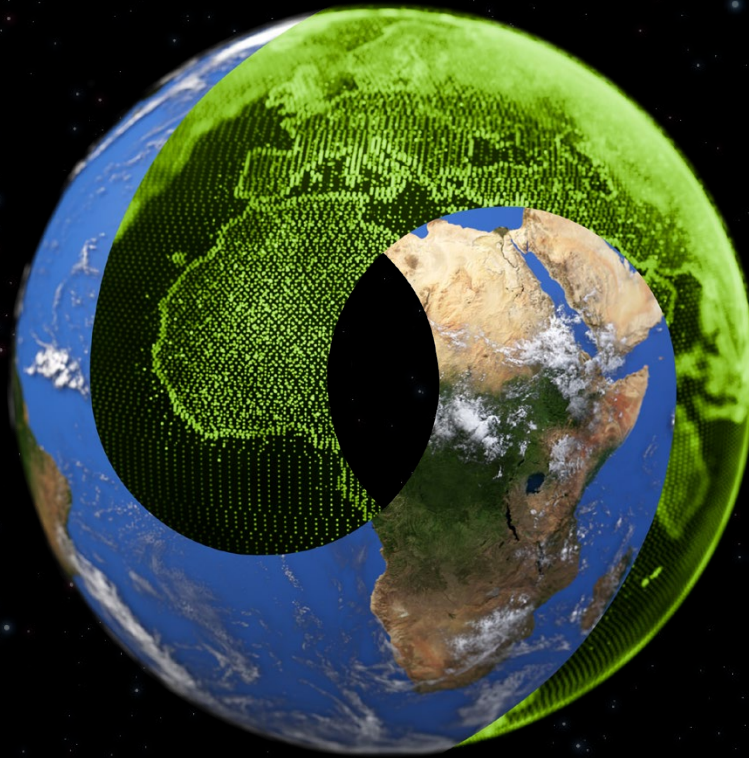




Financing the Green Energy Transition

A US\$50 trillion catch

Extended summary

The profound transformation of both energy supply and industrial processes is an unavoidable step on the path to climate neutrality. The key decarbonization levers consist of large-scale renewable deployment,¹ electrification of end-uses (buildings, industrial processes and transport sector),² direct and indirect use of green hydrogen in hard-to-abate sectors (e.g., steelmaking, e-fuels for aviation and maritime transport)³ and energy efficiency improvements.² Moreover, carbon capture, utilization and storage (CCUS) will be required to decarbonize industrial activities that use fossil fuels as feedstock, and to produce e-fuels for maritime and aerial transport.⁴ Such a transformation from a highly fossil-based energy system⁵ to a nearly fossil-free world amounts to a true societal, cultural, economic and political revolution. This will require unprecedented efforts and investments,⁶ in the order of US\$5 to more than US\$7 trillion per year globally through 2050.

However, today, the world invests less than US\$2 trillion each year into this transition.⁷ Green investments must scale up rapidly to put the world on course to reach its climate goals.

A direct result of poor investment opportunities and risk-return profiles for green projects is the lack of private money financing the required transformation.⁸ Most of the technological solutions identified for climate neutrality (renewable energy, electrification, green hydrogen, etc.) are highly capital intensive and often come with significant development uncertainties.⁹ A highly capital-intensive energy transition means that the cost of capital is a key cost driver. As capital providers expect more return to compensate for risk, the riskier the project, the higher the cost of capital. In fact, financing costs, stemming from the cost of capital, can account for as much as half of the investments required to fuel the transition.¹⁰ ➤

