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IEA-ECB-EIB High-Level International Conference

Ensuring an Orderly Energy Transition:
Europe's competitiveness and financial stability in a
period of global energy transformation

Background document

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International
Energy Agency

INTERNATIONAL ENERGY AGENCY

The IEA examines the full spectrum of energy issues including oil, gas and coal supply and demand, renewable energy technologies, electricity markets, energy efficiency, access to energy, demand side management and much more. Through its work, the IEA advocates policies that will enhance the reliability, affordability and sustainability of energy in its 31 member countries, 13 association countries and beyond.

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Executive summary

The recovery from the Covid-19 pandemic and the response to the global energy crisis are driving unprecedented growth in clean energy investments. In 2023, a record [EUR 1.7 trillion](#) is expected to be spent on clean energy projects worldwide. Clean energy investments – such as renewables, power grids, and energy efficiency – have been augmented by enhanced policy support such as through the US Inflation Reduction Act, the EU's Fit-for-55 package and the REPowerEU plan. They have also been reinforced by a strong alignment of climate and energy security goals and a focus on industrial strategy as countries seek to strengthen their footholds in the emerging clean energy economy.

However, alongside this rapid acceleration, some key challenges to Europe's competitiveness have also emerged, ranging from high energy prices to strong industrial policies in other advanced economies, and to significant market concentration of critical parts of the clean energy supply chain.

Achieving an orderly clean energy transition in Europe will primarily rely on the implementation of a set of ambitious climate change policies supplemented with the necessary funding. To align with the IEA's Net Zero Emissions by 2050 Scenario (NZE Scenario), annual clean energy investment in the European Union needs to rise to EUR 530 billion each year by 2030, from EUR 330 billion in 2022.

Private sector investment will be a crucial component to achieve net zero targets in Europe and worldwide. Concessional and blended finance programmes from multilateral development banks such as the European Investment Bank (EIB) will be crucial to scale up private sector capital, as will be the development of a green capital markets union that supports the further growth of sustainable finance. In addition, price stability and anchored inflation expectations are key requisites to support the clean energy transition and encourage sustainable investment.

Besides geopolitical instability and high inflation, important barriers to a scale up in private sector investment remain, including uncertain policy environments, permitting delays, higher up-front capital expenditure, lower returns compared to legacy technologies, and small or fragmented end markets.

The energy transition may also pose risks to financial stability and the financial sector that require close monitoring. While progress has been made by banks to meet supervisory expectations in the form of proactively incorporating climate-related and environmental risks into business strategies, more needs to be done.

Amid this myriad of challenges and risks, there is an increasing likelihood of a disorderly energy transition in Europe. The International Energy Agency (IEA), the European Central Bank (ECB) and the European Investment Bank (EIB) will come together in this High-Level International Conference to discuss these important challenges and suggest potential policies and solutions on how to ensure an orderly clean energy transition in Europe while strengthening its competitiveness and maintaining financial stability in a rapidly changing global energy context. To support the conference, this background document provides some key insights, relevant data and potential discussion questions for participants.

Session 1: Implications of the global energy crisis

Status of the energy crisis

While energy prices have eased from their record 2022 highs, an exceptionally wide range of uncertainties amid [continued tight gas supplies](#) could send prices soaring again, as well as create further supply disruptions and dislocations. The unprecedented energy supply and price shocks in the wake of the Russian Federation's (hereafter, "Russia") invasion of Ukraine have, however, already had a particularly severe adverse impact on European industrial production.

[Production curtailment](#) contributed around 50% to the 25 bcm gas demand reduction by the EU's industry in 2022, fuel switching from gas to oil and improved efficiency gains helped to save another 40% of gas, while other factors such as weather and behaviour made up for the remaining 10%. Nevertheless, overall output of final products by the euro area's industrial production remained largely unchanged as the region's manufacturers [substituted domestic output](#) of intermediate products with imports while maintaining the production of final products in the European Union. However, it is questionable whether these temporary measures can be maintained in the longer term without impacting employment, competitiveness and growth.

