


RESEARCH ARTICLE

Net zero portfolio targets for development finance institutions: Challenges and solutions

Sam Fankhauser¹  | Sugandha Srivastav¹  | Ingrid Sundvor¹ |
Stephanie Hirmer²  | Gireesh Shrimali¹ 

¹Smith School of Enterprise and the Environment, University of Oxford, Oxford, UK

²Department of Engineering Science, University of Oxford, Oxford, UK

Correspondence

Sam Fankhauser, University of Oxford, Oxford, UK.

Email: sam.fankhauser@smithschool.ox.ac.uk

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Abstract

Development finance needs to be better aligned with climate change objectives, and many experts see net zero portfolio targets as a powerful way to achieve this. This paper explores the operational implications of net zero portfolio targets for development finance institutions (DFIs). We set out an agenda to move development finance towards net zero goals in a way that acknowledges development concerns. These include (1) setting context-specific emissions pathways with granular bottom-up data and emphasising climate-development win-wins; (2) dealing with inertia and lumpiness in the portfolio through ‘when’ flexibility (multiyear carbon budgets) and ‘where’ flexibility (sharing of carbon space); (3) encouraging transition projects through future-emissions accounting and transition credits; (4) managing climate-development and other trade-offs with an internal carbon price and ESG standards; and (5) accounting for emissions after project-end with monitoring and legal provisions.

1 | THE NEED FOR RAPID CLIMATE ACTION

This article sketches out barriers and potential solutions to the adoption of net zero portfolio targets by development finance institutions (DFIs), which we define as bilateral development institutions and multilateral development banks (MDBs). DFIs are expected to bring their activities in line with the 2015 Paris Agreement. Article 2.1c of the Agreement calls for the alignment of financial flows with the objectives of reducing emissions and adapting to the impacts of climate change. There is a belief, expressed by global coalitions such as the Glasgow Financial Alliance for Net Zero (GFANZ), that this will entail a net zero emissions target for their project portfolios. We explore the practical implications of such a target. Whilst the emphasis is on DFIs, the lessons are relevant to all financial portfolios, particularly impact investors that are active in developing countries.

Net zero is essential for stabilising the world's temperatures. Global mean temperatures will keep rising as long as there is a positive flow of emissions that is not balanced by an equivalent removal of carbon from the atmosphere (Fankhauser et al., 2022). To meet the temperature objectives of the Paris Agreement, global carbon emissions need to peak within the next decade and reach net zero by the middle of the century. This is now well recognised. Governments around the world, including in developing countries, have committed to reaching net zero emissions by 2050 or soon after. They account for over 80% of the global population and 90% of world GDP (Net Zero Tracker, 2022).

Given the widespread commitment to net zero, DFIs have to find ways to make their project portfolios net zero compatible whilst meeting development objectives. DFIs are committed to delivering on the Sustainable Development Goals (SDGs), which require highly integrated policies to mitigate the risk of constraining, counteracting and cancelling the effects of interrelated

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SDGs (Nilsson et al., 2016). The pursuit of net zero emissions is a case in point. Climate change is one of the most critical SDGs, largely synergistic but, at least in the short term, potentially in conflict with other development goals.

Meeting urgent development needs requires some emissive investments, but unconstrained support for high-carbon projects is risky. Developing countries are amongst the most vulnerable to the impacts of climate change, and continued emissions will put development progress at risk (World Bank, 2013). There is a strong possibility of either locking in high-carbon behaviour or stranding high-carbon assets (Caldecott, 2021; Saygin et al., 2019; van der Ploeg & Rezai, 2020). Either outcome could undermine development progress and engender financial stability risks. Operationally, DFIs face reputation risks and possible legal liabilities, which are likely to grow over time (Covington et al., 2016; Setzer et al., 2022). Therefore, there is a clear need for DFIs to deliver on their mission of achieving the SDGs whilst assisting countries with transitioning into prosperous net zero economies.

DFIs have responded to this challenge with a combination of financial targets and operational adjustments. Practically all DFIs have set climate finance targets, which respond to the climate finance commitments of rich countries under the UN Framework Convention on Climate Change (UNFCCC). Large DFIs, like the European Investment Bank (EIB) and the International Finance Corporation (IFC), have introduced an internal carbon price to guide lending and investment decisions. MDBs have collaborated on operational principles, including an assessment framework for direct investment operations in mitigation, adaptation and climate resilience (MDB, 2023). Only a handful of bilateral DFIs, and none of the MDBs, have set net zero targets on their investment portfolios.

The adoption of net zero portfolio targets seems like a logical next step in the climate strategies of DFIs. They are attractive because they align directly with the objectives of the Paris Agreement. Unlike climate finance targets (which measure inputs) and operational principles (which guide processes), net zero portfolio targets monitor and measure the outcome that ultimately matters: lower emissions.

However, net zero portfolio targets raise important operational problems that need to be overcome before they become a practical option. Critics of net zero portfolio targets point to the development mandates of DFIs and the difficulty of defining appropriate and fair net zero pathways. They note that portfolio targets disincentivise high-carbon projects with a view of cleaning them up, which should be a key role for DFIs. They argue that the provision of patient capital for complex projects is difficult to square with rapid decarbonisation and worry that portfolio targets will encourage premature exits.

Policy Implications

- Development finance institutions (DFIs), defined here as bilateral development institutions and multilateral development banks, play an essential role in advancing an equitable transition to net zero carbon emissions in developing countries. DFIs are under international pressure to up their climate game.
- DFIs are still grappling with the question of how to operationalise net zero and combine it with their poverty alleviation mandates. However, the direction of travel is clear. DFIs must move from input targets (e.g. climate finance objectives) and process adjustments (e.g. internal carbon prices, net zero investment principles) to outcome targets (i.e. portfolio emissions that are on a pathway to net zero).
- We argue that well-devised net zero portfolio targets can reflect the specific country and sector contexts in which a DFI operates. They can accommodate the fact that DFI portfolios turn over slowly and may contain lumpy investments. They can retain incentives to invest in high-carbon projects with a view to cleaning them up. They can incentivise climate-development win-wins, and they can prevent premature exits from high-carbon projects.

