Financial Instruments and Support Mechanisms for Energy Start-ups

Focus: Europe and Germany

Contents

LIST OF ABBREVIATIONS

AI	Artificial Intelligence
ARIA	Advanced Research and Invention Agency (United Kingdom)
ARPA-E	Advanced Reseach Projects Agency-Energy (United States)
BMBF	Federal Ministry of Education and Research; since 2025: BMFTR
BMDS	Federal Ministry for Digital Transformation and Government Modernisation
BMFTR	Federal Ministry of Research, Technolgy and Space; formerly: BMBF
BMUKN	Federal Ministry for the Environment, Climate Action, Nature Conservation and Nuclear Safety
BMWK	Federal Ministry for Economic Affairs and Climate Action; since 2025: BMWE
BMWE	Federal Ministry for Economic Affairs and Energy; formerly BMWK
CAPEX	Capital Expenditure
CBAM	Carbon Border Adjustment Mechanism
CCS	Carbon Capture and Storage
CVC	Corporate Venture Capital
DTFC	DeepTech & Climate Fund
EEG	Renewable Energy Sources Act
EIB	European Investment Bank
EIC	European Innovation Council
EIF	European Investment Fund
EIT	European Institute of Innovation and Technology
EMF	Emerging Manager Facility
ERDF	European Regional Development Fund
ESF	European Social Fund
ETS	Emissions Trading System
EU	European Union
FOAK	First-of-a-Kind
GDP	Gross Domestic Product
GG	Grundgesetz (Basic Law of the Federal Republic of Germany)
IEE	Fraunhofer Institute for Energy Economics and Energy System Technology
ISE	Fraunhofer Institute for Solar Energy Systems
IP	Intellectual Property
IPO	Initial Public Offering
KfW	Kreditanstalt für Wiederaufbau (German Development Bank)
KTF	Climate and Transformation Fund (Klima- und Transformationsfonds)
MFF	Multiannual Financial Framework
NGO	Non-governmental organisation
OECD	Organisation for Economic Co-operation and Development
OPEX	Operational Expenditure
R&D	Research and Development
R&I	Research and Innovation
RTP	Research, Technology and Prototyping
SME	Small and Medium-Sized Enterprises
SVIK	Sondervermögen Infrastruktur und Klimaneutralität
STEP	Strategiy Technologies for European Platform
TRL	Technology Readiness Level
TUM	Technische Universität München
VC	Venture Capital
WIN	Wachstums- und Innovationskapital für Deutschland (Growth and Innovation Capital for Germany)
ZIM	Zentrales Innovationsprogramm Mittelstand (Central Innovation Programme for SMEs)

EXECUTIVE SUMMARY

Start-ups play a decisive role in accelerating the global energy transition. Climate-tech and energy start-ups are driving innovation by developing and commercialising new business models, products, services, and technologies that support decarbonisation, digitalisation, and the creation of a decentralised energy system. However, energy start-ups continue to face persistent challenges in securing capital, scaling their operations, and navigating complex regulatory environments.

For the German Federal Ministry of Economic Affairs and Energy (BMWE), fostering such innovation is not only essential to achieving climate and energy goals but also to enhancing cost-effectiveness and overall system efficiency. By integrating energy efficiency and cost-optimising solutions into start-up ecosystems, the BMWE can strengthen Germany's competitive advantage in global energy markets. Supporting innovative efficiency measures and technologies offers both economic and environmental benefits – driving productivity gains, reducing energy costs, and reinforcing Germany's commitment to the continental and global sustainable industrial transformation.

This report provides an overview of financial instruments and support mechanisms for energy and climate-tech start-ups in Germany and throughout Europe. It outlines how European initiatives such as the European Green Deal, Fit for 55, REPowerEU, Horizon Europe, the Innovation Fund, InvestEU and the EU Start-up and Scale-up Strategy strengthen innovation, create long-term signals for investors, and expand access to capital. Complementing these European-level initiatives, Germany's energy transition (Energiewende), the national Start-up Strategy (adopted in 2022), the Future Fund (Zukunftsfonds), the WIN Initiative, and the Climate and Transformation Fund (KTF) provide targeted national support to foster innovation, strengthen financing structures, and accelerate the growth of energy and climate-tech start-ups. The new government is further advancing these efforts through the preparation of a Start-up and Scale-up Strategy, expected to be published in 2026. Together, these frameworks aim to broaden both the availability and volume of financing for energy start-ups. Their full impact is expected to emerge gradually over the coming years. Currently, however, financing for start-ups and scale-ups remains constrained, with major investment rounds still largely dependent on foreign capital. Beyond financing instruments, the report underscores the importance of robust innovation ecosystems – including hubs, testing and demonstration facilities, and spin-out programmes – in bridging the gap between research and market entry for start-ups and scale-ups. Strengthening these structures is vital to accelerating technology deployment and fostering successful commercialisation. Efforts to enhance inclusivity and attract international talent further contribute to competitiveness and resilience. Despite persistent challenges, particularly in scale-up financing, skills availability, and ecosystem maturity, Europe and Germany have established strong foundations for clean energy entrepreneurship. Closing financing gaps and deepening international cooperation will be critical to maintaining leadership and advancing a resilient, globally coordinated energy transition.

Report Context: The Role of Germany's Energy Partnerships

This report has been developed in the framework of Germany's bilateral Energy Partnerships, Energy Dialogues, and Hydrogen Partnerships led by the BMWE together with partner countries. These cooperation formats aim to promote energy security, advance decarbonisation, and foster sustainable trade by jointly driving the global energy transition.

Among the cross-cutting topics addressed within this framework, which span areas such as hydrogen, digitalisation and protection of critical infrastructure, carbon management, civil society engagement, skilled labour, and communication - the start-up ecosystem is recognised as a key enabler of innovation, reflecting the growing strategic role of innovation-driven companies in accelerating the global energy transition.

This report is part of the activities under the cross-cutting theme start-up ecosystem. The report aims to provide a structured overview of financial instruments and support mechanisms relevant for energy start-ups in the EU and Germany. It aims to inform policymakers, implementing organisations, and ecosystem partners engaged in the Energy Partnerships and beyond, helping them to design targeted measures, identify synergies, and strengthen the role of start-ups in accelerating clean energy transitions.

1. Introduction and Background

Europe's road to clean energy innovation

Europe's shift towards clean energy innovation has been shaped by a sequence of ambitious policy frameworks and legislative milestones that reflect a growing commitment to sustainability, energy security and technological leadership. The 2009 Lisbon Treaty was an early signal of intent, in which energy policy as a shared responsibility among EU member states was formally recognised.[1] That same year, the Renewable Energy Directive laid a foundational framework by setting binding national targets for renewable energy consumption.[2] With a collective EU-wide goal of 20 % renewable energy by 2020, this directive provided a crucial policy anchor, giving early momentum to investment in clean energy technologies and enabling start-ups to enter a market with greater regulatory clarity and long-term signals.

The momentum received another push in 2015 with the launch of the Energy Union Strategy.[3] Responding to concerns over energy dependence, climate change, and fragmented markets, the Energy Union Strategy emphasised the importance of integration, efficiency, and decarbonisation. It also made research, innovation, and competitiveness one of its five core pillars, showing a shift in the European Union's view of energy start-ups from being seen mainly as peripheral disruptors to being recognised as important contributors to building a modern, low-carbon energy system. By encouraging collaboration across borders and aligning investment with innovation, the Energy Union helped create a more coherent internal energy market and opened the door to broader support mechanisms for new ventures in the sector.

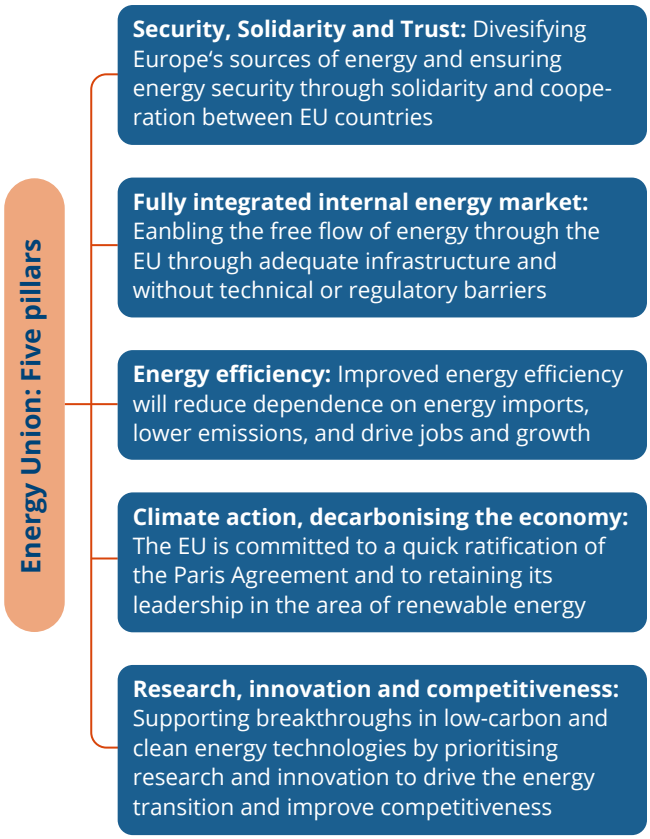
Building on this trajectory, the Clean Energy for All Europeans package, adopted in 2019, transformed strategic intentions into enforceable laws.[4] This comprehensive legislative package set more ambitious 2030 targets of 32 % for renewables and 32.5 % for energy efficiency, while also modernising the electricity market to facilitate a cleaner and more flexible energy system. It strengthened the position of consumers and prosumers (e.g., households installing rooftop solar panels and feeding surplus energy back into the grid or communities operating local energy cooperatives), further decentralising energy production and fostering conditions favourable to digital and platform-based energy innovations, many of which are developed and implemented by start-ups.

1 Treaty of Lisbon, 306 OJ C (2007), *http://data.europa.eu/eli/treaty/lis/sign*.

2 Directive (EU) 2018/2001 of the European Parliament and of the Council of 11 December 2018 on the Promotion of the Use of Energy from Renewable Sources (Recast) (Text with EEA Relevance.), CONSIL, EP, 328 OJ L (2018), *http://data.europa.eu/eli/dir/2018/2001/oj*.

3 Gregor Erbach, 'Energy Union Strategy', *Energy Union,* n.d.

4 *Clean Energy for All Europeans* (Publications Office of the European Union, 2019), *https://data.europa.eu/doi/10.2833/9937*.



Infographic 1: Five Pillars of the Energy Union
Source: Five pillars of the energy union

Later that year, the European Green Deal elevated climate action to the heart of EU policy.[5] Announced in December 2019, it committed Europe to becoming the first climate-neutral continent by 2050. This overarching strategy encompasses various policy initiatives to reduce greenhouse gas emissions, promote clean energy, and foster sustainable economic growth. Alongside regulatory reforms, the Green Deal unlocked substantial funding opportunities for clean energy innovation through initiatives such as Horizon Europe, the Innovation Fund, and the Just Transition Mechanism. This marked a significant step forward for energy start-ups, which could now access a wider array of support aimed at accelerating the development and commercialisation of next-generation solutions, including hydrogen technologies, carbon capture, and long-duration energy storage.

