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## RESEARCH ARTICLE

# Export finance and the green transition

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## Abstract

As emissions reach record levels, governments must implement and strengthen climate policies for the global pathway to net-zero emissions by 2050. Climate finance plays a crucial role in the net-zero transition. It refers to local, national, or transnational financing seeking to support mitigation and adaptation actions that address climate change. Public export–import banks (EXIMs) and government export credit agencies (ECAs) are highly influential actors for climate action. Although there is no consensus among EXIMs and ECAs on how to define climate finance, 20 institutions assessed in this research give evidence that they strongly support climate-action-related transactions: EXIM and ECA financing, guarantees, and insurance amounted to EUR 6.7–8.4 billion in 2020, much more than estimated by the Climate Policy Initiative (CPI). However, the results also reveal that EXIM and ECA lending, guarantee, and insurance activities must rise substantially in order to contribute to climate finance volumes required by 2030 as estimated by CPI. To retain their current proportion relative to other climate finance flows, assessed institutions would need to increase their climate financing 6.8 times to up to EUR 57.4 billion by 2030.

## 1 | STRENGTHENING CLIMATE POLICIES FOR NET-ZERO EMISSIONS BY 2050

CO<sub>2</sub> emissions are set to hit record levels in 2023, and there is no sign of peaking. The energy sector, in particular, is a key source of greenhouse gas emissions (GHG) and central to efforts to combat climate change. The sector contributed to approximately three-quarters of GHG in 2021 as most energy generation globally comes from fossil fuels. Despite increased climate ambitions and net-zero commitments, many governments still intend to raise oil and gas production, also a result of the economic consequences of the war in Ukraine. Only a moderate decrease in coal production is predicted over the next decade, although 195 countries committed to the Paris Agreement in 2015 (IEA, 2021;

Kong & Gallagher, 2021; Olivier & Peters, 2020). The agreement responds to the threat of climate change by holding the increase in global average temperature to ‘well below’ 2°C in this century, as well as to pursue efforts to limit the rise to 1.5°C.

Consequently, the global pathway to net-zero emissions by 2050 requires governments to implement and strengthen climate policies. This requirement led to a broad range of policy approaches, strategic directions, and concrete government actions in recent years. In November 2021, the 26th UN Climate Change Conference of the Parties in Glasgow (COP26) accelerated action towards the goals of the Paris Agreement. This included pathways to scale up renewable energy use in emerging markets and developing economies (EMDEs) as one of the most relevant mitigation measures to achieve the committed goals. On a national

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level, various policies and regulations foster clean energy projects, such as Indonesia's renewable energy tariff framework, Thailand's Hybrid Public-private Partnership (PPP) Scheme, and Vietnam's Solar Feed-in-Tariff (FiT) programme (Do et al., 2020).

Climate finance plays a crucial role in a just, net-zero transition. This fundamental role is embedded in Article 2.1(c) of the Paris Agreement, in which parties agreed to make 'finance flows consistent with a pathway towards low greenhouse gas emissions and climate-resilient development' (UNFCCC, 2015). Financial institutions (FIs) are uniquely positioned to drive Paris-aligned systemic decarbonisation. This is because FIs influence, enable, and depend on the behaviour of other economic actors through investment and lending activities. Public export–import banks (EXIMs) and government export credit agencies (ECAs) are highly influential actors for climate action because official export credits including financing, guarantees and insurance stimulate international trade in climate-related technologies (Caldecott, 2020; Hopewell, 2019; Klasen, 2015; Liao, 2021).

A just transition of the global energy system required to achieve net-zero in 2050 depends on a significant expansion in energy investment and a major shift in how capital is allocated. The Net-Zero Emissions by 2050 Scenario (NZE) of the International Energy Agency (IEA) concludes that annual energy sector investment must jump from USD 2.3 trillion in recent years to USD 5 trillion by 2030 (EUR 4.3 trillion; IEA, 2021). The Climate Policy Initiative (CPI) reveals that global climate finance flows in 2020 reached USD 640 billion (EUR 550.4 billion), and USD 632 billion on 2019/2020 annual average (Table 1). The CPI estimates annual climate finance must increase by 588% to USD 4.35 trillion (EUR 3.74 trillion) by 2030 (CPI, 2021). EXIMs and ECAs play a fundamental role in the climate transition, in particular regarding climate change mitigation such as renewable energy financing.

