Energy transition investment outlook: 2025 and beyond

Exploring eight key questions on energy transition investment and the organizations shaping the future of energy

Including new insights from 1,400 global energy transition investors

KPMG International

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Foreword

At COP28, a commitment was made to triple renewable energy capacity by 2030. Among the 1,400 investment executives surveyed globally, 72% believe that energy transition investments, including renewable energy and energy efficiency, are growing. While investors remain optimistic about this segment, the pace of investment lags behind required levels due to a number of barriers.

2023 was the warmest year on record, with energy consumption rising by 2%. Coal remained the dominant fuel source, and renewable energy accounted for only 30% of consumption. The growth in renewable energy capacity is modest, excluding China, which accounted for over 50% of the increase, while carbon emissions also rose by 2%.

Developing countries, including those in our region, the Caucasus and Central Asia, play a key role in the energy transition. These nations are responsible for 72% of emissions yet received only 20% of global investments in renewables. The growing electricity demand in developing markets is outpacing the expansion of renewables, and energy efficiency has seen little improvement.

Access to financing, including alternative funding instruments, the development of electricity market structures and investment regulatory systems, and investments in grid and energy storage systems are the primary focus areas for driving investments in low-carbon assets.

Energy transition investments have the potential to become the largest investment theme in history. This is not only a necessity driven by climate risks and stakeholder demands (from regulators, investors, and consumers) but also an opportunity to increase company value.

We stand on the brink of transformative change: the energy transition is becoming one of the largest and enduring investment megatrends, reshaping the global economy. Global commitments to achieving 2030 targets present numerous near-term opportunities for investors, including tripling renewable energy capacity and doubling the rate of energy efficiency improvements. This ambitious transformation will require substantial investments — increasing from US$1.2 trillion in 2024 to US$2.4 trillion by 2030 for renewable generation, grids, and storage, alongside substantial growth in spending on efficiency and electrification.

Gabit Musrepov
Partner and Head of ESG
KPMG Caucasus and Central Asia

Vitaliy Yakovlev
Managing Partner of KPMG Azerbaijan
Partner and Head of infrastructure at Deal Advisory
KPMG Caucasus and Central Asia

About the Authors

Grant Hill
Managing Director, M&A, Climate & Decarbonization
KPMG UK

Grant is a Managing Director, M&A, Climate & Decarbonization, KPMG UK and leads on coverage and origination across the climate investment theme. He has 16 years of experience working in the M&A space in the energy sector, both as an advisor and as part of a private equity backed management team.

Elizabeth Ming
Lead of Global Sustainability for Private Equity
KPMG International

Elizabeth is a Partner in the KPMG Private Equity practice. She has over 16 years of experience serving both public and private clients with assurance services as well as accounting and financial reporting related advisory services. Elizabeth is a leader in KPMG's rapidly growing sustainability assurance practice. In this role, she oversees the development and delivery of sustainability-related services, advises clients in developing best practices for sustainability measurement and reporting and leads engagements to provide sustainability and impact investing assurance services.

Geri McMahon
Lead of Global ESG for Asset Management
KPMG International

Geri is ESG Leader for the Asset Management sector and supports financial institutions to understand, assess, manage and report on a broad range of sustainability issues. Geri is experienced in sustainability policy development and implementation, the development of "net zero" strategies, the design and implementation of investment stewardship policies, and ESG and climate reporting.

Daisy Shen
Head of Climate and Sustainability
KPMG China

Daisy Shen has 24 years' experience with KPMG, including a long-term secondment to the KPMG Global Chairman's Office and the KPMG Energy Centre of Excellence based in London, where she gained invaluable international experience in executive management and cross border M&A transactions. Daisy is specialized in Strategy, M&A, Energy Transition, ESG and decarbonization, Sustainable Supply Chain Advisory, providing advice to corporates, financial institutions (including multilateral banks) and governments in climate change, energy transition, low carbon investment, ESG and decarbonization (including Corporate PPA, energy efficiency) strategy.

Summary

As the energy transition accelerates, massive investment opportunities are emerging across multiple sectors. These are driven by the need to expand renewable energy capacity, improve energy and resource efficiency, and upgrade related infrastructure.

This report tracks **the investor perspective on the energy transition**, emphasizing the importance of increasing, sustained and collaborative investment. It is based on a survey of **1,400 senior executives from 36 countries and 11 sectors** who are working in organizations that are actively investing in the energy transition.

We explore how a wide range of forces (such as public policy, market dynamics, technological progress and financial innovations) drive investment. We also consider how geopolitical uncertainty, regulatory risks and economic volatility pose challenges for many.

Investors play a crucial role in the energy transition, as they can identify and capitalize on opportunities to drive progress. Strategic investments in decarbonization, efficiency, renewable energy and infrastructure are essential to addressing the challenges posed by global warming.

This research is designed to offer **energy transition investors, policymakers, energy-intensive businesses and energy industry participants** a set of thought-provoking insights into current and future trends that impact these investments.

Key findings

Despite recent challenges, most say investment is accelerating swiftly

72 percent

of investors believe that investment in energy transition assets is increasing rapidly.

Even after a period of high interest rates and geopolitical volatility, investors are committed to pursuing **investments in clean energy technologies and projects**.

Investors are active across a broad and diverse set of opportunities

64 percent

have invested in energy efficiency technologies (including electrification) over the past two years.

- **56%** have invested in renewable and low-carbon energy.
- **54%** in energy storage and grid infrastructure
- **51%** in transportation and related infrastructure

This range highlights the **breadth of opportunities for investors**, as each area of interest involves many different systems and technologies.

Investors see a role for fossil fuels in an orderly transition

Only **25 percent**

are not making new investments in fossil fuel energy.

Despite the rapid growth in renewables, all credible forecasts see fossil fuels playing a steadily declining yet vitally important role in the energy mix over the next two decades. Recent years have shown **how fossil fuels (natural gas, in particular) remain crucial to energy security,** and further investment will be needed to meet energy demand as the transition proceeds.

Partnerships are key to risk management

94 percent

of energy transition investors prioritize finding partners who can share risks.

Collaborative approaches are vital to the success of energy transition projects, as they allow businesses to share risks, resources and expertise. Partnerships across various industries — and between public and private sectors — **reduce risks**, not only through reduced financial exposure, but also by **combining different advantages, infrastructure, influence, relationships and expertise**.

Policy risks worry investors

Regulatory or policy risks represent the **top barrier to investing in energy transition assets.**

These risks are difficult for investors to manage, and the resulting uncertainty can delay or prevent capital flows from reaching energy transition initiatives. **Stable, transparent and consistent regulatory environments can enhance long-term investment opportunities in clean energy and infrastructure**.

Contents

Introduction

Investing in the future of energy

The energy transition has created a vast, evolving world of investment opportunities across many sectors and reaching into all corners of the world.

A diverse set of actors are pursuing these opportunities, including traditional energy industry participants, financial investors, governments, as well as new energy developers, renewable energy producers and energy-intensive businesses.

KPMG's ***Energy transition investment survey*** captures perspectives from **1,400** energy transition investors from around the world.

Each survey respondent works for an organization that invests in energy transition assets,[1] including financial (e.g. banks, asset managers, venture capital, private equity and infrastructure funds) and non-financial entities (e.g. utilities, oil and gas, natural resources, automotive and transportation).

Big investments and big questions

A strong majority amongst these investors (72 percent) believes that investment in energy transition assets is increasing rapidly.

Indeed, of the US$3 trillion in global energy investment expected in 2024 — a record high — some US$2 trillion will be in clean energy technologies and infrastructure, close to twice the investment in fossil fuels for the year.[2]

KPMG's Energy Transition Investment Survey captures perspectives from

1,400 energy transition

investors from around the world.

[1] In the survey and this report, "energy transition assets" refers to infrastructure or projects in renewable energy, low-carbon technologies, energy storage, decarbonization, and networks/grids, as well as to the infrastructure related to any of these.

[2] World Energy Investment 2024, IEA, June 2024

Three quarters of this capital is from private and commercial sources — underscoring the private sector's leading role in implementing the energy transition.[3] The investors whose perspectives we explore in this research are involved in a diverse range of opportunities. They play a central role in driving the energy transition forward and this makes several questions important:

1. Which assets are organizations investing in, and why?
2. Which regions offer the most attractive opportunities?
3. Have energy transition investors stopped investing in fossil fuels?
4. Why do investors choose energy transition assets?
5. What are the main barriers facing energy transition investors?
6. How do policy conditions impact energy transition investments?
7. What role do partnerships play in energy transition investments?
8. What do energy transition investors expect from the next two years?

The following chapters explore these questions and related issues, uncovering the distinctive perspectives of today's energy transition investors.

[3] World Energy Investment 2024, IEA, June 2024

1 The investments

Which assets are organizations investing in, and why?

Over the past two years, most respondents

(64 percent)

say their organization has invested in energy efficiency technologies (including electrification). This was the highest of all the asset types in question.