A key component of the Green Deal is the European Climate Law, which legally binds the EU to achieve net-zero greenhouse gas emissions by 2050.[6] To ensure progress toward this goal, the EU has set an interim target to reduce emissions by at least 55 % by 2030 compared to 1990 levels. To operationalise the Green Deal's ambitions, the EU introduced the in 2021. This legislative initiative aims at aligning EU policies with climate objectives. The package includes measures such as revising the *EU Emissions Trading System* (ETS), introducing a *Carbon Border Adjustment Mechanism* (CBAM), and setting stricter emission standards for vehicles and buildings. It also created additional financial and regulatory tools that start-ups could leverage, particularly those operating in energy efficiency, carbon reduction, and electrification of transport and industry. *Fit for 55 package* in 2021. This legislative initiative aims at aligning EU policies with climate objectives. The package includes measures such as revising the *EU Emissions Trading System* (ETS), introducing a *Carbon Border Adjustment Mechanism* (CBAM), and setting stricter emission standards for vehicles and buildings. It also created additional financial and regulatory tools that start-ups could leverage, particularly those operating in energy efficiency, carbon reduction, and electrification of transport and industry.

In response to the economic crisis and fuelled by implications of the COVID-19 pandemic, the European Commission has updated the InvestEU programme to trigger €372 billion in investment within the EU from 2021 - 2027 using a mix of EU based financial instruments.[7] It seeks to increase the financial envelope, including a doubling of the guaranteed amount for the sustainable infrastructure window along new windows including research, innovation, digitalisation and small and medium enterprises (SMEs). Under *NextGenerationEU*, another temporary recovery instrument of €806.9 billion and a novelty in the 2021 - 2027 EU budget, funds are managed directly by the European Commission but implemented through Member States.

In 2022, the *REPowerEU* plan was introduced in response to the invasion of Russia in Ukraine and the need to reduce reliance on Russian fossil fuels. This strategy focused on accelerating the deployment of renewables, strengthening energy efficiency measures, and promoting energy source diversification, while also increasing available funding through the Recovery and Resilience Facility. For energy start-ups, REPowerEU opened new pathways for rapid growth by creating urgent demand for innovative solutions in areas such as solar manufacturing, heat pumps, smart grids, and alternative fuels.

5 *The European Green Deal,* n.d., *https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-green-deal_en*.
6 European Climate Law, 243 OJ L (2021), *http://data.europa.eu/eli/reg/2021/1119/oj*.
7 *InvestEU, https://commission.europa.eu/funding-tenders/find-funding/eu-funding-programmes/investeu_en*.

In February 2024, the European Commission proposed a new climate target for 2040, recommending a 90 % net reduction in greenhouse gas emissions compared to 1990 levels. The proposal was updated in 2025 and now includes that 3 % of the goal can be met by international carbon credits, which has been criticised by environmental organisations due to its possible watering down effect.[8] This proposal nonetheless aligns with scientific advice and serves as a milestone toward achieving climate neutrality by 2050. To this end, the EU is increasing its investment in renewable energy infrastructure, among other measures. In 2024, the EU achieved a record 47 % of its electricity generation from renewable sources, with solar and wind energy playing significant roles.[9] Projections indicate that the EU will add a record 89 gigawatts of new renewable capacity in 2025, comprising 70 GW of solar and 19 GW of wind energy.[10]

Together, these initiatives demonstrate a coherent and intensifying effort by the European Union to drive clean energy innovation through policy, regulation, and targeted financial support. For start-ups in the energy sector, the evolving European framework not only improves access to capital and markets but also places them within a broader industrial transformation shaping the future of the energy economy.[11]

CLEAN INDUSTRIAL DEAL

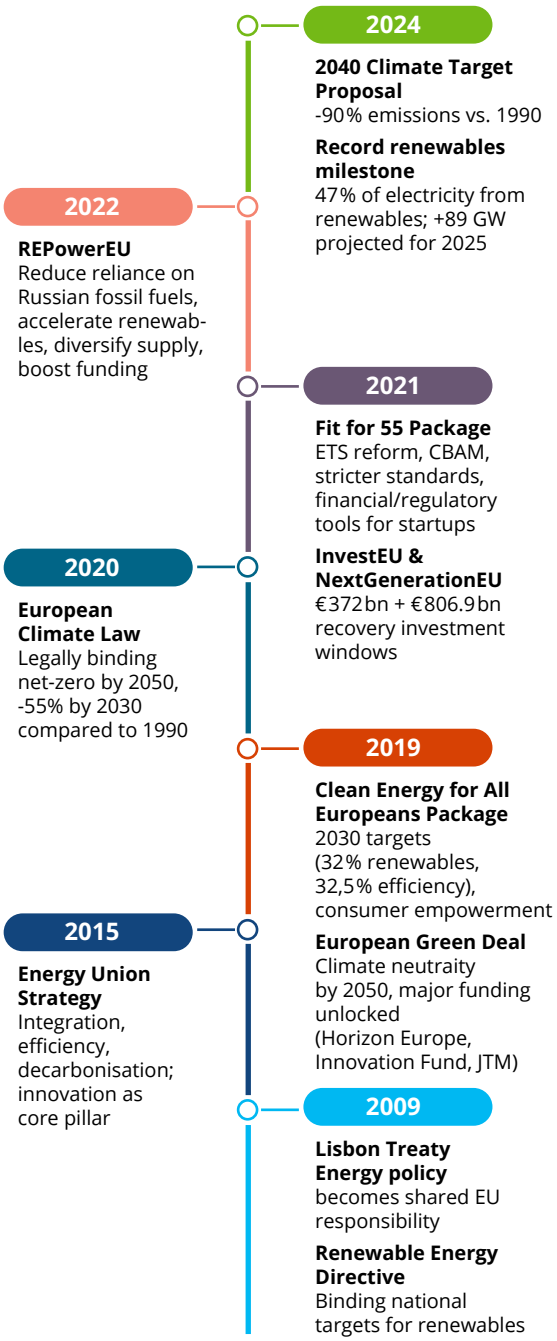
The European Commission launched the Clean Industrial Deal in February 2025 to align industrial competitiveness with the EU's climate neutrality target for 2050.[11] The initiative sets out a strategic framework to support the decarbonisation of energy-intensive industries while strengthening Europe's economic resilience. Key priorities include ensuring affordable energy, creating lead markets for climate-friendly products, mobilising over €100 billion in financing, advancing circularity and raw material security, fostering global trade partnerships, and preparing the workforce through targeted reskilling. Implementation measures are to be developed during 2025 – 2026 as part of the EU's broader Competitiveness Compass and the European Green Deal. The European Commission has created a *"Have your say"* portal for public citizens, businesses and stakeholders to give their views on initiatives, laws and to actively contribute to decision-making.

8 Recommendation for 2040 Target to Reach Climate Neutrality by 2050, Pub. L. 2025/0524 (COD) (2025), *https://climate.ec.europa.eu/document/download/e1b5a957-c6b9-4cb2-a247-bd28bf675db6_en*.

9 'Electricity from Renewable Sources Reaches 47 % in 2024', 19 March 2025, *https://ec.europa.eu/eurostat/web/products-eurostat-news/w/ddn-20250319-1*.

10 Kate Abnett, 'EU Expects to Add Record Renewable Capacity in 2025, Industry Sees Headwinds', Boards, Policy & Regulation, Reuters, 10 April 2025, *https://www.reuters.com/sustainability/boards-policy-regulation/eu-expects-add-record-renewable-capacity-2025-industry-sees-headwinds-2025-04-10/*.

11 Clean Industrial Deal (2025), *https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52025DC0085*.



Infographic 2: EU Renewable Energy & Climate Policy Timeline (2009 - 2024); source: own illustration

1.2. European Union Start-up and Scale-up Strategy

On 28 May 2025 the European Commission presented a new Start-up and Scale-up Strategy entitled "Choose Europe to Start and Scale".[12] The strategy builds on earlier EU efforts, including the 2016 Startup and Scaleup Initiative, which aimed to remove barriers to growth within the Single Market, and the establishment of the European Innovation Council (EIC) in 2018 as a flagship instrument for breakthrough innovation.[13] While these measures laid important foundations, fragmented regulations, limited access to venture capital, and slow commercialisation have continued to constrain European start-ups. The new strategy therefore seeks to transform Europe into a start-up and scale-up powerhouse and, thus, enhance innovation, competitiveness, job creation, technological leadership, and strategic autonomy. It addresses persistent obstacles that hinder the scaling of European start-ups, such as fragmented markets and regulatory hurdles, limited access to capital, work force shortage, and innovation commercialisation.

The strategy is structured around five pillars, each targeting a critical barrier to start-up growth in Europe:

1. Creating Innovation-Friendly Regulations

To simplify and harmonise the European innovation landscape, the Commission proposes a "28th regime", an optional EU-wide legal framework covering insolvency, labour, and tax systems. This aims to reduce complexity for founders operating across multiple member states. A European Business Wallet will serve as a single digital identity for start-ups dealing with public administrations. The planned European Innovation Act will introduce regulatory sandboxes, allowing innovators to test new solutions within a controlled legal environment. The EU also aims to promote best practices and utilise platforms like the *Europe Start-up Nations Alliance* (ESNA) to share and implement effective start-up policies across Member States.

2. Expanding Access to Finance

Recognising that deep-tech and scale-up companies often face funding shortfalls, the EU is launching a series of high-impact financing tools. These include a €10 billion Scale-up Europe Fund, supported by both public and private investment, and an Innovation Investment Pact to encourage institutional investment in venture capital.[14] Reforms under the Savings and Investments Union will help channel private savings toward innovation and high-growth firms. The EIC will also be expanded and simplified to better serve early-stage innovators.

12 The EU Startup and Scaleup Strategy (2025), *https://research-and-innovation.ec.europa.eu/document/download/2f76a0df-b09b-47c2-949c-800c30e4c530_en*

13 A New Initiative for Startups to Start and Scale up in Europe, n.d., *https://digital-strategy.ec.europa.eu/en/news/new-initiative-startups-start-and-scale-europe*.

14 Scaleup Europe Fund (2025), *https://ec.europa.eu/commission/presscorner/api/files/document/print/en/ip_25_2529/IP_25_2529_EN.pdf*

3. Supporting Market Access and Growth

The EU plans to launch a "Lab to Unicorn" initiative to strengthen links between universities, research institutions, and start-ups and foster partnerships, such as with the European Corporate Network. It will promote the commercialization of scientific research and help academic spin-outs scale. Therefore, the Commission aims at developing a blueprint for licensing, royalty- and revenue-sharing and equity participation for academic institutions and their inventors when commercialising Intellectual Property (IP) and creating spin-outs. Public procurement processes will be reformed to favour innovative SMEs, ensuring that public sector demand contributes to early-stage growth.

4. Attracting and Retaining Talent

To compete globally, the EU will implement the "Blue Carpet Initiative", focused on entrepreneurial education, tax-friendly treatment of stock options, and enabling cross-border remote work. Visa and residency processes will also be streamlined to attract global tech founders, with updates to the EU Blue Card to make Europe more accessible for skilled migrants and start-up teams.