We discover the potential contribution of officially supported export credits for the net-zero transition. Our research tries to answer the question: *'if climate finance must reach EUR 3.74 trillion by 2030 to support the green transition, by how much does EXIM and ECA climate finance need to rise to facilitate the change?'* There are several implications both from a theoretical and a practical perspective. There is a lack of research about officially supported export credits and the role they play in achieving net-zero. In particular, there is no quantitative study about EXIM and ECA contributions to finance the transformation. Our results will thus fill an existing research gap. Furthermore, there is an impact for policymakers and public export credit institutions, as they might be able to better understand what is required for climate export finance.

The article is divided into five sections. Following this introduction, Section 2 gives an overview of climate

### Policy Implications

- The global pathway to net-zero emissions by 2050 requires governments to implement and strengthen climate policies. This includes EXIM and ECA net-zero alignments.
- Effective EXIM and ECA climate finance requires amended multilateral regulations such as incentives under the OECD Arrangement for export credits.
- Public export finance institutions must collaborate to develop a common definition and measurement of climate finance, leveraging initiatives and institutions such as the Glasgow Financial Alliance for Net Zero (GFANZ).
- EXIMs and ECAs should include innovation and industrial policy objectives in their mandate, fostering technological competence and innovation for green growth.
- To reach required climate finance volumes by the end of the decade, assessed EXIMs and ECAs must increase their annual spending to EUR 45.3–57.4 billion by 2030.

finance and export credits. This includes a description of the role of EXIMs and ECAs. This is followed by a brief overview of the analytical framework. Section 4 focuses on the analysis and discussion of the results, in particular, what percentage of global spending on climate finance is currently funded, guaranteed, or insured by EXIMs and ECAs. The section describes quantitative research results and extrapolates findings to suggest a pro rata figure indicating the volume that should be targeted on an annual basis. It also includes scenarios and presents EXIM and ECA examples for climate finance. In addition, it presents limitations as well as recommendations for future research. The final section concludes, highlighting our contributions to knowledge and practical implications.

## 2 | CLIMATE FINANCE AND EXPORT CREDIT

Climate-action projects promise tremendous opportunities for investors, contractors, operators, and suppliers through gaps in general and the significant requirement for investments in many EMDEs in particular. Domestic public finance for publicly owned infrastructure, for instance renewable energy or low-carbon transport, comes from different sources such as taxation and general public borrowing. However, infrastructure gaps and substantial financing needs have led to

**TABLE 1** Climate finance landscape 2019/2020 (annual average) based on CPI, 2021

Actors	2019/20 Average	Instruments	2019/20 Average	Use	2019/20 Average
Commercial FI	122	Balance sheet (debt)	105	Private adaptation	1
Corporation	124	Balance sheet (equity)	155	Private mitigation	307
Other private	63	Grant	36	Private multiple	2
Government	38	Low-cost project debt	47	Public adaptation	45
Development banks	220	Project-level equity	51	Public mitigation	264
ECAs	1	Project-level market debt	232	Dual benefits	13
Other public	64	Other	5		
<b>Total</b>	<b>632</b>	<b>Total</b>	<b>632</b>	<b>Total</b>	<b>632</b>

adoption of a variety of methods to help meet the cost of public investment. Significant amounts of energy financing are provided by the private sector. In addition, multilateral development banks (MDBs), bilateral development finance institutions (DFIs), and official development assistance are highly relevant sources for financing energy projects in EMDEs (Ray, 2015; Regan, 2018; Santos & Kearney, 2018; Tyson, 2018). The same applies to EXIMs and ECAs; gaps in domestic public finance and private financing lead to market failure and necessitate officially supported export credits. Structural problems in the supply of finance are a key challenge. Climate mitigation projects, particularly in EMDEs, are often unattractive because of disadvantageous government regulations, challenging risk profiles, and uncertainty over investment returns (Regan, 2018; Singh, 2017; Wright, 2011).

Climate finance refers to local, national, or transnational financing seeking to support mitigation and adaptation actions that address climate change (UNFCCC, 2021a). A global taxonomy is not defined clearly, but it is widely recognised that climate finance describes funding activities such as equity, loans, guarantees, or insurance from public, private, or alternative sources, reducing the impact on the environment (Gupta et al., 2014; Peterson & Skovgaard, 2019). In addition to the private sector, important climate finance providers include global funds such as the Green Climate Fund (GCF), MDBs, and DFIs such as the World Bank Group and FMO Dutch Development Bank, as well as EXIMs and ECAs, including Atradius Dutch State Business (Atradius DSB), Export Development Canada (EDC), EKF Denmark's Export Credit Agency (EKF), the Export–Import Bank of Korea (KEXIM), or Nippon Export Credit and Investment Insurance (NEXI).