This paper seeks to advance the debate on net zero portfolio targets by unpacking the main reservations and putting forward potential solutions. Our approach was informed by the academic and practical literature on the subject, and potential solutions were discussed and co-created with leading DFI practitioners. However, all recommendations and interpretations are ours.

DFI practitioners were involved in shaping the narrative, as thought partners in formulating the recommendations and as expert reviewers to triangulate the findings. In some instances, the paper lets practitioners speak directly to underline a particularly pertinent point, but for the most part, we synthesise the outcomes of our engagement into normative viewpoints that are owned by the authors (See Appendix S1 for more details on our method).

Our focus is narrowly on the practicalities of net zero portfolio targets. DFIs face many other challenges in their climate strategies, including issues of measurement, reporting, mainstreaming, country ownership and the role of carbon offsets. We touch on these only to the extent that they are affected by a net zero portfolio target.

The practical and political feasibility of our suggestions will need further analysis and operational testing, but we believe they provide a practical roadmap to move DFIs further in their approach to net zero emissions.

2 | DEVELOPMENT FINANCE AND NET ZERO EMISSIONS

2.1 | The emergence of net zero

DFIs are exposed to the climate debate from two different but related directions. As financial institutions, they are expected to follow the growing trend in the financial sector to better manage climate risks and re-align financial flows towards net zero. The financial sector is increasingly embracing climate change objectives. Net zero alliances and networks are emerging from within the sector, many of which have grown rapidly in recent years (see Climate Action 100+, [n.d.](#); IIGCC, [2022](#)). A notable example is GFANZ, a coalition of seven financial sector alliances committing to net zero by 2050 with initially over 550 members (GFANZ, [2022a](#)), although some high-profile members have since left the alliance.

Net zero alliances require their members to gradually reduce the greenhouse gas (GHG) emissions linked to their portfolios. This often encourages the adoption of transition pathways, methodologies for estimating and accounting for GHG emissions (e.g. GFANZ, [2022b](#)), and updating internal disclosure and governance structures (e.g. IIGCC, [2021](#); UNEP FI, [2021](#)). Internal operational changes and measurement benchmarks are also incorporated to convert high-level targets into actionable short- and medium-term goals, frequently following recommendations from standard-setters such as the Science-Based Target Initiative (SBTi). These measures are consistently scrutinised on the grounds of integrity, adequacy and transparency.

As development agencies, DFIs are expected to deliver on the SDGs. This requires a rapid increase in investment. Yet, reviews show higher investment gaps than anticipated across all SDGs (Kulkarni et al., [2022](#)), with the largest gap in SDG 13 on climate action. Estimates on mitigation finance indicate that around \$3.4 trillion a year may be required globally between 2020 and 2025 (Rockefeller Foundation and BCG, [2022](#)). In comparison, the Climate Policy Initiative reports mitigation finance in 2019/2020 to be around \$570 billion (CPI, [2021](#)), showcasing the unparalleled need for rapid acceleration in per annum financing. The 2022 climate summit in Sharm-el-Sheikh (COP27) therefore called for a step up in DFI finance on climate change (UNFCCC, [2022](#)).

DFIs have historically been driven by traditional development objectives (which focus on poverty alleviation), but there is a growing discourse that climate

and development need to be synergistic in investment commitments. Various DFIs have reported goals for full Paris alignment in their financial activities and operations. At the transaction (as opposed to portfolio) level, this includes IFC by July 2025 (IFC, [2022](#)) and EBRD by the start of 2023 (Bennet, [2021](#)). In addition to net zero targets, several DFIs have progressed to developing dedicated climate strategies, for instance the climate action plans of the Dutch DFI FMO ([2022](#)) and the United States' DFC ([2021](#)).

We group the different climate-compatible approaches of DFIs into three waves of action: (i) setting climate finance targets; (ii) adjusting operational practices and guidelines; and (iii) adopting net zero portfolio targets.

2.2 | Climate finance targets

The first wave of action was setting climate finance targets for both emissions reductions and adaptation. This can be described as a 'low hanging fruit' to which most DFIs have committed. These climate targets are inputs into global investment flows rather than outcome targets, either as an absolute investment target or expressed in percentage terms of total DFI investments. For instance, the AfDB committed to 40% of all investment approvals by 2025 to be earmarked for emissions reduction and adaptation finance (AfDB, [2022](#)). [Table 1](#) provides an overview of climate finance targets for selected DFIs. Whilst

TABLE 1 Climate finance targets: selected DFIs.

	Absolute target	Percentage target
IFC ^a	–	35% over FY2021–25
EBRD	–	>50% by FY2025
EIB	€1tn from FY2021–2030	50% by FY2025
IDB	–	≥30% over FY2020–2023
IsDB	–	35% by FY2025
ADB	\$100bn from FY2019–2030	–
AfDB	\$25bn from FY2020–25	40% by FY2025
AIIB	Cumulative \$50bn by FY2030	50% by FY2025
FinDev Canada	–	35% by FY2025
Finnfund	€1bn by FY2030	50% of private capital by FY2030

Note: This is not an exhaustive list. The reported climate finance targets cover both adaptation and mitigation finance.

Source: AfDB ([2022](#)), Finfund ([2021](#)) and MDB ([2021](#)). See list of *Acronyms and Abbreviations* at the beginning of paper.

