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Support for decarbonising heavy industry in emerging markets and developing economies (EMDEs)



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Key findings

Mobilising finance and investment for industry decarbonisation in Emerging Markets and Developing Economies (EMDEs) is essential to achieving net-zero emissions by mid-century. The industry sector accounts for as much as 40% of total global energy-related carbon dioxide (CO₂) emissions, and EMDEs play a central role – producing over 75% of the world’s steel and more than 85% of its cement. As a result, the investment decisions made in these regions over the coming years will be pivotal in shaping the global transition to a net-zero economy.

Partnership and cooperation between EMDEs and advanced economies is key to making and implementing these investment decisions. Country partnerships and international cooperation can provide mutual benefits by accelerating the development and deployment of effective solutions for an affordable industrial decarbonisation, creating shared economic opportunities and enhancing competitive and resilient industries and supply chains. Strengthening these ties also helps to align standards, reduce trade barriers, and foster innovation that can benefit industries in both EMDEs and advanced economies over the long term.

In this context, there is broad consensus that financial and technical assistance for industry decarbonisation in EMDEs has been inadequate to date (OECD/Climate Club, 2024^[1]). The upcoming update of analysis on industrial decarbonisation assistance, undertaken by the OECD for the Climate Club¹, shows that despite significant growth in recent years, financial and technical assistance remains insufficient to put industry in EMDEs on a pathway aligned with net-zero emissions by mid-century (OECD/Climate Club, Forthcoming^[2]).

Looking ahead, the lion’s share of financing and investment for decarbonising steel and cement would need to reach EMDEs, in order to align with a net-zero pathway. In the IEA’s Net Zero Emissions by 2050 Scenario, global investment needs over the next decade for near-zero emission technologies in the cement and steel sector reach at least USD 500 billion in the two sectors combined. Over two-thirds of these investments take place in EMDEs, where the bulk of global production currently exists and where demand for steel and cement is growing fastest. This investment would need to come from all sources: public, private, international and domestic. In terms of international public finance, USD 2 billion a year is needed by the early 2030s to scale near-zero emission technologies for steel and cement projects across EMDEs. While near-zero emissions technologies will play the largest role in delivering the emissions reductions required for the sectors to be on track for net zero by mid-century, a range of low-emissions technologies will also be required. Here, transition finance, grounded in credible corporate transition strategies, can be a useful tool for emissions-intensive sectors to shift over time towards practices aligned with long-term climate and development goals.

High financing costs in EMDEs, combined with limited fiscal capacity to support industry decarbonisation efforts require international assistance to enable investments. Decarbonising the steel and cement sectors relies heavily on technologies that still require public support to reach full commercialisation. While advanced economies and China are actively supporting the development, commercialisation and early deployment of these technologies, such support is beyond the means of most

¹ The Climate Club is an inclusive high-level forum for industry decarbonisation with a total membership of 46 economies, as of October 2025.

other EMDEs. Technology risks and uncertainties pose challenges to accessing finance without public support. International support is therefore needed to enable investments in EMDEs and overcome other financing challenges including foreign currency risk, lack of long-term domestic currency finance and underdeveloped capital markets.

Finding the most effective way to combine different sources of finance is key to unlocking and accelerating investment in industry decarbonisation in EMDEs. This report identifies key learnings from the implementation of financial instruments to accelerate industrial decarbonisation in EMDEs, drawing on 16 case studies and building on ongoing work of the OECD for the Climate Club.

Overview of the report

This report aims to inform the Working Group on Green Industry Support for Emerging Markets and Developing Economies for COP30. This Working Group follows the launch of the Global Pledge on International Assistance for Industry Decarbonisation at COP29.

This report builds on three analyses:

- Section 1 provides an overview of the most recent data of financial and technical assistance provided for industry decarbonisation in EMDEs across the iron and steel, cement and chemicals sectors.
- Section 2 dives into the estimated total investment needs and in turn international public finance needs for near-zero emissions production in the iron and steel and cement sectors in EMDEs to 2035, to align with the IEA's Net-Zero Emissions by 2050 Scenario (NZE).
- Section 3 provides a summary of lessons learned from the use of financial instruments for industry decarbonisation. These draw from 16 case studies across EMDEs and advanced economies.

Table 1. Section scope

Section	Sectoral scope	Focus and sources of finance covered
1. Where we stand: mapping financial and technical assistance for industry decarbonisation in EMDEs	Iron and steel, cement and chemicals	Financial and technical assistance from: • Public bilateral and multilateral sources² • Private finance mobilised through Official Development Assistance • A selection of existing climate funds and programmes of International Financial Institutions (IFIs) • A selection of philanthropic support, based on publicly available information
2. Where we need to go: forward-looking investment estimates in EMDEs to 2035 to align with net zero emissions by 2050	Iron and steel and cement	Total investment and international public finance needs for near-zero emissions production
3. How to get there: case studies of financial instruments for industry decarbonisation	Focus on iron and steel, cement, and chemicals. Also includes examples of enabling technologies e.g. clean hydrogen and carbon capture use and storage (CCUS)	All sources

² Based on data from the OECD Development Assistance Committee (DAC) and Creditor Reporting System (CRS) (OECD, 2025^[3]; OECD, 2025^[4]; OECD, 2025^[5]).

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1 Where we stand: Mapping of financial and technical assistance for industry decarbonisation in EMDEs

The *Mapping of Financial and Technical Assistance for Industry Decarbonisation in EMDEs* report (hereinafter “the Mapping”) provides a state of play of the support that has been provided so far for industry decarbonisation in EMDEs. The first edition of the Mapping concluded that “the financial and technical assistance for industry decarbonisation in EMDEs has not received the necessary attention so far” (OECD/Climate Club, 2024^[1]). The 2025 update of the Mapping includes the latest available data and aims to identify new developments and emerging trends, whose key findings are summarised in this report.

The analyses of public bilateral³ and multilateral assistance and the private finance mobilised are based on OECD data from the OECD Development Assistance Committee (DAC) and Creditor Reporting System (CRS) (OECD, 2025^[3]; OECD, 2025^[4]; OECD, 2025^[5]). This allows for a relevant granular level of analysis in terms of sectors, amount, providers and recipients, type of financial instrument, and project level data. Interpretations on the main findings should focus on key trends instead of the figures themselves. Indeed, some methodological aspects relating to data collection, classification, aggregation and confidentiality may affect the completeness of reported financial flows on industry decarbonisation. Furthermore, the amounts mentioned for the mitigation-related public bilateral and multilateral development finance should not be compared or summed to the ones relating to the private finance mobilised. Indeed, differences in terms of methodology, type of recorded flows, data granularity or confidentiality constraints of some providers do not allow for any direct comparison between these amounts.

Key findings

Financial and technical assistance for industry decarbonisation in EMDEs remain insufficient for the sector to contribute to be aligned with a net-zero pathway. While representing around 70% of global industry’s carbon dioxide (CO₂) emissions, the steel, cement and chemical sectors have received limited support so far. Between 2000 and 2023, around USD 1.5 billion⁴ in total of mitigation-related public bilateral and multilateral development finance was directed towards these three sectors. This accounted for less than 1% of the total mitigation-related public bilateral and multilateral development finance across all sectors (i.e. beyond industry) recorded in the same period. To put this amount into perspective, it represents less than the investment required in an average-sized single greenfield steel integrated plant equipped with

³ Providers include DAC and non-DAC countries reporting to the CRS, see (OECD, 2025^[5]).

⁴ All amounts are expressed in constant 2023 USD.

near-zero emission breakthrough technology (hydrogen-based direct reduced iron (DRI) production or carbon capture use and storage (CCUS) based).

Crucially, public bilateral and multilateral financial assistance has triggered private finance mobilisation for decarbonising the steel, cement and chemical sectors in EMDEs, though it remains limited. Between 2012 and 2023, around USD 2 billion in total was mobilised for these three sub-sectors. This represented around 1% of the total recorded mitigation related private finance mobilised recorded under the same period.