5. Boosting Infrastructure and Ecosystem Access

The EU will propose a Charter of Access to simplify how start-ups can use public research infrastructure and technological resources across Member States. These efforts aim to accelerate the path from prototype to market, especially for deep-tech and climate tech ventures.

To ensure transparency and results, the European Commission will introduce clear definitions for start-ups, scale-ups and innovative companies by early 2026. A Start-up and Scale-up Scoreboard and annual founder survey will track progress, with a full implementation review planned for 2027.

This strategy forms part of the broader "Choose Europe" initiative, reflecting the EU's commitment to reversing the trend of innovation and talent migrating to other global regions, especially the United States and Asia.

1.3. Energiewende – Germany's Path to Energy Transition

At the core of Germany's climate strategy is the transition to renewable energy sources, a process known in German as the Energiewende, designed to achieve 80 % share of energy consumption from renewable energy by 2030 and greenhouse gas neutrality by 2045. The Energiewende is built on the triangle of environmental sustainability, economic competitiveness and security of supply. This ambition is legally anchored in the Federal Climate Change Act (Klimaschutzgesetz), first introduced in 2019 and amended in 2021, which sets sector-specific, binding reduction targets.[15] The law mandates a 65 % reduction in greenhouse gas emissions by 2030, an 88 % reduction by 2040, and full climate neutrality by 2045, all compared to 1990 levels, making it the most ambitious legally binding target within the G20.[16]

Germany's energy start-up ecosystem benefits from a vibrant entrepreneurial scene, strong institutional support, and an evolving policy framework, making it an important part in the energy transition. Support for energy innovation comes from funding programs from government agencies, partnerships with research institutions, dedicated innovation hubs, and access to EU-initiatives that foster collaboration between academia, industry, and policymakers. However, significant challenges remain in sectors like hydrogen, grid expansion, and industrial decarbonisation. Energy start-ups can contribute to addressing these challenges by developing innovative technologies, improving system efficiency, and providing scalable solutions that accelerate the shift toward a low-carbon energy system. Germany's initiative to develop a comprehensive and forward-looking sustainable energy policy framework already began more than two decades ago.

15 Entwurf eines Zweiten Gesetzes zur Änderung des Bundes-Klimaschutzgesetzes (2024), *https://dserver.bundestag.de/btd/20/111/2011183.pdf*
16 *Climate Action Tracker – Net Zero Target Evaluations,* n.d., *https://climateactiontracker.org/global/cat-net-zero-target-evaluations/*.

The Federal Ministry for Economic Affairs and Energy

The Federal Ministry for Economic Affairs and Energy (BMWE) is one of the top authorities of the German government responsible for shaping Germany's economic framework and ensuring a stable, competitive and modern economy.[17] These responsibilities include, among others, overseeing the country's economic policies, the power sector, renewable energy, energy networks and international energy and trade policy. The BMWE plays a pivotal role in the transformation of Germany's energy and start-up landscape. Among other undertakings, it sets the regulatory framework as well as supporting a wide range of innovation-focused initiatives in the energy sector. One such initiative is the *GreenTech Innovation Competition*, which allocates €75 million to support 21 projects focusing on digital environmental technologies. These projects aim to make a valuable contribution towards enhancing Germany's position as a high-tech centre for green technologies.

The regulatory framework by the BMWE is central to start-up and sustainability topics, but they are also anchored in other ministries, including the Federal Minister for Digital Transformation and Government Modernisation (BMDS), the Federal Ministry for the Environment, Climate Action, Nature Conservation and Nuclear Safety (BMUKN) and the Federal Ministry of Research, Technology, and Space (BMFTR). This reflects the cross-cutting nature of the energy transition and the recognition that innovation requires contributions from multiple policy domains. At the same time, effective coordination across ministries remains essential to ensure that the ambitious goals can be translated into timely implementation.

In 2000, Germany cemented its commitment to renewable energy with the Renewable Energy Sources Act (EEG), which established a framework for the expansion of renewable energy.[18] This significantly accelerated renewable uptake: renewables grew from 6.3 % of gross electricity consumption in 2000 to 27–28 % in 2014, reaching 54.4 % in 2024.[19] In terms of generation, wind and solar together now account for the majority of renewable electricity output, supplying approximately 59 % of the power mix in 2024.[20]

17 Federal Ministry for Economic Affairs and Climate Action BMWE, *Federal Ministry for Economic Affairs and Climate Action Providing €75 Million for Innovative GreenTech Projects,* n.d., *https://www.bundeswirtschaftsministerium.de/Redaktion/EN/Pressemitteilungen/2023/10/20231019-federal-ministry-for-economic-affairs-and-climate-action-providing-eur75-million-for-innovative-greentech-projects.html*.

18 Renewable Energy Sources Act (EEG 2017), *https://www.bundeswirtschaftsministerium.de/Redaktion/EN/Downloads/renewable-energy-sources-act-2017.pdf?__blob=publicationFile&v=1*

19 Sibylle Wilke, 'Indicator: Share of Renewables in Gross Electricity Consumption', Text, *Umweltbundesamt,* Umweltbundesamt, 22 November 2023, *https://www.umweltbundesamt.de/en/indicator-share-of-renewables-in-gross-electricity*.

20 Development of Renewable Energy Sources in Germany in the year 2024 (2025), *https://www.bundeswirtschaftsministerium.de/Redaktion/EN/Downloads/Energy/development-renewable-energy-sources-in-germany-2024.pdf?__blob=publicationFile&v=7*

Over the years, the EEG has been updated and adjusted several times.[21] The latest version (2023) sets out several ambitious goals, including that renewables should make up at least 80 % of gross electricity consumption by 2030. It also identifies renewable energy as a matter of simplifying and prioritising the permitting and expansion of wind and solar infrastructure. The EEG has also been instrumental in fostering innovation and creating a favourable environment for energy start-ups. This has been done by guaranteeing fixed feed-in tariffs and priority grid access for renewable energy, reducing market entry risks and encouraging innovation in decentralised energy solutions among other actions. This regulatory certainty has enabled start-ups to attract investment and develop technologies in areas like solar, storage, and smart energy services.

During the past two decades, the national energy and start-up ecosystem has been experiencing a dynamic evolution, marked by significant policy initiatives, institutional support and a surge in entrepreneurial activity. In 2023, 2,558 new start-ups were established, including 92 energy-focused start-ups, reflecting a 31,4 % increase compared to the previous year.[22] This growth aligns with broader trends in green innovation. Currently, there are approximately 3,000 so-called green-tech start-ups operating in environmental and climate-related fields. Of these, around 26 % focus on energy, amounting to an estimated 755 start-ups in the energy sector.[23] The importance of green tech in Germany's economy has been rising as well. In 2023 the industry exported goods worth €132 billion (more than 8 % of German exports) and 3.4 million people were employed in the green tech sector.[24]

Parallel to the expansion of renewable energy, Germany embarked on a nuclear phase-out, which was formalised in 2002. Though the decision has been contested and was temporarily reversed in 2010 under Chancellor Angela Merkel's government, the Fukushima disaster in 2011 prompted a renewed commitment to the phase-out. The policy was reinstated, and the last nuclear power plants were permanently shut down by April 2023. In addition, the Coal Phase-Out Act was introduced in 2020, which mandates the end of coal-fired power generation by 2038.[25] The North Rhine-Westphalia region has already set out to accelerate this timeline and phase out by 2030.[26] To further bolster and accelerate the phase out,

21 Gesetz für den Ausbau erneuerbarer Energien (ErneuerbareEnergien-Gesetz – EEG 2023) (2023), *https://www.gesetze-im-internet.de/eeg_2014/EEG_2023.pdf*

22 Julian Wettengel, 'Energy Start-Ups on the Rise in Germany, Environmental Technology Sector down – Report', *Clean Energy Wire,* 19 April 2024, *https://www.cleanenergywire.org/news/energy-start-ups-rise-germany-environmental-technology-sector-down-report*.

23 GreenTech Monitor 2025 – Startups: Wachstum meets Energiewende. Deep Dive Energie. (2025). Startup-Verband. *https://startupverband.de/fileadmin/startupverband/mediaarchiv/research/green_tech_monitor/DeepDive_Energie_GreenTech_Monitor_2025.pdf*

24 Patrick Bechhaus et al., *GreenTech Made in Germany 2025: GreenTech-Atlas for Germany* (German Environment Agency, 2025), *https://www.umweltbundesamt.de/en/publikationen/greentech-made-in-germany-2025-0*.

25 Ending Coal-Generated Power, *https://www.bundesregierung.de/breg-en/service/archive/kohleausstiegsgesetz-1717014*.

26 'Braunkohleausstieg in NRW kommt früher | Bundesregierung', *Die Bundesregierung informiert* | Startseite, 24 December 2022, *https://www.bundesregierung.de/breg-de/aktuelles/kohleausstieg-2030-2139228*.

the Structural Development Act (Strukturstärkungsgesetz) provides up to €40 billion to support economic diversification in coal-dependent regions, funding infrastructure, research, and job training initiatives.[27] This transition underscores Germany's dedication to a sustainable energy future.

Financing for the energy transition is largely channelled through the *Climate and Transformation Fund* (KTF), which pools revenues from national CO2 pricing and the EU Emissions Trading System.[28] The KTF underpins investments in clean energy, green hydrogen development, low-emission mobility, and industrial decarbonisation by, for example, financing infrastructure measures to expand the rail network and abolishing the EEG surcharge for businesses and private consumers, as well as supporting private households with energy-efficient renovations (window replacement, facade insulation, heating replacement).

In addition, the government enacted a constitutional amendment (Art. 143h GG) in March 2025 to allow the creation of a €500 billion Infrastructure and Climate Neutrality Special Fund (Söndervermögen Infrastruktur und Klimaneutralität, SVIK). Over the next 12 years, €100 billion is earmarked for state and municipal infrastructure projects, another €100 billion will flow into the KTF, and €300 billion is set aside for federal-level climate, energy, and infrastructure investments. In 2025, the fund plans €37.2 billion in expenditures plus €84.8 billion in committed allocations, including €10 billion annually over a decade to support the KTF.[29] The SVIK is debt-financed but carved out of the federal budget's debt brake rules, allowing additional investment for grid expansion, digitalisation, energy infrastructure, and climate transformation.

However, challenges persist, including difficulties for start-ups in raising capital with 46 % of green start-ups identifying this as a key hurdle.[30] The Federal Government continues to address these barriers through dedicated measures such as the Future Fund, the WIN Initiative and the upcoming Start-up and Scale-up Strategy, all of which aim to improve framework conditions for innovation and investment (see Policy Focus: National Start-up Strategy and Spotlight: WIN INITIATIVE).

In 2024, allocations under the *Federal Energy Research Programme* (EFP) were tightened, with authorisations for new projects cut by roughly 12 %, and research institutions estimating a decline of up to 30 % in available funds for innovation projects. The EFP is Germany's instrument for promoting applied energy research and demonstration, supporting companies, research institutions, and start-ups in developing technologies that advance the energy transition. Start-ups can apply through targeted funding calls to test prototypes, conduct pilot projects, or collaborate with academic and industrial partners.