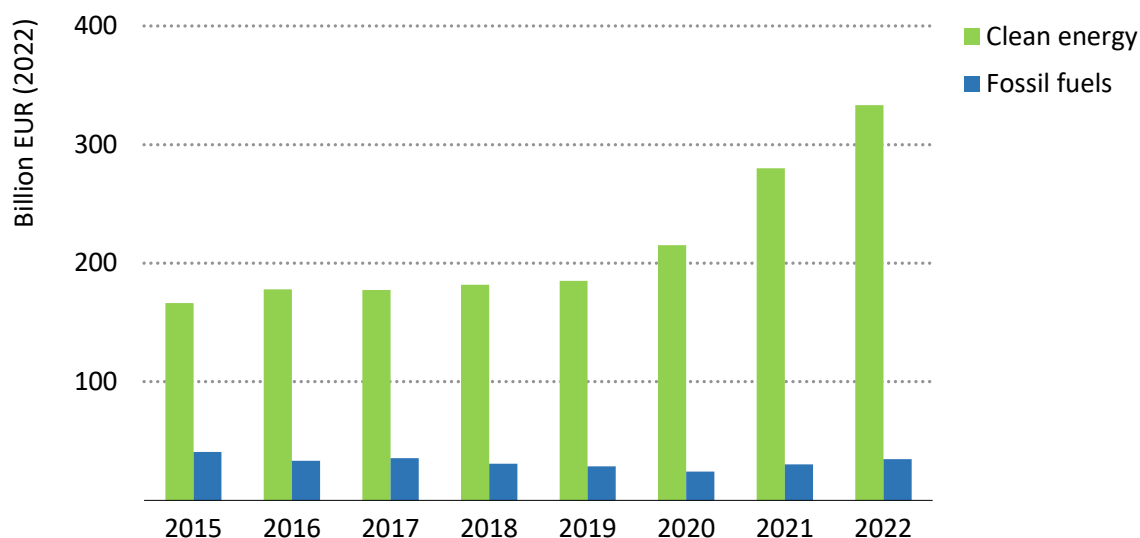
In response to the global energy crisis triggered by Russia's invasion of Ukraine, the European Commission announced its [REPowerEU](#) plan in 2022. It aims to reduce dependence on Russian fossil fuels through four key steps: 1) diversification of energy supplies; 2) securing affordable supplies by increasing gas storage with new regulations and joint gas purchasing mechanisms; 3) saving energy and 4) investing in renewables. In its [10-point plan](#), released shortly after the invasion, and in [subsequent analysis](#), the IEA has underscored that the lasting solution to the global energy crisis – and to get on track to net zero emissions – is a dramatic scaling up of energy efficiency and clean energy. This major step change is critical to delivering the much-needed growth in clean energy manufacturing and to maintaining Europe's economic competitiveness.

Clean energy investment trends in Europe

After the People's Republic of China (hereafter, "China"), the European Union has been leading the increase in annual clean energy investment over the past five years. Compared to 2019, EU clean energy investment has increased by 80% to

EUR 330 billion in 2022. To be on track with the IEA's NZE Scenario, annual clean energy investment in the European Union needs to rise to EUR 530 billion by 2030. While spending for solar PV, battery storage and energy efficiency in 2023 is already surpassing or close to achieving their respective EU 2030 net zero investment needs, annual investments in the clean electrification of industry, buildings and transport, grids (a key enabler for the clean energy transition), and low-emission fuels are far from their required levels.

Investment in clean energy and in fossil fuels in the European Union, 2015-2022

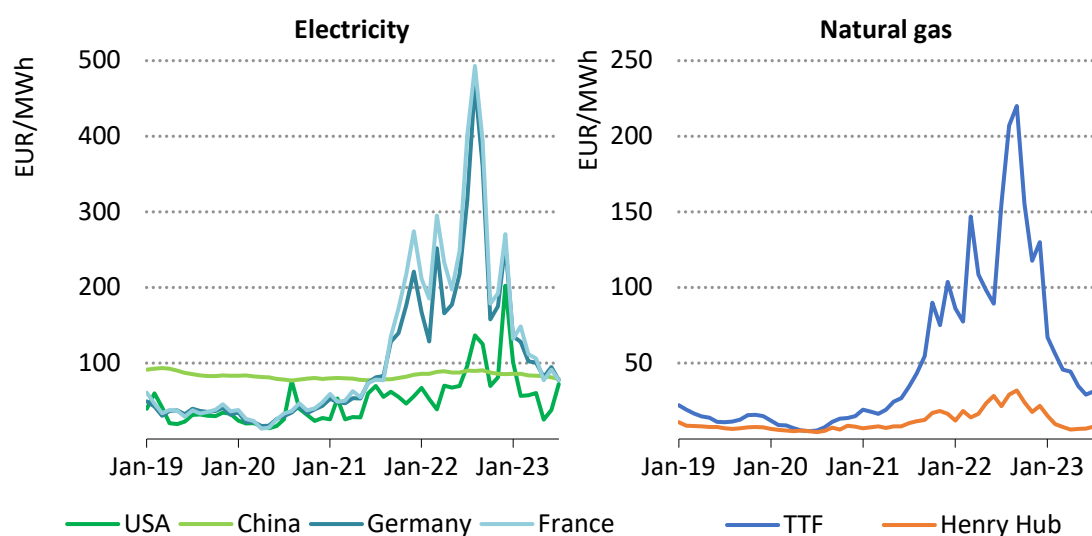


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Key risks to European competitiveness