Officially supported export credits are crucial to remaining competitive in the global economy. International trade and foreign direct investment require sufficient, reliable, and affordable sources of financing. Imperfect information or information asymmetries between banks, project developers, or exporters and buyers prevent mutually beneficial investment from occurring (Heiland & Yalcin, 2020; Krummacker, 2020; Stiglitz &

Weiss, 1981). EXIMs and ECAs step into the breach when commercial banks or private insurers do not offer sufficient facilities. This might be because of high country risks, significant buyer risks, or long financing tenors. Originally insurers or lenders of last resort, many institutions are now more actively pursuing opportunities following a 'trade facilitator' or 'trade creator' approach. A distinction can be made between organisations offering financing, which are often referred to as direct lenders or EXIMs, and ECAs acting as insurance or pure cover providers (Broocks & Biesebroeck, 2017; Gianturco, 2001; Klasen, 2011; Klasen, 2020).

Export credit and political risk insurance provide incentives to commercial banks to finance transactions while limiting the risk of internationally active companies. FIs can rely on loan repayments because of EXIM/ECA cover rather than depending on the financial capacity of the borrower. This protects the FI from losses, regardless of whether those losses are caused by an action of the exporter, the foreign buyer, or political events. Furthermore, EXIMs and ECAs can play an important role in mobilising financing from private-sector sources. For instance, public banks and agencies can help create synthetic loans to slot in funds alongside commercial lending at commercial interest rates and therefore expand existing lending capacity. The involvement of public banks and agencies demonstrates to commercial lenders and insurers through positive lending or underwriting decisions that financing projects in uncertain political and economic environments can be viable (Bischoff & Klasen, 2012; Kim & Yoo, 2019; Krummacker, 2020; Mah & Milner, 2005; Oramah, 2020).

Historically, EXIMs and ECAs have played an important role in supporting the fossil-fuel sector. For instance, EDC provided an annual average of EUR 6.5 billion in financial support to oil and gas companies between 2012 and 2017. Over the same period, EDC facilitated EUR 4.3 billion in cleantech finance (Shishlov et al., 2020). The example demonstrates that EXIMs and ECAs are key to both exiting the carbon-intensive economy and financing transitional technologies to support a low-carbon future.

Consequently, EXIMs and ECAs play a critical role within the global trade finance network and are well-positioned to be pivotal regarding climate finance. This includes scaling down support, which is not consistent with the 2015 Paris Climate Change Agreement, contributing to climate-resilient development and low-carbon financing, and the support of low-carbon-transformation-related transactions (Bannert, 2020; Bronswijk et al., 2020). For example, government-backed ECAs provide approximately EUR 2.2 trillion of payment risk protection to exporters, investors, and banks together with private credit insurers. This is equivalent to 13% of world cross-border trade for goods and services (Berne Union, 2021). EXIMs and ECAs can influence the portfolio of goods produced in the country of origin (particularly in export-led companies) by promoting the export of certain goods, as well as influence the mix of goods reaching the country or countries of destination (Hale et al., 2021). By moving away from their traditional role as lenders and insurers of last resort—supporting mostly manufacturing goods and carbon-intensive industries owing to existing demand, while adopting broader mandates and principles of intervention—EXIMs and ECAs have an opportunity to intervene and employ climate-related initiatives to alter their impact.

Looking at EXIM and ECA climate finance, officially supported export credits circle two main areas: multilateral regulations and national policies. On a multilateral level, the OECD Arrangement comprises several climate-related sector-specific rules, such as the Renewable Energy, Climate Change Mitigation and Adaptation and Water Projects Sector Understanding. Although it does not cover incentives, such as lower minimum pricing for climate finance, participants in the OECD Arrangement agreed in 2020 to examine at least the areas of ‘Net zero energy buildings’ and conditions for low-emission and highly energy-efficient fossil-fuel power plants in more detail. Furthermore, several European countries launched an Export Finance for Future (E3F) coalition in 2021 to align export finance with climate objectives. At COP26 in November 2021, more than 40 countries committed to shift away from coal and 20 countries agreed to end international public support for the unabated fossil-fuel energy sector by the end of 2022 (BBC, 2021; UNFCCC, 2021b).

