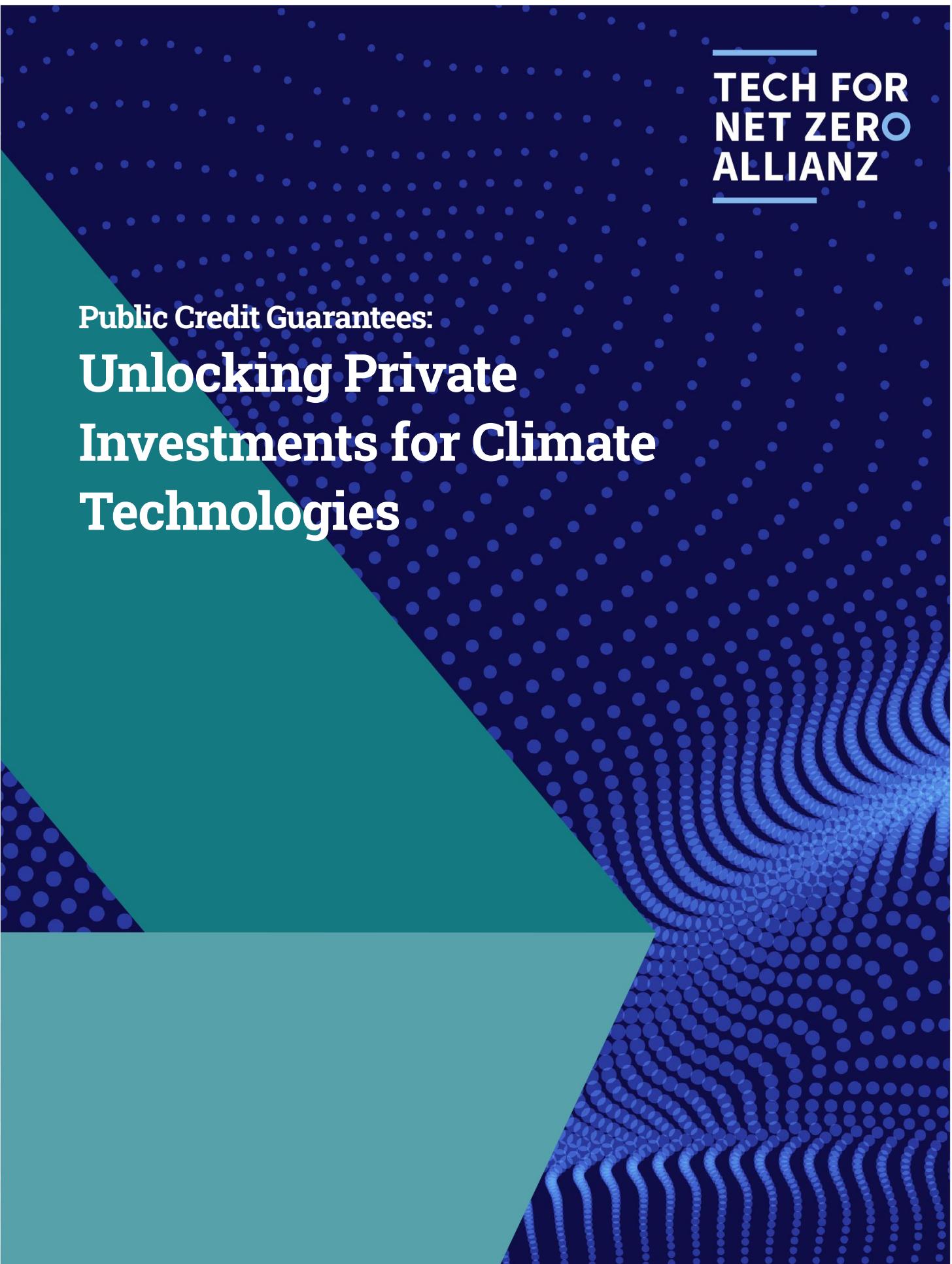


**TECH FOR  
NET ZERO  
ALLIANZ**

**Public Credit Guarantees:  
Unlocking Private  
Investments for Climate  
Technologies**



---

# Executive Summary

**Financing large-scale climate tech projects – such as battery factories, e-fuel production facilities, and green cement plants – can be challenging due to their capital-intensive nature.** Climate tech startups and scale-ups with breakthrough technologies tend to have relatively small balance sheets and often face difficulties raising debt financing. This is due to a combination of risks, the uncertainty associated with longer investment time frames, the scale of projects and the prospects for selling outputs in the future. In such cases, public credit guarantees can unlock the funding gap by providing security to private lenders. By de-risking commercial loans, credit guarantees can pave the way for banks to increase their climate tech lending, while unlocking the backlog of climate tech investments.

**To counter the US Inflation Reduction Act (IRA), which provides substantial and readily available funding and loan guarantees for the green transformation, the EU needs to walk the talk on the market scale-up of climate tech.** For many years, the EU has held a leading position in the deployment of climate technologies and renewable energy. As the EU is developing new industrial policy instruments in response to the IRA, assessments of climate tech green value chains shows that a much faster growth of production and generation capacities in the EU is needed. With both the Net-Zero Industry Act (NZIA) and the Green Deal Industrial Plan (GDIP), the EU has responded to these challenges, especially the need to reduce import dependencies in critical goods and raw materials. Numerous climate tech facilities need to be built and financed in order to scale climate tech production. This is posing unsurmountable challenges for many startups and scaleups.<sup>1</sup> Existing public instruments for startup financing such as the venture debt program of the European Investment Bank (EIB) have proven to be supportive for the scaling of innovative young companies, however, they alone are not sufficient to meet the needs of climate tech startups. Without credit guarantees, most of these enterprises will not be able to scale fast enough to meet the NZIA and GDIP targets.