Many have also invested in

renewable and low-carbon energy	energy storage and grid infrastructure	transport and related infrastructure
56%	**54%**	**51%**

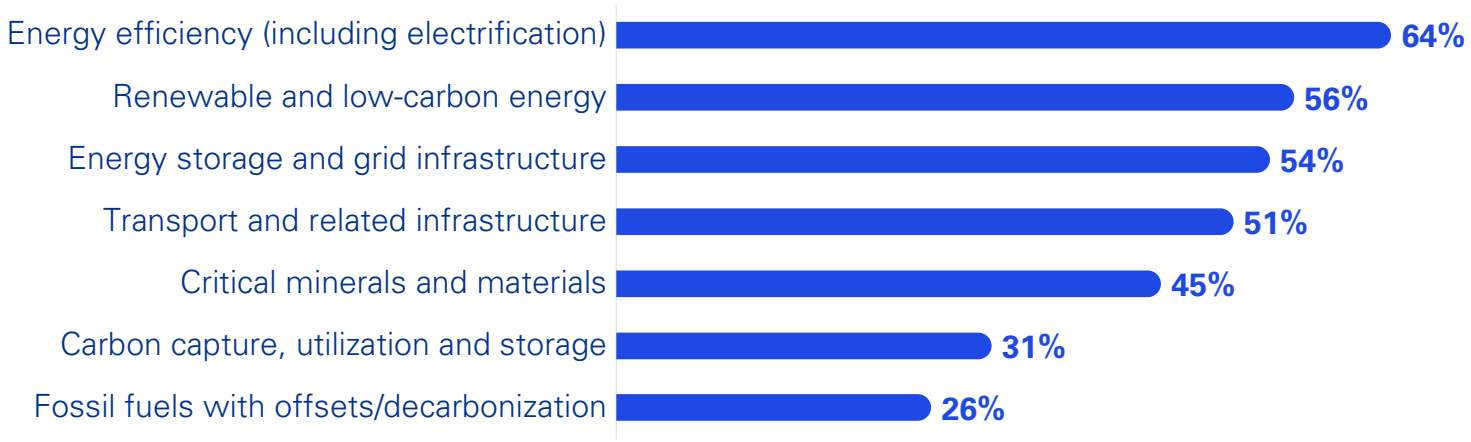
These top four areas — efficiency, renewables, storage/grids and transportation — comprise the bulk of the US$2 trillion expected global investment in energy transition assets in 2024. This figure includes US$771 billion in renewables, US$669 billion in efficiency and electrification (which includes transport, buildings and industry) and US$452 billion in grids and storage.[4]

The broad scope of the transition means that investment isn't limited to traditional energy companies and projects. Instead, it extends to startups; tech companies; industrial, materials and natural resources companies; energy-intensive industries; and services companies in the supply chain.

Investors are looking at everything from solar and wind farms to batteries, power grids, raw materials, synthetic fuels, green hydrogen and electric vehicle infrastructure.

Dozens of emerging technologies — like floating offshore wind, direct air carbon capture and synthetic fuels — are also on the radars of some energy transition investors.

Figure 1: Energy efficiency investments have been the most popular over the past two years



A diverse range of technologies and systems can improve efficiency

All of the top four areas cover a wide range of systems, technologies and related infrastructure, but energy efficiency arguably offers the most varied opportunities. Gains can be made in many different contexts using diverse methods and technologies. These include improved industrial processes, electrification, high-efficiency machines and appliances, improved building insulation, reflective roofing, daylighting and shading in building design, and the intelligent automation of lighting, heating, cooling and other processes.

[4] World Energy Investment 2024, IEA, June 2024

Many efficiency gains are enabled by digitalization, which opens investment avenues in areas such as the internet of things for energy management, artificial intelligence for grid optimization and blockchain for energy trading.[5]

While individual projects in renewables, storage or grids often hit the headlines with high dollar-value or gigawatt capacity, energy efficiency investments are often less visible and encompass many smaller investments and optimizations. However, it is estimated that doubling the global rate of progress on energy efficiency could reduce energy costs by one third and deliver 50 percent of worldwide CO2 reductions by 2030.[6]

The importance of the demand side of the energy system

Like energy investment, recently, global energy consumption hit an all-time high.[7] This is not unexpected. Global energy consumption has increased in 22 of the 24 years of this century. The two exceptions are 2009 (in the wake of the global financial crisis) and 2020 (during the COVID-19 pandemic).

However, both 2009 and 2020 were followed by strong rebounds in energy consumption. In fact, 2010 and 2021 recorded the two highest year-on-year increases in energy consumption this century.[8]

While individual projects in renewables, storage or grids often hit the headlines with high dollar-value or gigawatt capacity, energy efficiency investments are often less visible and encompass many smaller investments and optimizations

[5] Digital technology: The backbone of a net-zero emissions future, MIT Technology Review, March 2023
[6] Energy Efficiency 2023, IEA, November 2023
[7] 2024 Statistical Review of World Energy, Energy Institute, June 2024
[8] 2024 Statistical Review of World Energy, Energy Institute, June 2024

Figure 2: Year-on-year change in global energy consumption (renewables vs all other sources)

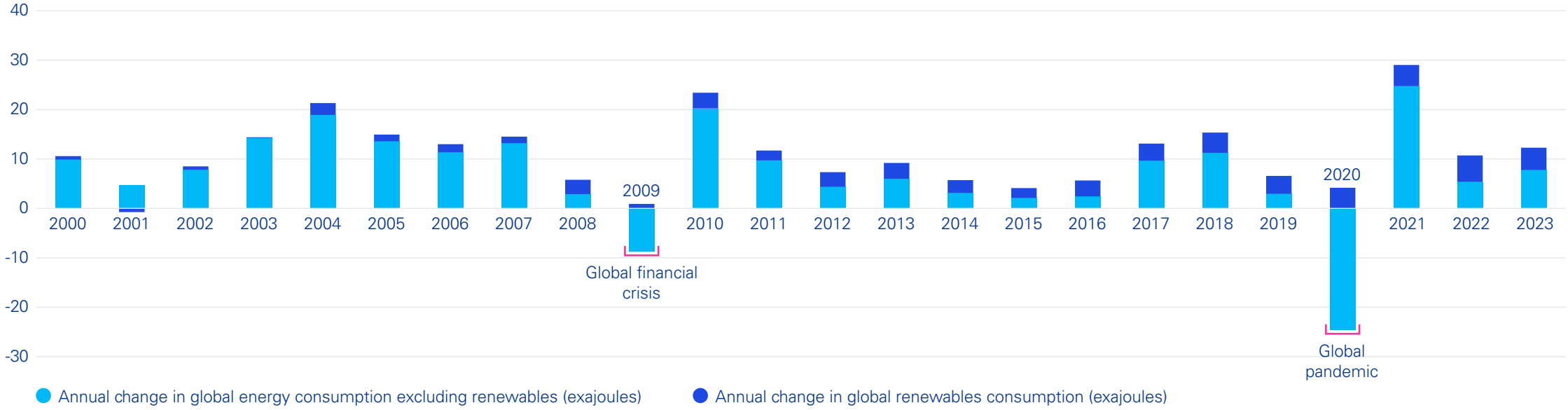
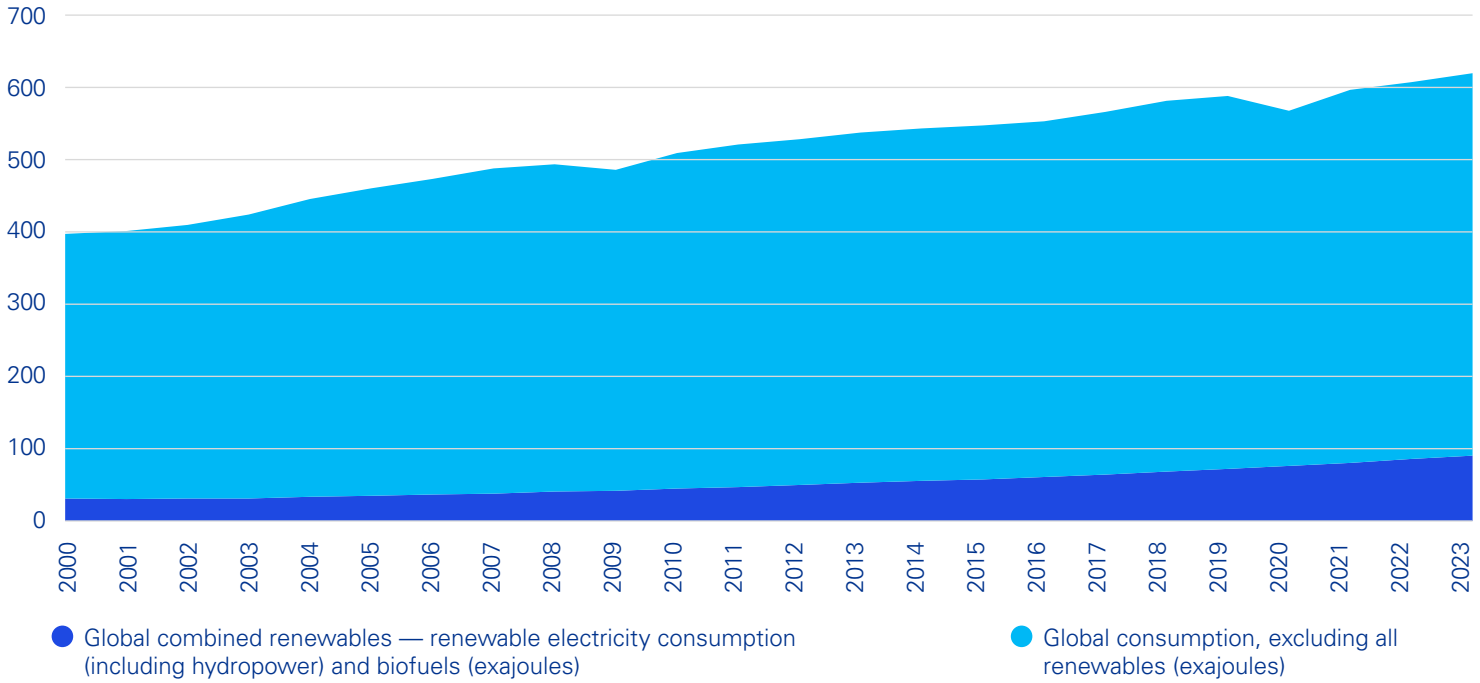


Figure 3: Total global energy consumption: renewables vs all other sources



Source: Energy Institute *Statistical Review of World Energy 2024*.[9]

This relentless growth in energy consumption underlines the enormity of the energy transition and the scale of the decarbonization challenge. Over the past 10 years, the growth rate in global renewable energy capacity, on average, has only served to (almost) cover the growth in consumption, doing little to reduce the world's reliance on fossil fuels.