Organisations such as the Fraunhofer Society have expressed concern that reduced budget could slow the development of key technologies for the energy transition and risk undermining Germany's technological leadership.[31] These concerns highlight the tension between fiscal constraints and the need to maintain momentum in innovation funding. At the same time, Germany's policies align closely with European Union climate objectives, namely the European Green Deal and Clean Industrial Deal (more information on page 8). Together, national and EU policies create a strong regulatory and financial framework to advance clean energy, reduce emissions, and ensure an effective and lasting transition. Despite economic and political challenges, Germany remains a frontrunner in implementing ambitious climate legislation supported by a robust institutional and funding infrastructure.

27 'Strukturstärkungsgesetz Kohleregionen', *Bundesgesetzblatt Teil I,* no. 37 (August 2020): 1795.

28 Überblick Klima- und Transformationsfonds (2024), *https://www.bundeswirtschaftsministerium.de/Redaktion/DE/Downloads/J-L/klima-und-transformationsfonds-ueberblick.pdf?__blob=publicationFile&v=7*

29 Etat 2025: Sondervermögen Infrastruktur und Klimaneutralität (2025), *https://www.bundestag.de/presse/hib/kurzmeldungen-1098154*

30 Green Startup Monitor 2023 (2024), *https://www.borderstep.de/wp-content/uploads/2023/03/GreenStartupMonitor2023_LY09_001.pdf*

31 'Massive Cuts in Research Funding Hamper Necessary Innovations in Key Technologies for the Energy Transition', *Fraunhofer ISE,* 18 June 2024, *https://www.ise.fraunhofer.de/en/press-media/press-releases/2024/Massive-cuts-in-research-funding-hamper-necessary-innovations-in-key-technologies-energy-transition.html*.

1.4. Policy Focus: German national start-up strategy

In July 2022, the German Federal Government adopted its first comprehensive National Start-up Strategy to strengthen the country's start-up ecosystem and enhance innovation-driven entrepreneurship.[32] The strategy outlines ten action areas and includes 130 individual measures aimed at improving conditions for young, innovative companies, facilitating company foundations, and strengthening funding mechanisms. According to the Second Progress Report in 2025, 81 % of these measures have been fully implemented.[33]

Key initiatives include simplifying the process of establishing new companies by enabling fully digital company formations, aiming for completion within 24 hours. This involves integrating online services from federal and state governments and notaries to create a one-stop shop for start-ups. Additionally, the strategy seeks to improve access to public contracts for start-ups and simplify the establishment of spin-out companies from academic institutions. To this end, the government aims to make better use of the federal digital funding portal, which has existed since 2006, as a central platform for information on available funding from federal, state, and municipal sources.

To address financing gaps, the strategy emphasises the need of increasing venture capital availability, particularly for capital-intensive growth phases. To address financing gaps, the strategy focuses on expanding venture capital for capital-intensive growth phases. Central to this is the *Future Fund (Zukunftsfonds)*, launched in 2021 as the Federal Government's flagship vehicle for strengthening Germany's venture capital landscape. With a total volume of € 10 billion until 2030, the fund is jointly implemented by BMWE, BMF, KfW Capital, and the European Investment Fund (EIF). The Future Fund operates as an umbrella structure, combining several specialised modules that address distinct financing needs across company stages and technology fields. Among these modules, the *Emerging Manager Facility* addresses the promotion of new, female and diverse management teams in venture capital funds. The *High-Tech Gründerfonds* (HTGF) *Opportunity Fund* enables promising startups from the HTGF, a public-private seed investor, to raise follow-on rounds and bridge the gap between

32 Die Start-up-Strategie derBundesregierung. BMWE (2022), *https://www.bundeswirtschaftsministerium.de/Redaktion/DE/Publikationen/Existenzgruendung/start-up-strategie-der-bundesregierung_in_german.pdf?__blob=publicationFile&v=4*

33 Zweiter Fortschrittsbericht zur Umsetzung der Start-up-Strategie der Bundesregierung, BMWE (2024), *https://www.publikationen-bundesregierung.de/pp-de/publikationssuche/start-up-strategie-2308820*

seed and growth financing. The *DeepTech & Climate Fund* (DTCF) acts as an anchor investor for companies in fields such as Industry 4.0, AI, robotics, quantum computing, and new energy, supporting deep-tech and climate ventures on their path to capital market maturity in close cooperation with private investors, who must always participate alongside public capital. The *Growth Fund Germany (Wachstumsfonds)* Deutschland invests as a fund-of-funds in growth-oriented Venture Capital (VC) funds, expanding the availability of large-scale growth capital for innovative technology companies. By early 2024, the Future Fund investment commitments amounted to €1.9 billion, with an additional €1.75 billion released to further expand financing for young, innovative technology companies.[34] Collectively, the Future Fund serves as the backbone of Germany's growth financing architecture, mobilising public and private investment to close long-standing scale-up financing gaps.

In September 2024, the WIN Initiative (Wachstums- und Innovationskapital für Deutschland) was launched jointly by the Federal Government, industry, and financial associations to improve framework conditions for growth and innovation capital.[35] The initiative aims to mobilise additional private investment and enhance the impact of the Future Fund through complementary measures, while also addressing regulatory and tax barriers to venture financing (more information on page 21).

Complementary legislative measures such as the Future Financing Act (Zukunftsfinanzierungsgesetz)[36], which improves tax treatment of employee share ownership and simplifies capital market access, and the EU Listing Act, which streamlines listing procedures for growth companies, further enhance the framework for start-up and scale-up financing in Germany.[37] As parts of the Listing Act require adaptation into national law, e.g. regarding multiple vote share structures and simplified prospectus requirements, these reforms are closely aligned with broader national initiatives such as the WIN Initiative, which aim to strengthen access to capital market and attract long-term growth and innovation capital.

Recognising the importance of diversity and inclusion, the strategy includes measures to reduce barriers to financing for female founders, aiming to foster a more inclusive start-up environment. It includes measures for socially beneficial or public welfare-oriented start-ups under its "common-good" field of action.

The government also plans to enhance networking within the start-up ecosystem by organising events like the "Start-up Summit Germany", which took place on 17 September 2024, and establishing a network of contact points for start-ups across all federal ministries and subordinate authorities. These efforts aim to promote collaboration among stakeholders and ensure the strategy's measures are implemented effectively within the current legislative period.

Latest Developments

The new government has in mid-2025 sought feedback and input from key stakeholders as they prepare for the development of an updated and new national start-up and scale-up strategy.[38]

34 Zweiter Fortschrittsbericht zur Umsetzung der Start-up-Strategie der Bundesregierung (2024), *https://dserver.bundestag.de/btd/20/129/2012940.pdf*

35 WIN Initiative Growth and Innovation Capital for Germany (2025) *https://www.kfw.de/Presse-Newsroom/Aktuelles/WIN-Inititiave/2024-09-26-Joint-commitment-WIN-initiative-EN.pdf*

36 Gesetz zur Finanzierung von zukunftssichernden Investitionen (Zukunftsfinanzierungsgesetz — ZuFinG) (2023), *https://www.recht.bund.de/bgbl/1/2023/354/VO*

37 EU Listing Act (2024), *https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=OJ:L_202402809*

38 Bundesministerium für Wirtschaft und Klimaschutz | BMWE, Bundeswirtschaftsministerium startet Stakeholder-Prozess für neue Startup- und Scaleup-Strategie der Bundesregierung, 12 August 2025, *https://www.bundeswirtschaftsministerium.de/Redaktion/DE/Pressemitteilungen/2025/08/20250812-bundeswirtschaftsministerium-startet-stakeholder-prozess-fuer-neue-startup-und-scaleup-strategie-der-bundesregierung.html*.

2. Different types of support for energy sector innovation – Quick Guide

The energy sector, especially in Europe and Germany, is undergoing a profound transformation driven by decarbonisation, digitalisation, and decentralisation. In this context, fostering innovation through energy-focused start-up ecosystems is essential to accelerate the clean energy transition. Governments, private actors, and organisations have developed a range of support mechanisms across four key domains: financial backing, ecosystem development, policy support, and knowledge sharing. Each of these areas plays a pivotal role in enabling energy start-ups to emerge and scale.

2.1 Financial Backing

The financing landscape for energy start-ups in Germany has developed significantly over the past decade. According to the 2025 Greentech Monitor, the total financing volume rose from approximately €620 million between 2015 and 2019 to €4.98 billion between 2020 and 2024.[39] This growth illustrates a sustained interest in technologies that contribute to the energy transition.

In international comparison, investment per capita in the United States remains approximately twice as high as in Germany. However, the rate of growth in Germany's energy start-up sector has been steeper: financing volumes increased by a factor of eight, compared to a threefold increase in the U.S. during the same period.

Across Europe, the investment landscape has been uneven, with overall equity funding trending downward in many markets since 2022. During the first half of 2025, Germany secured approximately USD 1.2 billion in equity investment – slightly behind the United Kingdom (USD 1.3 billion) but ahead of France (USD 0.7 billion).[40] Sweden and Finland followed with around USD 0.2 billion each. Positive year-on-year growth was concentrated in several few markets, including Ireland, the UK, the Czech Republic, Latvia, Romania, Bulgaria, and Slovakia, which is reflective of both resilience and ongoing volatility in investment activity.

Despite a general slowdown in overall equity activity, there are signs of renewed momentum. While VC investment across Europe remains below the record levels of 2021, Germany recorded a 7 % increase in the number of VC deals and a 34 % increase in total investment volume year-on-year in early 2025.[41] Start-ups from the energy sector ranked second by deal volume, achieving €922 million in investment, an increase of 164 % over the same period in 2024.

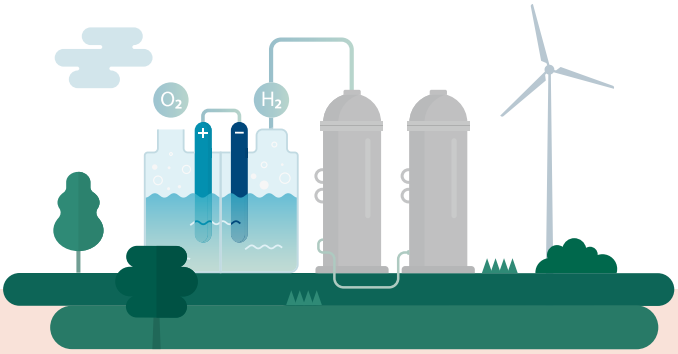
Overall capital demand in Germany continues to rise. The German Start-up Monitor 2024 reported a 4.6 % increase in capital needs among start-ups, underscoring the continued expansion of the start-up ecosystem and the growing appetite for private financing.[42]

39 GreenTech Monitor 2025 – Startups: Wachstum meets Energiewende. Deep Dive Energie. (2025).

40 State of Climate Tech H1 2025 Report, Net Zero Insights, 2025, *https://stateofclimatetech.com/h1-2025/*

41 EY Startup-Barometer July 2025, EY, 2025, *https://www.ey.com/de_de/functional/forms/download/2025/07/ey-startup-barometer-juli-2025*

42 Dr. Alexander Hirschfeld et al., Deutscher Startup Monitor 2024 (Startup-Verband, 2025), *https://startupverband.de/fileadmin/startupverband/mediaarchiv/research/dsm/Deutscher_Startup_Monitor_2024.pdf*.