**As Europe accelerates towards a net zero economy, policymakers are faced with a new type of investment project that they need but that is anything but easy to finance through financial markets alone.<sup>2</sup>** Climate technologies are much needed innovative solutions that are typically lab-tested yet struggle to secure private debt finance for commercial first-of-a-kind (FOAK) industrial facilities and even subsequent commercial facilities. There is widespread evidence that private (debt and equity) investors will typically not underwrite the technical risks associated with FOAK facilities.<sup>3</sup> On the

<sup>1</sup> For an overview of climate technologies, see for example the climate tech investment forecast: <https://techfornetzero.org/en/a-venture-capital-analysis-of-climate-technology-startup-financing-to-2030/>.

<sup>2</sup> For example, climate tech startups developing more efficient solutions for electrolysis, e-fuels, building and insulation materials, renewable energy, etc.

<sup>3</sup> Quas et al (2022). The scale-up finance gap in the EU.

other hand, equity investors cannot invest due to the relatively large amount of capital that is needed (not enough equity available). As a result, there are a considerable number of climate tech startups across Europe with investment-ready decarbonization projects that remain unfunded and cannot scale due to a lack of access to debt finance. This affects both FOAK facilities as well as later-stage facilities.

**Public guarantees are widely used, highly effective industrial policy instruments to mitigate technical risk, and make projects bankable.** Public guarantees are a well-established policy instrument to mobilize private capital for industrial projects with large positive externalities for society. Guarantees are being used across Europe to facilitate job growth and to increase private investments in lagging regions. They are considered among the most fiscally efficient, i.e., cheapest, policy instruments to boost industrial activity without market distortions.<sup>4</sup> Guarantees are highly effective as they reduce selected risks and thereby support the bankability of courageous investment in breakthrough projects through private capital. In addition, from a public administration perspective, guarantees have the advantage that unlike subsidies, they are contingent liabilities that are not included in general government gross debt.

**By further developing public guarantee instruments for innovative climate tech startups and for financing commercial FOAK facilities, Europe can unleash private capital to bankroll the green industrial transformation.** Expanding existing guarantee instruments by the EIB Group to accelerate the rollout of climate technology projects by highly innovative startups would be transformative. Guarantees would de-risk projects to a risk level that enables private capital to finance much needed demonstration plants and large-scale FOAK facilities. Different investors providing debt or equity finance are well versed to deal with many different types of risk (e.g., execution risk, market risk, tech risk, etc.) and always try to minimize these different risk categories. However, it is the technical risks in particular that need to be addressed to make climate tech projects more bankable. In practice, that would mean providing cost-effective guarantees for climate tech projects with proven market demand (i.e., offtake agreements). To be effective in accelerating the key climate technologies, guarantees would need to focus on startups and scale-ups, thus defining new requirements for minimal company age or revenue. By doing so, more private capital will flow into the green industrial transformation, innovation cycles will be accelerated, and the net zero targets can be more quickly reached.

**An important pillar of global financial markets are public guarantees that provide a form of insurance protection that shields banks and other private lenders from the risk of non-repayment.** Guarantees play an important role in helping the private sector make investments that promote growth, create jobs, and/or increase exports. Could public guarantees also play a greater role in mobilizing debt finance for climate technology startups and their capital-intensive facilities? As a new

<sup>4</sup> Bachas, N., Kim, O., & Yannelis, C. (2021). ‘Loan Guarantees and Credit Supply.’ Journal of Financial Economics, Vol. 139(3), pp. 872–894.

category of public guarantees, this paper develops a concept for climate tech guarantees to improve the bankability of decarbonization projects, mobilize large amounts of private capital and thereby help meet the 2030 climate targets. A guarantee program for climate tech startups and scaleups could provide a rapid boost to climate innovation and reduce the climate tech investment backlog.

**This paper suggests that the European Commission collaborates with the EIB Group to leverage their extensive expertise in order to enhance and broaden current credit guarantee instruments for climate tech startups.** Ideally, the design of the new program would benefit from global best-practices, such as the loan program of the US Department of Energy regarding loan size (no upper cap), guarantee share (up to 100%), and streamlined due diligence. This paper introduces the concept of ‘capacity-to-deploy’ to ensure breakthrough technologies deploy fast enough to meet the legally binding climate targets. The proposition is to assess the riskiness of a loan based on an existing offtake agreement, the technology readiness level, and a standardized cashflow forecast. The paper specifically argues to not base ‘bankability’ of a loan on previous balance sheets that, by definition of fast-growing hardware startups, typically do not contain meaningful metrics to predict the future risk of a loan. Regarding the source of finance, the paper explores the option of earmarking a third of the InvestEU program (EUR 8 billion out of the total EUR 26 billion). The expanded credit guarantee program should be ready as soon as early 2024 to significantly contribute to the EU Green Deal Industrial Plan and the EU response to the Inflation Reduction Act.

## Recommendations for action

- Expand existing credit guarantee programs for climate tech startups and scaleup by leveraging 30% of the existing InvestEU fund.
- Build on existing expertise and structures at the EIB Group and design the program using internal and external best-practices, in particular the loan guarantee program of the US Department of Energy.
- Prioritize credit guarantees for commercial FOAK facilities that can demonstrate commercial offtake agreements, technical readiness, and sufficient forecasted cashflow, rather than company balance sheets, to enable the deployment of breakthrough climate innovation.

---

# **1. Climate tech startups: limited bankability prevents technology roll-out.**

## **Unlocking private investments for ready-to-deploy climate technology is essential for achieving**

**Europe's net zero targets.** The Intergovernmental Panel on Climate Change (IPCC) stresses the need for the rapid deployment and widespread adoption of all existing climate technologies. To get there, the IPCC emphasizes the role of policy frameworks, financial incentives, and supportive regulations in facilitating the scaling of climate technology to overcome barriers and create an enabling environment for the widespread deployment and adoption of climate solutions. What is currently holding back the large-scale deployment of climate technologies more than anything else is the difficulty in getting new commercial climate tech facilities financed through credit, according to a rapid assessment which Tech for Net Zero has conducted climate tech startups. While equity finance is increasingly available, debt finance is extremely hard to come by for fast-growing climate tech startups with asset-heavy technologies.