This is why efficiency is so important. At the 2023 United Nations Climate Change Conference (COP28), 133 countries signed a pledge to double the global average annual rate of energy efficiency improvements, with the goal of sustaining a rate of at least 4 percent every year until 2030 (up from the current rate of about 2 percent).[10]

Investors in assets, projects and businesses related to energy efficiency will have been encouraged by this commitment, and as we show in Section 8, many expect energy efficiency and electrification to continue to be an attractive area over the next two years.

[9] Renewables includes all forms of renewable electricity generation (including hydropower) and biofuels. "Global energy consumption, excluding renewables" refers to the consumption of commercially traded fuels and nuclear power. Energy from all sources of non-fossil power generation is accounted for on an input-equivalent basis. Source data and further methodological details can be found in the resources and data section of the 2024 Statistical Review of World Energy.

[10] Global Renewables and Energy Efficiency Pledge, COP28 UAE declaration, November 2023

2 The Regions

Which regions offer the most attractive opportunities?

Most energy transition investors have focused on three regions over the past two years, with just over half pursuing opportunities in

East Asia	Europe	North America
54%	52%	52%

Parts of Asia, Europe and North America offer favorable conditions to investors across all (or most) of these factors. Some countries have many of the right conditions in place, but it only takes one or two issues to reduce investor interest. For instance, although many countries (and especially the world's largest economies) have enormous market potential and many other advantages, investment can be held back by factors such as political risks, immature market regulations or a lack of infrastructure.

Investors in energy transition assets are looking at a range of factors when assessing countries or regions, these include regulatory support, market potential, political stability, infrastructural readiness, environmental policies, legal frameworks, available skills, resources, local partners and more. The regions that are seeing the most investment have cultivated a blend of these factors, offering investors an attractive risk–reward proposition.”

Daisy Shen
Head of Climate and Sustainability
KPMG China

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Rapidly maturing regions could offer new opportunities

Several countries are becoming increasingly attractive to investors. In our survey, we asked respondents to choose which (one or two) regions were the most attractive for their organizations’ energy transition investments over the next two years. The expected top three emerged, with 43 percent selecting East Asia, 39 percent North America and 35 percent Europe. However, one in five selected the Middle East and North Africa (20 percent) and Southeast Asia (20 percent).

A range of developments may have brought these two regions into focus for investors. In Southeast Asia, the establishment of the *ASEAN Taxonomy for Sustainable Finance* (and related guidance) has helped enhance transparency and credibility for capital providers. Launched in 2021, and updated in 2023 and 2024, this taxonomy has given organizations the confidence to advance their transition plans.[11] For instance, in 2024, Tenaga Nasional, Malaysia’s electric utility, relied on this guidance to become the first ASEAN utility to establish a framework for issuing sustainability-linked debt instruments.[12]

[11] ASEAN Taxonomy for Sustainable Finance Version 3, Association of Southeast Asian Nations, April 2024
[12] TNB unveils groundbreaking Transition Finance Framework to support energy transition, The Malaysian Reserve, October 2024

In the Middle East, nations with some of the world's largest oil and gas reserves have advanced plans to fund major investments in energy transition assets. Saudia Arabia, for example, plans to increase its renewable energy generation capacity from 5 to 130 gigawatts by 2030.[13] The UAE increased its renewable energy capacity by 70 percent in 2023 and plans to become a world leader in carbon capture and green hydrogen.[14]

The importance of emerging and developing markets

Beyond the regions mentioned so far, there are several other emerging markets where investment is badly needed, and the opportunities are undeniable. However, much more needs to be done in these regions to attract large, long-term investors.

In our survey, several emerging market regions are only in focus for a minority, including South Asia (24 percent), Latin America (13 percent) and Sub-Saharan Africa (11 percent).

From a climate change perspective, it is vital that more is invested in energy transition assets outside of developing countries, particularly as fossil fuel use is accelerating in many emerging economies, far outpacing the growth of renewables.[15]

Globally, only

15 percent

of all clean energy investment occurs in emerging and developing countries (excluding China)[16] despite these nations being home to about 67 percent of the world's population.[17]

"Sustainable finance taxonomies are being developed globally to establish definitions for green and transition finance, helping to define sustainable activities. These taxonomies offer a framework for assessing the green credentials of companies, aiding in the fight against greenwashing and supporting new reporting requirements."

Geri McMahon, Lead of Global ESG for Asset Management, KPMG International

[13] World Energy Investment 2024, Middle East, IEA, June 2024
[14] UAE's Clean Energy Investments Exceed $12 Billion, Aiming for 32 percent Renewable Mix by 2030, ESG News, September 2024
[15] 2024 Statistical Review of World Energy, Energy Institute, June 2024
[16] World Energy Investment 2024, IEA, June 2024
[17] World Statistics Pocketbook 2024 edition, United Nations Department of Economic and Social Affairs, August 2024

The next frontier: Big barriers, vast opportunities

The financial investors we surveyed say that policy and market uncertainty are the main obstacles to considering energy transition assets in emerging markets. A lack of local infrastructure is another key problem. "When it comes to renewables, emerging markets are often quite fragmented, with underdeveloped or aging grid infrastructure," says James Suglia, Global Head of Asset Management, KPMG International. "These barriers make it harder for variable energy sources to be adopted as easily as they are in more developed markets."

In 2023, Africa and South Asia accounted for less than 10 percent of the world's energy consumption. These regions contain many developing countries and large populations, many lacking access to reliable energy sources. Globally, one in ten people — some 750 million — do not have electricity in their homes.[18] These regions will drive global energy demand further in the coming years as they continue to modernize, urbanize and industrialize.[19]

"Investors who move early into emerging markets, with the right risk management strategies in place, stand to gain outsized rewards. These markets often offer first-mover advantages, and local governments are increasingly offering favorable conditions for investment. When the regulatory framework is stable enough, and risks like currency fluctuation or supply chain disruptions are mitigated, investors can discover highly attractive opportunities relative to those in more saturated markets."

Gavin Geminder
Global Head of Private Equity
KPMG International

[18] 2024 Statistical Review of World Energy, Energy Institute, June 2024
[19] 2024 Statistical Review of World Energy, Energy Institute, June 2024

3 Fossil fuels

Have energy transition investors stopped investing in fossil fuels?

Despite the shift toward sustainable assets, only

25 percent

of investors have stopped making new investments in fossil fuels.

The geopolitical conflicts in Ukraine and the Middle East have led to a renewed focus on energy security, highlighting the importance of oil and gas and leading to an increase in fossil fuel investments. Record-high global oil production and consumption were seen in 2023,[20] and global investment in fossil fuel energy is expected to be over US$1.1 trillion in 2024.[21]

[20] 2024 Statistical Review of World Energy, Energy Institute, June 2024
[21] World Energy Investment 2024, IEA, June 2024

At the same time, higher interest rates, increased market volatility and various supply chain issues have contributed to a downturn for renewable energy developers and operators.[22]

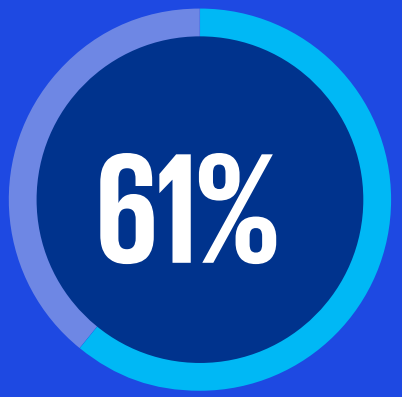
An orderly transition needs transitional fuels

However, the above shifts are unlikely to explain why only a quarter of investors have stopped investing in oil, gas, coal and related areas.

The rate of renewables adoption can sometimes obscure how reliant the world remains on fossil fuels, which currently account for 82 percent of the energy mix.[23] Replacing the sheer volume of fossil fuel energy currently in the mix will be an enormous global challenge.

"We're seeing renewed interest in transitional energy sources like natural gas," says Wafa Jafri, Partner, Energy Strategy, KPMG UK. "These sources are crucial for helping to ensure energy security and affordability during the transition to fully renewable energy systems. Without investment in transitional fuels, we risk creating energy shortages or forcing developing economies to rely on even dirtier energy sources like coal."