Promoting Inclusive Funding for Energy Innovators in Germany and the EU

Germany and the European Union have implemented several initiatives to enhance inclusivity and access to funding for underrepresented innovators in the energy sector. In Germany, for example, the *exist Women programme*, provides targeted support for female founders through financial grants, coaching, mentorship, and networking opportunities. *University of Bonn* offers tailored support under the exist-Women programme, including up to €9,000 in grants, individualised coaching, and access to a network of diverse founders and experts.

At the EU level, the EIC and the European Institute of Innovation and Technology (EIT) complement national efforts through initiatives such as the *European Prize for Women Innovators* and *Women TechEU*. These programs offer equity-free funding, access to corporate partners, and tailored mentorship, aiming to reduce structural barriers for innovators who have historically faced limited access to capital and networks.

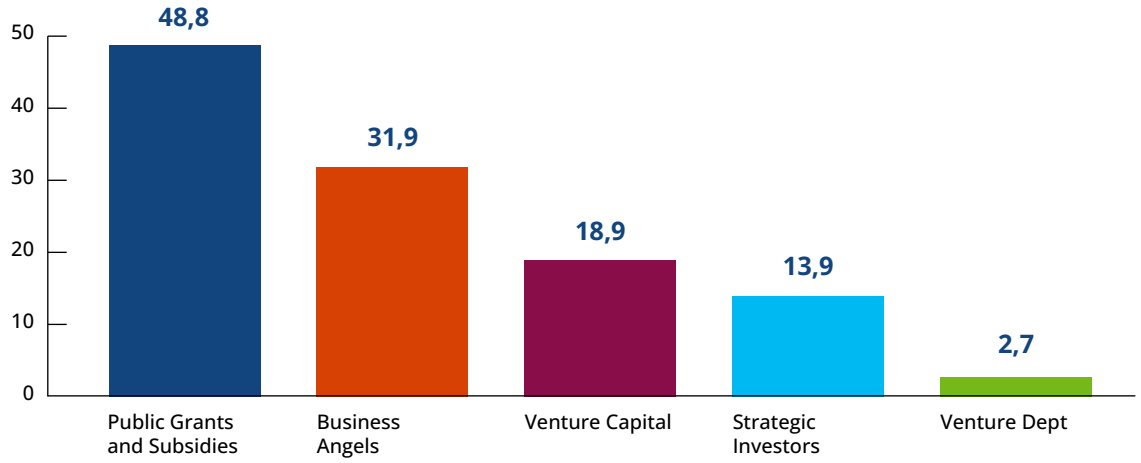
While gender-targeted initiatives are the most established, other inclusivity measures are being introduced. Many of these are embedded in broader innovation or digital start-up programmes, for example through accelerator tracks or mentorship schemes designed for diverse founder groups, rather than standalone long-term funding lines.

Collectively, these initiatives contribute to creating a more inclusive, equitable, and diverse energy innovation ecosystem, ensuring that talent from all genders, identities, and social backgrounds can access the resources, funding, and mentorship needed to drive Europe's clean energy transition forward. By actively supporting underrepresented founders, Germany and the EU are fostering innovation that reflects the society it serves and strengthens the overall competitiveness of the energy sector.

Energy start-ups in Germany access financing through a range of public and private instruments. According to the German Start-up Monitor 2024, the most commonly used sources of external financing include:

Usage Rates of Various Funding Sources Among Startups

Survey allowed multiple responses; percentages do not sum to 100 %



Infographic 3: Funding Composition and Sources in the German Start-up Landscape (in %);
Source: https://startupverband.de/fileadmin/startupverband/mediaarchiv/research/dsm/Deutscher_Startup_Monitor_2024.pdf

Public funding remains the primary external funding source, particularly during the early stages of company formation. This widespread availability of public support is seen as a stabilizing factor and contributes to a relatively strong early-stage funding environment in Germany.

At the same time, venture capital remains comparatively limited in Germany in international comparison and in relation to Germany's economic power. VC investment amounts to 0.18 % of GDP in Germany, below levels seen in France (0.25 %), the Netherlands (0.22 %), Denmark (0.28 %), and Finland (0.31 %). The EU average stands at 0.16 %, while the United States reaches 0.65 %, highlighting the broader gap in scale-up financing across Europe.[43]

Nevertheless, the German VC market has grown considerably over the last decade. VC investments in Germany have nearly quadrupled, increasing from €2.2 billion in 2014 to €7.6 billion in 2024. This long-term growth trajectory illustrates increasing interest from institutional and private investors in the start-up segment.

Despite this progress, challenges remain in later-stage financing. Financing rounds above €10 million, particularly in the scale-up phase, are more difficult to close. In rounds above €50 million, over half of the capital originates from foreign investors, highlighting the limited availability of domestic growth capital.[44]

Moreover, while 19 % of start-ups are currently VC-backed, interest from founders is significantly higher. Some founders express hesitation about VC involvement due to concerns about ownership and strategic dependence.[45] At the same time, studies show that VC-backed start-ups tend to scale faster and achieve greater innovation and commercialization success. Venture capital is also widely regarded as an important prerequisite for successful exits such as mergers and acquisitions or initial public offerings (IPOs), making it an essential component of a functioning start-up and scale-up ecosystem.

43 Ursula Walther, *German Startup Ecosystem – Punching below Its Weight* (Deutsche Bank AG, 2025), *https://www.dbresearch.com/PROD/RPS_EN-PROD/PROD0000000000593289/German_startup_ecosystem_%E2%80%93_punching_below_its_weig.pdf?&realload=ogW5LvdsJ5hxMkwfULV5OldffKa5PgVwK2gkd66SFzmf3t9mavAcwEghpi0wvL3h*.

44 Dr. Gregor Metzger and Dr. Steffen Viete, *The German Venture Capital Market after the Boom and Bust: Returning to a Sustained Upward Trend Should Be the Goal* (KfW Research, 2025), *https://www.kfw.de/PDF/Download-Center/Konzernthemen/Research/PDF-Dokumente-Fokus-Volkswirtschaft/Fokus-englische-Dateien/Fokus-2025-EN/Focus-No.-492-March-2025-VC-market-development.pdf*.

45 Walther, *German Startup Ecosystem – Punching below Its Weight.*

To navigate the diverse financing landscape in Germany and Europe, energy start-ups can access a variety of funding mechanisms, each suited to different stages, business models, and risk profiles. The table below provides an overview of key funding types, their target groups, and typical use cases:

Funding Instrument	Target Group	Start-up Stage	Funding Type	Provider
Incubation/Acceleration Programs	Business model validation, mentoring, stipends	Pre-Seed to Seed	Primarily non-dilutive (stipend-based); occasionally includes equity	Public institutions, private corporations, universities
Loans and Venture Dept	Asset-heavy models, revenue-generating start-ups	Seed to Growth	Debt (repayable)	Public banks, private lenders
Public-Private (Blended Finance)	High-risk innovation, pilot deployment, demonstration projects	Seed to Growth / Scale-up	Mixed	EU, federal initiatives, impact funds
Venture Capital (VC)	Fast-scaling start-ups with large market potential	Seed to Growth / Scale-up	Equity (dilutive)	Private VC firms, corporate VCs
Public Funding	R&D, prototype, commercialisation, scale-up support	Pre-seed to Growth/ Scale-up	Non-dilutive / blended	

Table 1: overview of key funding types, their target groups, and typical use cases

2.1.1. Public Funding

As outlined above, public funding remains the backbone of early-stage support for energy start-ups in Germany and the EU. These instruments are largely non-dilutive and focus on promoting innovation, economic development, and energy transition.

European-level programs are particularly relevant for cross-border collaboration and deep-tech development. The financing for energy start-ups operates within the Multiannual Financial Framework (MFF) 2021-2027, complemented by the NextGenerationEU recovery instrument.[46] This framework sets thematic and administrative boundaries while allowing considerable flexibility and combinability (blending) of funds. Various funding programs and instruments overlap in their objectives and can be used synergistically to maximize impact. They also serve an important signaling function, as pan-European selection processes (e.g. Innovation Fund tenders) highlight promising start-ups beyond those that ultimately receive funding, creating opportunities for national co-funding and follow-on support.

Key instruments include:

- *Horizon Europe*: supports collaborative research and demonstration projects
- *Innovation Fund*: Focused on large-scale industrial decarbonization and clean energy technologies, the fund supports demonstration and first-of-a-kind projects, including renewable hydrogen and energy storage.
- *European Regional Development Fund* (ERDF) & *Just Transition Fund*: Address regional innovation and energy transition needs, especially in coal-dependent or energy-intensive regions facing structural change.
- *Digital Europe Programme*: Supports digital infrastructure and technologies critical for the energy transition, including AI, smart grids, and cybersecurity.
- *Strategic Technologies for Europe Platform* (STEP): Established to coordinate and combine funding streams from Horizon, Digital Europe, InvestEU, and Innovation Fund, focusing on strategic energy and industrial technologies

46 Alix Delasnerie, *Multiannual Financial Framework | Fact Sheets on the European Union,* 31 March 2025, *https://www.europarl.europa.eu/factsheets/en/sheet/29/multiannual-financial-framework*.

At a national level, Germany complements this with a mix of federal and state initiatives that are characterized by a mix of direct public financing (grants, loans) combined with mechanisms that mobilize private risk capital. Key national programs targeting different stages and technologies can be found in section 3.

2.1.2. Incubation and Acceleration Programmes

Incubators and accelerators, while primarily providing infrastructure and networks, often also complement early-stage financial support. They often offer stipends, grants, or small-scale convertible loans that help founders validate ideas, develop prototypes, and prepare for first investment rounds.

2.1.3. Public-Private (Blended Finance) Instruments

Blended finance combines public and private capital to fund innovations with high technological or market risk that may otherwise struggle to attract commercial investments. By de-risking investments through public co-financing, guarantees, or first-loss capital, these instruments make it more attractive for private investors to engage in high-impact sectors of the energy transition. At the European level, the EIC Accelerator under Horizon Europe provides blended support through a mix of grants (up to €2.5 million) and equity (up to €15 million) to support breakthrough innovations reach market. Complementing this, InvestEU mobilises private capital at a larger scale by offering EU budget guarantees to financial intermediaries such as the European Investment Bank Group. Germany applies blended finance models through the Future Fund, notably the Growth Fund Germany and the DeepTech & Climate Fund. These vehicles blend public and private capital to strengthen growth financing for deep-tech and climate-tech ventures, including hydrogen, industrial decarbonisation, and energy storage.