On a national level, the increased interest of governments in creating comprehensive climate strategies requires a renewed and strengthened role for EXIMs and ECAs. Most agencies align their strategies with their respective government's policy goals, to provide development or affect returns. As such, strategies focus increasingly on promoting sectors of strategic importance such as climate finance. For example, EDC became the first ECA to announce a 2050 net-zero target in July 2021 and outline initial steps towards it (EDC, 2021; Hale et al., 2021). UK Export Finance (UKEF) also

announced a net-zero commitment in September 2021, ensuring that its operations and financial portfolio will contribute to net-zero emissions by 2050 (UKEF, 2021). At COP26, EKF set a net-zero emission target and announced that EKF's portfolio will be carbon neutral by 2045 at the latest (EKF, 2021).

Furthermore, several EXIMs and ECAs are working on or are discussing a renewed mandate for innovation and industrial policy, focusing on climate change mitigation by virtue of their mandate and core activities. The scale and scope of the green transformation creates an enormous need for innovation and the development of new industries. Financing research, development, and innovation (R&D&I), capital expenditure (CAPEX), and working capital are key challenges for many businesses. Although firms investing in green innovation can perform better owing to market differentiation and cost reduction, limited access to external financing and insufficient internally generated cash flows can lead to a lack of investment. When companies face financing constraints, illiquid balance sheets prevent businesses from undertaking valuable projects when they arise (Almeida et al., 2004; Bankowska et al., 2020; Beatty et al., 1997).

Despite recent increases by EXIMs and ECAs in actual climate financing and announcements regarding net-zero ambitions, there remains a gap in the literature quantifying the flow of finances to climate projects. Furthermore, little research has been done to understand how EXIMs and ECAs define climate finance.

### 3 | ANALYTICAL FRAMEWORK

Our research follows a quantitative approach with a survey research design, obtaining data from EXIMs and ECAs in different national contexts over the same period to investigate climate finance characteristics. The primary quantitative data were collected via electronic surveys sent to 68 EXIMs and ECAs that we located worldwide. In our survey, we used a questionnaire focusing on two main points: first, respondents were asked about their definition of climate finance, and second, respondents were asked to input the total volume of new business for 2018, 2019, and 2020, and estimate how much of that volume was climate related. Twenty responses from EXIMs and ECAs were received for inclusion in this research. The respondents were 15 institutions from member countries of the Organisation for Economic Co-operation and Development (OECD; OeKB from Austria, Credendo from Belgium, EDC from Canada, KredEx from Estonia, Finnvera from Finland, EXIM Hungary, Eksfin Norway, KUKE from Poland, Eximbanka Slovakia, and SERV from Switzerland) including five members of the E3F coalition (EKF Denmark, Bpifrance, Euler Hermes from Germany, Atradius Dutch State

Business from the Netherlands and CESCE from Spain), as well as five institutions from non-OECD countries (ECGC from India, Indonesia Eximbank, JLC from Jordan, KazakhExport from Kazakhstan, and Exiar from Russia). In addition to the survey, secondary data from publicly available sources such as CPI were examined via desk research. In particular, EXIM and ECA annual reports from the respondents for the period 2018–2020 were analysed for cross-validation of survey results. The analysis specifically sought information on the volume of new business being transacted each year and whether climate finance was mentioned and/or reported for the period.

The analysis is based on linear extrapolation to estimate future values. It reviews the current state of climate finance and assesses the level that EXIM and ECA export finance needs to increase to support the green transition by 2030. On receipt of survey results, the data were cleaned, which included converting all currency figures to EUR. Before estimating the current total flow of climate finance, each respondent was categorised as ‘E3F coalition’, ‘OECD (excluding E3F coalition)’, and ‘non-OECD’. An estimate was made for the lower and upper bound of climate financing for each category. An estimate was also made on the proportion of which each category contributed to the global new export credit volume each year. The global volumes were taken from US EXIM’s Annual Competitiveness Report medium- and long-term (MLT) figures (US EXIM, 2021) and crossmatched with OECD data, Berne Union data, annual reports, and survey respondent inputs. Medium- and long-term (MLT) credits were adopted for the total volume of new business because MLT provides a stronger basis for analysis than if short-term (ST) credits are included. Climate finance is usually provided on a medium- to long-term basis as the underlying asset typically returns in that time frame; therefore, inclusion of ST credits would skew results. Once an estimate was made for the proportion of climate finance (lower and upper bounds) and the total volume of new business according to each country category, an estimate could be made for the total volume of climate finance issued by EXIMs and ECAs globally for 2018–2020. This estimate was used to revise upward CPI figures.