Relatively higher energy prices than in other advanced economies are a clear risk to the competitiveness of European industry. While spot natural gas prices have decreased significantly from their record highs in Europe, they are still about four times higher – and more volatile – than in the United States, and at a similar level as LNG import prices in [China](#). Wholesale electricity prices in Europe also remain elevated compared to the United States, with the average US wholesale electricity price since January 2021 at EUR 65/MWh versus around EUR 150-170/MWh in Germany and France. If this trend persists, such differences in prices for key energy inputs for gas- and electricity-intensive industries, such as chemical or aluminium manufacturing, puts European production sites at a significant disadvantage to their competitors. Some companies have announced that they will [downsize permanently in Europe](#) due to high energy costs and indicators for eurozone manufacturing activity remain in [contractionary territory](#).

Prices for electricity and natural gas in selected geographies, January 2019–July 2023



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Note: Left graph shows wholesale electricity price. Electricity price in China is the average industry tariff for 36 Chinese cities.

Source: IEA based on prices from the US Energy Information Administration (EIA), Argus Media Group, CEIC, and Ember.

The passage of the US Inflation Reduction Act (US IRA) in 2022 that includes significant financial support for clean energy technologies – mainly through tax credits – and its local content requirements sparked fears that this would lead to a shift in private investment and projects relocating to the United States. While major European automotive players did announce [new battery manufacturing investment](#) in North America, so far most of these concerned plans predating the act. The European Union is now aiming to expand available funding for net zero industries via its [Green Deal Industrial Plan](#) and, in particular, through the relaxation of state aid guidelines that restrict direct funding by EU member states.

The global energy crisis has also focused attention on potential risks affecting clean energy supply. Many of today's clean technology supply chains are [very concentrated geographically](#), including the extraction, processing, and refining of critical minerals, as well as manufacturing and assembly of key technologies such as PV modules, electrolyzers, fuel cells and EV batteries. This industrial capacity has been instrumental to bring down costs worldwide, giving much-needed momentum to clean energy transitions, but the current level of geographical concentration also poses challenges that governments need to address. The European Commission has started setting the framework conditions to accelerate the scale up of the EU's clean energy manufacturing industry. Its proposal for a Net Zero Industry Act requires that the EU's manufacturing capacity must satisfy at least 40% of its annual clean energy deployment needs by 2030. Moreover, its Critical Raw Material Act is designed to strengthen the EU's capacities along all

stages of the value chain. Questions remain, however, as to how exactly, and how fast, these aims can be achieved and how to finance these ambitious goals.

Key discussion questions

- Given elevated inflation rates, high energy prices and increased global competition, what is needed to enable Europe to continue accelerating its scaling up of clean energy deployment?
- Are higher energy prices making Europe's industry uncompetitive? If so, what is required to avoid a dearth of investment in key industries?
- Are the US IRA and stronger industrial policies in other countries such as China, Korea and Japan changing the strategic landscape for clean energy investment to the detriment of Europe? If so, what can be done about it?
- How can Europe ensure a secure and affordable supply of critical minerals for a clean energy supply chain?

Session 2: Managing systemic risks in Europe's clean energy transition

Expected economic impact of the clean energy transition

The clean energy transition to net zero by 2050 for Europe will require deep and wide-ranging structural changes to the economy, which will affect real GDP growth and inflation. It may impact the EU economy through a combination of supply and demand shocks, which can be either positive or negative. Assessing the relevance of these shocks from today's perspective is prone to a high degree of uncertainty. A variety of factors – which can also be mutually reinforcing – come into play, ranging from the policy tools chosen within the European Union and globally, the availability and adoption of clean energy technologies, corporations' transition pathways, and consumer preferences. Other key imperatives are access to private and public funding for clean energy investment and innovation, managing spill-over effects and adjusting labour force skills.

