acquire the coal assets of local energy companies PGE, Enea, Tauron and Energa (Martewicz and Krasuski, 2023). The announcement of the plan led to a rapid increase in the stock price of all the utilities, and Fitch Ratings noted the improved credit outlook for the utilities (FitchRatings, 2023). Although this model has been subject to significant critique, including that taxpayers would then be responsible for the costs of decommissioning, remediation, and repurposing (Lo, 2020), as these utilities are state-owned, taxpayers would have to finance these costs in either case. Again, separating the coal assets was key to becoming more attractive for investors, with one asset manager saying that "foreign investors steered clear of the companies because of their carbon footprint. Now comes the time to reassess and to look more positively at the sector and for investors to come back" (Martewicz and Krasuski, 2023). A similar transaction structure is under consideration in Indonesia, where PLN plans to sell some of its ageing coal-fired power plants to state-owned coal miner Bukit Asam (Maulia, 2022).

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ENGAGING WITH INDEPENDENT POWER PRODUCERS

IPPs play an important role in meeting energy sector financing needs. In addition to investments in coal plants, many IPPs invest in renewable energy capacity. The scope of this section covers only those that own coal plants.

In response to rising electricity demand, a growing number of both developing and developed countries have taken steps to reform and liberalise their electricity sectors. The motivation behind these efforts is primarily twofold: to attract private investment for capital-intensive energy generation projects and to introduce competition to reduce electricity prices and foster innovation (Woolf and Halpern, 2001). In reforming their energy markets, governments often seek to attract private investment by at least partially unbundling generation, transmission, distribution, and sales.

Opening up coal generation to the private sector often means attracting independent power producers (IPPs) with guaranteed offtake contracts in the form of power purchase agreements (PPAs), which, once signed, lock in coal-powered generation for years to come (Kansal et al., 2023; Khannan et al., 2023). Take-or-pay clauses in PPAs require offtakers to purchase a minimum amount of electricity or pay a penalty fee, incentivising running coal plants at high-capacity factors, and obliging consumers to continue purchasing expensive power from uneconomical coal plants that hamper grid flexibility and can lead to inefficient coal dispatch (IEEFA, 2017; Boute, 2021; Calhoun et al., 2021). As such, though there may be competition among investors to win a contract to build a plant, once built with a PPA, coal plants are shielded from competitive electricity markets, which can seriously undermine coal phase-out efforts. Contracts lock in high-emitting energy generation and hold governments liable for future losses within the duration of the PPA, disincentivising policy change. In Indonesia, PPAs with take-or-pay clauses have been criticised as disincentivising the utility, PT Perusahaan Listrik Negara (PLN), from developing renewables as the utility is locked into paying capacity charges (IEEFA, 2017). Maintaining PPAs unchanged locks in emissions-intensive coal generation, but importantly, it also delays countries from benefiting from the rapid fall of renewable energy generation costs, which typically accelerate as deployment increases within a country.

IPPs may own a single coal-fired power plant, or several, within a single market or distributed across several markets. Depending on the energy market, IPPs can hold substantial ownership of coal plants and require a targeted approach to phase-out. In Indonesia, close to 32%, or 14.5 GW, of the country's coal power generation capacity is owned by IPPs (Parapat and Hasan, 2023). In China, five IPPs account for around 44% of the total power generation capacity, with over half of the capacity coming from coal (Yin and Yep, 2021). In Viet Nam, 29% of national power generation capacity is generated by IPP/Build-Operate-Transfer schemes (Export.gov, 2018).

7.1 ADDRESSING PPA LOCK-IN

A key way for public development banks to engage with IPPs on coal phase-out is to facilitate legal support for off-takers to review and renegotiate PPA contracts.

Pricing foregone cash flows is the main challenge when public development banks address PPA lock-in because IPPs could seek higher compensation, which could lead to overpayment. IPPs investing in coal after the Paris Agreement did so at the risk of early termination and stranding, which raises the question of if and to what extent they should be compensated.

There are four broad approaches to address PPA lock-in: termination, replacement, restructuring, and repurposing (Srinivasan et al., 2022; ESMAP, 2023a; Kansal et al., 2023).

Termination of a PPA ends the contract to purchase coal generation without replacement. In markets with rapidly increasing demand, this is not always feasible without impacting energy security. In terminating PPAs early, IPP debt is refinanced at concessional rates, which in turn lowers repayment expense and allows for earlier termination (Kansal et al., 2023). Buying out PPAs entails high costs that would need to be borne by the government or international donors (i.e., by taxpayers). These include costs associated with terminating fuel supply contracts, penalty fees for PPA termination, the cost of decommissioning the coal plant, and support for workers (Kansal et al., 2023).