^aIFC is covered by the World Bank Group's commitments.

these commitments are critical, they are relatively low compared to overall clean investment needs (Greig et al., 2023).

Amongst DFIs, the multilateral development banks have coordinated their approach to climate finance and over several years have agreed a set of common principles to ensure the Paris alignment of their operations (MDB, 2023). Their joint statement at the COP27 climate summit reports that their combined climate commitments have delivered \$51 billion of climate investments in Low and Middle-Income Countries and \$31 billion in High-Income Countries (MDB, 2022).

However, DFIs have recognised that finance targets alone are not enough. Substantial financing gaps remain (CPI, 2022), and the narrow focus on climate finance has reduced pressure to target emissions in the rest of the portfolio. The definition of success has to be broadened from finance input to emissions reductions in the real economy. The climate commitments of DFIs have therefore evolved into a second wave of action.

2.3 | Operational practices and guidelines

The second wave of action was to adopt operational practices and guidelines that align DFIs activities with the Paris Agreement. They can best be described as 'soft rules' for how DFIs should decarbonise their investment portfolios. As one practitioner explained, they are often preferred over introducing 'hard rules upfront' as 'you spend a lot of time, discussing the hard rules and sometimes they actually change over time'. Unlike climate finance targets, which are easy to ascertain once transparent reporting rules are defined, the operational practices and principles for Paris alignment represent a more complex story that covers multiple internal processes and priorities (Lutkehermoller et al., 2021). However, this appears to be the current wave of action for the majority of DFIs.

Both bilateral and multilateral DFIs are developing and adopting often detailed investment principles across their operations. Examples include BII's framework for assessing Paris alignment in natural gas power plants projects (BII, 2020a) and Swedfund's climate lens guide in performance standards assessments (Swedfund, 2021). All DFIs have environmental, social and governance (ESG) frameworks, green bond standards and SDG or climate-environment strategies.

Perhaps the most notable frameworks for operational practices and guidelines are the MDBs' jointly developed principles on Paris alignment, which were finalised in 2023 (MDB, 2023). The principles set out

a robust set of decision making criteria and common methodologies for MDBs across their operations, covering issues such as criteria for GHG emissions reduction, resilience building, climate risks and sector-specific guidance (see also IFC, 2022). No DFI is as yet fully Paris-aligned, even according to their own metrics (E3G, 2023). However, the body of common best practices that is emerging is an important stepping in this direction, and a complement to more target-based approaches.

Operational practices and guidelines function at the level of individual investments. They do not speak to the Paris alignment of the portfolio as a whole. As one practitioner highlighted:

The problem with [guidelines is] that the emissions footprint of any one project is always so small in the context of countries' emissions that you can make almost any project consistent with Paris if you assume various other things about what's happening elsewhere in the economy.

To guide their investment decisions, some DFIs have adopted internal carbon prices (ICPs; Table 2). As an operational practice, ICPs are hypothetical (shadow) prices that inform economic and financial due diligence. They have become widespread practice amongst private sector investors (CDP, 2021). Note that ICPs have so far only been adopted by institutions that conduct economic cost–benefit analyses. DFIs use ICPs as a guiding framework rather than an investment cut-off. As one practitioner explained, the carbon price test 'didn't necessarily mean that the project would be rejected if its carbon price adjusted IRR fell below some threshold, but it was a factor in the decision making'.

The impact of carbon pricing on investment decisions seems to be limited. The same practitioner notes that only a small number (<5%) of investment projects became 'questionable' as a result of applying a carbon price to the internal rate of return (IRR). Table 2 suggests that this may be linked to the adoption of relatively low intermediate carbon prices compared to what net zero requires (NGFS, 2022). The longer-term carbon prices in institutions like ADB and EBRD also fall below the estimated levels needed for net zero, suggesting that the impact of internal carbon pricing could remain limited.

The experience with operational guidelines suggests that to reach net zero, DFIs will ultimately have to move towards outcome indicators. This means committing to net zero in their financed emissions as opposed to Paris Alignment and operational guidelines. It is the third wave of climate action, towards which DFIs are slowly evolving.

TABLE 2 Internal carbon prices.

	Intermediate targets	2050 target
IFC	Unspecified price level	Unspecified price level
EBRD	\$50–100/tCO ₂ e in 2030	Increase by 2.25% per year ≈ \$78–156/tCO ₂ e
EIB ^a	\$270/tCO ₂ e in 2030	\$868/t
ADB	\$43.2/tCO ₂ e	Increase by 2% per year ≈ \$78/tCO ₂ e

Sources: ADB (2021), EBRD (2019), EIB (2020) and IFC (2022).

^aOriginal valuation for EIB was in euros (€) and thus USD (\$) are estimates. All reported carbon prices are shadow prices and are often restricted to certain asset classes or project sizes/industries. This context is excluded for simplicity. Other DFIs have not reported the use of carbon prices in publicly available resources.

2.4 | Net zero portfolio targets

The last and third wave of action is for DFIs to adopt net zero portfolio standards and targets. A target for financed emissions ensures that DFIs account for the emissions performance of their investee companies and financed projects (Scope 3) in decarbonisation strategies. The accounting can cover the direct lending and equity portfolios, as well as intermediated products (e.g. equity funds), and will likely result in a portfolio-level carbon constraint.

This approach is consistent with the adoption of science-based targets (SBTi, 2021) by private organisations and the use of transition pathways (TPI, 2022) and net zero roadmaps by asset owners. Whilst these frameworks are not perfect (Rekker et al., 2022), the fact that they are increasingly adopted in the private sector (Net Zero Tracker, 2022) is putting pressure on DFIs to follow suit.