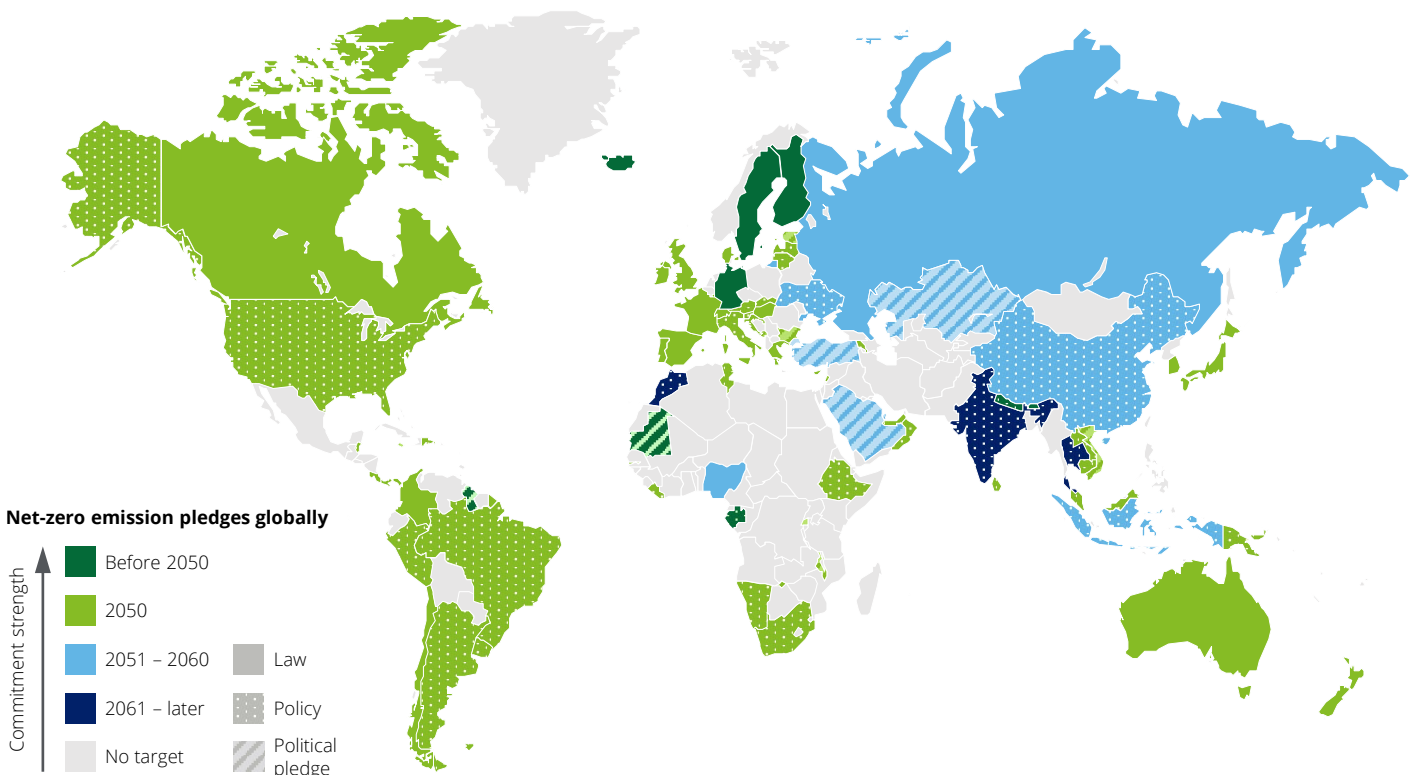
Today, green projects face significant revenue, offtake and technology risks. Thus, they suffer from underinvestment and high costs of capital as they are seen as riskier than alternative investments. On top of the micro-level risks (market and technology), a key contributor to this risk perception is the political and regulatory risks that stem from governments' failure to establish the necessary mechanisms and instruments that can guarantee attractive returns on investments.¹¹ Developing economies, where about three-quarters of green investments should occur,¹⁰ often face greater political and regulatory risks and stricter public budget constraints on energy transition projects.⁶ Therefore, green projects, especially when they are in the Global South, are often not bankable, i.e., their risk-return profiles do not meet the investors' criteria to mobilize sufficient capital.