Engaging IPPs in phase-out presents different risks depending on plant age. Early termination of young plants with PPAs could be prohibitively expensive and legally and politically challenging. The certainty of repayment under PPAs could disincentivise engagement in early termination if the pricing is not competitive or if IPP losses are deemed too high. Termination of older plants' PPAs might be more feasible and presents the opportunity to ease the financial pressure on governments and utilities to pay expensive capacity payments for uneconomical plants and potentially frees up capital for investment in renewables (Calhoun et al., 2021; ESMAP, 2023a). IEEFA (2021) estimates that exiting old coal PPAs could save electricity distributors over US$7 billion annually in India. Particularly towards the end of PPAs, an immediate upfront payment, rather than future diminishing cash flows, could entice IPP investors to retire their coal assets early. However, public development banks must weigh the opportunity cost of allocating finite public finance towards coal plant retirement instead of investing in alternative technologies, such as grid upgrades. Uneconomical plants should not be prioritised. To be effective, compensation for buyout and termination of PPAs should be coupled with other policy incentives that exert growing pressure on IPPs, for example, increasingly stringent environmental controls and carbon pricing. While the enabling environment is determined by national regulation, public development banks can provide strategy support and technical assistance to foster such an environment.

IEEFA defines old PPAs as those over 25 years old. This is in line with the Indian central power regulation that allowed Delhi's largest electricity distribution company to exit its supplemental purchase power agreement (SPPA) after it completed its original 25-year-old PPA.

Replacement is similar to termination, where coal assets are purchased for early retirement, but retired generation capacity is replaced with equivalent renewable energy PPAs (ESMAP, 2023a; Kansal et al., 2023). Like termination, replacement

requires an enabling environment for renewable energy alternatives. Replacement seeks to address IPPs' potential losses by providing financing to IPPs to develop renewables from which they can profit while either transferring ownership of the coal asset to a new investor or maintaining the same ownership. Swapping coal PPAs for renewable PPAs ensures energy consumers access cheaper and less emission-intensive energy (IRENA, 2022). To be attractive to IPPs, potential earnings from renewable PPAs would need to rival anticipated earnings from coal PPAs. Public development banks must, however, exercise caution to avoid overpaying IPPs as they are incentivised to maximise compensation.

Solar for coal swaps have been developed in the United States, where utilities sold coal assets to third entities who agreed to decommission the plants in return for PPAs for new solar installations (Lehr and O'Boyle, 2020). Coal plants in the United States are older and have often recovered their amortisation cost, meaning the applicability of this model in other jurisdictions depends on the local context. The model could support the retirement of IPP-owned coal plants but, depending on the context, might require some elements of concessional finance, which public development banks can provide, to de-risk renewable investments.

Restructuring amends existing PPAs to reduce coal plant generation and emissions before eventual retirement at a time earlier than the existing PPA contract (Kansal et al., 2023). Such an option might be more politically feasible in coal-reliant economies and ensure continued energy security while renewables are scaled. Even with a modified PPA that reflects lower utilisation, there are potential perverse incentives for new owners to utilise uneconomical plants into the future to recoup investment. As such, there are potential reputational concerns for public development banks if coal plant emissions do not decrease. At worst, restructuring could lead to no significant reduction in the lifetime of the plant and still be costly.

Kansal et al. (2023) propose a monitored transition vehicle, financed by public and private investors, to purchase coal assets outright and run plants at lower utilisation rates. To ensure credibility, such transition vehicles would need to be guided by clear governance and measurement, reporting, and verification systems.

Repurposing utilises existing coal plant infrastructure by leasing or selling sites or grid connections to renewable energy developers. Through repurposing, coal plant owners can diversify earnings and address, to a degree, loss of income. Alternative cash flows could increase the economic viability of accelerated coal phase-out and the attractiveness of PPA restructuring (GFANZ APAC, 2023). The benefits of repurposing are threefold: compensation for decommissioning costs, continued employment opportunities for impacted communities, and decreased investment costs by repurposing existing infrastructure (e.g., transmission lines, land, generators) (ESMAP, 2023a). Cash flows from repurposing can also support environmental remediation. This approach is limited by the generation potential on-site. It is also likely most attractive for older plants closer to retirement rather than younger plants.

7.2 CONDITIONS FOR ENGAGEMENT WITH IPPS

In engaging with IPPs in PPA renegotiation, governments, and in turn supporting public development banks, face two core challenges: overcompensation and compensation without significantly bringing forward coal plant retirement. In considering the presented modes to unlock PPAs, they face similar engagement challenges. Negotiations with IPPs on coal phase-out encounter a number of pricing challenges, including information asymmetry about hurdle rates, discount factors, and depreciation. While MDBs independently assess transactions' potential for emission reduction and set baseline assumptions, data points used in calculations come from the asset's operation history as reported by the generator. Information asymmetries create perverse incentives for coal plant owners to inflate, or under-report, data points to enhance phase-out compensation. The potential for future bailout also risks incentivising IPPs to maximise short-term profit (and emissions) under the assumption that they will be bailed out in the future (Pinko and Pastor, 2023).