A vanguard of bilateral DFIs has started committing their investment portfolios to net zero (see Table 3). One prominent example is Finnfund, which has already presented a net negative carbon balance in their investment portfolio, mainly due to investments in afforestation (Finnfund, 2021). Their portfolio target (Table 3) is complemented by a commitment to align each investment to a country/sector net zero pathway, which is a stricter interpretation of a net zero portfolio.

MDBs have not emulated these commitments, in part because of their multilateral shareholdings. As one practitioner explained, MDBs have a strong ‘culture that is client driven’ which ‘makes it very hard to put a net zero strategic frame’. In other words, it might be politically and culturally difficult to pursue acceptance of portfolio targets amongst the MDB shareholders.

The move to net zero targets is helped by the introduction of new accounting rules about emissions attribution. Net zero portfolio targets require clear rules to define which assets and emissions are included in

TABLE 3 Example DFIs' net zero targets.

	Net zero targets
BII	2050
DEG	2040
Swedfund	2045
Finnfund	2050 ^a
DFC	2040
FMO	2050

Sources: BII (2020b), DEG (2022), DFC (2021), FMO (2022), Finnfund (2022) and Swedfund (2021).

^aReflects each investment being Paris-aligned and complying to country/sector net zero pathway. This table is not an exhaustive list. Institutions included are all private sector DFIs. MDBs have not committed to net zero investment portfolio targets. See list of *Acronyms and Abbreviations* at the beginning of report.

the target and how project emissions are attributed to different funders. The extent of the ‘emissions boundary’ (e.g. the inclusion of Scope 3 emissions) is an indication of the responsibility DFIs are willing to take for the emissions they are associated with. Attribution defines how this responsibility is shared. Important guidance is starting to emerge on how these questions may be answered. Institutions such as SBTi and the Partnership for Carbon Accounting Financials (PCAF) have published guidance on which assets should be included in a net zero portfolio target (PCAF, 2022; SBTi, 2021). Clarity about accounting rules moves the adoption of net zero targets an important step forward.

Proponents of net zero portfolio targets highlight the predictability, credibility and transparency they create. Portfolio targets create predictability by ensuring that project managers and the market can foresee and plan for available financing and standards in future project developments. They enhance environmental credibility as they are directly compatible with global net zero and require the stable transfer of finance from high to low carbon. They also safeguard against greenwashing practices. In terms of transparency, portfolio targets, complemented by entity- or sector-level information from tools like SBTi, make it easier to assess the climate performance of individual projects and the DFI as a whole. Tools to help portfolios align with the Paris Agreement are emerging, that is, new computational models that can estimate global carbon budgets by sector and geography (Doshi et al., 2021).

Proponents maintain that net zero targets are about strategy and culture, not just emissions accounting. The advantage of changing the investment culture—that is both *how* one assesses the impacts of high-emissive projects and the *acceptance* of new processes—should not be underestimated. This is not solely an investment process but also a cultural mindset, enabling the shift towards incorporating synergistic thinking on climate

and development. Net zero investment portfolios will thus not solely lead to emissions reduction, but arguably they will create a new discourse in what constitutes responsible investments.

Whilst advantages of net zero portfolio targets are powerful, the short-term challenges should not be overlooked. The main concern expressed by practitioners is that a stringent GHG emissions constraint is too rigid and would limit their ability to respond to urgent development needs. Strict net zero pathways may be inconsistent with the national climate and development strategies of their client countries. This, coupled with the relative historical precedence of risk-averse behaviour amongst DFIs, is prohibiting necessary investments into new technologies and a low-carbon transition in developing countries.

These issues are perceived by some as the ‘the big elephant in the room’, as one practitioner puts it. They observe that ‘DFIs need to be taking more risk’ and that meeting climate change and development objectives cannot be solved unless ‘[one has] the conversations about the hard choices’.

The rest of the paper unpacks this general unease and identifies the specific issues identified by the DFI community that must be resolved before a net zero portfolio target becomes practicable.

3 | MAKING NET ZERO PORTFOLIO TARGETS WORK

We discuss possible solutions to the most salient concerns raised around net zero portfolio targets. We identify five key concerns but do not cover generic issues such as

emissions monitoring and carbon accounting, which are common to all carbon management approaches.

3.1 | Selecting an appropriate emissions pathway

Multiple emissions pathways are consistent with targets to decarbonise; this introduces subjectivity regarding what pathway a DFI should adopt. There are many modelled pathways to choose from, with different assumptions about global burden sharing, technology developments and other parameters, such as the scope for carbon capture and storage. The chosen trajectory will have to be consistent with global objectives and compatible with scientific views on what is feasible. It will have to reflect the country strategies of a DFI and be cognisant of the development contexts it is operating in. Amongst other factors, this prevents perverse incentives in setting country priorities. Figure 1 shows schematically how different pathways may affect the portfolio. The shape of these curves varies because of the inherent subjectivity of how emissions budgets should be distributed.

It is possible analytically to downscale credible global models to the country or country-sector level to develop emissions trajectories (Doshi et al., 2021). DFIs should invest in this evidence and the emissions pathways should be subject to scrutiny by external experts. Disclosure on how such pathways are constructed is essential. Periodic reviews can prevent gaming and would ensure that the pathway remains Paris-aligned on aggregate, is consistent with those of other investors and continues to reflect the strategic direction of the DFI and the climate ambitions of its portfolio countries.