The percentage contribution of EXIMs and ECAs to climate finance is estimated based on the revised total climate finance figure for officially supported export credits financed or insured by the respective institutions (and as a result a revised total global climate finance figure). The export volumes are fixed *ceteris paribus*. No context and influence factors such as trade volumes or growth have been considered. A linear extrapolation scaling the total climate finance flows to meet the CPI’s EUR 3.74 trillion target resulted in the final estimate of the role EXIMs and ECAs have to play in financing the net-zero transition.

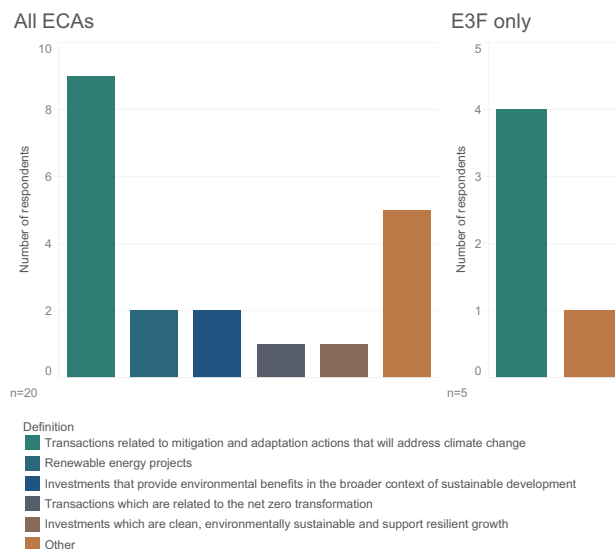


FIGURE 1 EXIM and ECA climate finance definition.

## 4 | FINDINGS AND ANALYSIS

### 4.1 | Defining climate finance

Hale et al. (2021) mention that many FIs, including the world’s largest banks, asset managers, asset owners, and insurers have moved quickly to adopt net-zero targets and create methodologies and approaches to, inter alia, measuring portfolio emissions, setting net-zero targets and interim goals, as well as defining sector-specific pathways to net-zero and climate finance definitions. As discussed above, the UNFCCC offers a definition of climate finance. The Glasgow Financial Alliance for Net Zero (GFANZ) brings together and defines best practices for transition strategies in the financial sector. GFANZ also further develops work on portfolio alignment metrics for FIs.

However, no clear consensus exists among EXIMs and ECAs on what constitutes climate finance or harmonisation on how it is defined and measured. The lack of consistency is evident, for example, in annual reports: Approximately 25% of the 2020 annual reports assessed in this study contains some form of climate-related definition or performance metric.

Furthermore, research results found that only 45% of survey respondents answered that the financing and/or insuring of ‘*transactions related to mitigation and adaptation actions that will address climate change*’ (UNFCCC definition) most aligned to their EXIM or ECA definition of climate finance. Figure 1 shows an even spread of all other responses.

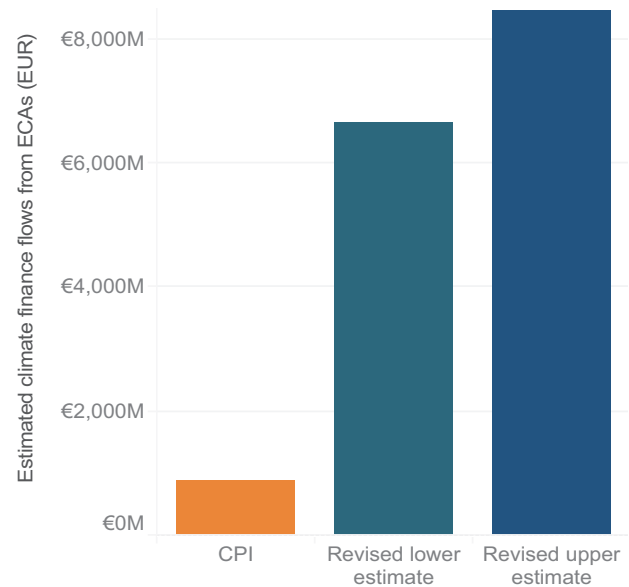
More respondents agree that the UNFCCC definition aligns better with their definition of climate finance than any other definition. Among E3F coalition members, one member aligned with the same definition and added ‘*as well as non-climate related green transactions*’. For respondents in the ‘other’ category, one

has adopted the European Union's taxonomy whereas other EXIMs and ECAs are currently refining or developing their definitions. Although there is a clear leader in terms of definition following the UNFCCC approach, 45% is hardly a consensus. The spread of responses from the remaining 55% of respondents rather indicates that there is work to be done in aligning EXIMs and ECAs to a common definition. It is to be noted, however, that two respondents indicated that their definition is 'in development', signalling that institutions remain engaged in the process of identifying and measuring climate impact and that process remains in the early stages.