The use of international public climate finance must be subject to rigorous scrutiny to ensure that taxpayer funds are not directed towards compensating coal plant owners for lost revenue but rather contribute to accelerating the retirement of such plants. Buyout of PPAs is likely too costly and an inefficient use of public funds. Restructuring and replacement run the risk of overcompensating IPP owners for uneconomical plants and setting perverse incentives that keep plants online, which would not lead to early retirement. Engagement to renegotiate PPAs must be carefully designed to mitigate risks. Key considerations for engagement should include whether there is a credible commitment and political will to phase out (at the national and IPP level), whether the mechanism to find a price utilises transparent and market-based mechanisms, and whether there is a plan to replace generation with renewables. Given the risks and limited financing available, only under exceptional circumstances should public finance be used to buy out coal plants owned and operated by IPPs. The following sections outline two important circumstances of engagement: credible commitment to phase-out and market-based mechanisms. Three cases of engagement with power producers for early retirement are then presented.

CREDIBLE COMMITMENT TO PHASE OUT COAL

To avoid moral hazard and perverse incentives, it is important that financing is coupled with a credible commitment from the IPP to cease the construction of new coal plants and engage in phasing out other existing coal plants. IPPs with coal phase-out commitments are limited and requiring a commitment prior to engagement with IPPs is challenging as the ownership of coal plants may be

complex. Depending on the market, a significant share of coal plants is owned by consortiums of foreign investors (Hamdi and Adhiguna, 2021), some of which are directly or indirectly owned by national governments (GEM, 2023a). The involvement of global investors with diverse ambition levels accentuates the challenges in navigating managed phase-out with IPPs and underscores the crucial role of national commitments in advancing the early retirement of coal. The managed phase-out of the Cirebon 1 power station in Indonesia highlights the challenges of engaging with IPP consortiums, particularly in the context of incomplete government commitment to phase out all new coal plants and developments in the pipeline **(→ Asian Development Bank Energy Transition Mechanism)**. In the case of unearmarked finance, denying financing to IPPs without clear phase-out commitment, or those that are building new coal plants, is an important measure to address indirect financing of coal.

In markets that lack robust government commitment to phase-out, there may be a role for public development banks to engage at the investor level to prevent new coal already in the planning and financing stage and to facilitate legal support to cancel projects in the pipeline.

TRANSPARENT AND COMPETITIVE MARKET-BASED MECHANISMS

Opaque bilateral negotiations between public development banks and IPPs should be avoided as they run a high risk of wasting public funds and often lack transparency and public scrutiny. Transparent and competitive market-based mechanisms like **reverse auctions** should be prioritised over bilateral negotiations to overcome inherent challenges, facilitate price discovery, and reduce the transaction costs of bilateral engagement (The World Bank, 2022). Market mechanisms exploit competition between operators and, therefore, can result in more cost-efficient phase-out pricing.

Reverse auctions for coal phase-out involve a competitive process in which power plant operators bid to receive compensation for the decommissioning of their coal plants.

So far, reverse auctions have been confined to the phase-out of utility-owned coal plants. However, reverse auctions could also be employed in countries with a credible phase-out commitment to facilitate the retirement of IPP-owned plants. While most IPP-owned coal plants have PPAs that lock in payment, the time value of money suggests that recouping compensation now instead of in the future could attract IPP investors to participate as they could reinvest the money (e.g., in renewables) while resulting in emission reduction because of early retirement.

In a reverse auction, IPPs would submit bids for retirement compensation, which would be ranked according to specified criteria (e.g., cost efficiency, emission intensity, and maintenance costs) (IEA, 2021b). The maximum compensation available (the ceiling price) would decrease in subsequent auction rounds to incentivise participation and early retirement (Hauser et al., 2021). This could be further incentivised by connecting phase-out compensation with financing for renewables, for example, through engaging with IPPs to replace coal PPAs with renewable clean energy PPAs.

The success of a reverse auction for coal retirement hinges on the right enabling environment of policies, political support at the national and local levels, and the design of the auction itself (Scott et al., 2022). Viability also depends on the breakdown of coal plant ownership, whether there is sufficient competition, if PPAs are renegotiable, and if IPPs are interested (The World Bank, 2022). Not all countries have the technical or financial means to support public auctions. If there is a clear interest from host governments, international finance could play a role in supporting the design and set-up of reverse auctions. Auctions should be country-owned. Public development banks could contribute to identifying projects and support the government in raising money to pay for the winning bids.