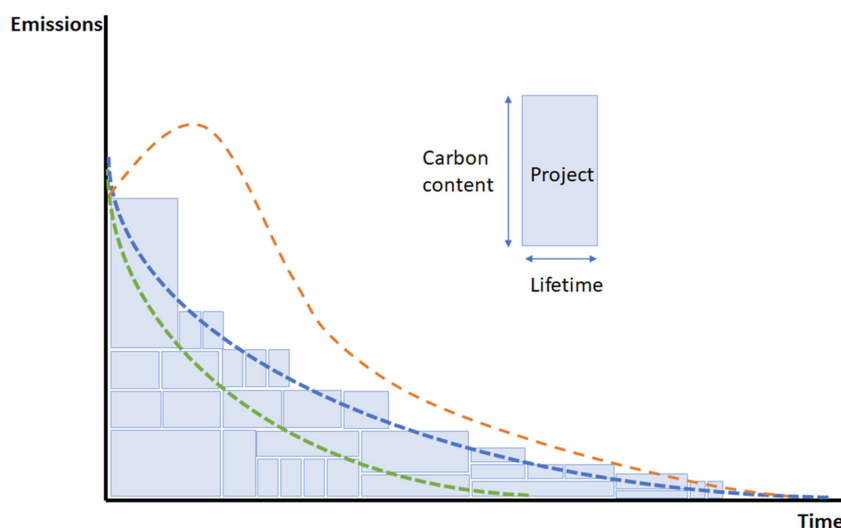


FIGURE 1 Schematic of the impact of different emissions pathways on portfolios. *Note:* The figure shows how different emissions pathways (dotted lines) constrain portfolio emissions. Portfolio emissions are the sum of project emissions. Each project is represented by a block, the height of which reflects annual emissions and the width represents project duration. Note that zero-emissions projects are not visible in the chart (they have zero height), although they will become the majority of investments as time passes.

Crucially, the chosen pathways must reflect the common but differentiated responsibilities of portfolio countries and their long-term strategies (Bendahou et al., 2022). DFIs will have to balance the ambitions of their portfolio countries and the requirements of global net zero. Developing countries will decarbonise more slowly than the global average. There are no expectations that they will follow the global emissions path. However, reducing emissions in a Paris-aligned way is not only the direct remit of SDG 13, it also supports the 16 remaining goals, given the synergies between climate action, poverty alleviation and economic development. Finding the right balance is made more difficult by the fact that the net zero ambitions of many portfolio countries (expressed via their Nationally Determined Contributions, NDCs) are not fully Paris-aligned (Climate Action Tracker, 2023).

DFIs can reduce the tension between global pathways and NDCs through investment strategies that promote climate finance, climate-development wins and negative emissions. The investible universe for DFIs, and the scope for development impact, is unlikely to be smaller, but it will be different with net zero portfolio targets. For example, DFIs may start investing more in sectors that build international competitiveness in growing green industries as this would both reduce emissions and foster growth (Fankhauser et al., 2020; Hepburn & Ward, 2011; Ward et al., 2012). They may also pursue activities that have strong developmental co-benefits such as mangrove restoration that improves the productivity of fisheries, provides hazard defence, enhances agricultural productivity, all whilst reducing emissions.

Emissions targets are not an accounting exercise, but a strategic tool to shift the balance of investments towards those that are zero carbon or can be decarbonised. They force an organisation to identify where to prioritise decarbonisation and how to target capital which is aligned with development. As one practitioner elaborated: ‘as you go across the [organisation], they say our mandate is not just net zero, our mandate is about poverty reduction. Then the question becomes how do you integrate the notion of net zero in there’.

3.2 | Dealing with inertia and lumpiness in the portfolio

The decarbonisation rate of a portfolio depends on the speed at which projects turn over and the rate at which zero-carbon solutions are introduced. Table 4 illustrates this in a stylised example. It calculates the year in which the emissions of a hypothetical portfolio are reduced by half as a function of portfolio turnover and the rate at which zero-carbon solutions are introduced. Reaching the 50% benchmark is delayed if investments are held longer (the portfolio turns over more slowly)

TABLE 4 Year when a hypothetical portfolio is decarbonised by 50%.

Holding period (yrs)	Share of clean in new projects				
	20%	30%	40%	50%	60%
6	2038	2033	2031	2029	2028
8	2043	2036	2033	2031	2030
10	2048	2040	2036	2033	2031
12	2053	2043	2038	2035	2033
14	2058	2046	2041	2037	2035

Note: We assume a steady state portfolio with no growth (with growth, the 50% benchmark would be reached later) and no emissions reductions in the portfolio itself (with abatement of portfolio emissions the benchmark would be reached earlier). Emissions, E , in year 1 are the sum of emissions in year 0 minus exits X plus investments I . Over a period of t years, this means $E(t) = E(0) + t(I - X)$. If projects are held for H years, a fraction $1/H$ of the portfolio is turned over per year. If a share c of the new projects is zero carbon, we have $E(t)/E(0) = 1 - tc/H$.

and if the share of zero-carbon projects is smaller. The table suggests that halving emissions in the 2030s—a likely target for many DFIs—is possible for holding periods of up to 10 years but will require at least 40% of new investments to be zero carbon—higher if the portfolio turns over more slowly.

DFIs provide patient capital and are often involved in large long-term projects, such as infrastructure investments. This results in project portfolios that are lumpy and slow to turn over. Specialist investors who focus on transactions with long project horizons such as materials, heavy industry and energy may find it particularly difficult to meet strict annual emissions targets. High-carbon or long-lasting projects have a greater tendency to run over the emissions constraint.

Dealing with slow, lumpy portfolios requires flexibility in the way carbon targets are structured. Flexibility can be introduced both over time (‘when’ flexibility) or by sharing emissions across different DFIs (‘where’ flexibility). The terms are borrowed from the early literature on integrated assessment models (e.g. Manne & Richels, 1999). ‘When’ flexibility can be introduced through multi-year carbon budgets (Figure 2). In a development context, multi-year targets provide space for portfolios to turn over and for emissions reductions in high-carbon projects to ramp up. Developing and implementing credible emission reduction strategies takes time, and multi-year budgets help to accommodate these timelines. This approach has been adopted in the UK through a series of five-yearly carbon budgets, which can accommodate short-term socio-economic fluctuations (Averchenkova et al., 2021).