Climate policies around the world are already shaping up, with 93 parties (almost 80% of global greenhouse gas emissions) having set net-zero targets as of September 2023 (Figure 1).¹² Yet, more must be done to deploy clear and comprehensive policy and regulatory transition frameworks around the world to reach net zero by 2050. Climate policies also tend to show greater degrees of breadth and depth in advanced economies compared to developing economies. Moreover, green finance and taxonomy policies are scarcely present in existing legal frameworks. Novel financial products like green taxonomies and green bonds can

reduce the cost of equity and debt for green projects respectively. However, these instruments see very limited global uptake, and advanced economies issued 80% of all global sustainable debt in 2022.¹³ A rapid global uptake of these financial tools and the harmonization of standards around these tools is more critical than ever to unlock low-cost finance in developing economies where it is most needed. Such change cannot take place in isolation: it needs coordination.

The *Financing the Green Energy Transition* project aims at raising awareness on the need for governments, financial institutions, lenders, investors and project developers to jointly develop and agree on mechanisms to foster the bankability of green projects that are essential for climate neutrality. The cardinal challenge in the ecological transition is the energy transition, as the energy sector (including industries) is responsible for 80% of global greenhouse gas (GHG) emissions. By assessing the financial instruments that can foster investments in the green energy transition, notably in developing economies, the current paper addresses the crucial and essential step of bankability, then quantifies the impact of enhanced financial instruments on the transition cost. In writing this report, Deloitte calls on its readers to engage in the conversation on the future of green finance and on the resolution of key investment barriers to accelerate the energy transition today.

Figure 1. Global map of net-zero targets

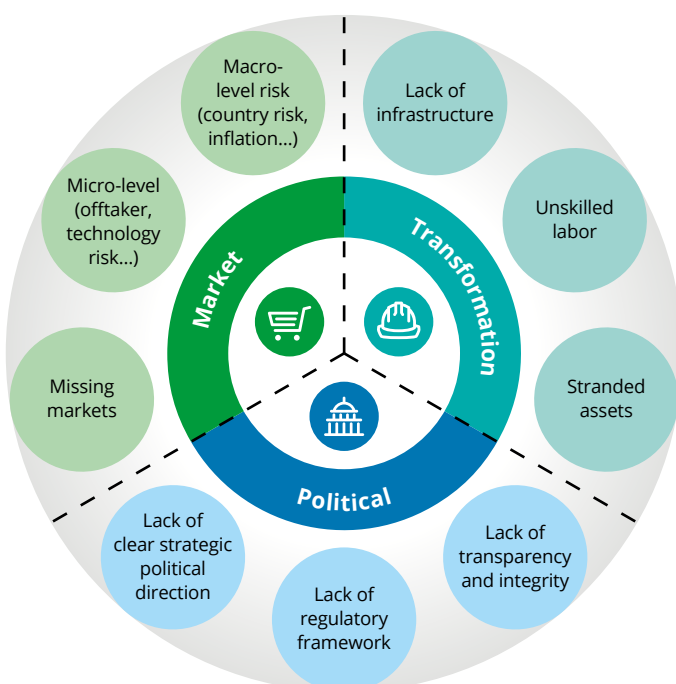


Source: Deloitte analysis based on data from Climate Watch^{12,14}

Governments need to work with financial institutions to develop mechanisms and instruments that reduce risks and unlock private finance at attractive costs. These risks are associated with political, market and transformation barriers (Figure 2).

Developing countries often face higher offtake, market liquidity, currency and inflation risks. These are all factors impacting projects' financing costs, making capital-intensive energy transition projects disproportionately expensive. While developing regions generally have better renewable endowments, higher cost of capital entails higher product costs in these regions (Figure 3). Financing costs account for about a quarter of the levelized cost of electricity (LCOE) from solar power plants in advanced economies, but they account for about half of it in developing economies.¹⁵ Moreover, the governments of developing countries tend to run on tighter budgets. Therefore, two key efforts chiefly aimed at emerging economies will be to de-risk projects to lower the cost of capital, and to remove barriers constricting the flow of private capital toward green projects.