As coal becomes increasingly uncompetitive, auctions should be carefully designed to avoid overpaying underutilised and uneconomical plants that will likely close due to changing economic conditions. Such plants represent low-hanging fruit, which would likely close in the near term. This was the case with the German reverse auction, which awarded €317 million to plants that collectively lost over €200 million between 2018 and 2020. Units with successful bids had an average load factor of only 12-30% in 2018 and were running at a loss (Brown, 2020) **(→ German Reverse Auction for Coal Exit)**. Factors, like contracted minimum offtake, PPA lifetime, and political commitments to phase-out, should be considered in determining eligibility. Limited climate finance must flow towards high-impact applications that offer substantial additional emissions mitigation.

The case of IDB Invest in Chile offers another example of public development bank engagement with coal phase-out market-based mechanisms **(→ IDB Invest Engie Energía Chile)**. The bank entered the Chilean market only after the government announced a number of push measures (i.e., "sticks") – a commitment to coal phase-out by 2040 (now 2030) and implementation of a carbon tax. Given the context of a clear commitment to phase-out at the national and investor level, there was potentially a missed opportunity to utilise market mechanisms to facilitate price discovery and avoid overcompensation.

7.3 EXAMPLES OF ENGAGEMENT WITH POWER PRODUCERS FOR EARLY RETIREMENT

The following section looks at three examples of engagement:

- Asian Development Bank Energy Transition Mechanism.
- German Reverse Auction for Coal Exit.
- IDB Invest Engie Energía Chile.

Each example utilises different financing mechanisms and is assessed according to the outlined engagement criteria: credible commitment to phase-out and transparent and market-based mechanisms. The success of phase-out engagement, regardless of mechanisms, depends on factors such as political support, institutional readiness, local context, and design of the mechanism.

ASIAN DEVELOPMENT BANK ENERGY TRANSITION MECHANISM

Through its Energy Transition Mechanism (ETM), the Asian Development Bank committed to a US$ 250-300 million refinancing deal to shorten the PPA obligation period of the Cirebon 1 coal plant in Indonesia by seven years from 2042 to 2035 (ADB, 2023b). The Cirebon 1 power station is owned by a private consortium of four corporations, one of which is a state-owned enterprise (GEM, 2023a). The ETM refinances IPP project debt, allowing investors to accrue savings through lower repayments and higher earnings. While the ETM succeeds in restructuring the PPA by seven years, it does so in a context where there is a high risk of leakage because of weak coal commitments, which could ultimately make the initiative ineffective.

Mechanism of engagement: Blended finance for refinancing

The financing agreement behind the retirement of Cirebon 1 power station uses a blend of concessional capital from ADB's ETM Partnership Trust and the Climate Investment Fund's Accelerating Coal Transition Window and **private capital** from ADB's Private Sector Operations Department.

Commitment to phase-out

Government-level commitment to phase-out: **Incomplete**

In 2021, the Indonesian government signalled its commitment to transition from coal with the potential to accelerate phase-out to 2040 with international assistance (UK COP26 Presidency, 2021). More recently, in the context of the Just Energy Transition Partnership, the government committed to “freezing” the existing pipeline and phasing down coal (IPG, 2022). This is weakened by Presidential Regulation 112/2022, which carves out an exception for off-grid captive plants (Government of Indonesia, 2022). Off-grid captive plants are outside the scope of the JETP’s Comprehensive Investment and Policy Plan (JETP Secretariat, 2023).

IPP-level commitment to phase-out: **No**

While the ADB has committed **US$ 250-300** million to refinance Cirebon 1, a consortium with many of the same original investors as for Cirebon 1 is moving forward with the development of Cirebon 2 coal power station, which sits adjacent to the first facility. → **Table 3** shows the original investors in Cirebon 1 and 2 power stations. Without ensuring a clear investor commitment to phase out coal, the ETM risks generating savings for investors while allowing for emission leakage.

Tab. 3
Original financing of Cirebon 1 and 2 coal power stations

	Total financing	Equity	Equity Providers	Loans	Loan Providers
Cirebon 1 →	**USD 850 million**	USD 255 million	KEPCO	USD 595 million	Japan Bank for International Cooperation
			Marubeni		Export-Import Bank of Korea
			PT Tripatra Engineers & Constructors		ING Group
			ST International		Sumitomo Mitsui Banking Corporation
					Mizuho Financial Group
					Mitsubishi UNJ Financial Group
Cirebon 2 →	**USD 2.175 billion**	USD 435 million	Japan Bank for International Cooperation	USD 1.74 billion	Japan Bank for International Cooperation
			Export-Import Bank of Korea		Export-Import Bank of Korea
			ING Group		ING Group
			Mitsubishi UNJ Financial Group		Sumitomo Mitsui Banking Corporation
			Mizuho Financial Group		Mizuho Financial Group
			Sumitomo Mitsui Banking Corporation		

Source: (GEM, 2023a).

Transparent and market-based mechanisms

Agreement transparency: **No**

The Memorandum of Understanding for the ETM Cirebon 1 financing agreement is not publicly available. As public funds are directed towards blended finance mechanisms, it is crucial to enhance transparency regarding the blended terms, including the extent of concessional finance utilised. This transparency is necessary for evaluating the effectiveness of deals in accelerating retirement dates.