2.1.4. Venture Capital and Corporate Venture Capital

Venture capital continues to play a vital role for start-ups seeking rapid growth. In Germany, specialised funds focusing on energy and climate-tech have become increasingly active, even though the country's overall VC market remains smaller than those of the UK, France, the Netherlands, and several other European peers. Beyond providing capital, VC funding often brings strategic expertise and access to new markets, yet it also entails equity dilution and greater investor influence – factors that can make some founders cautious, especially in the early stages. Despite a recent dip in climate-tech investment volumes, Europe continues to lead globally in impact-driven venture capital activity.[47]

Corporate Venture Capital (CVC) also plays an important role in supporting energy start-ups and driving innovation. Through CVCs, established energy companies and industrial players invest strategically in young firms to access emerging technologies, new business models, and agile innovation processes. For start-ups, CVC investment offers not only financial resources but also valuable industry expertise, infrastructure access, and market networks that can accelerate commercialisation. In the context of the energy transition, CVCs help bridge the gap between early-stage innovation and large-scale deployment, fostering collaboration across the energy value chain.

2.1.5. Loans and Venture Debt

Start-ups with predictable revenues or capital expenditures can access loans or venture debt. Public development banks such as KfW offer energy-related programs with favourable conditions. Venture debt, typically used in later growth stages, plays an increasingly important role for deep-tech and capital-intensive energy start-ups, as it complements equity rounds without further dilution. However, there remains a strong demand for expanding and institutionalising venture debt mechanisms in Germany to better meet the financing needs of scaling technology companies.

47 *Report 2024: Beyond Returns – Venture and Growth Investing Fueling Sustainability & Societal Change* (2024), *https://www.europeanwomenvc.org/resources/european-women-in-vc-report-2024*.

WIN INITIATIVE

The *WIN Initiative* (Wachstums- und Innovationskapital für Deutschland – Growth and Innovation Capital for Germany) is a joint effort by industry and government to strengthen growth and innovation capital and improve the framework conditions for market-oriented venture investments. It was officially launched through a Declaration of Intent signed in September 2024 during the Startup Summit, marking a shared commitment to mobilise substantial private and institutional capital for innovation and scale-up financing in Germany.

WIN is coordinated by KfW as the public partner and platform facilitator, bringing together federal ministries, investors, and industry associations. Its objective is to make Germany more attractive as a location for venture and growth capital by improving regulatory, fiscal, and market conditions.

The initiative is built around two main pillars:

1. A 10-measure action package spanning the entire start-up value chain, from early-stage support and fund-raising to scale-up financing and secondary markets, to strengthen venture capital investment throughout all growth phases.

2. A joint commitment by public and private partners to mobilise substantial additional venture capital of €12 billion by 2030.

Among its priorities is the financing of First-of-a-Kind (FOAK) projects, which represent the first commercial scaling of innovative technologies in fields such as clean energy, hydrogen, and industrial decarbonisation. FOAKs often face limited financing due to high technological and project risks. By addressing these barriers, WIN helps bridge the gap between innovation and commercial scale.

Over the longer term, the current federal government in its coalition agreement sets the goal for investor commitments under the WIN Initiative to more than double to over €25 billion, to be further leveraged through federal guarantees.

2.2. Ecosystem Development

For energy start-ups, innovation requires not only funding but also access to physical and digital infrastructure. Unlike digital-only sectors, energy innovation often involves hardware development, integration with existing systems, and regulatory testing environments. In addition, industry associations and networks play a crucial role by connecting start-ups and scale-ups with established market players, policymakers, and research institutions – facilitating collaboration, knowledge exchange, and advocacy for more innovation-friendly regulatory frameworks.

The transition to a clean and resilient energy system depends heavily on the success of start-ups and innovators bringing new solutions to market. In Europe and Germany, a multifaceted support ecosystem has been developed to enable this, encompassing financial instruments, infrastructure, favourable policies, and robust knowledge-sharing networks. As the energy sector continues to evolve rapidly, adapting and strengthening these support mechanisms will be critical to meet climate goals and sustain economic competitiveness.

2.2.1. Innovation Hubs and Networks

Innovation hubs and networks create collaborative environments where energy start-ups, research institutions, and corporations can jointly develop and test new technologies. They combine access to key infrastructure, such as prototyping labs and demonstration spaces, with community-building activities that foster innovation.

Across Germany, hubs like Berlin's *Future Energy Lab* and the *Munich Urban Colab* bring together start-ups, utilities, and municipalities to advance digital and cross-sector energy solutions. These regional ecosystems are increasingly interconnected through national programs such as the *Digital Hub Initiative (de:hub)*, coordinated by the BMWE and the BMDS. This initiative links 25 independent innovation hubs under a shared brand and collaboration platform, enhancing visibility and knowledge exchange across regions. Examples include *digihub* in Düsseldorf, which focuses on GreenTech and sustainability-driven digital solutions, the *Greentech Hub* in Rostock/Greifswald, supporting climate and energy innovation in northern Germany, and *GATEWAY49* in Lübeck, an accelerator dedicated to renewable energy and maritime technologies.

German innovation hubs are also part of international networks such as the *Impact Hub* network, which connects innovators across seven German and over 100 global Impact Hub locations. These linkages expand access to global partners, investors, and markets and strengthen Germany's position within the broader international clean-tech innovation landscape.

2.2.2. Regulatory Sandboxes (Reallabore)

Regulatory sandboxes (Reallabore) provide real-world environments where innovative technologies, services, or business models can be tested for a limited period under regulatory supervision. They create space for experimentation and "regulatory learning", allowing policymakers and innovators to identify barriers, assess risks, and adapt legal frameworks based on practical insights.

In the energy transition, Reallabore are used to trial system-relevant innovations such as hydrogen production, sector coupling, grid flexibility, and digital energy services. The BMWE's programme *Reallabore der Energiewende* is one of the flagship instruments supporting large-scale demonstration projects in these areas.

In May 2025, the Federal Government adopted the Regulatory Sandboxes Act, establishing a comprehensive legal and administrative framework to simplify approval processes, harmonise experimentation procedures, and strengthen knowledge transfer from testing into legislation. The Act also anchors the Regulatory Sandboxes Innovation Portal, launched on 22 May 2025, as a central point of contact for advice, networking, and documentation of regulatory sandboxes in Germany. The accompanying *Regulatory Sandboxes Network*, with more than 1,000 members from business, academia, and public administration, promotes exchange and mentoring between practitioners.

2.2.3. Spin-off and Spin-out Programmes

Spin-off and spin-out programmes in Germany are key to transforming academic research and corporate innovation into successful energy start-ups. The terms 'spin-out' and 'spin-off' are sometimes used interchangeably, but most commonly distinguished as follows: spin-outs usually originate from universities and research institutions, where a new business is built around intellectual property, often patents, with the main goal of commercialising or monetising that IP. Spin-offs, by contrast, often emerge from corporate innovation activities, typically as existing divisions or units of a parent company that are developed into independent ventures. Both formats play a critical role in bridging the gap between knowledge creation and market application in the energy transition.

Fraunhofer AHEAD stands out as a dedicated programme that leverages Fraunhofer's applied research base and close ties to industry. It provides spin-out teams with direct access to Fraunhofer's research infrastructure and networks, creating strong opportunities to commercialise high-impact technologies in areas like hydrogen and energy storage. *Science & Startups*, the joint initiative of Berlin's major universities, distinguishes itself by pooling resources across institutions. This collective approach provides start-ups emerging from diverse research fields with broader visibility, critical mass, and stronger investor outreach than a single-university incubator could achieve.

UnternehmerTUM in Munich combines venture building programmes, accelerator formats like TechFounders, and access to labs and prototyping facilities. Closely linked to the *Technical University of Munich (TUM)*, it has become a leading hub for deep-tech and energy-related spin-outs. A distinctive feature is its entrepreneurship course, which pairs PhD students with business students to transform scientific ideas into viable companies. UnternehmerTUM serves as a parade example of a spin-out ecosystem and as a blueprint for the ten new *Start-up Factories* currently being established across Germany under the WIN Initiative.

SET Hub

SET Hub, established by the German Energy Agency (dena) on behalf of the Federal Ministry for Economic Affairs and Energy, has been supporting start-ups and aspiring entrepreneurs in the energy transition and climate-tech sectors since 2020. Through various formats, including knowledge workshops, individual consulting for start-ups and scale-ups, pilot projects and networking opportunities, SET Hub is the central point of contact for the energy start-up ecosystem in Germany.

2.2.4. Incubation and Acceleration Programmes

Incubators and accelerators provide early-stage support to energy start-ups, offering stipends, coaching, workspace, and access to partner networks that facilitate technology validation and market readiness. Programmes which include incubation-like modules and university-based incubators are particularly relevant for research-oriented start-ups developing solutions in renewable energy, energy efficiency, and smart systems.

In addition, specialised accelerators have emerged in recent years. *AXEL – the Energy Accelerator*, supported by the State of Baden-Württemberg, offers targeted mentoring, financing support, and links to industry for early-stage energy start-ups. The *SET Hub*, supported by the BMWE and operated by dena, provides mentoring, coaching, pilot opportunities, and networking with a specific focus on energy and climate-tech start-ups. *SpinLab – The HHL Accelerator* in Leipzig supports high-growth start-ups in energy, smart city, and e-health sectors, standing out for its strong investor network and industry partnerships. Alongside these specialised initiatives, corporate accelerators are also active in the energy transition space, especially in fields such as mobility, smart grids, or heating.

SPRIND – GERMANY'S AGENCY FOR DISRUPTIVE INNOVATION

The Federal *Agency for Disruptive Innovation (SPRIND)* has become a flagship example of how governance reform can unlock breakthrough innovation. Founded in 2019 and overseen by the Federal Ministry of Research, Technology and Space (BMFTR), SPRIND supports radical, high-risk innovation projects that fall outside conventional R&D or venture-capital mechanisms. It funds and incubates transformative ideas in fields such as energy, materials, and biotechnology, helping them transition from concept to market-ready applications. A core element of SPRIND's work are its 'Challenges', which are innovation competitions that tackle major societal and technological issues. Interdisciplinary teams develop solutions to defined missions with full freedom in their approach, typically targeting Technology Readiness Levels (TRL) 3-7, bridging experimental feasibility and the development of marketable prototypes. This format promotes creativity, rapid iteration, and practical application.

With the adoption of the *SPRIND Freedom Act (SPRIND-Freiheitsgesetz)* in December 2023, the agency gained unprecedented operational flexibility. The law allows SPRIND to recruit talent under private-law contracts, grant equity participation, and make investment decisions independently, aligning its structure more closely with international innovation agencies such as ARPA-E in the United States or the UK's ARIA. This reform aims to reduce administrative bottlenecks and enable SPRIND to respond dynamically to emerging technological opportunities – a decisive step in modernising Germany's public innovation architecture.

SPRIND's approach has drawn significant international attention. Policymakers in France and other EU Member States have announced plans to explore similar "freedom laws" to create more agile public innovation agencies inspired by the German model . As a result, SPRIND is increasingly viewed as a pioneer of institutional innovation, offering a blueprint for how Europe can accelerate deep-tech and climate-tech breakthroughs through more flexible governance.