## **Climate tech startups fulfill a vital role in the energy transition and the green industrial**

**transformation to achieve Europe's climate targets.<sup>5</sup>** Climate tech startups drive innovation and accelerate progress towards a sustainable future faster than many well-established corporates. By developing efficient, cost-effective, and scalable solutions for the green industrial transformation, climate tech startups can accelerate the transition to a low-carbon economy and help reduce greenhouse gas emissions. With their nimble approach, these companies can quickly respond to changing market conditions, collaborate effectively with other startups and organizations, and inspire others to take action on climate change. It is no surprise that, for example, the startup strategy of the German government emphasizes the critical role of climate tech startups in achieving Europe's climate targets.

## **Financing capital-intensive climate tech facilities is challenging due to the significant upfront investments, longer runway to profitability, and vulnerability to market fluctuations and politics.**

Climate tech startups that are developing technologies that can reduce hundreds of megatons of CO<sub>2</sub> are usually asset-heavy hardware companies that require significant upfront investments to purchase and

<sup>5</sup> Definition: Climate tech startups are mostly asset-heavy companies with often breakthrough technologies that can decarbonize the economy by 100Mt CO<sub>2</sub> p.a. and more. For example, climate tech startups have been pushing the technology frontier on renewable energy production, others grow alternative protein, help industry to get of gas and coal, and run engineered-carbon capture facilities, to name a few verticals. Some of Europe's most successful climate tech startups include Climeworks (carbon capture), Enpal (solar), Ineratec (power-to-X), Northvolt (batteries), Polestar (electric vehicles), and Sunfire (hydrogen), although there are hundreds of younger, smaller breakthrough technologies ready to get scaled.

maintain physical assets such as factories, equipment, and inventory. These assets often need a relatively large amount of capital compared to the startup's own balance sheet size, which can be difficult to raise, especially for early-stage ventures. In addition, it is difficult for equity investors to allocate the needed large amounts of capital purely on an equity base, as the company valuations are still comparably low.

**The full menu of corporate finance is inaccessible to climate tech innovators because of their specific risk structures.** Climate tech startups face specific challenges that distinguish them from larger, well-established companies. For one, climate tech startups often lack the necessary equity to pre-finance larger demonstration plants or even initial plants for industrial production, making it difficult to secure the corresponding conventional bank financing. Moreover, the development and scaling of climate innovations may seem to pose heightened technical risks, even though the commercial production of output for which offtakers are secured does not. At this critical stage, innovative climate projects do not have a long track-record of operating commercial facilities, further discouraging banks and other private investors. Consequently, there is a significant investment backlog for urgently needed climate innovations that are poised to revolutionize the market.<sup>6</sup>

**Debt finance is essential in view of the cost and limitations of equity finance and the substantial upfront investments needed to build or expand climate tech facilities.** The cost of equity is typically higher than the cost of debt and is limited by the available equity pool and company value. For young companies deploying breakthrough technologies, the cost of building or expanding climate tech facilities quickly exceeds the maximum amount of equity finance they have access to. That is why debt financing – either in the form of funded loans or in the form of unfunded guarantee lines – is key for scaling climate tech, as it enables companies to undertake capital-intensive projects that may not be feasible otherwise. However, to access debt financing, companies depend on banks and other lenders to assume a portion of the financial risk of such commercial projects. But without appropriate guarantee programs, debt financing from private lenders is either not achievable or only possible at prohibitively high interest rates. It is promising, though, that industrial subsidies tend to be most effective for smaller companies and startups (Criscuolo et al, 2019) – a result also found by Pless (2022).

**Many climate tech startups are haunted by an ‘innovation curse,’ which prevents banks from providing debt finance to breakthrough technologies due to a higher risk perception of often low-risk facilities.** The debt finance challenge is further compounded by the limited tangible assets most startups can offer as collateral, the lack of track record and a mismatch between the startups’ long-term investment needs and the available short-term debt. The innovative nature of their solutions and the nascent market introduce higher risks, while the intangible value of their assets complicates collateral

<sup>6</sup> In a rapid assessment among members of the Tech for Net Zero alliance, more than half of the startups and all participating VC funds reported of specific investments by startup and scale-ups in facilities that were either delayed by over a year or failed altogether due to lack of debt financing.

requirements. As many innovative climate tech startups operate in emerging sectors with limited operating history, they often do not meet the banks' creditworthiness criteria or are offered excessively priced interest rates. At the same time, while startups are associated with risk, much of what these companies do is not necessarily very risky – such as setting up production lines that require machines, buildings, and technicians. These activities can be resolved into less risky parts. It is the markets for the ‘new tech’ that are inherently unstable, but the machines and the production of climate tech are actually ‘known’ factors in many cases.

**This paper calls for the swift adaptation of a European credit guarantee program for climate tech startups and scaleups to effectively leverage private investments and to close the financing gap.**

The following section explains the functioning of credit guarantees, discusses their track record, and explores the fiscal implications. Section 3 provides practical guidance for policymakers and public bankers establishing a climate tech guarantee program and takes into account lessons from Europe and North America. Once in place, the credit guarantees program can help unleash private investments, propelling the rapid market expansion of much needed climate technologies.

---

## 2. Credit guarantees: unlocking bankability for climate tech

**Public credit guarantees hold the key to overcoming the innovation curse, boasting a strong track record in mitigating risk perceptions and thus making projects bankable.** These guarantees are an established policy instrument that aims to mobilize private capital for industrial projects that create substantial positive externalities for society. Across Europe, guarantees have been instrumental in facilitating private sector investments, economic growth, exports, and jobs. Notably, public guarantees are considered one of the most fiscally efficient instruments of industrial policy by boosting economic activity without causing market distortions. The simplicity of guarantees is what makes them highly effective: by selectively reducing risks, guarantees enable de-risking of industrial projects making them bankable through private capital. In fact, it has been shown how financial support to early-stage climate tech startups can double the probability that a company receives subsequent venture capital and has large, positive impacts on patenting and revenue. These effects tend to be strongest when the liquidity is used to fund technology prototyping and first-of-a-kind commercial demonstration facilities (Howell, 2017).