Figure 2. Main barriers to investment in clean technologies

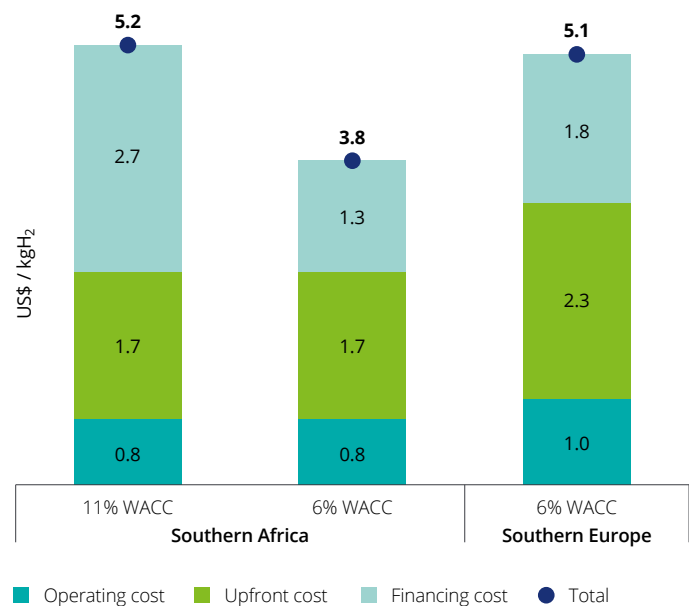


Source: Deloitte analysis

The key action levers to overcome these barriers can be grouped in three main categories: de-risking green projects, bridging the cost gap between green and fossil technologies and cutting fossil fuels (Figure 4):

- Clear climate policies, guarantee mechanisms, offtake reliability and the development of domestic capital markets can significantly reduce the risks associated with these projects. Notably, blended finance mechanisms can reduce both project risks and facilitate commercial capital flow to green projects by virtue of the mobilization power of concessional capital. US\$1 of concessional public finance can mobilize more than US\$4 commercial capital, more than half of which can come directly from private capital.
- R&D and upfront investment support schemes, the addition of operating premiums to green assets and penalization of GHG-intensive assets are some of the key tools to bridge the cost gap between green and GHG-intensive assets. They are often used in combination to facilitate market integration of green products (e.g. carbon tax and feed-in premiums).
- Ending fossil subsidies, compensating for the early phase-out of some of the fossil assets and facilitating the job transition of people employed in GHG-intensive industries to clean ones can facilitate the transition both socially and economically, preparing the groundwork for cutting fossil assets.

Figure 3. The impact of cost of capital in the cost of green hydrogen production: comparison between southern Africa and Southern Europe



Source: Deloitte analysis of solar production in Southern Africa based on the renewable endowments from the reanalysis of Copernicus - ERA 5 hourly solar PV capacity factors database,¹⁶ current technology costs for renewables and electrolyzers from IRENA¹⁷ and IEA¹⁸ cost data respectively and country-specific costs of capital aligned with IRENA's lower and upper bound estimations.¹⁸

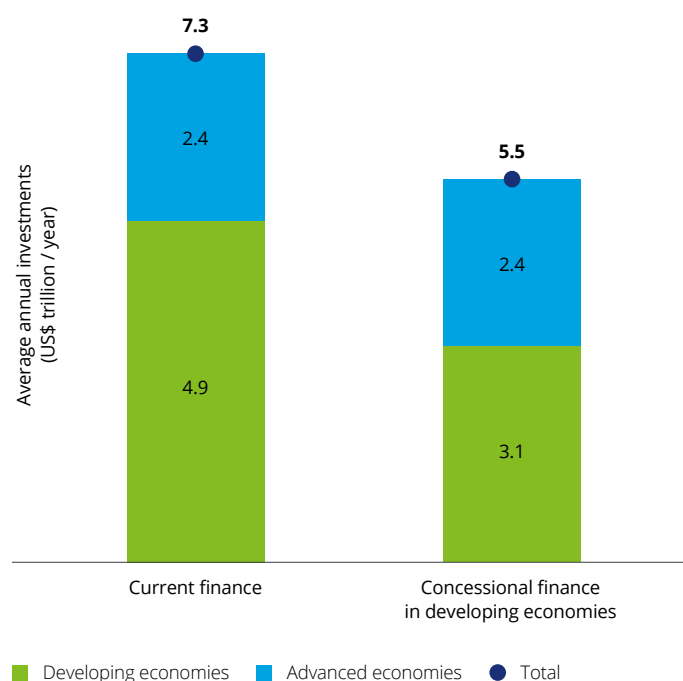
Figure 4. Overview of the key solutions to turn green projects more bankable