Market-based mechanisms: **No**

The financing agreement was concluded under bilateral negotiations with IPP investors. No market-mechanisms were utilised to facilitate price discovery

Replacement with renewables

Replacement has not yet been announced, but renewable technologies are under consideration (ADB, 2023a). ADB is in talks with PLN regarding the replacement of power generation lost due to the closure of Cirebon 1 (ADB, 2023a). Replacements should be evaluated in light of an oversupplied grid and the long-term strategy for energy decarbonisation.

GERMAN REVERSE AUCTION FOR COAL EXIT

In 2020, the German government announced its intention to phase out coal nationally by 2038 (LoC, 2020). To enable phase-out, it announced a reverse auction mechanism through which owners of hard coal plants and small lignite plants could submit bids for a closure premium to retire plants early.

Mechanism of engagement: Reverse Auction

Commitment to phase-out

Government-level commitment to phase-out: **Yes**

In 2020, the Coal Phase-Out Act entered into force in Germany, which aimed to gradually reduce and end the use of coal power. It banned new coal plants from August 2020 on and set a phase-out date of 2038 (which has since been amended to 2030).

Investor – level commitment to phase-out

German utilities had different commitments to phase-out. Most were not more ambitious than the government's 2038 target **(→ Tab. 4)**.

Tab. 4
Phase-out commitments of selected utilities in 2020 and today

Utility	2020	Today
RWE	2038	2030
ENBW	2035	2028
LEAG	2038	2038

Sources: (LEAG, no date; EnBW, 2020, 2023; RWE AG, 2020; Steitz et al., 2022)

Transparent and market-based mechanisms

Agreement transparency: **Yes**

The bid price per coal-fired unit was not publicly announced, but the total capacity covered and total closure premium paid were disclosed (Brown, 2020).

Market-based mechanisms: **Yes**

The reverse auction created competition between utilities to submit bids for retirement compensation. The reverse auction reduced the compensation rate per kW by 85 €/kW compared to the ceiling price (Tiedemann and Müller-Hansen, 2023). However, the later auctions were undersubscribed, which led to a lack of competition and resulted in the government awarding the tender equal to the bid cap (Riechmann, 2023).

Replacement with renewables

The reverse auction did not directly facilitate renewables but supported system decarbonisation in conjunction with other policies to scale renewables. Because of the design of the reverse auction to rank bids based on emissions per MW of installed capacity, it had the adverse effect of favouring modern coal plants that operated more than older, less efficient plants (Scott et al., 2022). While this avoided compensating low-hanging fruit – i.e., plants that are older, uncompetitive, or increasingly under pressure from environmental policies – it had the negative effect of moving higher-polluting plants up the merit order, a perverse outcome (Scott et al., 2022).

IDB INVEST ENGIE ENERGÍA CHILE

In 2019, IDB Invest and Engie Energia Chile announced an agreement to develop a coal phaseout instrument. In 2021, IDB Invest provided Engie Energía Chile with US$ 74 million of long-term finance under market interest rate and conditions to retire coal (IDB Invest, 2021). The IDB Invest Engie financing agreement provides an innovative example of results-based financing that can facilitate decarbonisation and renewable buildout. The project provides compensation to Engie in the form of results-based finance that monetises the emissions displaced from early plant closure. Through the investment, Engie receives financing to develop a 150 MW wind installation. The interest rate of the wind project is tied to the displaced emissions resulting from the phase-out of coal assets and their replacement with clean technologies. The deal was estimated to have brought forward the closure date of the coal plant units by 18 months (Shockling et al., 2022). However, there are questions about how much public finance led to additional emission reductions and if public finance was the optimal option. While innovative, the Engie deal is considered a low-hanging fruit (i.e., it targeted a plant that was close to retirement anyway).

Mechanism of engagement: Results-based financing

Commitment to phase-out

Government-level commitment to phase-out: **Yes**

IDB Invest entered the Chilean market after the government announced its intention to phase out coal by 2040. Since then, phase-out discussions have advanced, and the Ministry of Energy has announced plans to retire plants by 2030 (Ministerio de Energía, 2022). The Ministry of Energy also announced an energy efficiency plan, Ruta Energética 2018-2022, which outlined a decarbonisation matrix and a binding schedule for coal phase-out (Ministerio de Energía, 2018).

Since 2017, Chile has also implemented a carbon tax. The Ministry of Social Development initially set the carbon price at a flat rate of US$ 5 per tonne and has not increased the rate (GIZ, 2021). While the tax rate has remained unchanged, it is similar to other countries in the region and close to the global average (Evan and Zhunussova, 2023).