## 4.2 | Estimating current climate finance flows

Despite a lack of unity around a common definition, each respondent was able to provide data regarding current climate finance flows. Because all definitions go some way towards supporting the net-zero transition, all self-reporting of EXIM and ECA climate finance was accepted as valid for the analysis, following data consistency checks. CPI data estimates that climate finance flows from ECAs (and EXIMs) constituted USD 1 billion (EUR 0.86 billion) in 2020 (CPI, 2021). If this figure of EUR 0.86 billion from EUR 545.4 billion estimated by CPI is correct, EXIMs and ECAs represented approximately 0.16% of total current climate finance flows in 2020.

Findings from this study indicate that the CPI figures on officially supported export credits seem to underestimate climate finance flows from EXIMs and ECAs. Survey respondents were asked to give a range for their climate finance activities for each year: 2018, 2019, and 2020. Based on these responses, the lower and upper bound estimates of 2020 EXIM and ECA supported climate finance amounts to EUR 6.7 billion and EUR 8.4 billion, respectively (Figure 2). This estimate was found by calculating the weighted average climate finance volume for E3F, OECD (excluding E3F coalition), and non-OECD members and applying to the total volume of 2020 EXIM and ECA new business on a pro rata basis. Given this, the total climate finance flows were revised upward from CPI's estimate to be EUR 551.2 billion for 2020. Therefore, the current level of official export credits towards climate is estimated at between 1.2% and 1.5% of total climate finance flows. This finding forms the basis of a prorated estimate of the required increase in climate financing from EXIMs and ECAs to meet the CPI climate finance requirements and the IEA net-zero pathway. Although a significant part of EXIM and ECA climate finance activities is not related to lending but guarantees and insurance where liquidity from commercial sources is used for transactions, we allocate the total amount reported of activities



**FIGURE 2** EXIM and ECA climate finance 2020 figures.

to EXIMs and ECAs. The reason for this is that EXIMs and ECAs are additional and crowd in commercial financing owing to their mandates and intervention principles. The EXIM and ECA risk mitigation function is crucial and without the support, the respective transaction would not happen.

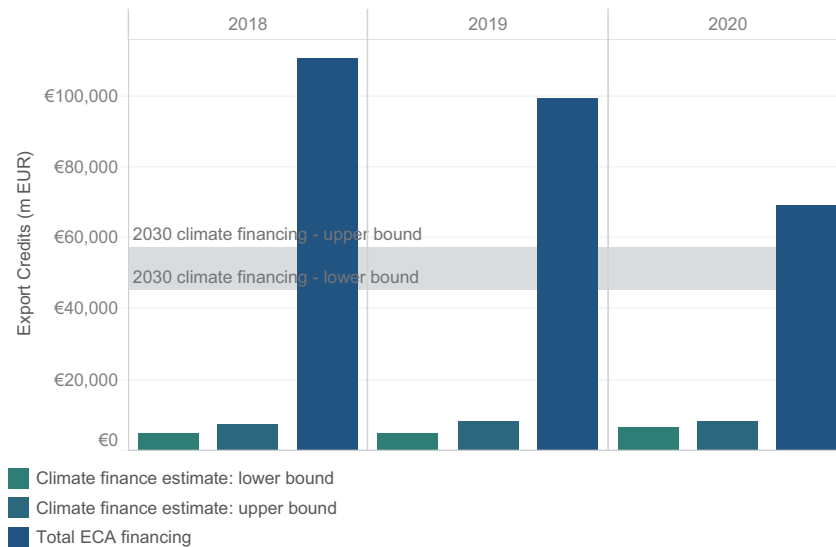
There is a significant spread of climate financing across EXIMs and ECAs; many report no or very limited climate-related lending or insurance, whereas some respondents reported that more than 30% of activities were climate related. Figure 3 shows the climate finance range per year for each survey respondent (anonymised). Where respondents provided a specific figure, only a single point is shown. Across all respondents, the median climate finance percentage was 1% in 2018; however, by 2020, the median increased to 6%, exhibiting a modest increase in supply (Figure 3). The E3F coalition performed better than its comparators with the median finance percentage reaching approximately 13% in 2019 and 2020 (Figure 4). Figure 4 shows the same ranges as Figure 3, with only E3F countries shown. The box and whisker plot gives evidence that the coalition members have lifted their performance year on year and are more aligned in 2020 than in previous years. Although the increase by the E3F coalition may seem modest, it has a large impact on the total EXIM/ECA climate figures because coalition EXIMs and ECAs make up a relatively large proportion of total global export credit flows.