Empirical evidence of the impact of the clean energy transition on inflation is inconclusive, reflecting the high uncertainty, the different channels at play and the monetary policy responses. Higher carbon pricing, for example, raises the price of fossil energy consumption relative to renewable energy consumption. It may also act as an adverse productivity shock by increasing the marginal cost of production for firms. At the same time, economic agents may cut their overall spending in case of rising energy costs, which would contain upward price pressures.

The economic consequences may change throughout the transition path and across countries and sectors, driven, amongst others, by the front-loading and sequence of policy interventions, and the swift substitutability of fossil energy consumption. There is broad consensus that friction in the reallocation of labour and capital will lead to higher volatility and adjustment costs in the short- to medium-term time horizons, while in the longer run the clean energy transition is expected to have a positive impact on output and productivity.

From an economic perspective, the near-term costs to finance the transition will be eclipsed by the [long-term costs](#) of unabated climate change. To support the transition, it will be crucial to dismantle regulatory barriers preventing the uptake of renewable energy and other clean energy projects, upgrade the electricity grid

and foster investment in renewables. Measures need to be adopted to accelerate technological innovation in areas such as energy storage and energy-intensive sectors by reducing red tape, reskilling the labour force and encouraging venture capital. Blanket subsidies for fossil fuels, which impede the switchover to clean energy use, need to be unwound, while support measures for the most vulnerable consumers ought to be temporary, tailored and targeted.

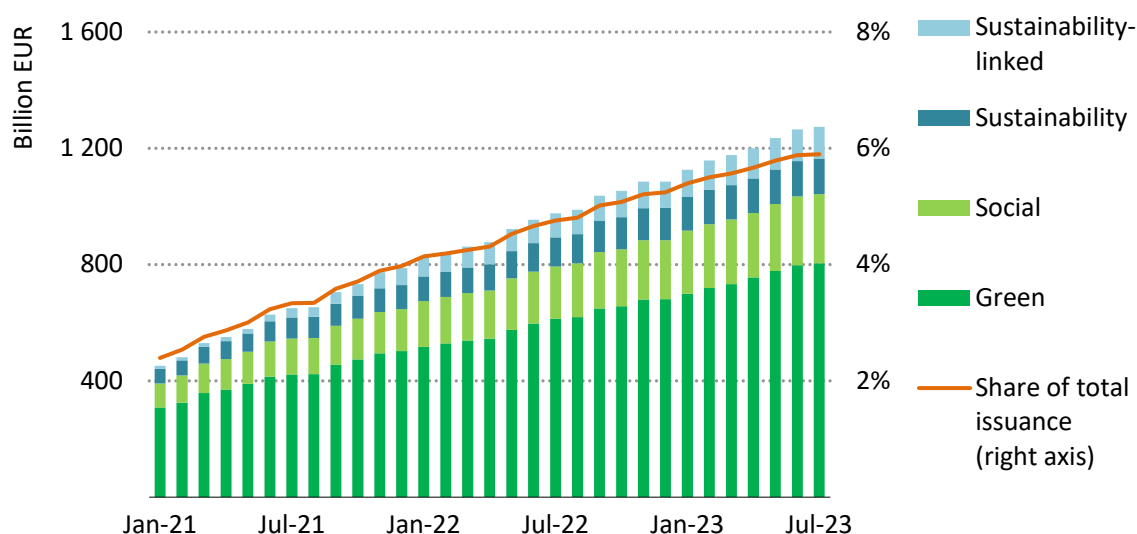
Additionally, the early adoption of policies, regulations and financial tools will bring benefits in terms of rolling out more efficient technologies faster and vastly improve Europe's competitiveness.

Financing the clean energy transition in Europe

Under the [European Green Deal](#), the European Union has decided on a set of ambitious climate change policies to accelerate the clean energy transition and to reduce net greenhouse gas emissions by at least 55% by 2030, compared to 1990 levels. The transition policies range from adjustments to the EU Emissions Trading System, to regulatory measures, including rules for increasing energy efficiency and retrofitting of buildings, and public support measures for firms and households. The Green Deal is complemented by national climate policies.

The financial sector has a decisive role to play in the clean energy transition, with outstanding amounts of issuances of green debt securities amounting to around EUR 800 billion in July 2023. Yet, compared to total issuance, the relevance of green finance instruments remains marginal at around 4%.

Issuance of sustainable debt securities in the euro area, January 2021-July 2023



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Note: Outstanding amounts at face value.