We will need fossil fuels to support the transition because it is not simply a matter of replacing one source with another.



of energy transition investors believe that geopolitics has slowed the rate of the energy transition

[22] 2023: the year the European renewables bubble burst, Wood Mackenzie, January 2024

[23] 2024: Statistical Review of World Energy, Energy Institute, June 2024

The energy transition is more like rebuilding a house than just changing the furniture. It involves enhancing or transforming the entire energy system — supply, demand and everything in between. This includes adapting transmission lines, storage solutions and energy grids to handle the variability and distribution of renewable power.

It's a revolution that will likely demand decades of investment and policy support.

This reality has inspired some investors to invest in the more traditional energy businesses, as they understand the key role these organizations will need to play in the energy transition.

"There's value in engaging with them on their energy transition plans and understanding how they are looking at the risks and opportunities," says Geri McMahon, Lead of Global ESG for Asset Management, KPMG International. "By supporting them and monitoring their progress, investors can play a critical role in driving the energy transition."

"What we're seeing is an enhanced understanding of the scale of the energy transition and the need to invest in the capital-intensive infrastructure that can help us decarbonize and transition energy sources. We need a phased transition that delivers the change we need while maintaining returns for businesses and investors."

Elizabeth Ming
Lead of Global Sustainability for Private Equity
KPMG International

4 The motives

Why do investors choose energy transition assets?

Different investor types have different reasons for investing in energy transition assets, and there are a wide range of investor types driving progress. These include governments, infrastructure funds, private equity groups, energy companies and energy-intensive businesses. Each has its own set of contexts, objectives and risk profiles.

This research looks in particular at the evolving roles of two broad groups: financial investors (banks, asset managers, venture capital, private equity infrastructure funds, etc.) and operational investors (energy, utility, oil and gas and natural resources companies and the automotive and transportation industries).

These two groups are both diverse in themselves, but the division has a significant difference between them: operational investors are active users of the assets they invest in, whereas financial investors provide funding and expertise in pursuit of investment returns.

Financial investors prioritize risk-return factors

We asked both groups for their top reasons for investing in energy transition assets. For financial investors, financial returns and portfolio diversification are the leading reasons. Regulatory compliance and risk management are also important factors. These are relatively universal drivers for financial investors, whatever themes or strategies they pursue.

Operational investors emphasize different reasons, led by energy security and regulatory compliance, and followed by reputation, social impact, financial returns, technological development and environmental impact.

Investments can demonstrate a commitment to sustainability

Concern about corporate reputation is a notable point of difference between financial and operational investors. Operational investors prioritize reputation, but it is far less of a concern for financial investors, who put risk-return considerations first. This situation may change as regulators focus more on controlling greenwashing in financial services.[24]

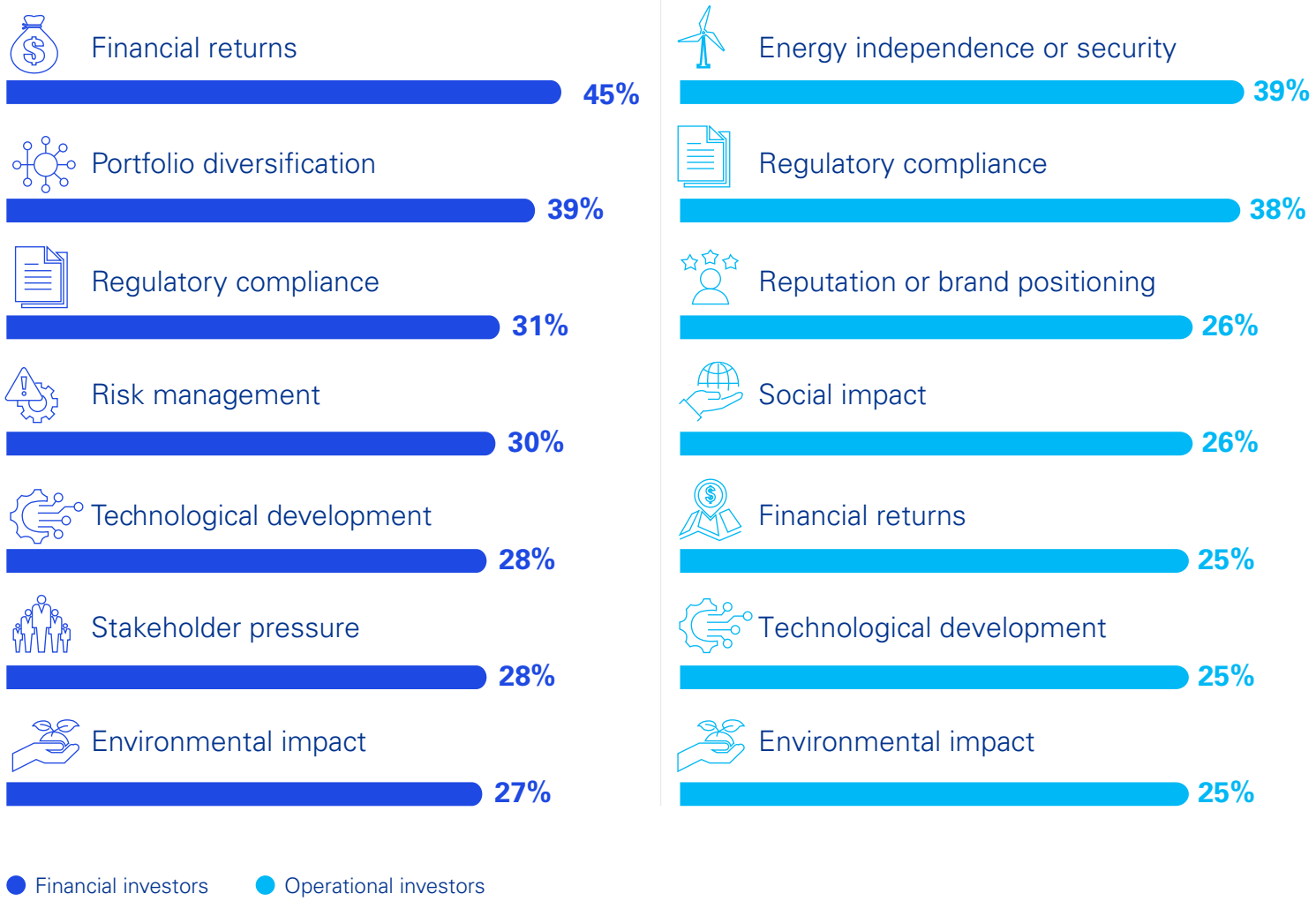
Operational investors have already experienced many years of increasing consumer and stakeholder pressure to adopt sustainable practices, which has influenced their corporate investment strategies.[25] Companies invest in clean energy projects not only for the potential returns or because it is the right thing to do for the planet; they do so to enhance their public image and comply with consumer expectations, which can be crucial to their market share. In turn, most CEOs (76 percent) now say they would be prepared to divest a profitable part of their business if it was damaging their reputation.[26]

[24] Avoiding the Greenwash Peril, KPMG, January 2023

[25] How stakeholder alignment on sustainability unlocks a competitive advantage, World Economic Forum and Accenture, February 2022

[26] KPMG 2024 CEO Outlook, KPMG, September 2024

Figure 4: Top reasons for investing in energy transition assets



There's a growing realization among companies that the energy transition is not just a long-term issue but a near-term, operational reality. These aren't just aspirational goals set for 2050. Evolving policies and regulations, stakeholder expectations and present physical and transition risks all create immediate challenges that need to be addressed within the next few years."

Elizabeth Ming
Lead of Global Sustainability for Private Equity
KPMG International

Energy-intensive businesses are driving their own transformations

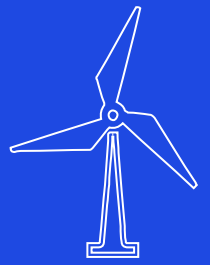
The energy transition is forcing a revolution in power generation, and it is also sparking radical change in several other sectors, including the manufacturing, automotive, steel, cement, oil and gas, chemicals and construction industries.

Corporate investment in renewables and carbon reduction is expected to increase. For some large consumers, particularly in heavy industry or commercial buildings, on-site generation remains quite limited compared to their significant power demands. As a result, many of these businesses are likely to invest in greenfield renewable projects and sign power purchase agreements with renewable providers.

Increasing numbers of customers and shareholders are considering whether businesses are decarbonizing their operations, products and supply chains. Sustainability issues now impact company valuations, adding to the business case for energy transition investments.[27] In fact, 72 percent of CEOs from energy, chemicals and natural resources companies say they have fully embedded environmental, social and governance (ESG) factors to create value in their businesses.[28]

Shareholders are also increasingly likely to assess the risk of investments based on their climate impact and rate of decarbonization, leading to the creation of financial instruments such as green bonds, sustainability-linked loans and carbon credits.[29] This, in turn, drives businesses to increase their decarbonization efforts. And investor demand for sustainable investments continues to grow, influencing further capital flows towards green assets.[30]

72 percent



of CEOs from energy, chemicals and natural resources firms say they have fully embedded environmental, social, and governance (ESG) factors to create value in their business.[28]

[27] Building the business case for sustainability, World Business Council for Sustainable Development, July 2024
[28] KPMG 2024 CEO Outlook, KPMG, September 2024
[29] Navigating climate risks: 3 strategies for building resilient financial institutions, World Economic Forum and auctus ESG, July 2024
[30] KPMG global ESG survey: ESG is becoming an impactful element in transactions, KPMG Law, July 2023

How do financial investors differ from operational investors?