**Public guarantees offer policymakers an efficient instrument to leverage more private capital towards climate tech technologies.** Credit guarantees can be considered a form of insurance in the sense that they provide protection against the risk of default or non-payment on a loan. Guarantees make innovative projects bankable by providing a form of insurance to banks and other private investors from the risk of non-payment on a loan or performance, thereby directing much needed private capital to the climate tech space. Guarantees are considered among the most fiscally efficient instruments (i.e., cheapest for the taxpayer) to boost industrial activity without distorting the market. A recent review by the OECD (2022) found that public guarantees consistently show a strong positive impact on credit availability. The effect seems to be largest for smaller SMEs (small and medium-sized enterprises) and startups. By underwriting selected risks, guarantees make climate tech investment projects bankable for private lenders. Public guarantees can be deployed along the scale-up journey:

- Public loan guarantees can be decisive in getting first-of-a-kind facilities financed in the early stages of climate tech startups.
- During later growth stages, performance guarantees, warranties and guarantees for advanced payments can free up critical working capital to boost manufacturing capacity once climate tech companies are ready to sell innovative equipment – such as electrolyzers or long-duration energy storage systems.

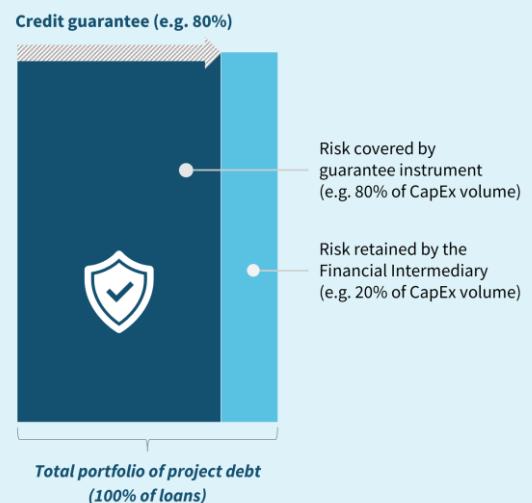
## How do credit guarantees work?

Public credit guarantees are a form of financial assistance provided by a government or a public financial institution to enterprises, including startups and scale-ups, to help them obtain financing from private banks or other lenders for specific projects. A credit guarantee works by providing the lender a complete (or partial) guarantee that the project loan will be repaid, even if the startup defaults on or cannot repay the loan, thereby making the project bankable and bringing the cost of capital down. A typical credit guarantee scheme has five stages:

1. **Loan application by startup:** The startup applies for a loan from a private bank or other financial institution (the lender). The lender evaluates the startup's creditworthiness including project risks and determines whether or not to approve the loan.
2. **Guarantee application by lender:** A public credit guarantee by the lender can be sought from the EIB Group if the lender is hesitant to approve the loan due to the startup's lack of collateral or limited balance sheets. The lender is considered as intermediary financial institution by the EIB Group.
3. **Guarantee approval:** Once the EIB credit guarantee is approved, it enhances the risk classification of the project loan for the lender. In case the startup fails to meet its payment obligations or defaults, the EIB takes responsibility for repayment. By reducing the risk associated with the loan for the lender, the project becomes more attractive for investment, enabling the deployment of private capital by the lender.
4. **Financing and guarantee offer:** The startup receives the loan from the lender and uses it to finance its business operations. A related guarantee agreement is signed between the private lender and the EIB issuing the guarantee.
5. **Monitoring:** In the event that the startup is unable to fulfill its loan obligations, the lender has the option to utilize the credit guarantee to recoup a portion or the entirety of the outstanding debt.

Credit guarantee schemes can cover different proportions of the loan amount (50%, 80%, and 100% are the most common in Europe). Figure 1 features a typical guarantee cover of 80%, meaning 20% of the loan amount needs to be secured by the startup and its founders. Notably the lender would have to pass the remaining financial risk through to the startup to comply with financial regulations on risk taking. Given the size of required loans and the low asset stock of most startups, a 100% guarantee cover would be much more effective for the climate targets.

### Uncapped guarantee



## **Examples of credit guarantee schemes**

**Credit guarantees are mostly used to support private debt finance (loans).** In addition, they can be used to support advance payments, technical performance and warranty bonds, which customers regularly require of climate tech providers. Other terms and conditions may also vary, including the duration of the guarantee, the interest rate, and the fees charged to the startups and the lender.

**The world's largest credit guarantee program for climate technologies is run by the US Department of Energy (DOE) and makes projects bankable by actively taking on risks.** To date, the Energy Loan Guarantee Program has provided more than \$25 billion in loan guarantees for largely renewable energy facilities.<sup>7</sup> These loan guarantees boost bankability and support renewable energy projects in the United States that embody innovative technologies and reduce greenhouse gas emissions. Under the loan guarantee program, the US government guarantees repayment of 100% of the principal and interest on private loans for up to 80% of construction costs. Guaranteed loans can have terms up to 30 years. Importantly, the DOE acknowledges the inherent risk and accepts that some loans will fail, meaning the guaranteed amount will have to be refunded to the guaranteed commercial bank. As of end of 2022, only 3% of loans guaranteed by the DOE have run into repayment issues, though only a fraction of those have fully defaulted. As public institution, the department is expected to achieve a ‘reasonable prospect of repayment,’ according to the US government’s mandate. This is crucial: only with a clear mandate to accept certain risks and cover the occasional fallout, public loan guarantee programs can be a success.