	 Tools and Instruments		 How does it work	 Parameter influenced	 Effectiveness				
					Technology		Regional		
					Green	Conv.	LICs	MICs	HICs
De-risking sustainable and green projects	Implement policy frameworks	Set climate strategies	Provides market transparency and regulatory clarity	Reduce political risks	●	●	●	●	●
	Guarantee mechanism	Loss reserves	Protect the investors against losses	Reduce the risk of default	●		●	●	
	Market creation		Facilitate access to an exchange market	Reduce revenue risk	●		●	●	●
	Offtake contracts (PPA, CfD, FiT...)		Guarantee a sell price for the producer	Reduce revenue risk	●		●	●	●
	Develop a domestic financial market		Increase confidence, information transparency	Lower borrowing costs	●	●	●	●	
	Bonds (green, blue, sustainability-linked)		Categorize the end-use of bonds	Lower borrowing costs, gives transparency	●			●	●
	Portfolio approach		Diversify investments	Reduce portfolio risk	●	●	●	●	●
Bridging the cost gap	Upfront cost reduction	R&D support	Activate the experience curve	Financial support	Reduce investment costs and financing costs	●		●	●
	Carbon pricing		Put a price on GHG emissions	Make fossil alternative more expensive		●	●	●	●
	Operational premiums (CfD, tax reduction)		Increase the revenue linked to the sale of the product	Make clean energy technologies more profitable	●			●	●
Reducing the use of fossil fuels	Ending public support for fossil assets		Stop direct socially untargeted support to fossil fuels	Make fossil alternative more expensive		●		●	●
	Compensate for stranded assets		Compensate the unanticipated devaluation of fossil assets	Ease the economic impact on the society		●		●	
	Do Climate stress test		Assess the exposure of portfolio to transition risk	Avoid unanticipated losses and allow devaluation management	●	●		●	●
	Support job transformation		Implement training programs and job reallocation	Provide skill labor for the transition and social benefit	●	●		●	●

Source: Deloitte analysis

In the absence of concessional finance in developing economies, the net zero transition would cost more than US\$7 trillion per year on average through 2050, i.e., about US\$200 trillion cumulatively. About 70% of those investments would take place in low- and middle-income economies. Reducing the cost of capital can both facilitate the flow of private capital toward the transition and reduce its cost. If developing and developed countries reached similar financial conditions, the cost of the transition could fall by over 25% to about US\$5.5 trillion/year (Figure 5). Accessing such low-cost capital requires maximizing the potential of blended finance. Active participation of development finance institutions, international standardization, increased debt to equity ratio (via notably subordinated loans or mezzanine instruments) and innovative guarantees (such as first-loss tranches) can significantly reduce investor risks and thus, the cost of equity and debt.

Figure 5. Average annual investments in advanced and developing economies through the period to 2050 with and without enabling concessional finance in developing countries



Source: Deloitte Energy Transition Investment Calculator results¹⁰

Achieving climate goals is a formidable challenge. Decisive and coordinated policy support, and collective action from investors and policymakers are paramount to guide investments toward green and sustainable projects. The energy transition must commence throughout the globe today, but it will cost unfathomable sums of money, requiring private capital which is largely deterred by the risks of investing in green projects.

- **The solutions are here, now is the time to implement them.** Research and field work have clearly identified technological solutions to decarbonize each sector of our global economy. Those solutions, i.e., renewables, clean electricity, and green hydrogen, are highly-capital intensive and face many investment barriers. Now is the time to articulate effective implementation strategies to support the growth of green economies.
- **However, the energy transition will cost too much for governments to afford it alone; private capital should also be mobilized.** The quests for economic growth and climate neutrality converge in aiming to make green investments economically viable. This alignment will forge the path of a just, cost-efficient and successful transition. Governments and especially developing countries cannot single-handedly fund the required several trillion US\$ per year of required investments. Private capital providers must be mobilized.
- **Currently, private capital providers are deterred from investing in the green transition because it is riskier than alternative investments.** The lack of clear regulation, transparency and general certainty on the viability of green markets is making private capital providers think twice about investing in green projects. Their contribution will however be pivotal to achieve net zero by 2050.