Source: ECB Centralised Securities Database, as modified by the IEA.

To further foster sustainable finance, important policy initiatives have been launched to strengthen credibility, such as the EU taxonomy, the introduction of mandatory climate disclosure requirements and the green bond standard regulation. [First evidence](#) of investors being willing to pay a greenium (where green bonds trade at a higher price than conventional bonds) has emerged, which will help lower the issuer's cost of capital for clean energy investments. Given the huge investment needs, it will be important to put the right financial infrastructure in place and further expand the financing tools available to support the clean energy transition. This includes establishing a green capital market union (CMU) to unlock cross-border capital flows to finance the clean energy transition. A green CMU will also help to prevent risks of national fragmentation and greenwashing by enhancing the comparability and standardisation of sustainable finance products. Maturing venture capital markets in Europe and blended finance will also be crucial.

At the same time, the clean energy transition will pose risks to the financial sector that could raise financial stability concerns and therefore requires close monitoring. The needed transition policies can affect financial institutions via their exposure to firms and households that are vulnerable to these risks and may lead to stranded assets. In the euro area, bank lending to companies is already impacted by climate change as bank lending [credit standards](#) are being tightened for loans to polluting companies, while low-emitting firms benefited from a net-easing impact over the past 12 months. Credible and timely transition pathways are essential to reduce these risks and attract funding. Moreover, channelling large funds into the renewable energy sector, specific clean energy technologies and innovation, may bear credit risks for the financial institutions providing the funding.

The role of central banks and supervisors

While the principal responsibility for driving the clean energy transition lies with governments, the fight against climate change is also of relevance for central banks and supervisors.

Within its mandate to maintain price stability, the ECB is [committed](#) to account for climate change in its monetary policy framework to support the transition. The [measures adopted by the ECB](#) include the tilting of its corporate bond asset holdings and enhancement of its risk management tools, and the commitment to incorporate climate change aspects into the collateral framework. These measures help protect the Eurosystem balance sheet from climate risks and provide important signals to help channelling finance towards projects supporting the transition. At the same time, the ECB is closely analysing how climate change risks will impact the inflation outlook and the monetary policy transmission mechanism to be well prepared when climate-related shocks further increase in

volume and quantity. Price stability and anchored inflation expectations are key requisites to support the clean energy transition and encourage sustainable investment. The benefits of price stability exceed the costs of higher interest rates. Clean energy investment decisions are supported by real long-term interest rates which are still at low levels.

Supervisors expect banks to proactively incorporate climate-related and environmental risks into their business strategies, as well as their governance and risk management frameworks, in order to mitigate and disclose such risks and comply with the corresponding regulatory requirements. While progress has been made by banks to meet supervisory expectations, more needs to be done. The [ECB issued clear expectations](#) on where supervised banks in Europe should land by the end of 2024.

Key discussion questions

- What are the economic and inflationary consequences of the clean energy transition in Europe and how should adverse implications be best addressed?
- How successful are recent policy initiatives, such as the Green Deal Industrial Plan, to support the needed structural adjustments, while preserving Europe's competitiveness?
- To foster green investment and its financing, what initiatives are considered crucial going forward?
- What is the role of central banks and supervisors in supporting the clean energy transition?

Session 3: Scaling up investment in the clean energy transition

Status of clean energy investment landscape

The European Court of Auditors left no room for doubt: There is “little indication that actions to reach the 2030 targets will be sufficient”, it said, referring to EU climate and energy targets in a [report](#) published earlier this summer. The European Union has committed to spending at least 30% of its 2021-2027 budget on climate action – about EUR 87 billion per year. The rest of the investment should come from national and private funds. But the auditors are pessimistic: “There is no information that sufficient financing will be made available [...], in particular from the private sector.”

The limitations of public finance to mitigate climate change and adapt to its effects have long been recognised. Private markets are critical to scaling solutions to the problem, hence it is crucial that public institutions encourage investment from and cooperate with the private sector in all its facets. In principle, in particular in Europe, they are helped by the fact that environmental, social and governance (ESG) factors have risen up the corporate agenda, with investors showing increasing interest in financing the energy transition.