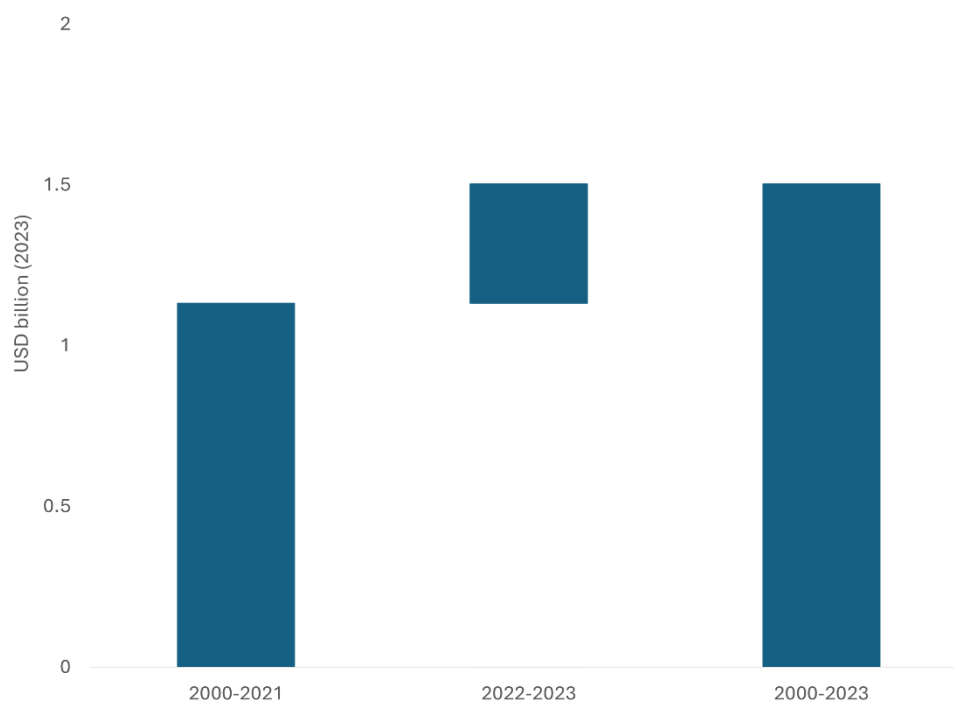
However, recent years have witnessed a remarkable growth in financial assistance for industry decarbonisation. The update of the mapping report (OECD/Climate Club, Forthcoming^[2]) shows that the total mitigation-related bilateral and multilateral support provided over two decades towards the steel, cement and chemical sectors has increased by more than one third in just two years, in 2022-2023 (Figure 1). Likewise, the total mitigation-related private finance mobilised since 2012 has increased by two thirds in just three years (Figure 2). Rather than reflecting a structural shift in supporting industry decarbonisation, this growth is primarily driven by the overall rise in the total mitigation-related financial flows recorded on the same periods (2022-2023 for bilateral and multilateral support, 2021-2023 for private finance mobilised). From a broader perspective, this growth in mitigation-related flows mirrors an overall increase in Official Development Assistance (ODA), as well as an increasing share of mitigation related flows.

It is important to note that ODA from DAC member countries declined in 2024 for the first time in six years (falling by 9% in net terms compared to 2023). In addition, the OECD projects a 9-17% drop in net ODA in 2025, in addition to the 9% decline in 2024 (OECD, 2025^[6]). While ODA reductions may vary across sectors, the overall downward trend is likely to affect all areas – including the industry sector.

Therefore, channelling industry development finance towards further mitigation-related activities would be crucial in sustaining the efforts observed in recent years, despite the challenging ODA outlook. This is especially relevant given the untapped potential to better target mitigation within overall development finance for the steel, cement, and chemical sectors – currently representing around 25% of the total private finance mobilised for these three sub-sectors.

Philanthropic funding targeting mitigation activities for the industry sector is significantly lower than for other sectors. Industry accounts for 2-3% of philanthropic spending on climate mitigation (ClimateWorks, 2024^[7]). While the role and the nature of the assistance provided by philanthropies differ from those of bilateral and multilateral providers, there is room for further prioritisation of the industry sector (OECD/Climate Club, 2024^[1]).

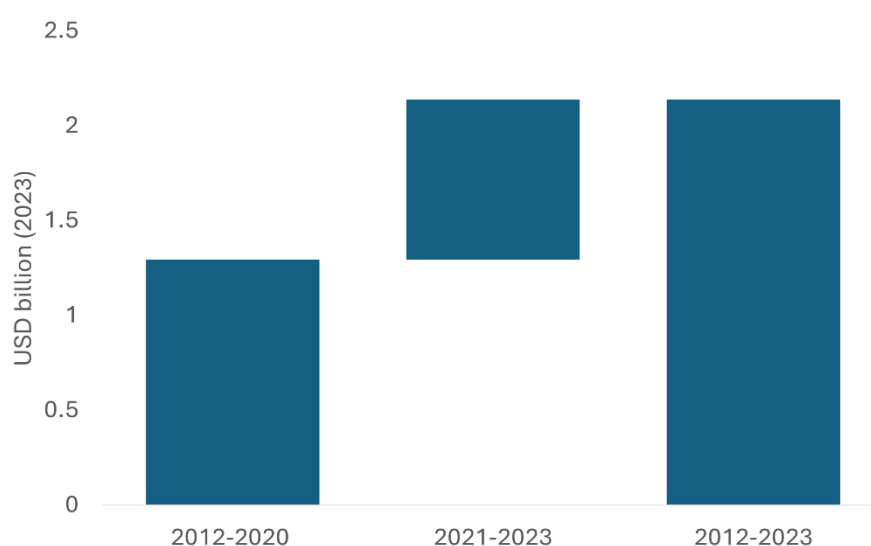
Figure 1. Cumulative public bilateral and multilateral mitigation-related development finance for the steel, cement and chemical sectors



Note: The period 2000-2021 refers to the period analysed in the first edition of the Mapping. The period 2022-2023 represents new added data available from the OECD DAC/CRS database since the first edition of the Mapping.

Source: (OECD, 2025^[3]), (OECD, 2025^[4]).

Figure 2. Cumulative mitigation-related private finance mobilised for the steel, cement and chemical sectors



Note: The period 2012-2020 refers to the period analysed in the first edition of the Mapping. The period 2021-2023 represents new added data available from the OECD DAC/CRS database since the first edition of the Mapping.

Source: (OECD, 2025^[5]).

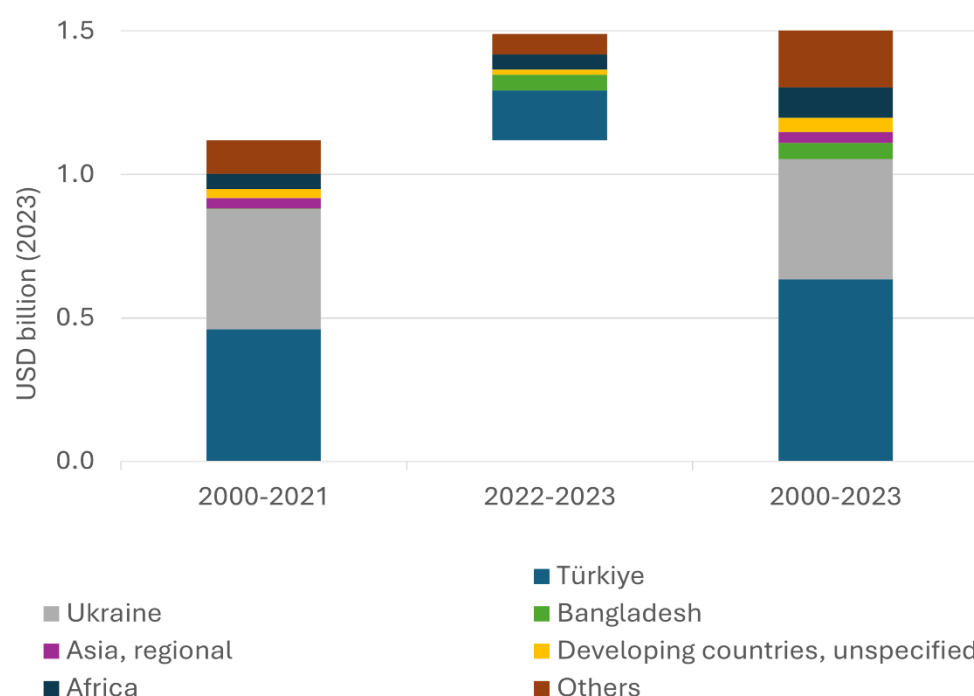
While some progress has been made, there is still space to consider a wider range of providers, recipient countries and financing instruments. Mitigation-related financial assistance – whether arising from public bilateral and multilateral sources or from the private finance mobilised – targeting these three industrial sectors in EMDEs are characterised by a limited pool of providers. More than 90% of the recorded flows from both sources originated from multilateral providers. This trend is even more pronounced in the case of public bilateral and multilateral mitigation-related development finance, where a single provider, the European Bank for Reconstruction and Development (EBRD), accounted for 80% of the cumulated flows between 2000 and 2023. There are thus opportunities for these sub-sectors to potentially benefit from a more varied set of providers that have been recorded in sectors other than industry. Nonetheless, it is worth noting that in recent years, there has been a noticeable increase in the share of bilateral support both in public assistance and in private finance mobilised.

There is also room to broaden the range of financing instruments used in mitigation-related public bilateral and multilateral assistance, as around 80% of the cumulated flows during the period 2000-2023 were delivered through debt instruments – almost all of which were reported as non-concessional.

Regarding the related private finance mobilised, the range of instruments used is more diversified. Providers used various leveraging mechanisms, including syndicated loans (around 45% of the total amount mobilised), direct investments in companies and Special Purpose Vehicles (SPVs) (around 30%), co-financing and guarantees (respectively, 15% and 9%). However, between 2021 and 2023, syndicated loans and direct investments in companies and SPVs emerged as the dominant instruments, together representing 90% of the total mobilised during this period.