**In Europe, the historic origin of public credit guarantees can be traced back to the late 19<sup>th</sup> century.** At that time, the industrial revolution was in full swing, and many SMEs were struggling to obtain the necessary financing to start or expand their businesses. To address this issue, various credit guarantee schemes were introduced in different countries. One of the first such schemes was established in Germany in 1876 and provided guarantees to banks that loaned money to SMEs. Other European countries, such as France, Italy, and the Netherlands, soon followed suit and established similar schemes. These programs were initially funded by the government or by public institutions and were aimed at promoting economic growth and social welfare by facilitating access to credit for SMEs. As the need to combat climate change creates a new age of net-zero emissions industry, the same financial instrument is again in high demand.

**Today, credit guarantee schemes are widely used in many European countries where they play an important role in promoting economic growth, investments, trade, and entrepreneurship.** Some of the best known credit guarantees are provided by Export Credit Agencies (ECA), which exist in all European member states – from Atradius in the Netherlands, to CESCE in Spain, to Hermes in Germany, to LEII in Latvia and SID Banka in Slovenia, to only name a few. They offer companies protection against

<sup>7</sup> For more information about the DOE Title XVII Innovative Energy Loan Guarantee Program, visit: <https://www.energy.gov/lpo/title-17-clean-energy-financing>.

the risk of non-payment on export transactions. Export credit guarantees are an important component of foreign trade promotion and have helped, positioning many EU members as export nations. They give exporters the opportunity to hedge their export earnings against economic and political risks. In some member states, the government has commissioned private entities with the implementation of export credit guarantees.<sup>8</sup>

**Given its strong climate ambitions, the European Union could mobilize large amounts of private climate finance by expanding its portfolio of public credit guarantee instruments to support the scaling of climate tech facilities.** The EIB Group is a global leader in credit guarantees with decades of experience. The EIF alone has provided more than € 77 billion in guarantees since its inception more than 25 years ago.<sup>9</sup> These have been used to support regional development and to improve access to finance for SMEs. Until 2020, the EIB Group offered a range of credit guarantee schemes in several narrowly defined sectors, mostly to businesses with anticipated social impact. Yet, when it comes to climate finance, the currently existing EIF guarantees are targeting mostly smaller SMEs, which means guarantees are limited in size (capped at €2 million and €7.5 million) and have a limited scope (only 50% to 80% of the loan amount are secured).<sup>10</sup> Moreover, these guarantees are issued by a limited number of accredited financial institutions at member state level, which leads to unlevel playing fields.<sup>11</sup> When it comes to decarbonizing Europe's economy, these conditions are not suitable for building a commercial battery factory, financing a commercial e-fuel production facility, or setting up a green cement plant. The absence of adequate credit guarantee instruments for climate tech startups is holding back investments in decarbonization projects and the deployment of breakthrough innovation.<sup>12</sup> Essentially, the EU does not sufficiently address the growing investment backlog in climate tech, despite a strong commitment for the EIB to be a 'climate bank.'

**The EU has recently launched a new investment instrument with the InvestEU Fund, which will be primarily implemented by the EIB Group, including the EIF.** The InvestEU program aims to provide financial support through selected implementing partners (mostly EIB and a few selected public banks at

<sup>8</sup> An overview of existing public guarantee programs by the German Ministry of Finance can be found here: [https://www.bundesfinanzministerium.de/Content/DE/Standardartikel/Themen/Internationales\\_Finanzmarkt/Internationale\\_Finanzpolitik/auslandsgewehrleistungen-des-bundes.html](https://www.bundesfinanzministerium.de/Content/DE/Standardartikel/Themen/Internationales_Finanzmarkt/Internationale_Finanzpolitik/auslandsgewehrleistungen-des-bundes.html).

<sup>9</sup> The EIF has made over €77bn in guarantee commitments in the past 25 years, according to its website. URL: <https://engage.eif.org/investeu/guarantees>.

<sup>10</sup> European Investment Fund (2023). Sustainability Portfolio Guarantee Product, URL: <https://engage.eif.org/investeu/guarantees#Sustainability-PG>.

<sup>11</sup> Accredited financial institutions at member state level differ vastly by several aspects, including credit rating, how the due diligence processes for loans and guarantees is conducted, how existing risks are assessed and priced, which experience, expertise, and rules in assessing the loan default risks of projects run by startups vs. SMEs are applied, and very different levels of priority regarding financing the decarbonization of the economy. These differences in conditions make the existing EIF sustainable guarantee program partly ineffective in some member states. In addition, not all member states have signed up. In Europe's largest economy, Germany, for example, the national public bank KfW that is tasked with providing climate finance is not even accredited.

<sup>12</sup> For example, existing EU programs offer loan guarantees to small businesses in the creative and cultural space, certain social enterprises, student loans, sustainable forests projects, and the digitalization of supply chains. For more details consult: [https://www.eif.org/InvestEU/guarantee\\_products/index.htm](https://www.eif.org/InvestEU/guarantee_products/index.htm).

member states), which in turn provide direct and intermediate financing solutions.<sup>13</sup> While not exclusively targeted at climate technologies and greenhouse gas emissions (GHG), the InvestEU investment committee recently approved a credit guarantee instrument named the ‘Sustainability Guarantee product.’<sup>14</sup> It offers relatively small loan guarantees to SMEs, small Mid-Caps, housing associations and natural persons via accredited banks in EU member states. To unleash the investment backlog in climate tech, it would be advisable to build on the existing program with increased guarantee coverage, maximum size, and a single streamlined due diligence process.

<sup>13</sup> For the growing list of implementing partners, please consult the EIB: [https://investeu.europa.eu/what-investeu-programme/investeu-fund/how-get-financing\\_en](https://investeu.europa.eu/what-investeu-programme/investeu-fund/how-get-financing_en).

<sup>14</sup> Framework operation #14 for Sustainability Guarantee product INVEU-ICR-0050-2022 – SME & Sustainable Infrastructure [https://investeu.europa.eu/investeu-operations/increase-framework-operation-14-sustainability-guarantee\\_en](https://investeu.europa.eu/investeu-operations/increase-framework-operation-14-sustainability-guarantee_en).