## 4.3 | Extrapolating future climate finance requirements

As described above, the CPI estimations of total climate finance required in 2030 is equivalent to EUR







**FIGURE 5** Climate finance EXIM and ECA estimations.

across different economies and sectors, it would be unrealistic to imagine such a high percentage of total export credits dedicated to climate finance and displacing other sector investments. So, to accommodate the increased investment needs for the net-zero transition, export finance overall needs to significantly rise. This increase is expected, even as EXIMs and ECAs transition their portfolios away from carbon-intensive investments. It should be noted that EXIM and ECA activity fell globally in 2020, if the same figures are used against 2019 activities, the percentage is 46%–58%. Regardless, the large deficit suggests that EXIMs and ECAs must make extensive internal changes to increase annual climate-related export credits in the period 2022–to 2030.

#### 4.4 | Challenges and portfolio implications

For EXIMs and ECAs to reach higher annual climate-related export credits of up to EUR 57.4 billion, the overall capital allocation for export credits must increase substantially. It is very unlikely that EXIMs and ECAs will be able to increase their level of climate-related export credits solely through portfolio reallocations; transition takes time and is unlikely to generate the net amount required.

The Climate Policy Initiative suggests that, to achieve a climate finance increase to EUR 3.74 trillion by 2030, large investments will be required in key sectors such as energy systems, industry, or transport. EXIMs and ECAs, such as SACE in Italy or Oesterreichische Kontrollbank (OeKB) in Austria, are already supporting climate-related innovation and technology. However, there will be a need for each institution to consider its own portfolio, government priorities, and opportunities

at hand. EXIMs and ECAs should expect to take differentiated paths in scaling up their climate finance activities and each set a strategy according to its own operating environment and mandate. For many, this enhanced innovation and technology support for exporters and investors will come hand in hand with divestment or shifting support away from carbon-intensive industries.

As the UN Sustainable Development Goals (SDGs) and climate action become much more important for EXIMs and ECAs, there is an opportunity to include innovation and industrial policy objectives in their mandate. For example, Oesterreichische Kontrollbank (OeKB) launched a green investment guarantee in 2019 on behalf of the Austrian government. Within its public ECA mandate, OeKB provides a quasi-guarantee to Austrian exporters investing in CAPEX such as new production lines or new machinery. In addition to a standard product, the Exportinvest Green cover is available for green investment. Austrian exporters that make targeted investments to reduce harmful impacts on the environment and to make a sustainable contribution to improving the environment can benefit. Investments of at least EUR 2 million from Austrian companies with an export quota of at least 20% are eligible. Up to 100% of companies' investments can be covered with a flexible repayment structure of the underlying loan. The maximum loan tenor is 14 years (OeKB, 2021). The Italian government created a new instrument in 2020 to support the country's green transition and European Green Deal. The SACE Green Guarantee is directed at Italian companies facilitating the transition to a clean and circular economy, or accelerating the transition towards sustainable and intelligent mobility. Covered projects must aim, for example, at reducing GHG emissions, urban regeneration, digitisation transforming the mobility sector, and investments for a circular economy. Other projects benefiting from the SACE Green

Guarantee are, for instance, biofuels for aviation. SACE is able to cover capital amounts of up to EUR 200 million (Mastromarini et al., 2020; Montella et al., 2020).

A further example is the Netherlands. The government is currently working on an ambitious ECA green agenda including new guarantee instruments. Recently, Atradius DSB also introduced a broader content policy for green project finance, relaxed acceptance underwriting criteria for small green transactions, as well as a broader export definition for green transactions. In 2019, the Dutch ECA also implemented its first-ever measurement and reporting methodology on climate-related financing (Atradius DSB, 2020; Bronswijk et al., 2020). The purpose of the labelling is to map out how 'green' the Dutch ECA's guarantee and insurance portfolio is.