In terms of recipients, there is room for targeting additional EMDEs, especially in regions which face the unique challenge of growing while decarbonising their industry. Limited geographical diversification of providers and recipients was also highlighted through the analysis of philanthropies' portfolios. However a change in country distribution was observed in recent years. Between 2000 and 2023, the main recipients from public bilateral and multilateral mitigation-related development finance were Türkiye (around 40% of flows) and Ukraine (nearly 30% of flows). Yet, in 2022-2023, Ukraine was not among the beneficiary countries. During this period, the support was mainly directed to Türkiye (almost 50%), as well as to non-typical recipients, with Bangladesh as the second largest recipient (15% of the 2022-2023 cumulated amount). A growing focus on Africa can be underscored, as the continent received around 20% of the flows, particularly benefitting Egypt (Figure 3).

Figure 3. Cumulative public bilateral and multilateral mitigation-related development finance for the steel, cement and chemical sectors - Breakdown by recipient countries

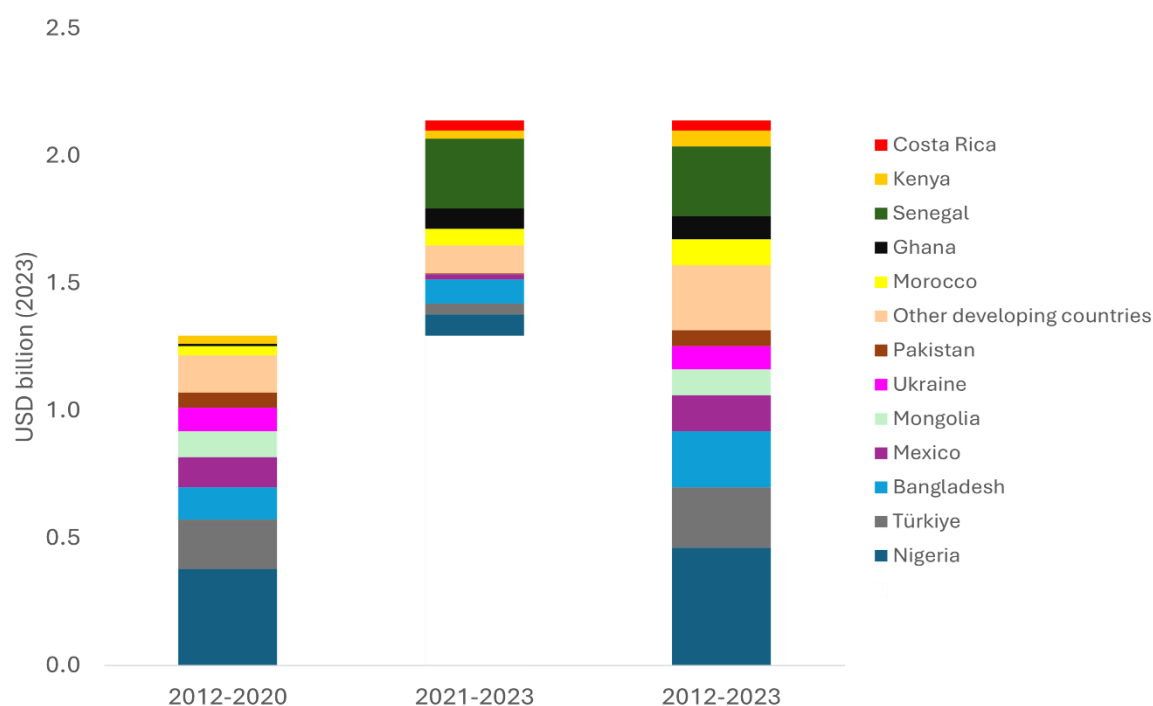


Note: The period 2000-2021 refers to the period analysed in the first edition of the Mapping. The period 2022-2023 represents new added data available from the OECD DAC/CRS database since the first edition of the Mapping.

Source: (OECD, 2025^[3]), (OECD, 2025^[4]).

Regarding the pool of recipient countries of the mitigation-related private finance mobilised, the picture is more nuanced. In absolute terms, this pool is much less concentrated than the one referring to mitigation related public development finance for these sectors. Key recipients are diverse and vary across the different time periods (Figure 4). Between 2012 and 2023, the largest shares of the cumulated amount mobilised went to Nigeria (around 20% of the total), Senegal (13%), Türkiye (around 10%), Bangladesh (10%) and Mexico (7%). Moreover, the recent shift in focus towards the African region mentioned earlier is clearly reflected, with 70% of the total private finance mobilised for mitigation between 2021 and 2023 directed toward Africa. However, it is important to note that, overall, the targeted recipients do not include major steel, cement and chemical manufacturing countries (e.g. in Southeast Asia). In this way, there is still considerable space to increase the impact of private finance mobilised on global emission reductions for these sectors.

Figure 4. Cumulative mitigation-related private finance mobilised for the steel, cement and chemical sectors - Breakdown by recipient countries



Note: The period 2012-2020 refers to the period analysed in the first edition of the Mapping. The period 2021-2023 represents new added data available from the OECD DAC/CRS database since the first edition of the Mapping.

Source: (OECD, 2025^[5]).

Assistance increasingly targets industrial projects, with growing attention to the integration of breakthrough technologies. So far, recipient projects had largely focused on incremental emission reductions rather than on breakthrough approaches that can significantly reduce emissions. Most of the assistance provided aimed at improving energy efficiency, circular economy approaches, and waste management. In contrast, financial and technical assistance directed to cross-cutting breakthrough technologies such as CCUS and clean hydrogen⁵ have been limited and did not focus on implementation projects. In 2022 and 2023, emerging trends indicate a growing emphasis on direct support for industrial projects, moving beyond capacity-building efforts. Notably, this shift also includes increased targeting of projects involving deep decarbonisation technologies, such as clean hydrogen.

New assistance programmes with a potential groundbreaking impact for industrial decarbonisation in EMDEs are emerging. A wide range of funds and IFIs' programmes could support decarbonisation projects in general. However, few operating funds and programmes are closely targeting the industry sector. While transversal and multi-sectoral funds can provide benefits to industry decarbonisation projects, funds and IFIs programmes dedicated to the industry sector could increase opportunities for reducing industrial emissions. Such programmes would notably ensure that industry related projects do not have to compete with projects in other sectors (e.g. energy, transport, land use) to access financial and technical assistance.

⁵ Hydrogen produced from renewable energy or from fossil fuels with safe and responsible carbon capture and storage

IFIs have expressed a growing interest in supporting industry decarbonisation projects for EMDEs in the past few years. As a result, some funds and programs that are specifically targeting industry decarbonisation in EMDEs – including focusing on steel, cement or chemicals – have emerged since 2024.

One key programme is the Climate Investment Funds' (CIF) Industry Decarbonisation Programme, launched in 2024 (CIF, 2025^[8]). The programme will devote USD 1 billion to decarbonise high-emitting sectors. Brazil, Egypt, Mexico, Namibia, South Africa, Türkiye and Uzbekistan are the 7 countries that will benefit from the programme by receiving concessional finance for industry decarbonisation projects.

The Türkiye Industrial Decarbonisation Investment Platform (TIDIP) is another major initiative launched by the EBRD in partnership with the World Bank Group and the International Finance Corporation (IFC) (EBRD, 2024^[9]). The objective is to mobilise USD 5 billion investment by 2030, aiming to reduce over 20 million tonnes of CO₂ emissions annually by 2030. Initially focusing on steel, aluminium, cement and fertilisers, the platform plans to expand to glass, ceramics and chemicals sectors.

2 Where we need to go: Forward-looking investment estimates in EMDEs to 2035

Industrial demand, supply and corresponding emissions in EMDEs

Global emissions from industrial sectors have continued to grow, with limited progress compared to other sectors. Collectively, it accounts for over 9 billion tonnes of direct carbon dioxide emissions per year, including process emissions, which rises to 16 billion tonnes once indirect emissions from electricity and imports of heat are included (around 40% of total energy system emissions). Whilst the carbon intensity of industrial products in some regions has fallen slightly in recent years, total global emissions have not yet begun to decline and overall global progress in the uptake of low-emissions technologies has been relatively limited.

Figure 5. Geographic distribution of cement and iron & steel production, 2023



Source: IEA analysis based on World Steel Association and USGS (World Steel Association, n.d.^[10]; USGS, n.d.^[11]).

The iron & steel and cement sectors account for over half of total industry emissions globally and demand is expected to remain robust into the future. EMDEs account for over 75% of global steel manufacturing and over 85% of all cement production. Over 80% of production in EMDEs for both steel and cement is in Asia, driven largely by India and China. Whilst demand growth in China is beginning to level off (steel) and decline (cement), the buildout of infrastructure in other developing countries will require growing quantities of core industrial products like cement and iron & steel.

Given the long lifetime of industrial plants – typically 30–40 years for heavy industries – avoiding the “lock-in” of emissions from future plants will be key to reduce emissions from the sector. Sites can also be operated for much longer than the typical lifetime depending on global business and investment cycles, with investments in the industrial sector typically highly cyclical with multi-decadal timescales that are highly sensitive to prevailing macroeconomic trends. Ensuring that near- and low- emissions industrial technologies are soon available for widespread deployment, and ensuring technical specifications are in place to incorporate them through future retrofits for any capacity built in the meantime, will be essential to avoiding the “lock-in” through continued build out of conventional plant capacity.