IPP- level commitment to phase-out: **Yes**

Engie has committed to phase out coal in Europe by 2025 and by 2027 globally (Engie, 2023). In 2019, Engie Energía Chile and the Chilean government signed an agreement committing the company to phase out coal no later than May 2024 (Carillo et al., 2023). Engie already committed to phase out coal by 2024 before IDB Invest was involved. While the retirement date was moved up, the result did not massively differ from the baseline scenario (the 2024 retirement commitment).

Transparent and market-based mechanisms

Agreement transparency: **Yes**

IDB Invest has been transparent in the mechanism behind the results-based financing. They have published the methodology used for calculating avoided emissions ex-post (IDB Invest, 2022).

Market-based mechanisms: **No**

IDB Invest engaged in bilateral negotiations with Engie and did not utilise market mechanisms. Future financing based on the IDB Invest and Engie model should consider the potential of integrating a reverse auction mechanism among IPPs to support competitive tendering and price discovery.

Replacement with renewables

The financing mechanism is linked to renewable replacement. The agreement replaced 250 MW of coal-fired units with a 150 MW wind farm.

/\ 08 CONCLUSIONS AND RECOMMENDATIONS

Public development banks have a portfolio of instruments at their disposal to support countries in their just transition to a sustainable, low-GHG energy system, which they should further use to accelerate the transition away from coal. While they have made progress in excluding coal from direct financial support, more still needs to be done to shift their indirect financial flows away from supporting carbon-intensive energy systems – notably coal-fired power plants, but also the broader coal supply chain.

Based on a literature review and expert inputs, this study outlines roles for public development banks in the early retirement of coal plants in their interactions across stakeholders.

It concludes that public development banks should further engage with national governments to provide support for ambitious energy policy and institutional reforms that shift the country's pathway towards complete coal and fossil fuel phase-out. In addition to financial support and technical assistance for policy reforms, public development banks should assist governments in preparing long-term decarbonisation pathways for the power sector, either as part of cross-sector long-term strategies or as sector-specific integrated resource planning exercises. There are several ways for them to do so, at relatively low cost compared to investments in energy infrastructure, including through knowledge sharing, targeted technical assistance, and initiatives supporting just transition planning. They could also support the issuance of sustainability-linked sovereign bonds that contribute to transforming local economies towards low-emissions and climate-resilient systems. Beyond engaging with national governments, multilateral development banks and other bilateral development finance institutions should also seek to engage with national development banks in facilitating the transition away from coal.

In supporting and financing a just energy transition, public development banks should continue to focus on efforts to finance the win-wins of renewable energy, energy storage, responsive smart grids and virtual power plants, and supporting decommissioning and remediation of coal plant sites. When engaging with high emitters to help them transition, it is important for public development banks to avoid the risk of indirectly supporting new natural gas capacity, as well as other moral hazard risks, and ensure that transition finance does not undermine climate objectives by inadvertently locking in trajectories to business-as-usual pathways through unambitious key performance indicators and other loopholes. Without the proper safeguards, such efforts risk undermining climate objectives and wasting public funds, potentially becoming a source of reputational risk for public development banks. Avoiding moral hazard requires firm commitments from partner country governments and other stakeholders to stop future coal investments, reduce current pipelines, and commit to a just energy transition.

The transition towards a renewable energy system means a fundamental shift in utilities' business strategies. Reforming the regulatory framework, altering their current business approach, and improving weak balance sheets of utilities will be fundamental to enable them to invest in a shift towards renewable, decentralised, affordable energy systems with access for all. Here, supporting national energy system reforms and helping utilities change their coal-dependent business models to new business models, gradually allowing investments in renewable energy will be key.

The third stakeholder that public development banks may engage with to support the early retirement of coal plants is IPPs. PPAs with IPPs are a substantial barrier to early retirement and can disincentivise and slow down the transition. Public development banks can play a role in facilitating legal review of PPA contracts and support innovative financing mechanisms aimed at terminating, replacing, and, potentially, restructuring PPAs. Credible government commitment to phase-out is needed to mitigate emission leakage risks and, when ambitious, can incentivise IPPs to come to the negotiation table. While country commitments are increasing, they remain weak. Commitments by IPP shareholders are virtually non-existent. Public development banks can play a role in incentivising more ambitious commitments. In engaging with IPPs, there is a strong need for transparent and competitive market mechanisms to ensure that public funds are used efficiently.

The main considerations for public development banks when engaging in coal phase-out efforts are summarised as follows:

- → Focus on engagement with governments for long-term commitments to phase out fossil fuels, including through policy-based lending and dedicated technical assistance programmes and initiatives.
- → Exercise caution for buyouts considering moral hazard, perverse incentives, and emission leakage risks.
- → Engage with owners (utilities / IPPs) rather than at the asset level.
    - Do not pursue buyouts for utilities at the asset level;
    - Only consider buying out IPPs under very limited circumstances.