	Financial investors	Operational investors
Sub-sectors	Banks, asset managers, venture capital, private equity, infrastructure funds	Energy providers/utilities, oil and gas, natural resources, automotive, transportation
Involvement with energy transition assets	Invest for the benefit of both clients and shareholders; typically providing debt and/or equity finance	More likely to own and operate the energy transition assets they purchase; typically use debt instruments to fund projects
Value of energy transition investments	Financial investors are responsible for larger amounts of capital per organization — 30 percent have over US$1 billion under management, 74 percent have over US$100 million	Operational investors have less invested per organization — 4 percent have over US$1 billion in energy transition assets, 33 percent have over US$100 million
Main reasons for investing in energy transition assets	Financial returns; portfolio diversification	Energy independence (or security); regulatory compliance
Most common strategies when investing in energy transition assets	Public–private partnerships and private (or growth) equity investments	Partnerships with financial investors and power purchase agreements
Most important partners or collaborators when investing in energy transition assets	Energy companies and asset management	Energy companies and consultants
Top three barriers to investing in energy transition assets	1) Regulatory or policy risks 2) Market volatility or uncertainty 3) Technology performance uncertainty	1) Regulatory or policy risks 2) Technology performance uncertainty 3) Market volatility or uncertainty
Most attractive areas for investment in energy transition assets over the next two years	1) Energy efficiency (including electrification) 2) Critical minerals and materials 3) Transportation and related infrastructure 4) Renewable and low-carbon energy	1) Renewable and low-carbon energy 2) Energy efficiency (including electrification) 3) Transportation and related infrastructure 4) Energy storage and grid infrastructure

5 The barriers

What are the main barriers facing energy transition investors?

Investors who completed our survey say that policy or regulatory risks are the most significant obstacles to pursuing investments in energy transition assets.

Geopolitical and economic uncertainty have made investors more tentative in recent times,[31] and survey respondents cite market volatility or uncertainty as the second biggest barrier to investment in energy transition assets. Like many barriers, the effects of volatility are unevenly distributed, but investors with a longer-term perspective are undeterred by shorter-term uncertainty, particularly when investing in a trend with such strong long-term momentum.

[36] Global inflation easing but high interest rates and policy uncertainty take their toll on growth, KPMG, December 2023

Figure 5: Top five barriers to investment in energy transition assets

Investors are looking for greater certainty in government policy. They want stable and predictable policy environments so they can make informed decisions. Without clear guidance and support, it can be difficult to commit significant capital.”

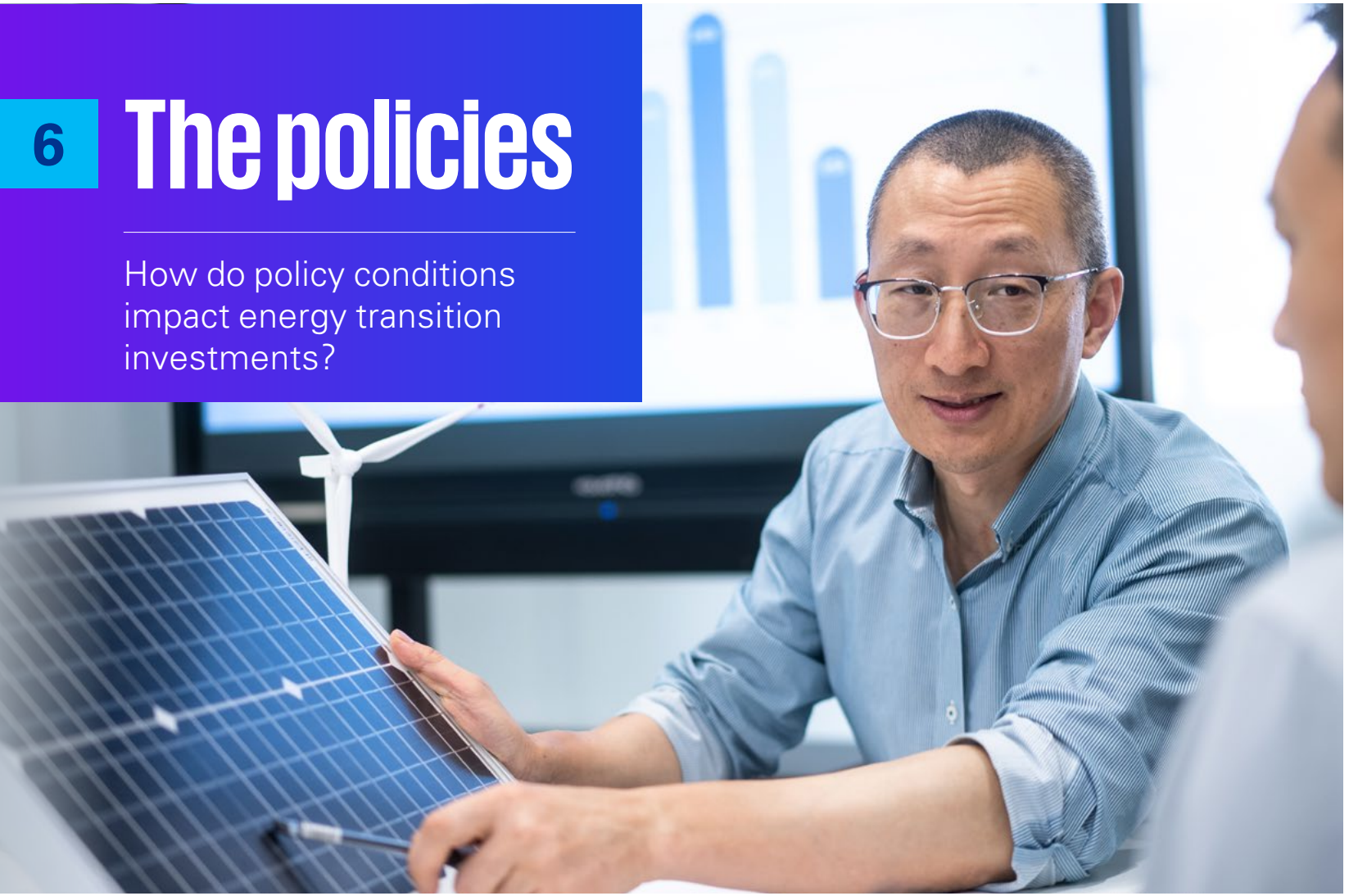
Geri McMahon, Lead of Global ESG for Asset Management, KPMG International

Technology performance uncertainty ranks as the third most significant barrier to investment in energy transition assets, with several factors contributing to this concern. Investors are often hesitant due to doubts about environmental patterns that influence the performance of renewables like wind and solar, as well as concerns about maintenance costs and how assets will integrate with broader energy networks. For new or emerging technologies, the challenges are more related to demonstrating long-term reliability and performance metrics, including efficiency, durability, and operational costs.

Some barriers are effectively risks that are difficult to manage, or too high for investments to remain viable. Investors require higher returns to compensate for higher risks, so barriers are sometimes passed through changes that increase projected revenue (such as subsidies) or reduce costs (such as lower equipment prices).

6 The policies

How do policy conditions impact energy transition investments?



The majority we surveyed

64 percent

say government policy is critical to the profitability of investments. This can take many forms, so what kinds of policy are most attractive to investors?

The energy transition is a policy-driven trend. Supportive regulatory frameworks, such as subsidies for renewable energy, carbon pricing, and mandates for clean energy usage, lower the risk and increase the attractiveness of investments in the energy transition.[32]

[32] Turning the tide in scaling renewables, KPMG, December 2023

"One of the biggest drivers of recent activity in the energy transition space has been the policy and regulatory intervention we have seen in the UK, Europe, Asia and increasingly, all around the world," says Geri McMahon, Lead of Global ESG for Asset Management, KPMG International.

Policy evolves as markets mature

Investors taking our survey say that feed-in tariffs (FITs) are the most important kind of policy driving investment in energy transition assets. FITs are popular with investors because they offer direct payment for electricity supply from renewable sources.

"Feed-in tariffs are clearly attractive because they provide long-term revenue guarantees and contract certainty, especially for less mature technologies," says Grant Hill, Managing Director, M&A, Climate & Decarbonization, KPMG UK.

Figure 6: Government policies deemed most important for driving investment into energy transition assets

"However, there's a movement towards more market-based mechanisms, which, if designed correctly, can stimulate development in these technologies at a lower cost than feed-in tariffs."

In comparison, governments have become less enthusiastic about FITs over the past decade, largely due to the risk of payments becoming unsustainable.[33] Many countries now favor renewable energy auctions, which are seen as more competitive and cost-effective.

Auctions can drive down prices by fostering competition among developers, who bid on the price at which they will sell electricity. Governments can offer investors security (through contracts for difference or power purchase agreements) but retain more control over the pace and scale of renewable energy development.[34]

Policy conditions are expected to improve in most regions

Policy conditions for investment in energy transition assets are expected to improve in China, the US and Europe over the next two years. India, Japan and (especially) Australia are more pessimistic.

A major driver of confidence in policy frameworks is how comprehensive they are. Policies that are too narrow in their applications and scope risk driving interest in one part of a value chain while leaving vital elements unsupported.