Heavy industrial sectors face unique challenges in decarbonisation efforts. Emissions from subsectors such as cement, chemicals and iron & steel are typically referred to as “hard to abate”, due to direct process emissions and the high temperature heat requirements of many underlying conventional processes that make replacement with low-emissions electricity challenging. Technologies that will be relied on to deliver deep emissions reductions for the industrial sector, such as CCUS and low-emissions hydrogen, are not yet widely available on commercial markets and will require further policy and financial support to scale. Many industrial products are also globally traded in highly competitive markets with low profit margins and significant overcapacity, introducing challenges in pursuing near-zero and low-emissions production pathways that are currently more expensive than conventional. At the same time, other factors including safeguarding export competitiveness by complying with carbon-based border tariffs and “green” supply chain standards, as well as addressing energy security concerns, may help to accelerate investments in industry decarbonisation.

Support for industrial decarbonisation in EMDEs will need to scale to move up future value chains and avoid lock-in of emissions-intensive production pathways. To date, there has been limited international public finance (IPF) channelled through both bilateral and multilateral sources to support industrial decarbonisation in EMDEs, which has largely been focused on other clean energy technologies such as renewables. As mapped earlier in this report, just under USD 1.5 billion has been provided cumulatively in IPF since 2000 to support industry decarbonisation. For scale, total energy-related IPF reached an annual average of USD 32 billion globally between 2022 and 2024 (IEA, 2025^[12]). Whilst support for industrial decarbonisation has grown in recent years, it will need to rapidly scale to support the deployment of near-zero emissions technologies.

In this section, we explore current investment flows and future requirements into near-zero emissions technologies in cement and iron & steel in EMDEs. Near-zero emissions technologies have been selected as a focus due to their high capital-intensity, the largest challenges they pose in terms of cost and the key role that they will need to play in reaching net zero emissions in heavy industries. We also explore the role and scale of international public finance (IPF) needed to support the required increase in investments into near-zero emissions industrial technologies in EMDEs and discuss the need for assistance to develop supportive domestic policy frameworks.

Historical investment trends for heavy industries

Investment into near-zero emissions industrial decarbonisation measures globally has been limited to date, with policy support and IPF largely focused on more mature sectors and clean technologies. Additional clean energy investment⁶ into all industrial sectors is set to reach nearly USD 46 billion in 2025, less than

⁶ Clean energy investment in end-use sectors such as cement and iron & steel is defined by the IEA as the incremental spending for fuel switching, decarbonisation technologies or energy efficiency investments measured relative to a baseline (fossil) technology that would have otherwise been used (IEA, 2025^[23]).

1.5% of the USD 3.3 trillion anticipated to be invested globally into the energy system in 2025 (IEA, 2025^[12]).

Investments into industrial decarbonisation measures in EMDEs face additional headwinds than advanced economies, particularly outside of China. Investments into industrial decarbonisation measures in EMDEs other than China are estimated at over a third of global industrial investments in 2025. Profit margins and returns on equity for industrial companies in EMDEs remain low, with elevated interest rates posing challenges to raising new capital from debt issuance for capacity expansions and additional capital investments. The absence of sufficient enabling policy frameworks in most EMDEs makes investments in decarbonisation measures in industry particularly challenging. The limited fiscal space coupled with competing development challenges and rising debt burdens impairs government's ability to support the roll out of new technologies.

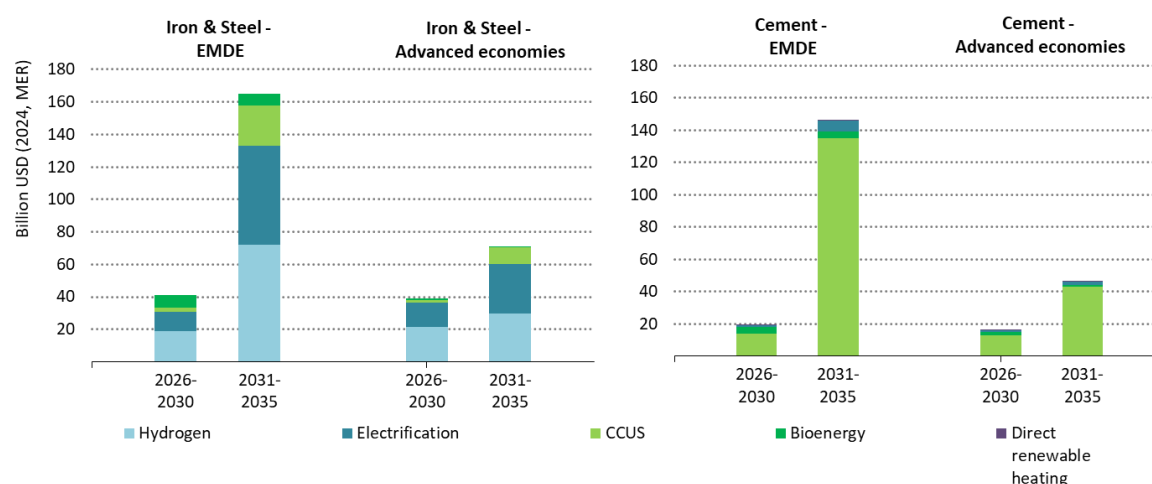
Near-zero emissions industrial technologies have also seen limited deployment globally, with most focused-on pilot projects largely in advanced economies and China. Lack of readiness for commercial deployment at scale of key technologies – including hydrogen and CCUS – and corresponding cost and deployment uncertainties means that technology deployment in industrial subsectors has largely been focused on energy efficiency measures alongside some mature low-emissions technologies such as scrap-based electric arc furnaces for steel. Challenges in EMDEs including high costs of capital have meant that in many developing economies, there has also been limited deployment of best available technologies and energy efficiency measures.

Investment to decarbonise iron and steel and cement in EMDEs

Global investments in near-zero emissions technologies over the next decade reach around half a trillion dollars across cement and iron & steel under the IEA's Net Zero Emissions by 2050 Scenario. Nearly 70% of these investments are focused in EMDEs, given the concentration of both existing production capacity and future demand growth. To avoid lock-in of carbon-intensive production capacity, external technical and financial support will be needed to enable the rollout of low and near-zero emissions technologies⁷ at the pace required.

⁷ Near-zero emissions are defined by the IEA as technologies that are already compatible an energy system that produces net zero emissions. In contrast, low-emissions technologies refer to those that make progress on emissions reductions towards the ultimate net zero goal but are not fully compatible with the net zero emissions energy system endpoint (IEA, 2025^[24]).

Figure 6. Cumulative investment requirements into near-zero emissions technologies for iron & steel and cement production, Net Zero Emissions by 2050 Scenario, 2026-2035



Source: IEA analysis.

Nearly USD 400 billion will need to be invested into near-zero emissions technologies in EMDEs across both the cement and iron & steel sectors over the next decade. CCUS make up the largest share of near-zero emission capital investments in the cement sector, given the significant process emissions that must be abated, whilst hydrogen, electrification and CCUS all play a key role in making progress towards near-zero emissions of the iron & steel sector. Whilst there are other innovative technologies still under development to address process emissions (e.g. the use of silicates for cement), these technologies are at lower levels of technology readiness, though with continued R&D efforts and support they may scale in the future.

Near-zero emissions industrial decarbonisation technologies are not yet at the levels of technology readiness required for widespread deployment. Investments over the next few years will largely be into demonstration and first of a kind (FOAK) commercial scale projects, which will be critical to ensuring that these technologies can be widely adopted. Alongside the deployment of FOAK near-zero emissions projects, a range of additional low-emissions technologies and strategies will also need to be financed and deployed in tandem (see Box 1).

Box 1: Role of low-emissions approaches in supporting emissions reductions

Near-zero emissions technologies for the cement and iron & steel sectors will play the largest role in delivering the emissions reductions required for the sector to be on track with the IEA's NZE Scenario. Alongside near-zero emissions technologies, a range of low-emissions technologies, approaches and process innovations will need to be deployed to deliver the full scale of emissions reductions required.

For the **cement** sector, these technologies and approaches include:

- **Clinker substitution and use efficiency:** increased use of supplementary cementitious materials alongside clinker in cement, as well as improving the efficiency of using cement within concrete, helps to reduce total demand for emissions-intensive clinker and for cement, and so reduces concrete's carbon intensity.
- **Fuel switching:** Use of bioenergy and renewable wastes can help to reduce the overall carbon intensity of production, through co-firing or substitution of fossil fuels used to provide the high temperature heat required in cement kilns.

For the **iron & steel** sector, it includes:

- **Scrap-based steel production:** scrap-based production with electric arc furnaces has an emissions intensity that can be much lower than iron-based production, even with typical operations today (e.g. with current typical electricity grid emissions intensities). It plays an important role in the NZE Scenario, including through measures to maximise use of available scrap, though there will be insufficient scrap availability to meet all future demand through it and considerable iron-based production will still be needed. Scrap-based steel production can also operate as a near-zero emissions technology when measures are taken to nearly eliminate its direct and indirect emissions.