The scope for ‘when’ flexibility is restricted by the need for credibility in the net zero commitment. In principle, maximum flexibility would be achieved through a single, aggregate carbon budget that extends to the point when net zero is to be reached. However, this would raise concerns about intertemporal credibility or time-inconsistency. Long-term budgets provide

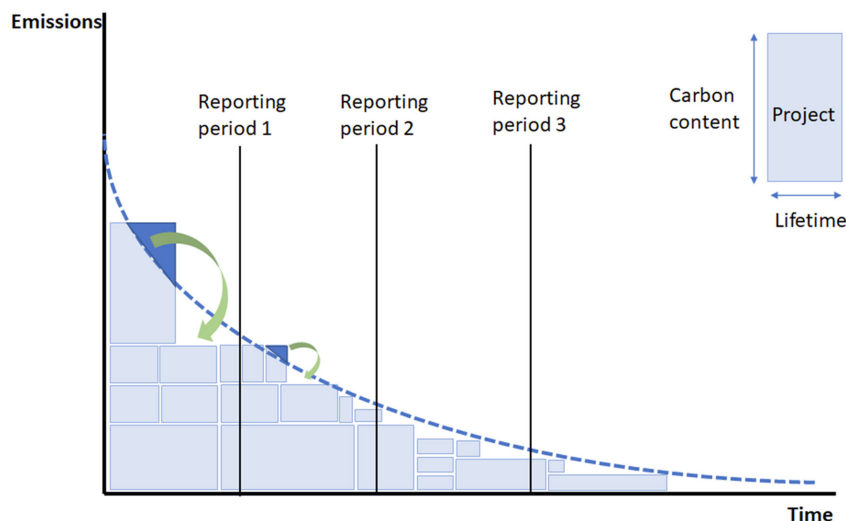


FIGURE 2 ‘When’ flexibility through carbon budgets. *Note:* The figure shows how the emissions pathway (dotted line) constrains portfolio emissions. Portfolio emissions are the sum of project emissions. Each project is represented by a block, the height of which reflects annual emissions and the width represents project duration. Emissions may be moved between blocks within a reporting period. Note that zero-carbon projects (which will grow in number) are not visible since they have a height of zero.

discretion to frontload emissions and use up the available carbon space quickly. The tight carbon constraint this implies for later years then becomes difficult to meet. As one expert put it ‘you want the intertemporal flexibility, but you don’t want too much of it because too much borrowing [of emissions from the future] leads to credibility problems’. Hence, the benefit of ‘when’ flexibility needs to be balanced against the need for intertemporal credibility.

Regular performance updates can mitigate the time-inconsistency problem of ‘when’ flexibility. Sound internal governance structures can facilitate forward planning and mitigate the risk that emissions budgets are used up too fast. External reporting requirements, at greater frequencies and related to disclosing plans of how the longer-term target will be reached could be an important tool to manage time-inconsistency risks. The incentive to reduce emissions in high-carbon projects can be further strengthened through future emissions accounting (see below).

‘Where’ flexibility can be introduced through the sharing of carbon space amongst DFIs. It is already common for DFIs to co-finance large projects. It allows individual organisations to remain within their risk appetite. The emerging norm in carbon accounting is to allocate carbon emissions to financiers in proportion to their financial contribution (PCAF, 2022). The co-financing of projects therefore not only shares financial risks, but also the carbon footprint of large projects. ‘Where’ flexibility requires common carbon accounting rules. Consistent carbon accounting will have to ensure that all project emissions are allocated. Caution will also have to be exercised that emissions are shared only across responsible financiers with equivalent net zero policies (reflected, for example, in similar net zero

pathways). If these conditions are not in place, there is a risk of carbon leakage and aggregate emissions reductions will not be achieved.

Safeguards should be in place to avoid financing structures that bypass carbon liabilities. There is a risk that financing structures will emerge that reflect carbon accounting concerns rather than the needs of the project. DFIs need a code of best practice around carbon avoidance to ensure transparency. Lessons may be learnt from the scrutiny of tax avoidance schemes, which raises similar challenges.

3.3 | Incentivising transition projects

Portfolio targets favour sectors that are unambiguously low-carbon over so-called transition projects, which have high emissions but are essential for net zero development. There are two main categories of transition projects (BII, 2022; Caldecott, 2021). The first is emissions reduction projects that help to decarbonise difficult sectors such as iron and steel, cement, aviation and petrochemicals. The second category is emissive projects, which support the net zero supply chain, for example by investing in battery factories or port facilities for offshore wind. Both types generate indirect carbon benefits, which are not captured in the portfolio target. In fact, engaging with these activities could result in a short-term increase in portfolio emissions, which may mean such projects are disincentivised under carbon emission targets.

One way to incentivise emissions reduction projects is through ‘future emissions accounting’. Under future emissions accounting, the emissions assigned to a project are calculated using the carbon intensity

expected at its end (Figure 3). The temporary rise in emissions when the project enters the portfolio gets discarded in the DFI accounts (though not in national emissions inventories, ensuring environmental integrity at the aggregate level). The projections for end-project emissions would be revised as the transaction progresses, and eventually forecasts would be replaced by actual, verified emissions. The system rewards emissions reductions, reduces (but does not eliminate) the scope for gaming and creates an incentive to see them through.

Future emissions accounting creates risks if the expected emissions cuts do not materialise. If emissions at the end of a project are higher than anticipated, those

higher actual emissions will enter the carbon account and count against the portfolio target. To mitigate such performance risks, DFIs could establish a provisioning system for carbon emissions. Similar to the way banks provision underperforming loans, carbon space would be set aside for emission reduction projects that are expected to underperform.