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ANNEX

INTERNATIONAL COAL PHASE-OUT EFFORTS HAVE NOT YET TRANSLATED INTO CONCRETE ACTION

Seventy-five countries have formally committed to no new coal, as of December 2023, through the three main currently existing initiatives supporting coal phase-out : by joining the Powering Past Coal Alliance (PPCA) or the No New Coal Power Compact (NNCPC) or by being a signatory to the COP26 Coal to Clean Power Transition Statement (Roberts et al., 2023). Out of these seventy-five countries, the sixty that are PPCA members account for 317,964 MW of operating coal capacity, representing a share of 15% of global operating coal capacity (Global Energy Monitor, 2023) that would be phased out before or after 2025. Five large countries with net zero emission commitments still have not formally committed to coal phase-out: Brazil, China, India, Japan, and South Africa. They represent 1,446,191 MW of operating coal capacity in 2023, i.e. 69% of global operating coal capacity (Global Energy Monitor, 2023).

The Powering Past Coal Alliance (PPCA) is considered as the world's largest alliance on phasing out coal, and joining it represents a commitment to phasing out unabated coal power generation. The No New Coal Power Compact (NNCPC) focuses on new coal only and requires a commitment to not building any new and additional coal power projects, as a first step towards coal phase-out. In the 'Global Coal to Clean Power Transition Statement', countries also committed to scaling up clean power and ensuring a just transition away from coal.

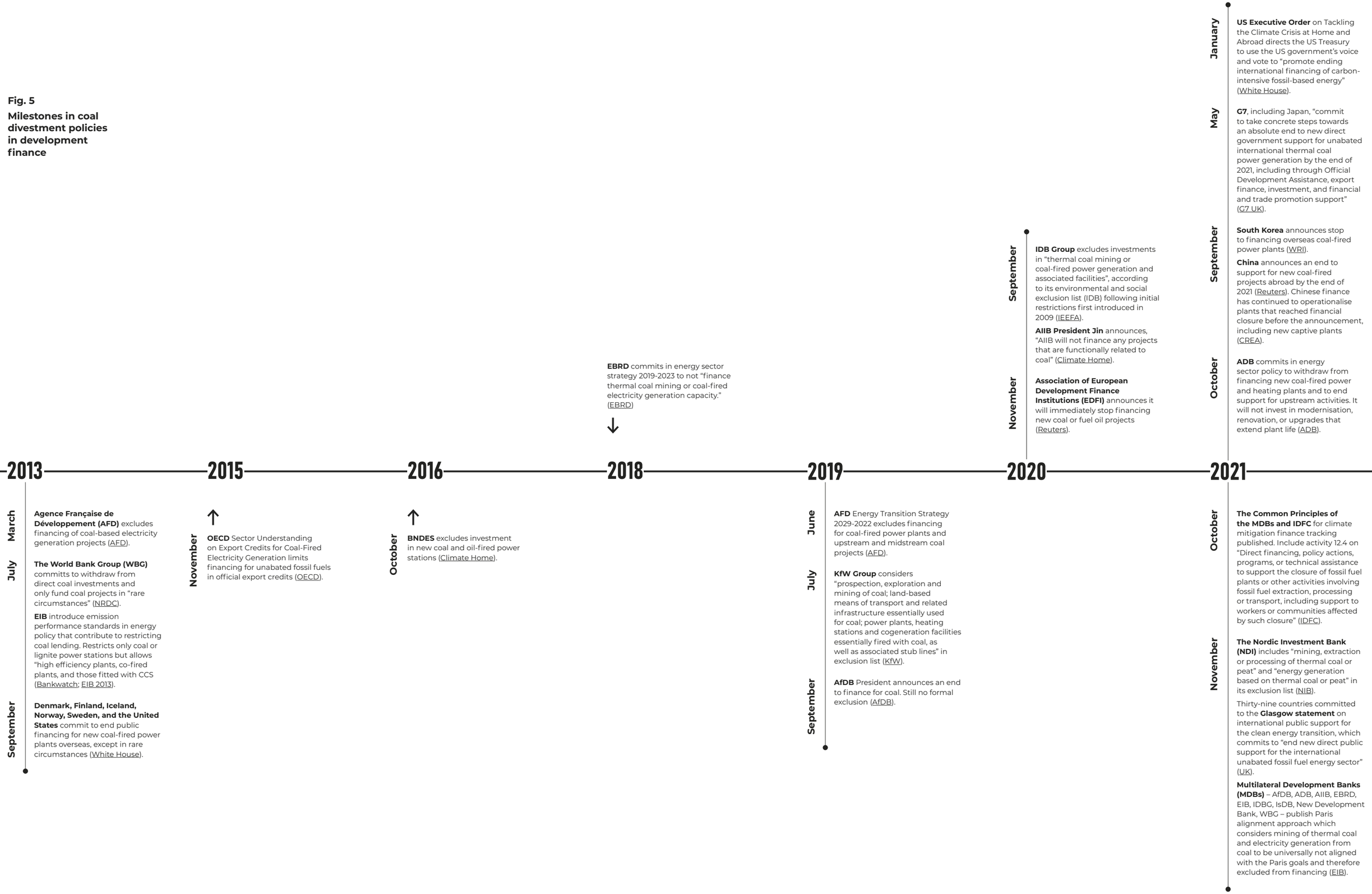
G7 governments "recognised the need" to end the construction of new unabated coal-fired power generation and indicated they would prioritise "concrete and timely steps towards the goal of accelerating the phase-out of domestic unabated coal power generation" in line "with keeping a limit of 1.5°C temperature rise within reach", yet without committing to a clear phase-out date. Among the G7, all members except Japan are also members of the Powering Past Coal Alliance, a coalition aiming to advance the transition away from coal.