Sources of finance for energy-related industrial investments

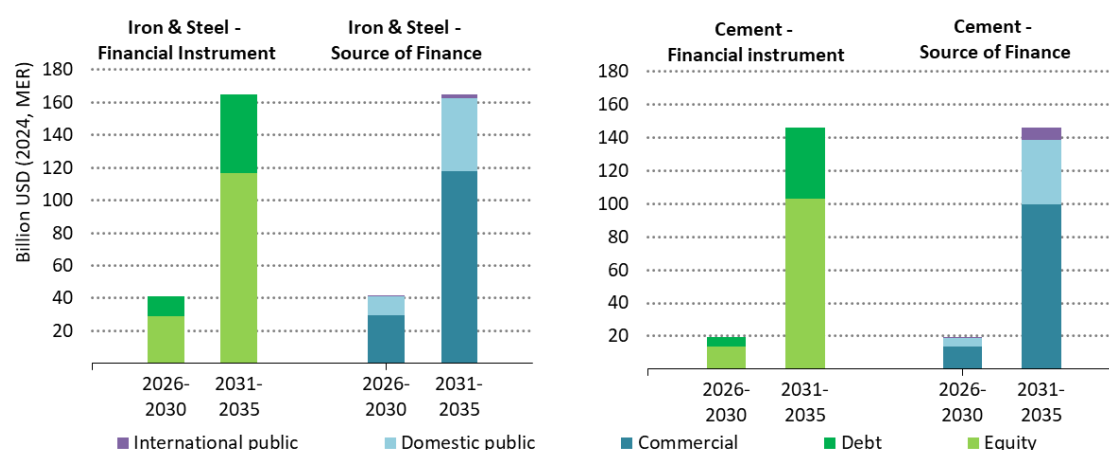
Industry investments are typically funded through a mixture of debt and equity, with domestic finance playing a stronger role than other energy-related subsectors (see Box 2 for the range of financing sources for industry capacity expansions and new technology deployment). Debt instruments made up an average of 35% of energy-related industrial investments in EMDEs other than China over the last decade, with the share falling in recent years due to periods of high interest rates. Equity plays a larger role than for other energy-related sectors due to the combination of longer payback periods, fluctuating and cyclical global demand and higher project-specific risks. Industry investments are also typically financed from local sources in EMDEs, due in part to the role that state-owned entities and public financial support plays in many industrial sites in EMDEs given their strategic importance.

Investments into near-zero technologies in EMDEs in the iron & steel and cement sectors will largely have to be financed through equity, with debt accounting for an average of 30% of financing over the next decade across both sectors. Given the lower technology maturity, high investment risks, and limited domestic policy support for near-zero emissions technologies in EMDEs, equity financing plays a larger role compared to current levels. Whilst domestic public financing for energy-related industry investments increases slightly relative to 2024 levels, it is commercial financing that will have to increase the most to meet investments required over the next decade. International public finance also plays a key role in unlocking commercial investments into near-zero emissions industrial technologies.

Whilst China represents the largest required investment into near-zero emissions industrial technologies in the NZE Scenario, trade sensitivities and adequate fiscal capacity mean that it is unlikely to receive

international support. Over recent years, China has progressed to being a net development finance contributor, though as a non-Development Assistance Committee member its contributions are not included in official ODA statistics. The higher levels of international public support for near-zero emissions technologies in the cement sector are in part a consequence of the broader geographic distribution of production capacity across EMDEs, with near-zero investments for iron & steel more concentrated in China than for cement.

Figure 7. Sources of finance for investments into near-zero emissions technologies for iron & steel and cement production in EMDEs, Net Zero Emissions by 2050 Scenario, 2026-2035



Source: IEA analysis.

Successfully financing and deploying near-zero emissions industrial technologies in EMDEs over the next decade in line with the NZE Scenario also holds opportunities for economic growth and development. Global markets for near-zero emissions steel and cement could already reach approximately USD 300-600 billion by 2035 (IEA, 2025^[13]), depending on the ambition of sectoral transitions. The transition to net zero emissions energy-intensive industries, including cement and iron & steel, provides opportunities for countries and regions less competitive under conventional production routes to build comparative advantages in the production of low and near-zero emissions industrial products and thus capture new market opportunities. EMDEs other than China account for less than 5% of the value generated from producing key energy technologies today (IEA, 2025^[14]). For regions such as Africa (IEA, 2025^[15]), Latin America and Southeast Asia, the new energy economy could hold opportunities to move up the value chain in energy and industrial supply chains, capturing additional value. Some developing countries may also be able to produce lower cost near-zero emissions industrial goods due to advantages such as low-cost renewable energy.

Box 2: Financing approaches used in hard-to-abate heavy industries

Industrial companies use a range of financing mechanisms, both conventional and emerging, to finance expansion plans and the new technology deployment. These include:

- **Loans and corporate debt issuance:** raising of capital either through commercial loans or the issuance of a corporate bond, typically on international capital markets due to limited domestic capital market development in many EMDEs.
- **Equity rounds:** raising of new equity capital from current shareholders and/or new investors either through public or rights offering on domestic and international markets.
- **Public capital:** For state owned industrial enterprises, debt financing or direct capital injections from the public budget can also be used to finance capacity expansions.

In all instances, industrial companies operating in EMDEs face much more adverse financing conditions than companies in advanced economies and China. For example, tracking of the weighted average cost of capital (WACC) over recent years shows that iron and steel companies face between 50-100% higher costs of capital than firms located in advanced economies. Given the long lifetimes of capital assets and limited profit margins, high costs of capital can have substantial impacts on the viability of large-scale investments into capacity expansions or new technologies (especially low- and near-zero technologies).

In addition to conventional financing mechanisms, a number of routes to raise capital for investments into low-carbon projects and technologies are also emerging, which will need to scale to support industrial decarbonisation. These include:

- **Grants and concessional loans:** domestic governments and development financial institutes (DFIs) provide a growing number of financing and assistance to support industrial decarbonisation, including loans, grants and guarantees.
- **Green bonds:** also referred to as Use of Proceeds bonds, the issuance of these bonds funds specific decarbonisation or sustainability projects within a company's operations.
- **Sustainability linked bonds:** funds raised from the issuance of sustainability linked bonds can be used for general purpose financing but the financing terms associated with the bond are linked to sustainability performance criteria, with penalties for not meeting the targets.
- **Transition loans and bonds:** Financing for projects that fall outside of the "green finance" label but are necessary for a sustainable transition. For heavy industries, transition finance can support the deployment of interim technologies such as energy efficiency, waste heat recovery and biofuel blending that may not be eligible for green finance or sustainability linked instruments. The role of transition finance in hard to abate industries is explored in the IEA's Scaling Up Transition Finance report (IEA, 2025^[14]).

While near-zero emissions technologies are essential to achieve net zero pathways, these technologies are still in preliminary stages of commercial deployment. In parallel, a variety of technologies and measures that can reduce the energy and emissions intensity of steel and cement production in the near-term are required. Therefore, transition finance for investments that can achieve significant emissions reductions over the next decade as plants transition to near-zero emissions production will also be needed. Transition finance refers to financial activities that can contribute to emissions reductions where finance needs are high but the support from green finance is limited. It is subject to an important process requirement, in that investments need to be grounded in transitions plans, strategies or equivalents, with mechanisms in place

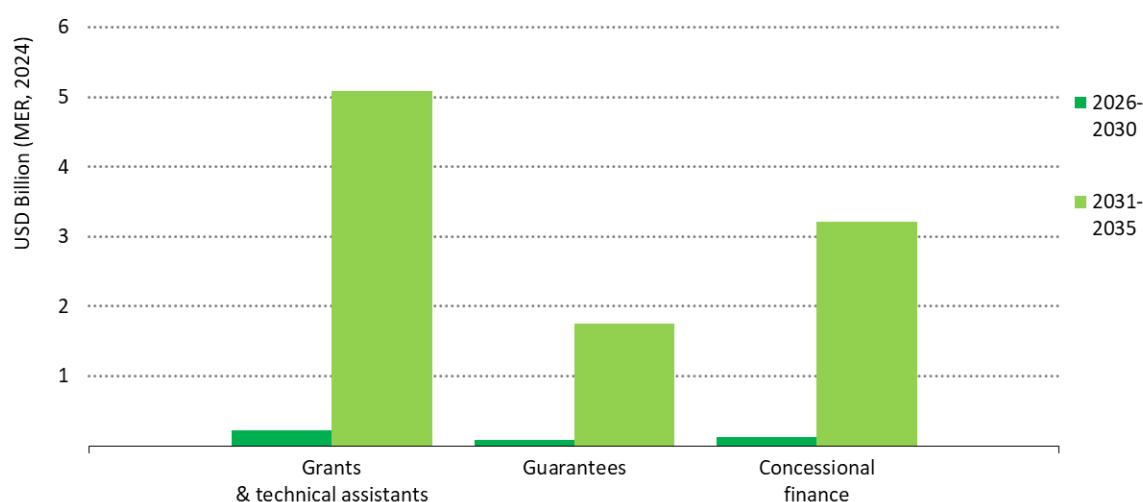
to enable tracking and follow-up that ensures transition finance contributes to a pathway to net zero emissions.