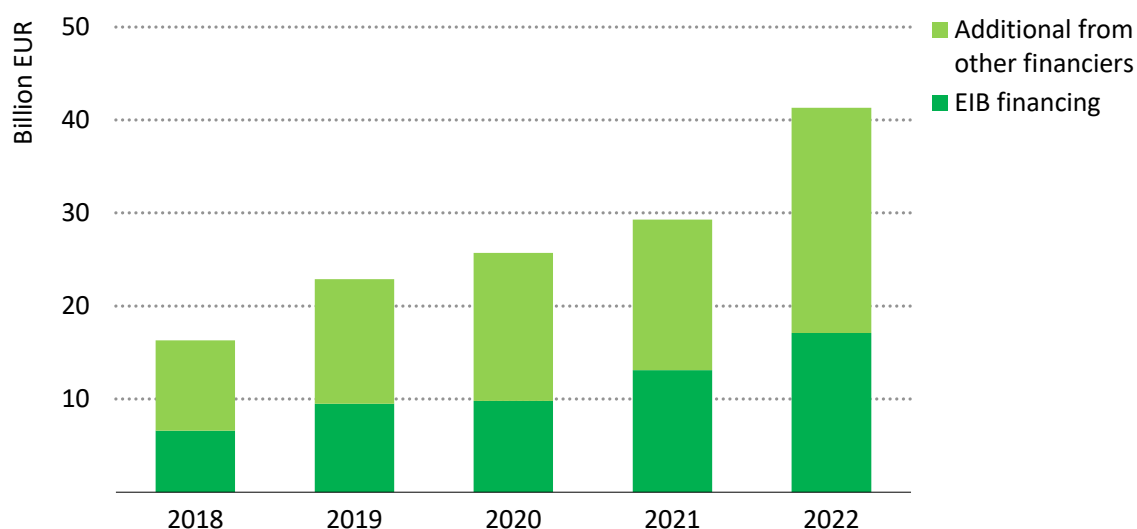
According to a sub-report of the latest [EIB Investment Survey 2022-2023](#), the share of European firms investing in climate change in 2022 has increased by 10 percentage points compared to the year before, reaching 53% on average. Energy-intensive manufacturers have a stronger appetite for climate investments than non-energy intensive firms. At the same time, high energy prices and growing uncertainty, caused by the Covid-19 pandemic and the Russian invasion of Ukraine, negatively impacted investment sentiment and decisions. The EIB report concludes that “the likelihood of a disorderly transition to green energy is increasing, particularly since the Ukraine war.”

Importance of development finance institutions

Development finance institutions such as the EIB have an important role to play in providing finance for clean energy projects, which in turn can de-risk those projects and mobilise additional financing from both the public and the private sector. Between 2018 and 2022, the EIB financed clean energy projects with around EUR 56 billion – more than doubling its energy-related support in those

years to reach 26% of total EIB lending in 2022. For every euro spent by the EIB on its energy operations, other financiers contributed an additional 1.4 euros. A key task for the future will be to increase this so-called leverage ratio of public finance provided by development finance institutions.

Clean energy financing supported by EIB, 2018-2022



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Note: Other financiers includes additional financing leveraged from both public and private sources.

Source: IEIB, as modified by the IEA.

Barriers to private sector investment

In addition to geopolitical instability and high inflation, serious barriers to private sector investment in clean energy projects persist. They range from changing, uncertain, or overly complex policy environments and extremely long permitting delays to legal requirements on investors that can make clean energy investments more expensive. Often the lack of long-term policy stability is also linked to longer timescales needed for returns from a renewable infrastructure asset. Another specific barrier for renewable energy infrastructure (and this includes the entire value chain from production to transmission/transport, and to consumption) are higher up-front capital expenditure, when compared to traditional energy assets. High initial costs often lead to expectations of higher returns over the lifetime of the investment to compensate for the additional risk that the initial investment represents.

The cost factor can be exacerbated by small, fragmented end markets, which leave investors in doubt as to whether they will be able to recoup large up-front investments. In addition, the lack of market maturity can make it hard to assess the expected risks and benefits of a specific investment – especially for smaller start-ups and new innovations. Technical barriers also exist, or at least are

perceived to exist. Renewable infrastructure often is untested at large volumes over long periods of time, and the specific performance of individual clean energy technologies is sometimes less well understood.

Key discussion questions

- How can a policy framework be developed for financing an enabling environment that helps to lower the risk and unlock the full potential of private investment?
- What financial instruments are needed to scale clean energy solutions?
- How can funding be targeted more effectively, especially for new technologies whose impact and feasibility are difficult to gauge?
- How can the energy transition be turned around from one of the biggest challenges of our time into a project that delivers on its economic, geopolitical and social potential throughout the European Union?

International Energy Agency (IEA).

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