Another important consideration is whether policymakers can respond quickly to market needs. Investors we surveyed are divided on whether energy transition–related government policy can adapt quickly enough to meet market needs. This suggests that governments could do more in this area.

"This has been a key element of policies like the Inflation Reduction Act and more recently, the Border Adjustment Mechanism in Europe. The focus isn't just on energy investment but also on building up the supply chain necessary to support that investment."

Wafa Jafri
Partner, Energy Strategy
KPMG UK

[33] Renewable energy: are feed-in-tariffs going out of style, Power Technology, January 2017
[34] Renewable energy auctions: status and trends beyond price, IRENA, December 2019

Regulating the next phase of the transition

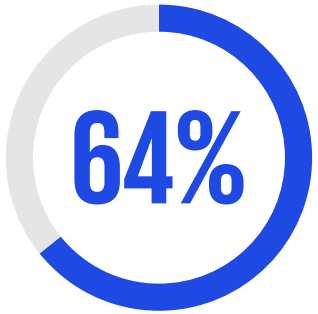
Major regulatory changes concerning ESG reporting will likely significantly impact companies and investors in the coming years. New ESG reporting standards are coming into effect. International and EU standards are already in place for the 2024 fiscal year, with the planned US climate-related disclosure rules delayed by a judicial review.[35]

Companies will need to report on how climate risks impact their businesses and how they're managing these risks. This demands a robust evaluation of their progress and an understanding of the long-term financial impact of climate and sustainability issues.

64% believe a carbon tax increases a region/country's attractiveness for investments in energy transition assets.

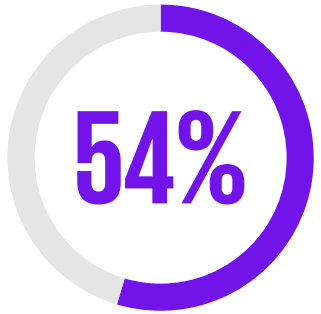
Figure 7: Most say that government policy is critical to profitability of investments in energy transition assets

(Percentages show the sum of "agree" and "strongly agree" responses to the statement.)



Government policy is critical to the profitability of investments in energy transition assets

Government policy related to the energy transition creates unnecessary complications or risks



Government policy related to the energy transition is too slow to adapt to market needs

"The transparency that will come from reporting regulations can enhance market understanding of how companies are managing climate and transition risk and the correlations to long-term value. Investors should be equipped to make more informed decisions and stakeholders may adjust their expectations based on this new information."

Elizabeth Ming, Lead of Global Sustainability for Private Equity, KPMG International

[35] Comparing sustainability reporting requirements, KPMG, March 2024

7 The partners

What role do partnerships play in energy transition investments?

Financial and operational investors pursue different strategies when investing in energy transition assets.

Financial investors use a wide range of strategies, the most popular being public-private partnerships (PPPs), private equity and infrastructure funds. Operational investors usually rely on partnerships with financial investors, but powerpurchase agreements, green bonds, sustainability-linked loans, and PPPs are also popular.

There is also an important strategic difference within the financial investor group. Pension funds (and other funds with similar responsibilities) are typically longer-term investors.

This is true even though pension funds can and do invest in private equity, venture capital, infrastructure funds and other specialized funds. While this gives them access to potentially higher-growth assets, it is typically done with limited allocations from broadly diversified portfolios, with risk controls designed to balance security and long-term growth.

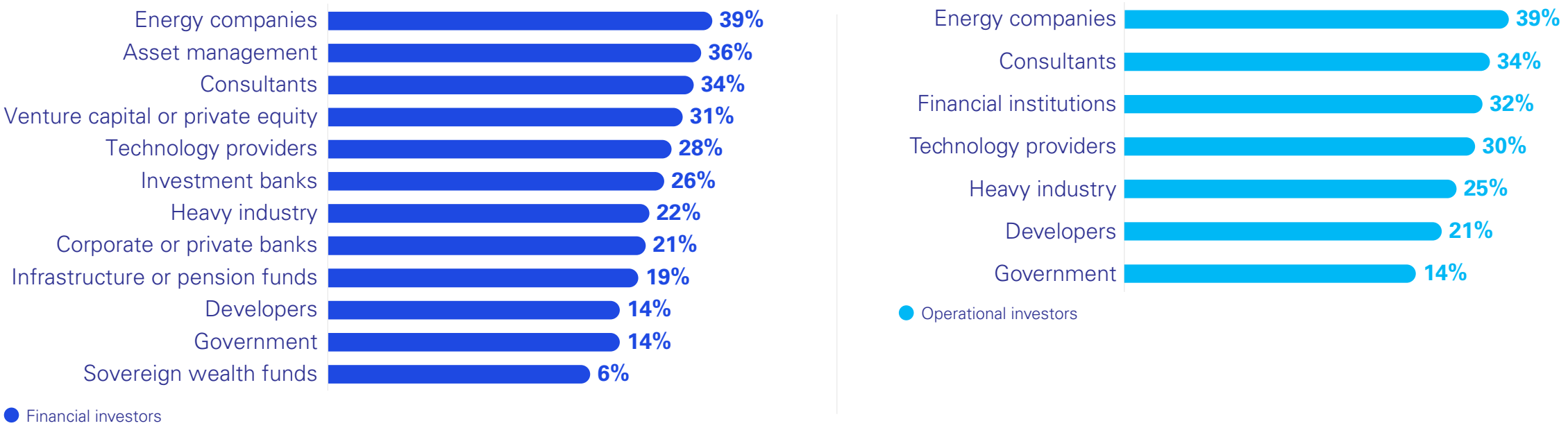
Investors seek partners to share risk, gain influence, and access skills

As we touched on in the last section, the energy transition — and the new energy industry that is emerging — extends beyond traditional energy sectors such as oil, gas, and power generation, to encompass a wide range of industries. This shift involves not just the production of energy, but also its consumption and the infrastructures and technologies that support both.

Private equity funds have shorter holding periods, while pension funds are more focused on long-term value creation. A long-term perspective is important in the context of energy transition investments, where the returns may take years to materialize.”

Geri McMahon, Lead of Global ESG for Asset Management, KPMG International

Figure 8: The most important partners/collaborators in energy transition investments



The energy transition is a horizontal investment theme, not just a vertical one — it's not limited to the energy and natural resources sectors. Private equity funds, for example, are now looking across multiple traditional verticals to make this energy transition system work, including industrials, business services, consultancies, and tech businesses, in addition to the classic grid and power generation sectors.

Grant Hill, Managing Director, M&A, Climate & Decarbonization, KPMG UK

This is leading to many new relationships and projects that unite organizations that have never previously had cause to collaborate. In our survey, energy companies are seen as the most important partners for most investors (of all types), followed by consultants, financial organizations and technology providers.

What do investors want from their partners? Almost all the respondents to our survey — 94 percent on average — prioritize finding partners to help with three things: to share the risk of energy transition investments, to add the right skills or experience, and to bring relationships or influence needed for success.

94 percent

prioritize finding partners to share the risk of energy transition investments.

The supply chain for wind and solar has historically been very fragmented, often consisting of small, country-specific businesses. We're now seeing investors interested in consolidating and growing these businesses to create more efficient, international supply chains.

Grant Hill
Managing Director, M&A,
Climate & Decarbonization
KPMG UK

8 The outlook

What do energy transition investors expect from the next two years?

Investment in energy transition assets has accelerated significantly since 2020, rising from about US$1.2 trillion in 2020 to over

US$2 trillion

in 2024.[36]

But it is estimated that we need to invest almost three times as much each year in the second half of this decade to meet Paris Agreement targets.[37]

While it will surely take longer than we would like to reach those levels, there are still reasons to expect a rapid expansion in energy transition investment over the next few years.

[36] World Energy Investment 2024, IEA, June 2024
[37] Energy Transition Investment Trends 2024, Bloomberg New Energy Finance, January 2024

Easing interest rate and supply challenges

In recent years, higher financing costs have slowed many energy transition investments. A shift in interest rates or inflation can significantly affect the economics of a project, making it more challenging to move forward. In the US, many off-take agreements previously agreed upon at the state level became unviable due to changes in interest rates.

However, as global inflation falls back from its recent highs, central banks worldwide are now lowering (or are expected to lower) their interest rates.[38] There is a good chance that merger and acquisition activity will continue to increase as financial conditions improve and withheld capital is invested.[39]

“The current market conditions demand careful monitoring of interest rate signals and macroeconomic indicators. Savvy investors are active, strategic players who anticipate shifts, understand the broader economic canvas, and act swiftly to secure investments that promise robust returns in a dynamic rate environment.”