---

### 3. Implementation: A European credit guarantee program for climate tech

**To counter the US Inflation Reduction Act (IRA), which provides substantial and readily available funding and loan guarantees for the green transformation, the EU needs to walk the talk on the market scale-up of climate tech.** For many years, the EU has held a leading position in the deployment of climate technologies and renewable energy. As the EU is developing new industrial policy instruments in response to the IRA, assessments of climate tech green value chains shows that a much faster growth of production and generation capacities in the EU is needed. With both the Net-Zero Industry Act (NZIA) and the Green Deal Industrial Plan (GDIP), the EU has responded to these challenges, especially the need to reduce import dependencies in critical goods and raw materials. Numerous climate tech facilities need to be built and financed in order to scale climate tech production; however, this is posing unsurmountable challenges for many startups and scaleups.<sup>15</sup> Evidence shows that the EU is lagging behind the US and China in its ability to transform its innovative startups into high-growth companies (Quas et al, 2022). Without credit guarantees, most of these enterprises will not be able to scale fast enough to meet the NZIA and GDIP targets.

#### Leverage existing expertise and structures

**The EU Commission and the EIB Group have the means to rapidly establish a credit guarantee program that is competitive with existing best-practices to unlock the backlog in climate tech finance.** The EU Commission can tap into its existing knowledge and expertise in designing and implementing financial programs. Also, it can draw upon successful credit guarantee programs and best-practices from both within the EU and internationally. By leveraging this expertise, the Commission can expedite the design and implementation process. To date, the most advanced loan guarantee program for climate tech is offered by the US Department of Energy, which could serve as a blueprint for Europe.

**The EU Commission is advised to collaborate closely with established financial institutions such as the EIB Group due to their strong experience in climate tech.** The EIB and the European Investment Fund (EIF) have solid expertise in risk assessment, underwriting, and fund management for climate tech startups, as well as excellent relationships with commercial lenders, which can be instrumental in developing new competitive financing programs. Within their existing portfolio of instruments, the EIB's venture debt program stands out as an attractive short-term loan program for early-stage startups seeking financial support for scaling. The venture debt instrument can be a suitable option for young

<sup>15</sup> For an overview of climate technologies, see for example the climate tech investment forecast: <https://techfornetzero.org/en/a-venture-capital-analysis-of-climate-technology-startup-financing-to-2030/>.

companies with a viable business model and solid governance that already secured equity from professional investors and now seek additional debt finance.<sup>16</sup> However, the EIB's venture debt can neither be seen as a universal remedy for all kinds of financing needs (e.g., for large-scale production plants), nor does it successfully crowd-in private capital, which is urgently needed to accelerate the green transformation. Therefore, credit guarantees are proposed as an additional and fiscally efficient approach to leverage the immense capabilities of private lenders such as commercial banks. In fact, the proposed credit guarantee program should be designed with flexibility and adaptability to the needs of fast-growing climate tech startups and scaleups in mind and could include guarantees for loans, unfunded guarantee lines, performance, and warranties. Specifically, the EU Commission could incorporate mechanisms that allow for periodic reviews and adjustments based on market feedback and evolving needs. Such measures will likely ensure competitiveness and responsiveness to the changing landscape of climate tech. Climate tech startups and scaleups would partner with private investors, including banks and other financial institutions, to agree on a financing structure using private investments for commercial FOAK facilities, which would then be backed by a public guarantee.

**To get started, Tech for Net Zero has conducted a rapid market assessment to better understand the needs and most suitable terms for a new loan guarantee instrument.** Understanding market dynamics, investment gaps, and technological trends allows the Commission to tailor the loan guarantee program to address these specific requirements effectively. The rapid market assessment involves identifying gaps and unmet needs in the financial landscape, including analyzing existing financial instruments and assessing their effectiveness. In addition to interviewing industry experts to gather insights on market needs, a broader stakeholder engagement with banks and other financial institutions, equity investors, startups and scale-ups, government entities, etc. can help guide the program terms and conditions. Such consultations have shown themselves to be valuable to understand the exact requirements, pain points, and expectations regarding the new financial instrument. The current paper builds on this assessment.

**Streamlined administrative processes are essential for the rapid issuance of loan guarantees.** The green industrial transformation mostly needs speed to meet the 2030 climate targets. The EU Commission can streamline administrative processes to expedite the establishment of the credit guarantee program. This includes simplifying application procedures, standardizing documentation requirements, and minimizing bureaucratic hurdles such as duplication of due diligence processes. Efficient assessments will help accelerate the program's implementation and ensure its competitiveness on a global scale, especially with the US and China, which are moving quickly.

<sup>16</sup> See more information on the venture debt program on the EIB's website: <https://www.eib.org/en/products/equity/venture-debt/index.htm>

### **Readiness-to-deploy is more informative to assess than balance sheets, company age, or revenue**

**when financing climate tech.** The urgency of addressing climate change requires swift action and deployment of scalable solutions. While company age and revenue are still considered important indicators of stability and financial viability, readiness-to-deploy should take precedence in the context of climate tech startups. It reflects the startup's potential impact, market opportunity, and growth prospects, aligning with the specific needs and goals of investors focused on climate change. In practice, the credit guarantee program should relax blanket conditions (company age, revenue, balance sheets, etc.) and instead focus on 'readiness-to-deploy' of the proposed technology. The proposition is to assess the riskiness of a loan based on (i) an existing off-take agreement, (ii) the technology readiness level, and (iii) a standardized cashflow forecast to comply with regulatory requirements. For fast-growing hardware startups, balance sheets and other traditional indicators used in corporate banking usually do not contain meaningful metrics to predict the future risk of a loan. Bankability should thus not be tied to balance sheets, but to other indicators that strongly correlate with ability to serve the loan.