48 Freiheit, Sicherheit und Wohlstand gemeinsam sichern (2025), *https://www.bundeskanzler.de/bk-de/aktuelles/pressekonferenz-merz-macron-toulon-2382296*

3. Case Studies – Support Mechanisms from Europe and Germany

This chapter presents a selection of European and German support mechanisms, including institutions, funds, and programmes, suitable for energy innovators and start-ups. The case studies are particularly relevant for founders, early-stage companies, and scale-ups and are designed to address a range of financing and growth needs – from seed-stage grants and accelerator support to venture growth capital and large-scale innovation or infrastructure funding. Collectively these mechanisms cater to start-ups seeking to advance clean energy solutions, navigate regulatory and market barriers, and expand within the German and greater European evolving innovation ecosystem.

European Union

1. European Innovation Council (EIC) Accelerator

The EIC Accelerator is part of the European Innovation Council under Horizon Europe, created to identify, fund, and scale breakthrough innovations that carry high technological risk but have the potential to create entirely new markets. Unlike many other EU programs, it integrates both non-dilutive grants and equity financing, making it one of the most flexible instruments available for deep-tech ventures. It is particularly well-suited for technologies that are beyond the research stage but still face challenges in commercialisation.

Audience / Eligibility:
The program primarily targets start-ups and small to medium-sized enterprises (SMEs), including spin-outs from universities and research institutions. Applicants must be established in an EU member state or a Horizon Europe associated country. Proposals must demonstrate breakthrough innovation, high scalability, and a strong potential to disrupt or create markets. Fields range from biotech, cleantech, and space tech to artificial intelligence and quantum computing.

Benefits for Recipients:
Successful applicants can receive up to € 2.5 million in grant funding for innovation activities (e.g., prototyping, testing, market validation) and up to € 15 million in equity financing for scaling and market entry. In addition to funding, beneficiaries access business acceleration services, expert mentoring, intellectual property support, networking with corporates and investors, and international visibility through the EIC community. This combination of financial and non-financial support is designed to significantly de-risk market entry.

2. Innovation Fund

The Innovation Fund is one of the world's largest programs supporting the demonstration and scale-up of innovative low-carbon technologies, with billions of euros available between 2020 – 2030. It is directly tied to the EU ETS, with funding coming from the auctioning of emission allowances. The Fund provides non-repayable grants to cover a share of project costs and is central to achieving the EU's climate neutrality targets by 2050, particularly in hard-to-abate industrial sectors. While the Fund itself does not offer loans or equity, projects may combine Innovation Fund grants with other EU or national financing instruments to reach full financial closure.

Audience / Eligibility:
The Fund is open to companies, consortia, and public entities developing projects in renewable energy generation, energy storage, carbon capture and storage (CCS), and low-carbon processes in energy-intensive industries (such as steel, cement, or chemicals). Both large-scale projects (over €7.5 million capital expenditures (CAPEX)) and small-scale projects (under €7.5 million CAPEX) are eligible. For start-ups and scale-ups, the small-scale and pilot project categories provide an important entry point to finance first-of-a-kind (FOAK) technologies that are technically proven but not yet commercially viable. Applicants must be established in EU member states, Iceland, or Norway. Projects must be highly innovative, significantly reduce greenhouse gas emissions, and be ready for deployment within a defined timeframe.

Benefits for Recipients:
The Innovation Fund can cover up to 60 % of total project costs, including both CAPEX and operational expenditure (OPEX). Payments are made based on project milestones

and verified emission reductions, which reduces financial risk for early movers. In addition to financial support, recipients gain visibility at the EU level, making it easier to attract co-investments and partnerships. For many industrial players, this de-risking mechanism is crucial to moving from pilot-scale to commercial deployment.

3. European Investment Bank (EIB)

The EIB is the EU's financial institution, jointly owned by its 27 member states. It provides loans, guarantees, equity investments, and advisory services to projects that support EU priorities such as climate action, sustainable infrastructure, digitalisation, and innovation. Unlike grant programs, the EIB focuses on providing large-scale financing at favourable terms, often leveraging private investments alongside public funds. The recently launched TechEU platform (2025) is specifically relevant for start-ups and scale-ups. It simplifies access to EIB Group financing instruments and advisory support, acting as a single-entry point for innovative companies seeking growth and venture debt financing across the EU.

Audience / Eligibility:

The EIB's clients range from national and regional governments to municipalities, corporates, commercial banks, SMEs and scale-ups. It is particularly active in financing large infrastructure projects (transport, renewable energy, digital networks) but also supports innovation-driven SMEs and scale-ups through intermediaries such as local banks. Eligibility is tied to alignment with EU policy goals, environmental and social sustainability standards, and financial soundness of the project.

Benefits for Recipients:

Recipients benefit from access to long-term, low-interest loans that may not be available from commercial banks, as well as guarantees and equity participation in some cases. The EIB often acts as an anchor investor, attracting additional private financing by reducing risk for co-investors. Beyond financing, the EIB provides advisory and technical assistance to improve project design and implementation, ensuring projects are bankable and impactful.

4. European Regional Development Fund (ERDF)

The *ERDF* is one of the EU's Cohesion Policy instruments, designed to reduce economic, social, and territorial disparities between regions. It focuses on strengthening regional innovation, supporting SMEs, improving infrastructure, and promoting the transition to a low-carbon economy. The fund is managed at the national and regional levels through Operational Programs tailored to the development needs of each region.

Audience / Eligibility:

Eligible applicants include public authorities, research institutions, SMEs, non-governmental organisations (NGOs), and in some cases large enterprises. The exact criteria depend on the priorities of each region's Operational Program. For example, a less developed region may focus on basic infrastructure and SME support, while a more advanced region might prioritise cutting-edge R&D and digitalisation. Cross-border and interregional cooperation projects are also eligible through specific ERDF strands.

Benefits for Recipients:

Although ERDF funding is primarily directed to public authorities, research institutions, and regional programmes, start-ups and scale-ups benefit indirectly through the strengthened innovation ecosystem it creates. This includes access to upgraded research and innovation facilities, technology transfer and incubation services, and support programmes for SMEs and clusters that provide mentoring, networking, and growth opportunities. By fostering collaboration between start-ups, larger enterprises, academia, and public institutions, ERDF funding helps emerging companies innovate, scale, and access new markets more effectively, even without being the direct recipients of grants.

5. Innoenergy

Founded in 2010 under the European Institute of Innovation and Technology (EIT), InnoEnergy has evolved from a European innovation community into an independent industrial and investment platform that continues to advance the EU's energy and climate objectives. It plays a central role in accelerating innovations across the sustainable energy value chain, from energy efficiency and renewables to storage, mobility, and smart grids. Its mission is to drive the energy transition by supporting innovation, business creation, and education. In recent years, InnoEnergy has expanded its mandate beyond innovation support to include direct investment and fund co-creation, aiming to mobilise up to €160 billion in clean-tech investment by 2030.

Audience / Eligibility:
Innoenergy supports start-ups, scaleups, corporates, universities, and research organisations across the EU and associated countries. It focuses on clean energy technologies that have strong potential to reduce CO_2 emissions and strengthen Europe's industrial base. Typical applicants include early-stage companies seeking to commercialise an energy innovation, universities developing spin-outs, and corporates engaging in collaborative projects.

Benefits for Recipients:
Innoenergy provides access to investment and tailored acceleration services, including business development expertise, go-to-market support, and access to industrial partners. Start-ups benefit from introductions to investors, corporates, and public authorities, as well as support in internationalisation and scaling. As part of a network of over 500 partners, participants gain access to Europe's sustainable energy ecosystem.

6. Climate-KIC

Climate-KIC is a knowledge and innovation community under the EIT, focusing specifically on tackling climate change through innovation and systemic transition. Unlike purely technology-focused programs, Climate-KIC also works on systemic approaches such as urban transformation, sustainable finance, and policy innovation.

Audience / Eligibility:
Its audience is diverse, including start-ups, SMEs, research institutions, universities, corporates, cities, regions, and NGOs. Eligible projects often involve cross-sectoral collaborations aimed at reducing carbon emissions, adapting to climate change, or reshaping economic and social systems for sustainability. Education and skills development are also central, with programs for students, entrepreneurs, and professionals.

Benefits for Recipients:
Climate-KIC provides tailored support depending on the type of participant. Start-ups and SMEs can access incubation, acceleration, and funding opportunities. Cities and regions benefit from systemic innovation programs that help them design and implement climate strategies. All recipients gain access to a large European ecosystem of climate innovators, which facilitates knowledge sharing, partnerships, and visibility. In this way, Climate-KIC helps accelerate solutions while enabling system-level change.

Germany

1. ERP Startup Loan (StartGeld)

The ERP Startup Loan – StartGeld is a financing instrument provided by KfW (a German state-owned investment and development bank) and backed by the ERP Special Fund. It is designed to help entrepreneurs and small businesses access capital for starting, consolidating, or expanding their operations. The loan aims to lower the barrier for financing in the early stages when private financing is often difficult to secure.

Audience / Eligibility:
The program targets founders, start-ups, and small businesses in Germany that have been active for less than 5 years. Eligible purposes include investments, working capital, purchasing equipment, or acquiring another business. Applicants typically need a solid business plan and go through their local bank, which submits the loan request to KfW.

Benefits for Recipients:
Recipients can access favourable financing terms for investments, working capital, equipment purchases, or company acquisition. Under the ERP Startup Loan scheme, *KfW assumes 80 % of the credit risk of the participating bank*, thereby lowering the collateral burden and improving access to credit. Interest rates are fixed for the term of the loan and currently approximately 2.05 % for five year terms and 2.7 % for ten year terms. The credit cap is up to €125,000 under typical use, and the loan may cover up to 100 % of eligible costs, meaning that the full portion of certain expenditures may be financed (subject to eligibility and underwriting).

2. exist (Existenzgründungen aus der Wissenschaft)

exist is a nationwide program funded by the German Federal Ministry for Economic Affairs and Energy (BMWE) and the European Social Fund (ESF). It supports university-based entrepreneurs in translating their research into innovative business ventures. exist is a cornerstone of Germany's efforts to foster academic entrepreneurship.

Audience / Eligibility:
The program is aimed at students, graduates, and scientists from universities and research institutions in Germany. To be eligible, applicants must be planning to launch a technology- or knowledge-based start-up. Universities act as the formal applicants, and teams must be hosted by them during the funding period. exist comprises several complementary sub-programmes and initiatives addressing different stages and target groups of academic entrepreneurships:

- *exist Start-up grant (Gründerstipendium)*: Provides individual founders and small teams with monthly grants, material funding, and coaching for up to one year to prepare business plans and prototypes.
- *exist Research Transfer (Forschungstransfer)*: Supports the commercialisation of advanced research results with high technical risk, funding both the development work within research institutions and the subsequent company formation phase.
- *exist Women*: Strengthens female entrepreneurship in academia by offering targeted mentoring, training, and financial support for women intending to start a business.
- *exist Start-up Factories*: Building on the exist model, the Federal Government is establishing ten university-based Start-up Factories across Germany. These hubs pool infrastructure, expertise, and investor networks to enable professional venture development and stronger connections between research, industry, and private capital.