Likewise, G20 countries, although they committed in 2023 to pursuing efforts to triple renewable energy capacity globally by 2030 and accepted the need to phase down unabated coal power, have not set any specific goals for coal phase-out (Patel, 2023).

Even if coal phase-out progresses at various speeds domestically, a number of steps have been taken to end public finance support for coal, including international development aid **(→ Fig. 5)**. While there is an uptick in commitments to end coal financing, the commitments are non-binding, and there is a risk of non-compliance.

Fig. 5

Milestones in coal divestment policies in development finance



LOOPHOLES IN PUBLIC DEVELOPMENT BANKS' COMMITMENTS ON COAL

As highlighted in the table above, multilateral development banks (MDBs) have made commitments to stop the direct financing of coal as part of their approach to Paris alignment.

The Joint MDB Methodological Principles for Assessment of Paris Agreement Alignment of New Operations, finalised in June 2023 for alignment with mitigation goals (BB1) and adaptation and climate-resilient operations (BB2), defines a "universally aligned list" with activities that are currently considered aligned with the Paris Agreement mitigation objectives. Such activities "contribute to climate action consistent with the pathways toward the mitigation goals of the Paris Agreement" or "have no material impact on climate change, as they do not harm countries' transition to long-term low-GHG development pathways and do not lead to lock-in"(ADB et al., 2023a). If the activity is not included in this list, it is then assessed against a "universally non-aligned list", which includes activities that are considered misaligned with the Paris Agreement objectives in all circumstances. This exclusion list includes "highly emissive activities (e.g., coal- or peat-fired power plants) that are considered universally (regardless of context) inconsistent with countries' low-GHG development pathways or incompatible with the mitigation goals of the Paris Agreement; and activities directly supporting coal or peat extraction that are considered as universally inconsistent with these pathways." (ADB et al., 2023b)

Although some of them had taken steps towards coal exclusion earlier, all major MDBs, i.e. AfDB, ADB, AIIB, EBRD, EIB, IDBG, IsDB, New Development Bank, and WBG, now consider any direct financing of activities supporting coal against their Paris alignment commitment. This exclusion is also expanding to other MDB activities such as intermediated finance, general corporate purpose financing, and policy-based lending operations (ADB et al., 2023b).

"The counterparty must set ambitious targets attached to the transaction to substantially reduce the carbon intensity of their operations and phase down fossil fuels during the tenor of MDB finance AND contribute to reach net zero greenhouse gas (GHG) emissions by mid-century. It is recommended that the process be subject to independent external review and verification. The International Capital Market Association Sustainability-Linked Bonds and/or Loan Market Association Sustainability-Linked Loan Principles may be taken as a reference." (ADB et al., 2023c)

In the case of general corporate purpose financing, if the counterparty supports universally not aligned activities (e.g. coal), "the MDB finance may be considered aligned [with the mitigation goals of the Paris Agreement] only if (a) the MDB finance is structured with the objective of decarbonising the counterparty in line with the principles of Sustainability-Linked Finance [...] or the requirements described in 3.B.ii are met for the MDB operation to be aligned with the mitigation goals of the Paris Agreement." (ADB et al., 2023b)

"The counterparty must have or commit to develop and implement a Paris alignment pathway during the tenor of the MDB finance." (ADB et al., 2023c)

Despite these principles shared across MDBs and public development banks' commitments to end support to coal, recent research has found that, in many cases, indirect finance continues to flow to new coal developments (Inclusive Development International et al., 2023). Such findings highlight the need to address current shortcomings in indirect lending operations and restrict financial intermediaries from financing new coal, including through bonds and financing of industrial projects powered by coal.

Moreover, these existing coal exclusion policies do not have any impact on projects that are already at the permitting or construction stage, which are soon to start operation (FFA and NGO Forum on ADB, 2022). In Indonesia, for instance, there is 19 GW of coal capacity in the pipeline, which would represent more than a 40% increase in currently installed capacity that would also need to be addressed.

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