International support for near-zero emissions technology deployment

Accelerating investment flows into industrial decarbonisation will require enhanced levels of international support, particularly for near-zero emissions technologies. Key technologies for near-zero emissions cement and iron & steel – e.g., hydrogen and CCUS – are currently just starting to enter commercial markets, with high perceived risks by private investors globally. Market and macroeconomic risks already pose a barrier to the flow of commercial investment into more mature energy technologies such as wind and solar in many EMDEs, so the rollout of near-zero emissions industrial technologies in these regions will require additional support from international public finance to access adequate capital.

Nearly USD 2 billion in IPF will be needed annually by the early 2030s to scale near-zero emissions industrial technologies for iron & steel and cement in EMDEs. Over the next five years, support will need to be concentrated on supporting FOAK commercial projects in each region, including through funding for project-related technical assistance and project pre-feasibility studies. Based on the mapping conducted earlier in this report, meeting this target will require a major scale up in support for industry.

Figure 8. Cumulative international public finance needed to support near-zero emissions technologies for iron & steel and cement in EMDEs, NZE Scenario, 2026-2035



Source: IEA analysis.

Over the next decade, cumulative support for industrial decarbonisation in EMDEs will need to scale to total nearly USD 11 billion. In the early 2030s, support from IPF will largely be needed in the form of technical assistance and cost sharing for project development costs alongside the use of guarantees and concessional loans for markets with limited financial development. India accounts for the largest share, mainly to support project development cost-sharing, whereas regions such as Africa and non-ASEAN member countries in developing Asia will need additional support through guarantees and concessional equity and loans to address high financing costs. In terms of technologies, it is hydrogen and CCUS that will need the largest levels of support from IPF, to support their deployment whilst they become more common in commercial markets over the next decade.

Support will largely need to be directed through multilateral channels because of the trade-sensitive nature of heavy industries. Bilateral aid providers are typically unable to undertake activities that are deemed as giving selective advantages to foreign industries, which could be viewed as a trade-distorting industrial subsidy in conflict with WTO subsidy rules. Giving commercial cost advantages relative to competitors in other countries – even if the direct aim is to support emissions reductions – could violate neutrality and reciprocity principles, though bilateral aid providers can still support industrial decarbonisation indirectly (e.g., technical assistance, feasibility studies and capacity building efforts). Multilateral development banks, such as the Asian Development Bank, European Bank for Reconstruction and Development and the World Bank among others, can invest or co-finance industrial decarbonisation, provided it is under market-neutral conditions. An example of how an MDB has financed previous industrial technology deployment is explored in Box 3.

Emerging channels to support industrial decarbonisation in EMDEs show promise. In 2024, the Climate Investment Funds (CIF) launched its USD 1 billion Industry Decarbonisation Investment Program (CIF, 2024^[16]), which provides access to highly concessional funding of up to USD 250 million per country over the next 8-12 years to scale up clean and near-zero emissions industrial technologies. Seven countries (Brazil, Egypt, Mexico, Namibia, South Africa, Turkey and Uzbekistan) were invited to participate in the program and develop investment plans in collaboration with MDBs and other international partners, from a pool of 26 countries that had expressed interest. Institutional readiness, private sector engagement and commitments to industrial decarbonisation were highlighted as key drivers for their successful selection, in recognition of the importance of these factors to sustained industrial decarbonisation. The implementation of these programs aligns with the need highlighted here to provide targeted country-level support and partnerships to accelerate industrial decarbonisation. However, support will need to scale up both in terms of volume and country coverage to support the deployment of near-zero emissions industrial technologies in line with the NZE Scenario.

Box 3: World Bank Group Support for Demand-side Energy Efficiency

Lessons for supporting the rollout of near-zero emissions industrial technologies can be taken from previous experience supporting emerging technologies, including the scale up of demand-side energy efficiency (DSEE) in commercial and industrial sectors (World Bank Group, 2023^[17]). Between 2011 and 2020, IFC and the World Bank Group provided USD 19.6 billion to support DSEE through 354 interventions globally, with MIGA issuing 11 guarantees.

Evaluation of the WBG's DSEE programs published in 2023 highlights the following success factors:

- Robust domestic policy environments.
- Support to improve the policy environment alongside project financing.
- Repeat engagements and support directed to multi-asset infrastructure owners.
- Coordinated, joined-up and complementary interventions between the World Bank Group institutions and with other MDBs and other actors.

Intensification of support, development of sector-specific approaches for select low middle income countries and support for technology leapfrogging were also highlighted as key recommendations, which could aid the scaling of low- and near-zero emissions industrial technology deployment. Continued engagement rather than one off interventions is also an important takeaway for supporting industrial decarbonisation.

Role of domestic policy frameworks and international partnerships

Production costs of near-zero emissions cement and steel are currently much higher than conventional production pathways. As outlined in the IEA's Demand and Supply Measures for the Steel and Cement Transition report (IEA, 2025^[13]), the production cost of near-zero emissions steel will typically carry a 10 to 75% premium compared to today's conventional steel production costs, varying with technology type and regional factors like energy and labour costs. For cement, the cost premium of near-zero emissions production is likely to be 30-125% compared to current conventional production, also depending on regional and technology factors.

Attracting commercial finance into near-zero emissions industrial technologies in EMDEs will require closing the cost premium, including through further innovation and the development of supportive domestic policy frameworks (IEA, 2025^[18]). Given the low profit margins in cement and iron & steel sectors and the high-cost premiums for near-zero emissions production, the development of viable business cases and supportive policy environments will be needed to improve project bankability and attract commercial investments. A number of case studies for the application of policy support to industrial contexts are explored in the next section, which are largely targeted on the supply side. Governments can also leverage their influence through measures that aim to grow demand for low- and near-zero emissions industrial products (e.g., through public procurement of such materials).

International support to develop enabling policy frameworks will also be key to unlocking sufficient private investment, including through technical assistance to support policy reforms and build institutional capacity ("macro-level catalytic TA"). It includes both capacity building through training for official bodies and capacity building to enable policy & regulatory reforms that can support private sector development and mobilisation. Macro-level catalytic TA currently remains under-recognised and misreported across ODA statistics (OECD, 2025^[19]). Quantifying the level of macro-level TA is challenging due to uncertainties over future policy trajectories in EMDEs and limited cost data for policy development, though it could play a key role in catalysing private investment for industry decarbonisation.

International partnerships encompassing more than just financial support also have a key role to play to unlock shared benefits. Alongside support from IPF, international cooperation at both the bilateral and multilateral level between EMDEs and partner countries can help drive industrial decarbonisation through knowledge sharing, capacity building and joint innovation efforts. For example, the Brazil-UK Industry Decarbonisation Hub was launched at COP28, which has involved collaborating on R&D, project preparation and development of enabling policy frameworks. A number of other partnerships with bilateral partners such as the International Climate Initiative have also been announced through UNIDO's Net Zero Partnership for Industry Decarbonisation initiative, including for Egypt, Morocco and Indonesia.

3

How to get there: Case studies of financial instruments for industry decarbonisation

This section provides an overview of the key learnings from 16 case studies of financial instruments for industry decarbonisation. This analysis builds on recent and ongoing work under the Climate Club (OECD/Climate Club, 2025^[20]). The case studies draw from examples in both OECD countries and where possible from EMDEs, in order to illustrate how the specific challenges in the latter group of countries can be overcome. Examples that refer to OECD countries provide insights to replicate similar instruments in EMDEs.

This selection of case studies illustrates the diversity of technologies and projects that can be supported by tailored financial instruments, covering the entire industry value chain. Particular attention has been given to projects that fail to reach final investment decision with conventional financing solutions, including less mature technologies in hard-to-abate sectors, such as green steel, cement or the use of alternative fuels and petrochemical feedstocks. Some case studies cover more conventional technologies such as energy efficiency, especially where industry actors in emerging and developing economies lack access to finance.

Table 2. Case study overview

Case Study name	Type	Instrument	Eligible sector(s) / projects	Country/region
1. MIGA for Global Steel Dust Gulf	Derisking	Political risk insurance	Steel	Saudi Arabia
2. EIB Venture debt for Sunfire GmbH	Financing	Venture debt	Clean hydrogen	Germany
3. BMW CCfD scheme	Economic	Auction and Contract for Difference	Industry	Germany
4. Foundation myclimate renewable heat programme	Economic	Carbon credits	Industry	Switzerland
5. EBRD Concessional loan for Arabian Cement Company (ACC)	Financing	Concessional loan	Cement	Egypt
6. EU Emissions Trading Scheme (EU-ETS)	Economic	Emission Trading Scheme	Industry	EU
7. GIZ PotencializEE programme	Financing	Grants and subsidies	Industrial energy efficiency	Brazil

Case Study name	Type	Instrument	Eligible sector(s) / projects	Country/region
8. New Energy Risk performance guarantee	Derisking	Performance guarantee	Breakthrough technologies (e.g. carbon capture projects)	Global
9. InfraCredit Partial Credit Guarantees	Derisking	First and second loss facility	Industry	Nigeria
10. South Africa Special Economic Zones	Economic	Accelerated depreciation	Industrial infrastructure	South Africa
11. Mitsubishi Heavy Industries (MHI) Transition bonds	Financing	Bonds	Industrial heat, steel, shipping, CCUS	Global
12. EBRD Climate Syndication Platform for 1st and 2nd loss Funds	Derisking	First and second loss facility	Climate mitigation and adaptation (including industry) projects	Eastern Europe, Caucasus, Türkiye, Southern and Eastern Mediterranean and Central Asia
13. IFC Sustainability-linked loans for Votorantim Cimentos	Financing	Sustainability-linked loans	Cement	Brazil
14. Partial Risk Sharing Facility for Energy Efficiency (PRSF) programme	Derisking	Partial Risk Guarantee	Industry micro-, small and medium-sized enterprises	India
15. Climate Fund Managers SDG Namibia ONE Fund	Financing	Public and Private Equity	Green hydrogen	Namibia
16. Inter-American Development Bank (IDB) results-based loan	Financing	Results-based financing instrument	Green hydrogen	Chile

Key learnings

Assistance during the project development phase facilitates final investment decision (FID).