Another way to promote transition projects is through a system of 'transition credits.' The system would operate similarly to tax credits, where desirable activities benefit from a tax break. In the case of transition credits, a discount on actual emissions would be awarded to qualifying projects that have indirect carbon benefits (Figure 3b). The system could build on the 'green

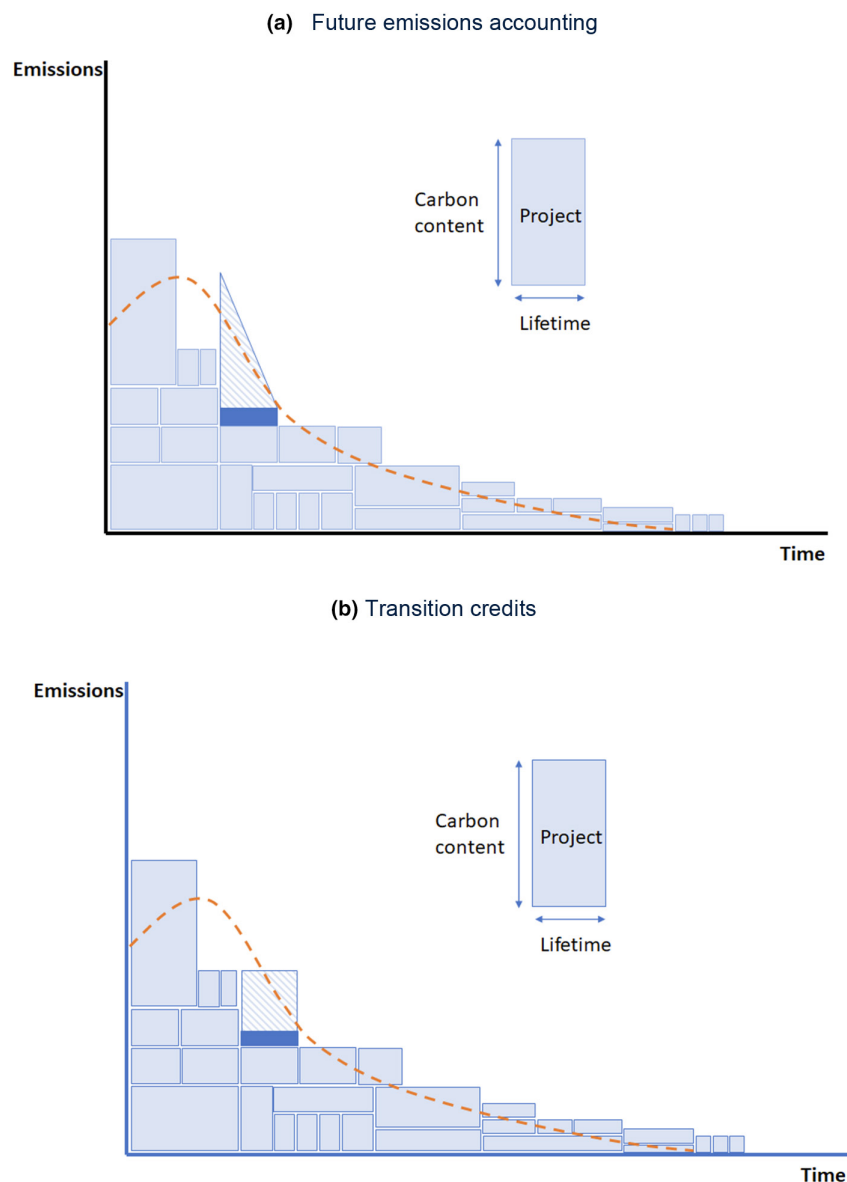


FIGURE 3 Rewarding transition projects. *Note:* This figure shows how an emissions pathway (dotted line) constrains portfolio emissions. Portfolio emissions are the sum of project emissions. Each project is represented by a block, the height of which reflects annual emissions (which may reduce in the course of the project) and the width represents project duration. Projects may enter the accounts of their expected emissions at the project end (panel a) or at a discount to reflect indirect benefits (panel b). Note that zero-carbon projects (which will grow in number) are not visible since they have a height of zero.

transition' criteria and project lists that some DFIs have already developed (e.g. EBRD, 2020).

The transition credit would reflect the indirect carbon benefits of an intervention, perhaps structured in indicative benefit bands. In the case of clean supply chain projects, the indirect benefits would relate to the clean investment that is supported (for example, offshore wind generation supported by a new port facility). For decarbonisation projects in high emissions sectors, transition credits would be banded according to the expected emission reduction benefits. The credit would provide an additional reward for engaging in emissions reduction activities, beyond the incentive provided through future emissions accounting.

The future emissions accounting and transition credit systems would be operated internally by DFIs, but they would have to be transparent, rules-based and externally audited. For example, the award of transition credits could be documented in a separate 'transition account', which lists relevant projects, the credits awarded and the indirect benefits that are anticipated. Independent verification is critical to ensure that the systems do not result in 'greenwashing', that is, the justification of projects that are not consistent with net zero commitments at the expense of genuine zero-carbon projects.

3.4 | Managing trade-offs with development objectives

The Sustainable Development Goals (SDGs) are interconnected and DFIs have to consider the trade-offs involved. The special treatment of high-development projects should be avoided to prevent greenwashing. It is tempting to impose a softer carbon constraint on high-development projects, for example by awarding a 'development discount'. In practice, such discounts would be difficult to control and would undermine the net zero target.

The important discussion about climate and development trade-offs should instead happen at the level of the emissions portfolio target. Context-specific net zero pathways can be set to reflect the development needs of the countries a DFI is active in (as argued above). Once that envelope is defined, no further allowances need to be made. If the development benefits of a project are strong, it should be acceptable to allocate carbon space to it within the agreed envelope.