Benefits for Recipients:
Funding includes living allowances for founders (up to 12 months), as well as material costs and coaching support. The program also provides up to €150,000 for teams, depending on their size and qualification. Beyond financial support, recipients benefit from mentoring, entrepreneurship training, and access to university infrastructure.

3. KfW Capital

KfW Capital, often referred to in the start-up context as KfW Venture, is an investment arm of KfW that strengthens the German venture capital ecosystem. KfW invests in German and European venture capital funds, thereby improving growth capital access through larger venture capital funds.

Audience / Eligibility:
The program targets innovative start-ups and growth-stage companies in Germany by providing them with improved access to venture capital. However, the direct recipients are venture capital funds, which in turn invest in eligible start-ups across sectors like digital technologies, life sciences, and green tech.

Benefits for Recipients:
By enlarging the pool of venture capital available in Germany and Europe, start-ups benefit from greater funding opportunities and stronger investor networks. KfW Capital's participation also de-risks private investments, encouraging more capital to flow into German high-tech and scale-up ventures.

4. Future Fund (Zukunftsfonds)

The *Future Fund* was launched in 2021 by the Federal Government and KfW Capital to strengthen growth financing for innovative start-ups and scale-ups in Germany. With a total volume of €10 billion, it is the largest public initiative to expand the availability of venture and growth capital and plays a central role in advancing Germany's start-up and scale-up ecosystem.

Audience / Eligibility:
The Future Fund is aimed at innovative and high-growth start-ups in Germany, particularly those in later stages of development that require large financing rounds. It combines direct investment instruments, such as the *High-Tech Gründerfonds* and the *DeepTech & Climate Fund*, which provide co-investments in early and growth-stage ventures, with indirect instruments under an umbrella structure, including the ERP Venture Capital Fund of Funds managed by KfW Capital. Together, these mechanisms mobilise private capital and expand the overall pool of venture financing available to German start-ups.

Benefits for Recipients:
The fund improves access to late-stage and growth capital, helping German start-ups compete globally. It supports a broad range of instruments, including direct and indirect equity financing, growth funds, and specialised instruments for deep-tech ventures. By mobilising private capital alongside public contributions, it multiplies the funding available to scaleups.

5. Climate and Transformation Fund (Klima- und Transformationsfonds, KTF)

The Climate and Transformation Fund is a special federal fund that finances Germany's energy transition, climate protection goals, and industrial transformation. It consolidates revenues from carbon pricing and emissions trading into a dedicated financing instrument for climate action.

Audience / Eligibility:
The fund targets a wide range of stakeholders, including companies, industries, municipalities, and households, depending on the program line. Eligible areas include renewable energy expansion, energy-efficient buildings, sustainable mobility, hydrogen economy, and industrial decarbonisation.

Benefits for Recipients:
Recipients benefit from substantial subsidies and financing for climate-friendly investments, ranging from infrastructure development to energy efficiency retrofits. For industry, the fund provides crucial support for transitioning to low-carbon processes, while for households and municipalities, it enables access to funding for sustainable energy solutions and mobility projects.

6. INVEST – Grant for Venture Capital (INVEST – Zuschuss für Wagniskapital)

INVEST is a funding program of the BMWE designed to incentivise private investors to provide venture capital to young, innovative companies in Germany. By reducing the risks of early-stage investments, it aims to channel more private money into start-ups.

Audience / Eligibility:
Eligible start-ups must be young (less than 7 years old), innovative, and based in Germany. Eligible investors are private individuals or business angels who provide venture capital to such companies. Institutional investors are not covered.

Benefits for Recipients:
Start-ups indirectly benefit because investors receive a 15 % acquisition grant on their investment (up to €500,000 per year) and a tax-free reimbursement of capital gains if the shares are sold after at least three years. This makes investments into early-stage start-ups more attractive, thereby improving their chances of securing venture funding.

4. Conclusion and Key Takeaways

The European Union and Germany have established a multi-layered framework to strengthen clean energy innovation and entrepreneurship. At the European level, regulation is expanding steadily, with initiatives such as the Clean Industrial Deal, the Competitiveness Compass, and the updated Start-Up and Scale-up Strategy providing direction to growth. At the national level, Germany is pursuing similar objectives with the new government prioritising competitiveness and economic strength and preparing a new Start-up and Scale-up Strategy to complement the Energiewende.

4.1 Key Takeaways

- **Policy as a catalyst for innovation and competitiveness:** EU measures such as Fit for 55, Green Deal instruments, REPowerEU and the 2025 Start-up & Scale-up Strategy reduce fragmentation and create clearer conditions for markets, finance, and talent. Germany's Energiewende and the forthcoming Start-up and Scale-up Strategy reinforce this trajectory by providing long-term signals and national-level support.

- **Financing momentum with persistent gaps:** Financing for energy start-ups in Germany has expanded eightfold in the past decade, reflecting strong investor interest. Public support stabilises the early stages, while later-stage financing above €10 million remains challenging, especially for deep-tech innovation, and large-scale rounds above €50 million continue to rely heavily on foreign investors.

- **Instruments are in place to mobilise private capital:** EU programmes (Horizon Europe, Innovation Fund, InvestEU) and national mechanisms (the Future Fund, WIN Initiative, Climate and Transformation Fund) have broadened the availability of capital and play a key role in leveraging private investment for demonstration and first-of-a-kind-projects.

- **Inclusivity is a lever for resilience and growth:** Programmes at both EU and national levels (e.g., exist-Women; EIC/EIT initiatives; National Start-up Strategy actions; the EU's "Blue Carpet" talent pillar) aim to broaden access to finance and networks for underrepresented founders and to attract international talent.

- **Ecosystem infrastructure supports the full lifecycle:** Innovation hubs, testing facilities, and spin-out programmes illustrate how dedicated platforms support start-ups from research commercialisation through to market entry and scaling, and offer models for international exchange and cooperation.

- **Headwinds require targeted fixes:** Reduced allocations under the Federal Energy Research Programme in 2024 raised concerns about innovation capacity. The forthcoming Start-up and Scale-up Strategy and expanded financial instruments demonstrate ongoing policy commitment to support innovation.

- **Structural challenges with international dimensions:** Infrastructure bottlenecks, fiscal pressures, and workforce shortages are significant hurdles. Yet Germany's openness to international start-ups and skilled workers offers a pathway to mitigate these challenges while fostering stronger international linkages.

4.2 Outlook

Germany and Europe have established a strong foundation of financial instruments and support mechanisms for start-ups and innovators in the energy and climate-tech sectors. However, moving from research to commercialising and scaling remains a central challenge. The next phase of policy action should focus on sustaining and scaling successful programmes and initatives, adapting the government's role as markets mature, and closing the remaining structural and financing gaps that limit growth and competitiveness.

4.2.1 Sustain and Scale Effective Programmes

Core financing instruments should be stabilised through a long-term predictable funding framework that is independent of annual budget decisions. This would secure continuity and planning certainty for key mechanisms such as the Future Fund, High-Tech Gründerfonds (HTGF) and KfW innovation lines.

The Future Fund should be further developed with a dedicated focus on energy and climate technologies, digitalisation, infrastructure, and critical sectors (KRITIS) to address Germany's strategic industrial needs. To bridge the persistent gap between seed and series A/B financing, a dedicated follow-up fund building on the experience of the HTGF could be established. Such a separate vehicle would ensure appropriate risk assessment and investment criteria for later-stage ventures.

Public–private financing instruments remain central to bridging early- and growth-stage funding gaps and should be strengthened as a stable pillar of Germany's innovation landscape. Furthermore, programmes that deepen the academic entrepreneurship pipeline, such as exist and the Start-up Factories, should be continued, advanced and institutionalised to better commercialise research and attract private co-investment.

Regulatory Sandboxes of the energy transition should continue to serve as testbeds for new energy business models. Cross-border cooperation and knowledge exchange should be enhanced through links between national innovation hubs (e.g., SET Hub, Future Energy Lab) and leading international ecosystems.

4.2.2 Evolve and Integrate Mature Markets

As segments of the innovation ecosystem become more established and reach maturity, public intervention should shift towards coordination, harmonisation, and framework development, moving beyond direct support to foster a more integrated and efficient European innovation and investment landscape.

Early-stage incubation support remains essential. Additional funding should be allocated to strengthen early-stage incubation support, particularly in targeted, high-risk sectors where entry barriers are high and strong technical expertise is required, rather than toward general start-up promotion.

Public–private mechanisms should incorporate long-term transition planning from the outset, ensuring that public funds act as catalysts for risk-taking but gradually give way to private capital as markets mature. In this sense, government's role becomes increasingly one of market enabler rather than permanent financier.

4.2.3 Close Remaining Gaps and Barriers

Germany faces persistent challenges, and they must be addressed to ensure the countries strong innovation base translates into global competitiveness. Innovation grants must be coordinated with venture capital and debt financing offers, and validation and due-diligence processes for start-ups should be streamlined and aligned across programmes to reduce complexity, shorten approval timelines, and build investor confidence.

Reforming IP and university spin-out frameworks is critical to accelerate the commercialisation of research and ensure that Germany's strong patent portfolio leads to viable businesses. Strengthened regulatory sandboxes can further support early deployment by offering start-ups flexible, digitalised, and agile testing environments, with active participation from public-sector partners such as municipalities and utilities.

A stronger focus on scaling and deployment is essential to retain value creation in Europe. For climate tech start-ups and scale-ups, this implies better support to move from pilot projects to market-ready solutions – including access to finance for growth, streamlined permitting and regulatory pathways, and opportunities for large-scale demonstration in real market settings. Strengthening Europe's capacity to commercialise and deploy homegrown energy innovations, while reducing reliance on non-European technologies and supply chains, will be key to ensuring technological sovereignty and long-term competitiveness. Finally, strategic coordination between ministries, EU programmes, and research organisations is essential. Aligning technology promotion, Horizon Europe funding, and national innovation initiatives will ensure a coherent support pathway from R&D to commercial scale-up.

4.2.4 International Perspectives and Knowledge Transfer

Many of the lessons from Germany's and Europe's start-up financing architecture and support mechanisms are relevant to other countries. Through partnerships between countries, such mechanism can inspire tailored approaches that strengthen innovation ecosystems globally.

Key transferable insights include:

- Hybrid financing models that blend public and private capital to de-risk early technologies;
- Long-term public anchor instruments that catalyse market creation without distorting competition;
- Institutionalised cooperation between research and finance, and policy to accelerate the commercialisation of innovation; and
- Testbed and sandbox frameworks that enable experimentation within safe regulatory boundaries

These approaches can be adapted and applied in other regions and countries, combining German and European experience with local needs and capital structures. Energy Partnerships provide an effective platform to exchange practical knowledge, pilot instruments regionally, and co-develop frameworks that mobilise innovation for the global energy transition.

4.3 Conclusion

Germany's innovation and start-up ecosystem has the capacity to drive the energy transition, yet greater coherence and strategic alignment are needed. By consolidating successful programmes, adapting public roles as markets evolve, and addressing structural and regulatory barriers, Germany can foster faster innovation cycles and stronger investment confidence. These efforts not only enhance domestic competitiveness but also position Germany as a leading partner for developing and emerging economies advancing their clean-tech transitions.

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