Therefore, our global institutions must prioritize two simultaneous actions:

- **First, governments and regulators should reduce the risks that threaten the bankability of green and sustainable investments.** All underlying risks, from unreliable off-take to unstable macroeconomics, raise financing costs. De-risking the investment landscape will unlock the low-cost capital that can make the costly and capital-intensive energy transition more affordable. Overall, governments will be pivotal in making more green projects bankable.
- **Second, concessional capital providers must maximize the potential of blended finance to mobilize private capital.** Under today's rates, reaching net zero by 2050 will cost over US\$7 trillion/year. Concessional finance via innovative financing structures can reduce the cost of the transition by nearly 40% for developing countries, lowering global investment needs to US\$5.5 trillion/year.

On this journey, policymakers will need to balance local constraints with global green policy trends:

- **At the micro-level, the tools to reach net-zero must be adapted to their local setting.** Experience has shown that frameworks should be tailored to specific geographies and technologies. There is no one-size-fits-all solution, and the transition needs to be multi-solution, or it will fail to take off.
- **At the macro-level, green policy guidelines and frameworks must be harmonized globally.** The global transition to net zero should be more than the sum of individual national contributions. Its achievement will take unprecedented levels of international cooperation. This calls for the development and global harmonization of standards for green policies, technologies and financial instruments. Dissonant frameworks can create unaffordable inefficiencies.

Investors should be ready to face the challenge ahead:

- **Societies and capital providers should deal with huge upfront investments today, reaping the benefits later.** The transition is an unprecedented financing challenge, but the cost of inaction is higher than the burden of a smooth, planned transition initiated today. The green transition can increase the world economy by US\$43 trillion between 2021 and 2070.¹⁹ Required investment levels remain below 6% of global GDP annually, however, a current policy pathway (aligned with +3°C of global warming) would entail almost 8% of global GDP loss by 2070. Delaying the start of the transition will only make the rise of green and fall of fossil more challenging and costly.
- **More than ever, investors should channel green funds to developing economies.** Currently, less than half of green investments take place in developing countries. Excluding China, which accounts for one-third of green investments, the figure shrinks to 16%.²⁰ To reach climate goals, some 70% of the green investments need to happen in developing countries by 2030. This can be possible through active participation of multilateral development banks (MDBs) and development finance institutions (DFIs) and international cooperation.

The struggle to foster sustainable investments is a pressing challenge to remedy and the findings of this study suggest that there is a need for all actors of the project finance environment to mutualize their key learnings from years of experience in the field. This report's findings call for pooling practical knowledge on green finance and the creation of new finance ecosystem models to help lay the foundations for a global sustainable green finance environment aligned with climate ambitions.

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Authors



Prof. Dr. Bernhard Lorentz
Deloitte Center for Sustainable
Progress Founding Chair
Managing Partner | Deloitte Germany
+49 1511 4881437
blorentz@deloitte.de



Dr. Johannes Trüby
Deloitte Economics Institute
Partner | Deloitte France
+33 1 55 61 62 11
jtruby@deloitte.fr



Dr. Pradeep Philip
Deloitte Economics Institute
Partner | Deloitte Australia
+61 416 214 760
pphilip@deloitte.com.au



Dr. Behrang Shirizadeh
Deloitte Financial Advisory
Manager | Deloitte France
+33 6 70 26 84 19
bshirizadeh@deloitte.fr



Clément Cartry
Deloitte Financial Advisory
Senior Consultant | Deloitte France
+33 1 40 88 28 17
ccartry@deloitte.fr



Clémence Lévêque
Deloitte Financial Advisory
Consultant | Deloitte France
+33 1 40 88 28 00
cleveque@deloitte.fr



Vincent Jacamon
Deloitte Financial Advisory
Consultant | Deloitte France
+33 1 40 88 28 00
vjacamon@deloitte.fr

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