Adrian Scholtz
Partner, Lead of Global Energy Deals
KPMG International

[38] Inflation and interest rates tracker: see how your country compares, Financial Times, October 2024
[39] Geopolitical uncertainty slowing growth, but GDP rebound forecast for 2025, KPMG, June 2024

Recent supply chain issues have also eased, leading to reduced materials prices. The cost of key battery metals (lithium, cobalt and nickel) has fallen sharply over the past year, with further decreases expected.[40]

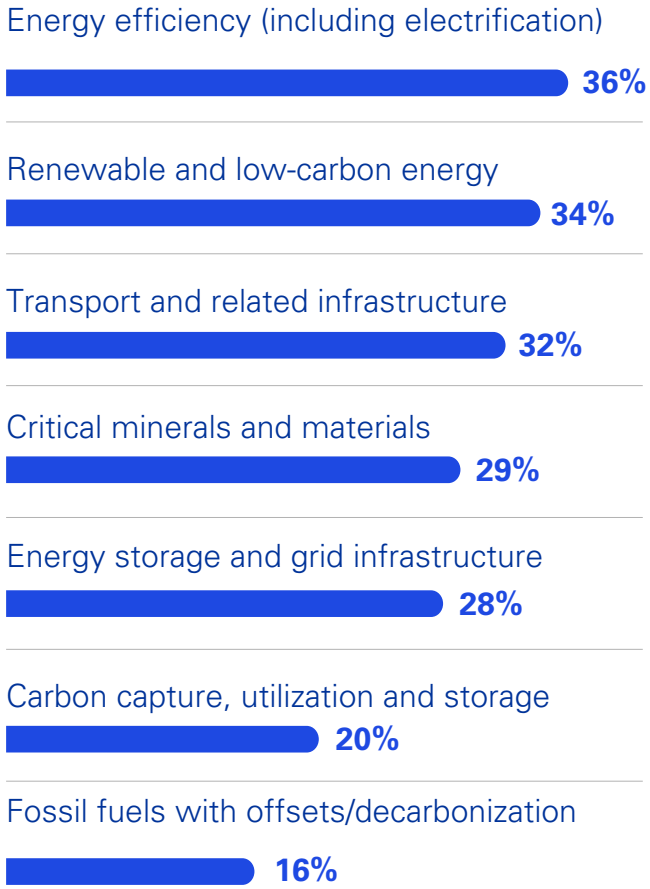
The cost of solar panels is now lower than ever before. In fact, photovoltaics are so affordable that citizens in the Netherlands and Germany have started using them to construct garden fences (despite the sub-optimal angle to the sun).[41]

Efficiency, renewables and transport are all expected to be attractive

Operational investors expect renewables to be the most attractive energy transition investment in the next two years, followed by energy efficiency and transportation.

Financial investors are less enthusiastic about renewables over the next two years, ranking them as the fourth most attractive asset type in this regard, after energy efficiency, critical minerals and materials, and transportation.

Figure 9: The most attractive areas for investment in the next two years



[40] Goldman says the bear market for battery metal prices is far from over, CNBC, March 2024
[41] Global glut turns solar panels into garden fencing option, Financial Times, April 2024

One of the reasons for this could be grid capacity and integration challenges, issues that slow the addition of renewable energy generators in many regions. Currently, renewable power projects totaling at least 3,000 gigawatts are stuck in grid connection queues around the world[42] — that is more than twice the worldwide capacity of all the solar power currently in use.[43]

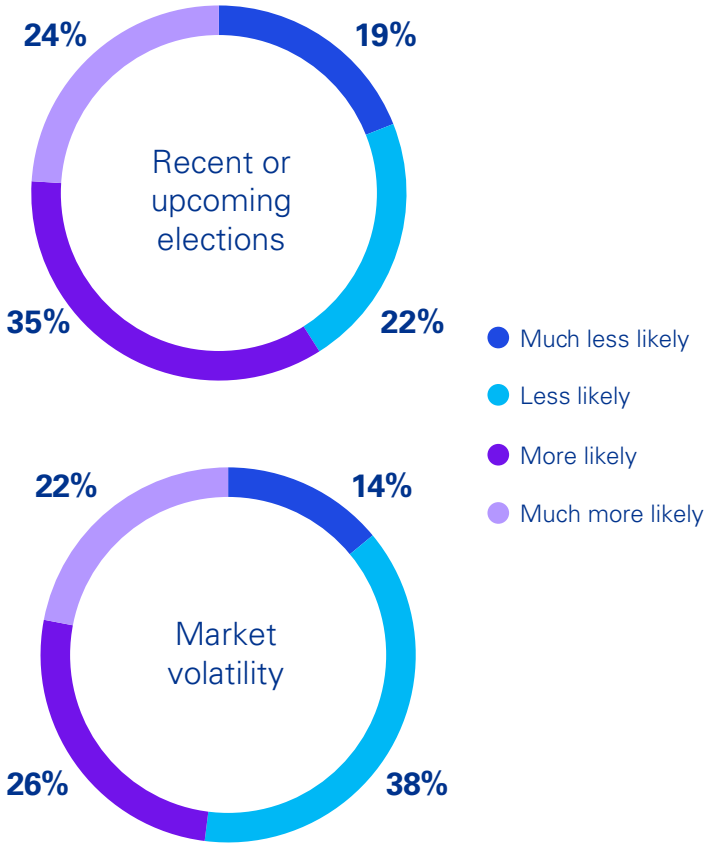
A major concern is the grid's ability to accommodate the growing addition of renewable energy. While the production of renewable energy is well understood, the challenge lies in efficiently transporting it to the right place at the right time. To keep pace with the expanding renewable capacity, it is important to address grid management and storage bottlenecks.

There are signs that things are starting to change. After remaining at around US$300 billion annually since 2015, investment in power grid capacity and technologies is projected to reach US$400 billion in 2024. This increase is fueled by new policies and investments across Europe, the US and China, as well as in certain regions in Latin America.[44]

Threats for some can be opportunities for others

Recent years have shown how even the most careful planning can be upended by shocks and surprises. This has left a lingering uncertainty, especially around the influence of geopolitics. Ongoing political changes could lead to more inward-looking and protectionist economic policies.[45]

Figure 10: Investors are divided on whether volatility and elections make it more or less likely that their organization will invest in energy transition assets



[42] Electricity Grids and Secure Energy Transitions, IEA, October 2023
[43] Renewable capacity highlights, IRENA, March 2024
[44] World Energy Investment 2024, IEA, June 2024
[45] Geopolitical uncertainty slowing growth, but GDP rebound forecast for 2025, KPMG, June 2024

Political elections and shifts in market volatility can both challenge and energize, depending on your context, goals, and point of view. Each election brings potential shifts in policy that can impact investment conditions, while market fluctuations can create new investment opportunities or expose risks. Navigating these changes requires a sharp focus on adapting investment strategies to capitalize on emerging opportunities.”

James Suglia
Global Head of Asset Management
KPMG International

We asked our survey respondents whether certain factors made them more or less likely to invest in energy transition assets. About half (52 percent) say that market volatility makes them less likely to invest, with 41 percent having a similar response to the effect of recent and upcoming elections. Just under half (48 percent) are more likely to invest in response to market volatility, and 59 percent expect that recent or upcoming elections will encourage them to invest.

Driving the next phase of the transition

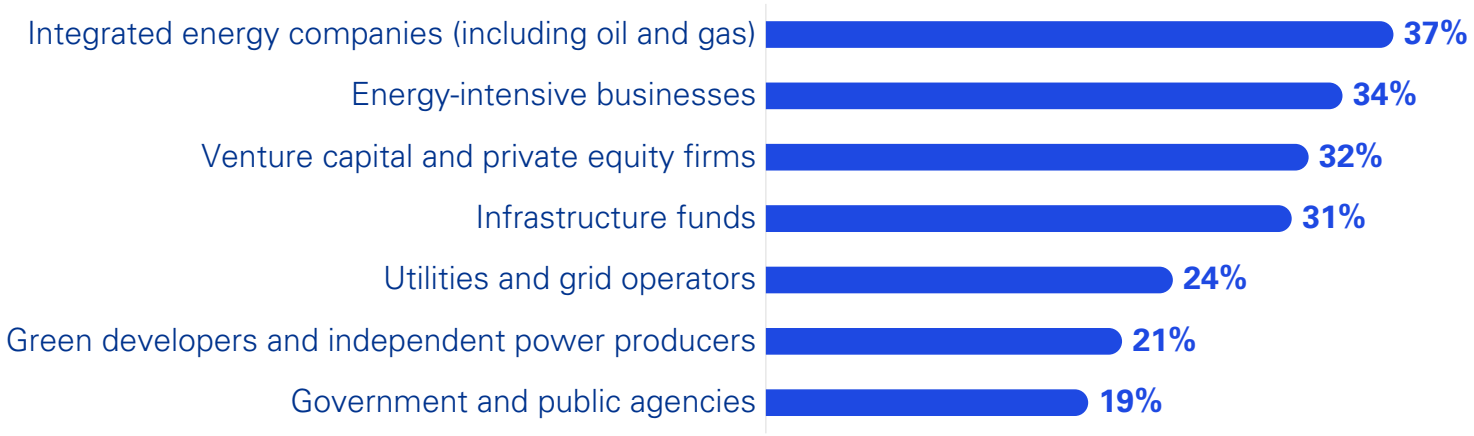
Several aspects of the energy transition megatrend will continue to support the case for investments in related assets.

Over the next two years, our survey finds that investors expect four types of organization to be the most active in funding, developing and acquiring energy transition projects: integrated energy companies (including oil and gas), energy-intensive businesses, venture capital/private equity firms, and infrastructure funds.

This diverse selection reflects the new landscape of energy investing, where governments create policy frameworks to encourage collaboration among energy producers, consumers, and investors, to collectively advance the next phase of the energy transition.

The pace of technological progress in solar, wind, storage, and electric vehicles has been remarkable. Efficiency continues to improve, costs are steadily decreasing, and the supply chain is strengthening. Despite ongoing geopolitical shifts, the impact on renewable investments may be limited. The technological advancements made over the past decades are now delivering results, and that momentum is difficult to slow down.