### **Financial instruments need to be designed to serve climate tech startups, not the other way**

**around.** Climate tech startups that are ready-to-deploy their technologies commercially are more likely to align with the timelines and urgency associated with climate crisis. Investors recognize the need for immediate action and are inclined to support startups that can quickly implement their solutions and drive positive change. There must be a new set of indicators that are aligned to the startups trajectory to make these projects 'bankable' by private lenders (hockey stick curve).

## **Identifying an existing financial anchor to back the guarantee program**

**The proposed European climate tech credit guarantee program needs to be backed by a fund, budget guarantee, or other source of finance.** The main reason is to maintain capital adequacy for fulfilling obligations. Ensuring financial sustainability of the program is essential to enhance market confidence and required for commercial banks to comply with regulatory requirements. The financial source acts as a warranty and provides resources to cover guaranteed portions of loans in case of non-service of the loan, thereby reducing exposure and the financial burden on the guaranteeing entity.

**The existing InvestEU budget provides a unique opportunity to leverage a sizable funding source for the proposed EU climate tech credit guarantee program.** Notably, the InvestEU program is underwritten by an EU budget guarantee itself with a value of €26.2 billion to back the investments of implementing partners such as the EIB Group and other financial institutions. Further, the EU Commission has mandated the InvestEU Program to earmark 30% of all supported investments for climate tech. In other words, the current political mandate would allow leveraging up to €8 billion for the immediate establishment of a credit guarantee instrument that helps to unleash private lending for scaling up climate tech facilities. Alternatively, a new stand-alone guarantee fund could be established by the EU Commission – though it would likely take more time.

**Public credit guarantee programs have generally demonstrated a positive track record in managing non-payment rates on loans.** While the specific loan service rates can vary, credit guarantee programs are typically designed to mitigate risks and ensure responsible lending practices. The presence of a guarantee reduces the risk for lenders, making them more willing to extend credit to borrowers who may not meet conventional lending criteria. This increased access to financing can actually contribute to lower default rates compared to non-guaranteed loans. Furthermore, credit guarantee programs often incorporate risk assessment mechanisms and due diligence processes to evaluate the creditworthiness of borrowers and mitigate potential defaults. Even for programs targeting climate tech startups, non-payment rates of loans have been found to range between 3% and sub-1%.<sup>17</sup> The reason is that FOAK facilities will have offtake agreements and operators in place before the financing is cleared.

## Effective legal and policy framework

### **Existing EU state aid rules for public guarantee are limiting the effectiveness of credit guarantees.**

The rules explain the conditions for compatibility, emphasizing the need for guarantees to serve a legitimate objective, be proportionate, and not distort competition.<sup>18</sup> The notice also provides guidance on calculating the aid element of a guarantee and highlights the importance of transparency, reporting, and evaluation. In practice, loan guarantees in Europe are capped at 80% of the loan amount, which poses a structural disadvantage compared to the DOE loan guarantee program that covers up to 100% of the loan amount (principal), since very few European climate tech startups and scale-ups can cover the remaining 20%. Given the anticipated economic damage climate change will cause across in Europe in the years to come, policymakers would be well advised to relax the 80% threshold for loan guarantees for climate technologies to unleash the full potential of climate finance and mobilize private debt finance.<sup>19</sup>

### **While it is important to manage risks appropriately, a credit guarantee program focused on rapid technology deployment needs to prioritize investments and overcoming market barriers.**

Maximizing the impact of the proposed climate tech credit guarantee program means encouraging the adoption of new technologies and accelerating their deployment to address climate change. A credit guarantee program focused on rapid technology deployment may offer reduced rates for several reasons. Firstly, market rates may deter potential borrowers due to the high costs associated with risks associated with new technologies. Secondly, offering more favorable terms through credit guarantees can help mitigate market barriers and incentivize borrowers to pursue projects they might otherwise consider too risky or costly. Additionally, favorable terms can attract private investment and leverage

<sup>17</sup> A recent US program supporting SMEs offering rooftop solar reportedly generated profits from financial intermediary fees, while maintaining a low default rate: <https://in.usembassy.gov/usaid-and-dfc-announce-41m-loan-guarantee-program-to-finance-rooftop-solar/>.

<sup>18</sup> European Commission (2008). Notice on the application of Articles 87 and 88 of the EC Treaty to State aid in the form of guarantees.

<sup>19</sup> Currently, schemes require pricing in all risks at market terms based on a realistic risk assessment to ensure financial sustainability of the fund.

additional financing for technology deployment, expanding the available funding pool. Lastly, simplified and expedited procedures, along with more favorable terms, enable faster decision-making and disbursement of funds, facilitating timely technology deployment.

**A robust policy framework is essential for the success of a public credit guarantee program for climate tech.** A supportive policy framework is crucial for several reasons, as it encourages investment in climate tech and aligns with the climate and sustainability goals of the EU. Clear policy objectives play a vital role in guiding the allocation of resources, ensuring that the financial instrument addresses urgent needs effectively. Furthermore, a strong policy framework sends strong market signals, attracting private investment by providing long-term visibility and stability. By implementing effective risk mitigation measures, perceived risks for investors can be reduced, thereby accelerating the development and deployment of climate solutions. Supportive regulations and incentives also play a significant role in driving market transformation towards low-carbon economies. For the credit guarantee program to thrive, the EU Commission must collaborate closely with relevant regulatory bodies to establish an enabling environment that ensures the program's long-term viability and competitiveness.