A shadow price of carbon can help to inform how to best allocate carbon space. An internal carbon price will be particularly useful in institutions that calculate the social return on investment of their operations (e.g. Mishan & Quah, 2020). Social return on investment is an established way to quantify the impacts of a project, comparing for example the development benefits of energy with its potential environmental costs. The

internal carbon price should reflect the marginal cost of the chosen emissions pathway, rather than the social cost of carbon (Kaufman et al., 2020). This will ensure consistency with the adopted net zero target and help to allocate the available carbon space efficiently for maximum development benefit.

3.5 | Accounting for emissions after a project ends

Reducing emissions can be a slow process. Most investors will exit or have their loans repaid before the projects they supported become net zero. This raises the issue that individual investors can clean up their books simply by exiting investments. Indeed, financial economists have started to devise net zero consistent exit roadmaps (Bolton et al., 2022). Such divestment only works to reduce emissions if there is coordination across all investors (Kruitwagen et al., 2017). Otherwise, emissions are merely assigned to a new owner, perhaps one with fewer qualms about climate change. Other investors may not have the same standards of disclosure or may run the asset in a more polluting manner.

To ensure emissions fall in the real economy (Caldecott et al., 2022), net zero targets need to be complemented by safeguards for the management of emissions once debts are repaid or a DFI exits the project. A responsible exit requires the vetting of potential new owners and their commitment to further clean-up operations or wind them down in a responsible manner. As one practitioner observed, 'withdrawing all funding in one go [...] creates wider societal and environmental risks'.

The continued reporting of emissions after a project has ended could provide longer-term scrutiny at acceptable costs. An important benefit of emissions targets is that project companies will put in place systems to monitor and report their emissions. These systems should continue to be used, and emissions should be reported after a DFI exits or a debt is repaid. Continued reporting by project companies will provide ongoing scrutiny and increase the likelihood that emissions continue to be managed. DFIs should be able to collect this information at a reasonable cost. The emissions of completed projects would not be part of the formal net zero portfolio target and may be reported at a lower frequency (for example, 1 year and 5 years after exit). Furthermore, continued reporting on post-project emissions creates an incentive for the DFI to ensure that the exit is conducted responsibly and that assets are sold to responsible entities. Selling to entities that reduce the asset's emissions will result in the DFI's post-project emissions declining, which is good reputationally.

Putting in place binding principles, standards and legal requirements could ensure emissions are managed beyond the project-end. The prospects of a responsible exit might be strengthened through legal

provisions in the sales contract that commit the new owners to maintain emission reduction efforts. So-called 'green pills' (Armour et al., 2022) instate a penalty for failure to deliver upon the climate commitment post-exit. Examples include contract-based mechanisms, which can be customised to the firm's circumstances and supported by standard corporate governance mechanisms. Such contractual structures work best for the sale of equity stakes. They are less suitable for debt financing, where the prospect of follow-on transactions with DFIs may serve as an incentive instead. These are forward-looking measures, and in the short term, it seems unlikely that there will be any type of legal requirement over legacy emissions. Instead, the pressure will come from public scrutiny.

4 | CONCLUSIONS

Net zero portfolio targets provide a transparent and credible direction of travel for DFIs committed to climate action. They are a complement, not a substitute, for wider operational strategies to align DFI activities with the Paris Agreement, such as those agreed by the MDBs (MDB, 2023).

The advantage of net zero portfolio targets is that they are based on outcomes, that is, the quantity of emissions that are removed, reduced or avoided. Implementing these targets will help move the system towards better reporting of financed emissions and incentivise project developers to disclose their carbon footprint. From a science-based perspective, this provides the clearest way to assess if financial institutions are decarbonising.

The practical challenges of reducing carbon in the portfolio are real but not insurmountable. There will be short-term technical difficulties related to the lumpiness of investments, the ability to exit responsibly, how to decarbonise high emission assets without being penalised and the trade-offs with development. Yet, similar to the way laws, standards and a canon of best practices are used to enhance financial stability and improve compliance with environmental, social and governance (ESG) metrics, there are also solutions to help navigate net zero operationally.

These recommendations need to be debated further, refined and tested in a practical context. The aim of this paper was to advance the debate on how to make net zero portfolios practically feasible. This debate is critical to ensure net zero portfolio standards move closer to operational reality. Whilst the direction of travel is clear, solutions will have to account for the varying capacities, resources, strategies and organisational cultures of each DFI, as this ultimately underpins their ability to move towards a net zero investment portfolio.

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CONFLICT OF INTEREST STATEMENT

There are no conflicts of interest to declare.

DATA AVAILABILITY STATEMENT

Data sharing not applicable to this article as no datasets were generated or analysed during the current study.

ORCID

Sam Fankhauser  <https://orcid.org/0000-0003-2100-7888>

Sugandha Srivastav  <https://orcid.org/0000-0001-7289-7484>

Stephanie Hirmer  <https://orcid.org/0000-0001-7628-9259>

Gireesh Shrimali  <https://orcid.org/0000-0002-8476-0108>

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AUTHOR BIOGRAPHIES

Sam Fankhauser is a Professor of Climate Economics & Policy in the Smith School of Enterprise and the Environment and Research Director of Oxford Net Zero at the University of Oxford.

Sugandha Srivastav is a British Academy Postdoctoral Fellow in Environmental Economics at the University of Oxford.

Ingrid Sundvor is a Researcher in the Smith School of Enterprise and the Environment at the University of Oxford.

Stephanie Hirmer is a Senior Researcher in Energy Systems at the Energy and Power Group at the University of Oxford.

Gireesh Shrimali is the Head of Transition Finance Research in the Sustainable Finance Group at the University of Oxford.

SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

Appendix S1

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