Technical and financial assistance in early and development stages reduce information gaps and transaction costs that can discourage private lenders from entering new or high-risk markets. By funding feasibility studies, supporting financial structuring and enabling the development of supportive regulations, assistance can help projects to meet institutional standards and due diligence requirements. It can also reduce technical, environmental or policy risks at an early project stage to provide more confidence to private investors.

The MIGA Political Risk Insurance for Global Steel Dust Gulf in Saudi Arabia (Case Study 1) illustrates this dynamic: comprehensive due diligence and environmental assessments conducted under World Bank standards secured investor confidence and enabled long-term foreign equity participation. The EBRD Concessional Loan for the Arabian Cement Company (ACC) in Egypt also demonstrates this approach (Case Study 5). Donor funded technical assistance and an EU EFSD+ guarantee allowed the EBRD to provide long loan tenor and mobilise private co-lenders for an investment to expand the use of alternative fuels at ACC's production facility. Likewise, IFC Sustainability-Linked Loans (Case Study 13) provide advisory and verification services that help corporates in emerging markets define measurable decarbonisation targets, thereby strengthening access to syndicated credit.

First-of-a-kind (FOAK) projects require tailored assistance and financial instruments to reach FID.

FOAK projects often struggle to attract investors due to high perceived risk. To overcome the lack of track

record in FOAK projects, technical assistance can support validation of innovative technology, for example through demonstration projects. Moreover, risk mitigation instruments, such as performance guarantees can better distribute risk in case of underperformance of innovative technology. Public or private equity investments can also turbocharge the deployment of early-stage technologies.

The EIB Venture Debt facility for Sunfire GmbH (Case Study 2) illustrates this: milestone-based tranches under the InvestEU guarantee enabled the company to scale electrolyser manufacturing and attract important private co-investment. In the private market, New Energy Risk's performance insurance policies (Case Study 8) transfer commissioning and technology performance risk to A-rated insurers, enabling first-of-a-kind clean tech deployments. Another example is the Mitsubishi Heavy Industries (MHI) transition bonds (Case Study 11), the proceeds of which are allocated to flagship R&D and commercialisation projects in hydrogen, ammonia, carbon capture and energy efficiency.

Blended finance is a key solution to mobilise private capital at scale. Blended finance – the strategic use of development finance for the mobilisation of additional finance towards sustainable development in EMDEs – is a widely used method for providers of development finance and the private sector to work together and leverage each other's resources and knowledge (OECD, 2025^[21]). Blended finance arrangements combine concessional and commercial capital within one structure, allocating risks efficiently across tranches. Public contributions, notably from MDBs, DFIs and ECAs, can provide preferential terms that commercial banks cannot competitively do, for instance through first loss layers, guarantees or concessional debt can de-risk private investments. While blended finance has not scaled as rapidly as hoped and has mobilised relatively limited private finance, such models can deliver high leverage when properly structured, with the strategic use of limited public budgets mobilising larger scale private investment flows.

InfraCredit Nigeria's partial credit guarantees and GuarantCo counter guarantees (Case Study 9) have unlocked local currency financing from private sources. The Climate Fund Managers' SDG Namibia One Fund (Case Study 15) combines technical assistance with layered equity (at varying levels of risk and return) and concessional tranches to attract private capital into the emerging hydrogen sector. Both case studies illustrate how targeted assistance and risk-sharing structures can crowd in private participation. These examples show how well-structured blending, combining public de-risking, private finance and technical capacity, remains an effective tool to mobilise capital for industrial decarbonisation at scale.

Risk mitigation instruments underpin projects' viability. Risk mitigation instruments, such as guarantees and insurance, protect lenders and investors from political, credit and technology risks that constrain lending. For example, first loss guarantees reduce non-repayment risk for senior lenders, thereby improving the credit profile of borrowers. Political risk insurance can reduce country risk, particularly in emerging markets and developing economies, thereby reducing the cost of capital of the project.

The EBRD Climate Syndication Platform (Case Study 12) uses donor backed first loss guarantees and technical support to attract co-lenders into innovative climate projects. The World Bank-SIDBI (Small Industries Development Bank of India) Partial Risk-Sharing Facility in India (Case Study 14) aims to attract investment for energy efficiency projects in MSMEs by providing up to 75 % loan default coverage. In high-risk jurisdictions, the World Bank MIGA's political risk insurance (Case Study 1) can improve investment terms, thereby enabling investment in infrastructure and industrial decarbonisation projects.

Revenue stabilisation mechanisms convert uncertainty into predictable cash flows. Revenue stabilisation instruments such as results-based payments, carbon credit offtakes and contracts-for-difference (CfDs) transform volatile revenues into more predictable income streams. In turn, they enhance debt service coverage ratios, lower financing costs, and extend tenors, particularly in markets exposed to policy uncertainty or commodity price fluctuations.

The Foundation myclimate Renewable Heat Programme (Case Study 4) provides ex-post payments for verified CO₂ reductions, creating steady cash flows and improving project returns. Germany's Federal Ministry for Economic Affairs and Energy's (BMWE) Carbon Contracts for Difference (Case Study 3) secure minimum carbon price revenues for industrial decarbonisation projects, ensuring stable income even when market prices fall. Both illustrate how predictable revenue frameworks make low carbon investments bankable for commercial lenders.

Programme and country platforms scale faster than stand-alone projects. Country platforms and national and regional programmes can accelerate market creation by standardising documentation, pooling technical assistance and developing pipelines of eligible projects. They can reduce transaction costs, enhance policy coordination and build institutional capacity within local banks and project developers. Over time, they establish replicable frameworks that reduce dependence on donor support.

The EBRD Climate Syndication Platform (Case Study 12) uses a typical co-financing structure of the EBRD, enabling partners to participate, while the EBRD remains the lender of record for the entire loan. The IDB Results-Based Loan for Chile's Hydrogen Programme (Case Study 16) also illustrates how a performance-linked national platform can mobilise both public and private co-finance within a common framework.

Replication and scale-up requires key enabling conditions, such as robust policy frameworks, shared infrastructure, and technical capacity. Scaling requires enabling ecosystems rather than isolated financial instruments. Industrial clusters and shared infrastructure reduce unit costs and facilitate permitting, while consistent regulatory frameworks, predictable carbon prices and demand side incentives strengthen investors' confidence. For assistance providers, replication depends on coupling financial instruments with long-term policy engagement, capacity building and institutional strengthening to maintain quality and investor confidence. Equally important is designing technical assistance components to become self-sustaining, by training local consultants, engineering firms and energy service companies (ESCOs) to identify and structure bankable decarbonisation projects.

In the EU, the Emissions Trading Scheme (EU ETS) has highlighted the importance of ensuring a robust policy framework that delivers a predictable carbon price (Case Study 6). The South Africa Special Economic Zone (SEZ) model (Case Study 10) demonstrates how integrated zone governance and fiscal incentives can anchor long-term industrial investment. In Brazil, the GIZ PotencializEE programme (Case Study 7) provides a complementary example of how donor funded technical support can evolve into local capacity by training auditors and banks to identify viable energy efficiency investments (GIZ, 2025^[22]). Together, these case studies show that scaling industrial decarbonisation requires combining clear policy and financing instruments with enduring institutional and human capital development.

4 Areas for action to scale up finance for industry decarbonisation in EMDEs

Mainstream industry decarbonisation when designing financial and technical assistance

Given that financial and technical assistance for industry decarbonisation in EMDEs remains inadequate, providers (e.g. countries, IFIs, philanthropies) would need to further target the industry sector when designing assistance programmes to support decarbonisation in EMDEs. The significant growth in assistance for industry decarbonisation recorded in recent years mirrors an overall increase in ODA, as well as an increasing share of mitigation-related flows. Considering the challenging ODA outlook, channelling industry-related development finance towards decarbonisation activities would be crucial to sustain the efforts observed in recent years. This is especially relevant given the untapped potential to better target mitigation within overall development finance for the steel, cement and chemical sectors.