#### 4.5 | Limitations and further research

There are several limitations to this research. First, the research is based on data from a limited number of EXIMs and ECAs. Sixty-eight institutions were approached to answer the electronic survey; 20 EXIMs and ECAs responded. Although there is evidence from desk research that most non-respondents have no or only limited climate finance activities, it would have been useful to extend the model. The same applies for time constraints because a longer research period could lead to more details. A second limitation is that it was not possible to distinguish between financing and guarantee or insurance activities, as well as support provided for climate change mitigation and climate change adaptation. However, because of the broad approach in this research, it is acceptable not to use consolidated figures as sources for the quantitative analysis.

Further studies might use the opportunity to undertake research with more institutions, as well as deeper research into feasible pathways and models for scaling up investment for a few archetype EXIMs and ECAs. This would provide further empirical evidence regarding climate finance activities and respective allocations. Future work might also contain climate finance activities of DFIs to provide a comparative study regarding development and export financing. This would allow the addition of relevant hypotheses or building an extensive quantitative model for climate financing. In addition, it would be useful to provide further details on the additionality and catalytic effects of EXIMs and ECAs in climate finance.

## 5 | CONCLUSIONS

Our research discussed the crucial role of public export-import banks and government export credit agencies for climate action. In some important ways, the results

of this research extend findings from prior studies. First, it demonstrates that there is no common understanding or definition of EXIM and ECA climate finance. Although 45% of respondents define climate finance as 'transactions related to mitigation and adaptation actions that will address climate change', there is hardly a consensus. Second, the research gives evidence that existing estimates for climate finance through officially supported export credits seem to be underestimated. The lower and upper bound estimates of 2020 EXIM and ECA are much higher than CPI figures because supported climate finance amounts to EUR 6.7 billion and EUR 8.4 billion, respectively. Third, EXIM and ECA activities must rise significantly to contribute substantially to required climate finance volumes in 2030. To retain their current proportion relative to other climate finance flows under the 2030 scenario, EXIMs and ECAs (at least institutions participating in this study) must increase their climate financing approximately 6.8 times. Fourth, this research demonstrates that higher annual climate-related export credits have significant authorisation and portfolio challenges. The overall capital allocation for export credits must increase substantially even with much higher private finance contributions because, based on past experience, EXIMs and ECAs will always need to catalyse commercial financing.

For some parties involved in officially supported export credits, this research also has important policy implications. First, EXIMs and ECAs must collaborate to develop a common understanding of climate finance. Together with initiatives such as GFANZ, institutions could create a platform for an aligned definition and common measurement of climate finance activities. Second, a broad commitment to upgrade EXIM and ECA climate goals and include net-zero by 2050 at the latest would create significant opportunities to increase climate financing. EXIM and ECA mandates focus mostly on export-led growth policies and 'creating trade' has emerged as an important intervention principle. However, the scale and scope of the green transformation creates a huge need for innovation and the development of new industries. EXIMs and ECAs can include innovation and industrial policy objectives in their mandate, securing and regaining technological competence, competitiveness, and industrial leadership through green growth. Third, raising financing for climate investment by issuing green bonds would be key. This would allow work towards the required increase in EXIM and ECA total annual spending on climate finance to EUR 45.3 billion to EUR 57.4 billion by 2030. For example, EDC was the first Canadian financial institution to issue a green bond in 2014 and issued the seventh bond in 2021. KEXIM will issue significant green bonds by 2030 to finance green and social projects. Fourth, there is a need for new or significantly amended existing products for climate finance. EDC recently launched a specific product for climate finance.

The Swedish ECA created a new climate finance product in 2021 to facilitate financing of green exports and green transition projects within Swedish exporting companies. The Export–Import Bank of China launched special policy loans for energy conservation and environmental protection projects. Other EXIMs and ECAs can also learn from KEXIM, which recently implemented three new financing programmes related to climate action. Fifth, global organisations such as the OECD can help ensure a sector-wide transition that leaves EXIMs and ECAs in a stronger position in a net-zero economy. In particular, incentives such as lower minimum pricing, longer repayment periods, or reduced advance payment requirements for innovation and technology-driven transactions under the OECD Arrangement could significantly push climate finance. The efforts of GFANZ to establish a net-zero EXIM and ECA alliance are another important driver.

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## DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from participating EXIMs and ECAs. Restrictions apply to the availability of these data, which were used under license for this study. Data are available from the authors with the permission of participating EXIMs and ECAs.

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