## References

- Bachas, N., Kim, O., & Yannelis, C. (2021). ‘Loan Guarantees and Credit Supply.’ *Journal of Financial Economics*, Vol. 139(3), pp. 872–894.
- Criscuolo, C., R. Martin, H. G. Overman, and J. V. Reenen (2019). ‘Some causal effects of an industrial policy,’ *American Economic Review*, Vol. 109(1), pp. 48–85.
- Dealroom.co (2023). Climate Tech in Europe, fastest-growing segment, URL: <https://dealroom.co/blog/the-rise-of-europe-climate-tech>.
- European Commission (2008). Notice on the application of Articles 87 and 88 of the EC Treaty to State aid in the form of guarantees.
- European Commission (2021). Communication from the Commission, Criteria for the analysis of the compatibility with the internal market of State aid to promote the execution of important projects of common European interest.
- European Commission (2022). InvestEU: How to get financing, URL: [https://investeu.europa.eu/what-investeu-programme/investeu-fund/how-get-financing\\_en](https://investeu.europa.eu/what-investeu-programme/investeu-fund/how-get-financing_en).
- European Investment Bank (2023). Venture debt, URL: European Investment Fund (2023). Guarantee products, URL: [https://www.eif.org/InvestEU/guarantee\\_products/index.htm](https://www.eif.org/InvestEU/guarantee_products/index.htm).
- European Investment Fund (2023). Guarantee products, URL: [https://www.eif.org/InvestEU/guarantee\\_products/index.htm](https://www.eif.org/InvestEU/guarantee_products/index.htm).
- European Investment Fund (2023). Sustainability Portfolio Guarantee Product, URL: <https://engage.eif.org/investeu/guarantees#Sustainability-PG>.
- Federal Ministry of Finance (2023). The foreign guarantees of the Federal Government, URL: [https://www.bundesfinanzministerium.de/Content/DE/Standardartikel/Themen/Internationales\\_Finanzmarkt/Internationale\\_Finanzpolitik/auslandsgewaehrleistungen-des-bundes.html](https://www.bundesfinanzministerium.de/Content/DE/Standardartikel/Themen/Internationales_Finanzmarkt/Internationale_Finanzpolitik/auslandsgewaehrleistungen-des-bundes.html).
- German Energy Agency, dena (2023). Investing in Net Zero: A venture capital analysis of climate technology startup financing to 2030. URL: <https://techfornetzero.org/en/a-venture-capital-analysis-of-climate-technology-startup-financing-to-2030/>.
- Howell, S. T. (2017). ‘Financing Innovation: Evidence from R&D Grants.’ *American Economic Review*, Vol. 107 (4), pp. 1136–64.
- OECD Science, Technology and Industry Policy Papers, May 2022, No. 128. Are Industrial Policy Instruments Effective? A Review of the Evidence in OECD Countries.
- Pless, Jacquelyn (2022). ‘Are ‘Complementary Policies’ Substitutes? Evidence from R&D Subsidies in the UK.’ *American Economic Journal: Economic Policy* (Revise and Resubmit), MIT Sloan Working Paper 5788-18. Cambridge, MA: MIT Sloan School of Management.
- Quas, A., Mason, C., Compañó, R., Testa, G., and Gavigan, J. P. (2022). ‘The scale-up finance gap in the EU: Causes, consequences, and policy solutions,’ *European Management Journal*, Vol. 40(5).
- Rodrik, D. (2022). ‘An Industrial Policy for Good Jobs,’ The Hamilton Project, Brookings.
- U.S. Department of Energy Loan Programs Office (2022). Loan Guarantee Solicitation Announcement - Innovative Clean Energy, URL: <https://www.energy.gov/lpo/articles/innovative-clean-energy-loan-guarantee-solicitation-current>.

## TECH FOR NET ZERO ALLIANZ

### TECH FOR NET ZERO

The Tech for Net Zero Alliance is a network of leading climate tech startups, scaleups and investors in Germany and the DACH region. The alliance focusses on expanding climate tech finance, stimulating market demand, and adopting an enabling regulatory environment to accelerate the scale-up of breakthrough climate technologies.

Given the abundance of technical solutions, talent, and financial resources, we believe achieving the climate targets is a matter of speed, focus, and execution. We need all hands on deck to move faster and turn Europe into a climate tech powerhouse.

As a Climate Tech Think Tank, the Tech for Net Zero Alliance is a reliable partner for policymakers, investors, and founders. In addition, the Tech for Net Zero Alliance supports the Climate Tech ecosystem in Germany, Europe, and beyond.

### Members



## **Publishing details**

### **Publisher**

Deutsche Energie-Agentur GmbH (dena)  
Chausseestraße 128 a  
10115 Berlin  
Tel.: (+49-30) 667-770  
Fax: (+49-30) 6677-7699  
Email: info@dena.de  
[www.techfornetzero.org](http://www.techfornetzero.org)  
[www.dena.de](http://www.dena.de)

### **Authors**

Tobias Lechtenfeld, 1.5° Ventures  
Helena Möller, dena  
Michael Müllneritsch, dena

### **Reviewers**

Jules Besnainou, Cleantech for Europe  
Pia Dorfinger, dena  
Nils Handler, d\carb future economy forum  
Julian Joswig, Tech for Net Zero Alliance  
Jeff Katz, 1.5° Ventures  
Martin Kröner, Munich Venture Partners  
Maria Leis, Breakthrough Energy  
Thomas Pellerin-Carlin, Institute for Climate Economics  
Tobias Seikel, Planet A Ventures  
Marlène Siméon, Future Cleantech Architects  
Peter Sweatman, Climate Strategy & Partners  
Julian Weisbrod, 1.5° Ventures

### **Image credits**

Titel – [freepik.com/starline](https://freepik.com/starline)

### **Status**

07/2023

### **Please quote as:**

Deutsche Energie-Agentur (Hrsg.) (dena, 2023): ‘Tech for Net Zero Alliance: Public Credit Guarantees: Unlocking Private Investments for Climate Technologies’

All rights reserved. Use is subject to the approval of dena. This paper reflects the majority opinion of the companies involved in Tech for Net Zero. All content has been prepared with the greatest possible care and to the best of our knowledge. The German Energy Agency (dena) accepts no responsibility for the topicality, accuracy or completeness of the information provided. dena shall not be liable for any material or immaterial damage caused by the use or use or non-use of the information provided, the German Energy Agency (dena) accepts no liability. German Energy Agency (dena) shall not be liable unless it can be proven that dena acted with intent or gross negligence can be charged with intentional or grossly negligent fault.