Amplify the impact of assistance by targeting a wider range of countries, and first of a kind projects in near-zero emission technologies

Targeting a wider range of countries, including those with large, rapidly growing and/or high-emitting manufacturing capacity, could unleash the significant potential of financial and technical assistance in reducing global industrial emissions in EMDEs. In addition, targeting programmes to first of a kind (FOAK) near-zero emissions industrial projects (focused in particular on clean hydrogen and CCUS, given their higher technology readiness) would support deep emission reductions.

Design multilateral funds and programmes dedicated to industry decarbonisation

Designing funds and programmes that closely consider or target the industry sector – such as the CIF's Industry Decarbonisation Programme or the Türkiye Industrial Decarbonisation Investment Platform (TIDIP) – would facilitate access to financial and technical assistance for industry decarbonisation projects. This would avoid industry-related projects competing with those in other sectors (e.g. energy, transport, land-use) for which the business case could be more favourable.

Target USD 2 billion a year in international public finance to scale near-zero emissions technologies for steel and cement projects across EMDEs by early 2030s

This is the level of financing that would be needed to align the steel and cement sectors in EMDEs under the IEA's Net Zero Emissions by 2050 Scenario. These funds should prioritise private capital mobilisation through derisking of projects and limited concessional funding should be prioritised for least developed

countries in Africa and Asia. For first of a kind industrial decarbonisation projects in each region, support should also be provided for feasibility studies and project preparation efforts.

Scale up the use of blended finance to mobilise private capital

Blended finance structures, which combine concessional and commercial capital are essential for mobilising private investment to support industry decarbonisation in EMDEs at scale. Development finance providers and private sector actors could expand the use of blended instruments that strategically allocate risk, including first-loss capital, guarantees, or concessional debt, to de-risk projects and attract commercial investors. While current levels of mobilisation remain limited, well-structured blended finance mechanisms can achieve high leverage ratios, making more effective use of constrained public budgets.

Deploy risk mitigation instruments to improve project bankability

Guarantees, insurance products and other risk mitigation instruments could be deployed more widely to address key investment barriers, particularly in EMDEs. These instruments can reduce exposure to political, credit and technological risks, enhancing project bankability and lowering financing costs. Development finance institutions and public actors have a critical role in providing these tools, including first loss guarantees and political risk insurance, to improve creditworthiness and facilitate greater private sector participation.

Introduce revenue stabilisation mechanisms to enhance financial viability

Revenue stabilisation tools such as results-based payments, carbon credit offtake agreements and contracts-for-difference (CfDs) can significantly improve the financial viability of decarbonisation projects. By turning uncertain or volatile revenue streams into predictable cash flows, these instruments increase the attractiveness of investments, strengthen debt service coverage and enable access to longer-term and lower-cost financing. Policymakers and development partners could consider prioritising the design and deployment of such instruments, particularly in markets facing policy or price volatility.

Support the development and strengthening of domestic policy frameworks

Production pathways for low- and near-zero emissions industrial products will carry a cost premium relative to conventional production routes. To ensure the bankability of industrial decarbonisation projects, domestic policy environments in EMDEs will need further development and strengthening to improve competitiveness – this will be especially important in the short to medium term, whilst key emerging technologies such as hydrogen and CCUS are first entering commercial markets.

References

- CIF (2025), *Industry decarbonisation program*, <https://www.cif.org/industry-decarbonization> (accessed on 15 October 2025). [8]
- CIF (2024), *CEM15/MI-9: CIF invests up to \$1 Billion in decarbonizing heavy-emitting industries*, <https://www.cif.org/news/cem15mi-9-cif-invests-1-billion-decarbonizing-heavy-emitting-industries> (accessed on 15 October 2025). [16]
- ClimateWorks (2024), *Funding trends 2024 - Climate change mitigation philanthropy*, <https://www.climateworks.org/report/funding-trends-2024/>. [7]
- EBRD (2024), *Türkiye launches industrial decarbonisation investment platform*, <https://www.ebrd.com/home/news-and-events/news/2024/trkiye-launches-industrial-decarbonisation-investment-platform.html> (accessed on 15 October 2025). [9]
- GIZ (2025), *Brazil – Industrial Energy Efficiency*, <https://mitigation-action.org/projects/brazil-transformative-investments-for-industrial-energy-efficiency-potencializee/>. [22]
- IEA (2025), *Definitions for Near-Zero and Low-Emissions Steel and Cement, and Underlying Emissions Measurement Methodologies*, <https://www.iea.org/reports/definitions-for-near-zero-and-low-emissions-steel-and-cement-and-underlying-emissions-measurement-methodologies>. [24]
- IEA (2025), *Demand and Supply Measures for the Steel and Cement Transition*, <https://www.iea.org/reports/demand-and-supply-measures-for-the-steel-and-cement-transition>. [13]
- IEA (2025), *How we track investment in energy*, <https://www.iea.org/reports/world-energy-investment-2025/how-we-track-investment-in-energy> (accessed on 15 October 2025). [23]
- IEA (2025), *Policy Toolbox for Industrial Decarbonisation*, <https://www.iea.org/reports/policy-toolbox-for-industrial-decarbonisation>. [18]
- IEA (2025), *Scaling Up Transition Finance*, <https://www.iea.org/reports/scaling-up-transition-finance>. [14]
- IEA (2025), *Stepping Up the Value Chain in Africa*, <https://www.iea.org/reports/stepping-up-the-value-chain-in-africa>. [15]
- IEA (2025), *World Energy Investment*, <https://www.iea.org/reports/world-energy-investment-2025>. [12]

- OECD (2025), *Cuts in official development assistance - OECD projections for 2025 and the near term*, https://www.oecd.org/en/publications/cuts-in-official-development-assistance_8c530629-en.html (accessed on 15 October 2025). [6]
- OECD (2025), *Development finance for climate and environment*, <https://www.oecd.org/en/topics/sub-issues/development-finance-for-climate-and-the-environment.html> (accessed on 24 July 2025). [4]
- OECD (2025), *How catalytic technical assistance can help unlock development finance*, <https://www.oecd.org/en/blogs/2025/08/from-transforming-enabling-environments-to-kick-starting-economies-the-central-role-of-catalytic-technical-assistance-in-emerging-markets-and-developing-economies.html>. [19]
- OECD (2025), *OECD DAC Blended Finance Guidance 2025*, Best Practices in Development Co-operation, OECD Publishing, Paris, <https://doi.org/10.1787/e4a13d2c-en>. [21]
- OECD (2025), “OECD Data Explorer - Creditor Reporting System (CRS)”, *OECD Data Explorer - Creditor Reporting System (CRS)*, [https://data-explorer.oecd.org/vis?df\[ds\]=DisseminateFinalBoost&df\[id\]=DSD_CRS%40DF_CRS&df\[ag\]=OECD.DCD.FSD&dq=DAC..1000.100.T.T.D.Q.T..&lom=LASTNPERIODS&lo=5&to\[TIME_PERIOD\]=false&ac=true](https://data-explorer.oecd.org/vis?df[ds]=DisseminateFinalBoost&df[id]=DSD_CRS%40DF_CRS&df[ag]=OECD.DCD.FSD&dq=DAC..1000.100.T.T.D.Q.T..&lom=LASTNPERIODS&lo=5&to[TIME_PERIOD]=false&ac=true) (accessed on 12 September 2025). [5]
- OECD (2025), “OECD Data Explorer - Official Development Assistance (ODA)”, *Official Development Assistance (ODA)*, [https://data-explorer.oecd.org/?fs\[0\]=Topic%2C1%7CDevelopment%23DEV%23%7COfficial%20Development%20Assistance%20%28ODA%29%23DEV_ODA%23&pg=0&fc=Topic&bp=true&snb=27](https://data-explorer.oecd.org/?fs[0]=Topic%2C1%7CDevelopment%23DEV%23%7COfficial%20Development%20Assistance%20%28ODA%29%23DEV_ODA%23&pg=0&fc=Topic&bp=true&snb=27) (accessed on 24 July 2025). [3]
- OECD/Climate Club (2025), *Climate Club Financial Toolkit: Economic, De-risking and Financing Instruments for Industry Decarbonisation*, OECD Publishing, Paris, <https://doi.org/10.1787/cba1a515-en>. [20]
- OECD/Climate Club (2024), *Mapping financial and technical assistance for industry decarbonisation in emerging markets and developing economies: Taking stock of trends in hard-to-abate sectors*, OECD Publishing, Paris, <https://doi.org/10.1787/7ecda2b7-en>. [1]
- OECD/Climate Club (Forthcoming), *Mapping financial and technical assistance for industry decarbonisation in emerging markets and developing economies*. [2]
- USGS (n.d.), *Cement Statistics and Information*, <https://www.usgs.gov/centers/national-minerals-information-center/cement-statistics-and-information> (accessed on 15 October 2025). [11]
- World Bank Group (2023), *World Bank Group Support to Demand-Side Energy Efficiency*, <https://ieg.worldbankgroup.org/evaluations/world-bank-group-support-demand-side-energy-efficiency>. [17]
- World Steel Association (n.d.), *Total production of crude steel*, https://worldsteel.org/data/annual-production-steel-data/?ind=P1_crude_steel_total_pub/CHN/IND (accessed on 15 October 2025). [10]