Figure 11: Groups expected to be most active in funding, developing and acquiring energy transition projects over the next two years



Despite the challenges, a strong wall of capital remains ready for deployment, with the investment community now pursuing quality investments with renewed vigor and discernment. Investors are increasingly aware of the risks and are learning to be more strategic, reflecting on both the successes and challenges of their past investments.”

Adrian Scholtz
Partner, Lead of Global Energy Deals
KPMG International

Key takeaways for Strategic investment in the energy transition

Explore the full range of opportunities

There are significant opportunities beyond traditional asset-heavy power generation and emerging technologies for investors seeking to benefit from the strong sector tailwinds across the energy transition. Investments across the broader supply chain (including business services, manufacturing, software and advisory companies) are crucial to the energy transition and benefit from the same favorable macro trends.

For private equity managers with existing portfolios, the ideal time to explore how portfolio companies can pivot or extend their products and services into the energy transition value chains is early in the holding period. This can significantly enhance exit values.

KPMG professionals can help investors identify opportunities across energy transition value chains and can conduct portfolio reviews to assess how existing investors may participate in the energy transition.

Assess government policy

Our survey clearly shows that government policy is a key consideration for investors in energy transition. This goes beyond short-term stimulus packages; government policies need to be resilient and stable enough to give investors the confidence necessary for long-term investments.

Operational investors typically have long-term holding strategies, while financial investors need to assess policy durability to ensure that their potential future buyers will be comfortable with today's long-term forecasts when the time comes to exit.

A government policy review should be comprehensive, considering both subsidies and financial support. Not only that, but it should also encompass the government's commitment to building supply chains and ensuring the availability of skilled labor, among other key factors. KPMG regulatory specialists, who are spread across the global organization of firms, offer guidance on the short- and long-term impacts of government policy.

Seek partners to add value and help reduce risk

Financial and operational investors recognize that partnerships are crucial to helping reduce risk in long-term capital deployment, especially in uncertain regulatory environments. Some partners will enter secured off-take agreements, such as gas and power purchase agreements, which help to unlock project financing.

There are also compelling partnership opportunities available via centralized or specialized development areas. These include the US Regional Clean Hydrogen Hubs and the European Hydrogen Backbone initiative.

Understanding different partnership structures and examples already in action can help turn ideas into viable projects. KPMG professionals provides advice on partnership structuring and can facilitate introductions to potential partners through our the global organization of firms.

Take a global view

While East Asia, Europe and North America dominate the geographic focus on energy transition investments, there may be significant advantages for investors willing to target emerging markets, as these can offer potentially outsized returns.

KPMG firms' global decarbonization team, working alongside our local teams with their on-the-ground experience, can help investors understand the real risks and opportunities in these markets. This knowledge can help reduce the cost of capital and can lead to strong economic returns.

Conclusion

The energy transition is one of the biggest, longest and most important investment megatrends in history. Global commitments to 2030 targets suggest that investors can look forward to many near-term opportunities.

To turn the COP28 pledge into reality — tripling renewable energy capacity and doubling the rate of energy efficiency improvements by 2030[46] — will involve significant investment. It is estimated that investment in renewable power generation, grids, and storage will need to rise from US$1.2 trillion in 2024 to US$2.4 trillion in 2030, while spending on efficiency and electrification, needs to increase from US$669 billion in 2024 to US$1.9 trillion in 2030.[47]

Taken together, that's an increase of about US$ 2.4 trillion, which puts significant responsibility in the hands of investors of all kinds and demands we find quick and effective ways to collaborate and overcome barriers.

In this report, we have seen how energy transition investing is eroding the traditional boundaries of the energy industry and introducing new actors, relationships and competitors.

Many of today's energy- intensive businesses — far from passively purchasing energy — are taking control of their energy transition pathway and developing their own assets for their own needs.

Many financial investors — far from passively providing capital — are actively orchestrating the development of assets and infrastructure to create new energy value chains.

The actors, challenges, policies, and economics of the transition are expected to continue to evolve, but at a macro level, there is strong, consistent momentum behind the technologies, policies and supply chains driving the transition.

[46] Global Renewables and Energy Efficiency Pledge, COP28 UAE declaration, November 2023
[47] World Energy Investment 2024, IEA, June 2024

How KPMG can help

KPMG's **Energy Transition Deal Advisory** practice provides wide-ranging support to investors navigating the rapidly evolving energy transition landscape. We help clients deploy capital effectively in both established and emerging markets.

Effectiveness starts with identifying the right investment opportunities, and KPMG leverages a global organization of industry, regulatory and financial specialists to help identify strategic opportunities across the value chain. Such opportunities range from infrastructure projects to asset-light business models, supply chain investments and emerging technologies.

Once the appropriate opportunity set is identified, KPMG provides a holistic suite of buy-side advice across the deal lifecycle, from pre-deal strategy and value creation thesis-building to in-deal due diligence and post-deal transformation.

Our global government policy and regulatory teams help investors assess the resilience of government policies, navigate subsidy regimes and evaluate key business factors, such as local labor and supply chains. All of these are critical to de-risking long-term investments.

KPMG also has the experience needed to guide investors who are forming the strategic partnerships that are often essential to reducing risk in uncertain regulatory environments. By leveraging tools such as secured off-take agreements and new partnership models, investors are better able to unlock their capital, access specialized knowledge and help ensure project viability.

KPMG has long-standing, in-depth experience in emerging markets. The combination of the global organization of firms and local understanding helps investors seize first-mover advantages and tap into high-growth opportunities. By providing clear insights into risks and rewards, KPMG professionals equips investors to make informed decisions wherever they choose to invest.

We also serve private equity managers with existing portfolios, working collaboratively with you and your portfolio company management teams to identify opportunities to help increase your exposure to energy transition end-markets and the huge sector tailwind behind these. In this way, we help you to drive value creation ahead of exit.

Accolades

The energy transition stands as the defining challenge of our era, compelling various sectors to navigate the complexities of powering human progress in a manner that is not only reliable and affordable but also sustainable and equitable. KPMG firms are uniquely positioned to guide businesses through this intricate landscape, leveraging the experience of over 1,500 professionals across more than 50 global hubs. Our energy professionals work closely with institutions and companies to help them understand the dynamics of energy transition, identify growth opportunities, and develop and execute strategic plans. KPMG professionals credibility in this space is underscored by our thorough approach, which synthesizes insights from a diverse range of stakeholders — including investors, managers, regulators, and service providers. This multifaceted perspective enables us to assist clients in making informed decisions that help propel their businesses forward, even amidst uncertainty. With a tailored suite of services and tools, KPMG empowers clients to formulate and implement leading strategies for navigating the energy transition effectively.

KPMG named a Leader in Climate Change Consulting by Verdantix

KPMG was **recognized as a global Leader in Climate Change Consulting** by Verdantix in their report entitled *Verdantix Green Quadrant: Climate Change Consulting 2023*. The report provides a detailed, fact-based benchmark of 15 of the most prominent climate change consulting providers in the market to identify those who "demonstrated the most comprehensive climate change consulting capabilities.[48]

[48] Verdantix Green Quadrant: Climate Change Consulting 2023

KPMG named a Leader in ESG Program Management Services by the IDC MarketScape

KPMG has been **recognized as a worldwide Leader in ESG Program Management Services** in the IDC MarketScape: Worldwide ESG Program Management Services 2023–2024 Vendor Assessment. The report evaluates the vendor performance of 11 environmental, social, and governance (ESG) program management services providers worldwide.[49]

KPMG named a global Leader in ESG Environmental Services by ALM Intelligence

KPMG was **recognized as a global Leader in ESG** by *ALM Intelligence in their report entitled ALM Pacesetter: ESG: Environmental 2023-24* and received the top overall score of all firms profiled. The report explores how the most innovative professional services providers in 2023 are helping clients understand, develop, and properly manage environmental factors as part of their business strategy — as well as how innovative providers themselves are developing an environmental focused approach that is aligned to meet their own ESG organizational goals.[50]

[49] IDC MarketScape: IDC MarketScape: Worldwide ESG Program Management Services 2023-2024 Vendor Assessment.", December 2023, IDC #US50608423
[50] ALM Intelligence, ALM Pacesetter: ESG: Environmental 2023-24 report (c) 2023; used with license permissions

About the Research

The *Energy transition investment outlook* is supported by primary and secondary research. The primary sources comprise a survey of 1,400 senior executives from around the world, together with in-depth interviews with subject matter experts and leaders. Secondary sources are referenced via footnotes throughout the report.

The survey was fielded in July and August of 2024. The survey sample profile is shown in the tables below.

Total number of respondents: 1,400

Countries

Australia	100	Ireland	50
Canada	100	Italy	50
China	100	Korea	50
France	100	Mexico	50
Germany	100	Netherlands	50
Japan	100	Saudi Arabia	50
UK	100	Singapore	50
US	100	Spain	50
Brazil	50	Switzerland	50
India	50	Africa*	50

*17 countries are represented, led by South Africa (15)

Industries

Corporate or private bank	142
Asset management or pension fund	188
Investment bank	206
Venture capital, private equity	66
Infrastructure fund	68
Energy or utility	210
Oil and gas	210
Natural resources	210
Automotive and transportation	100

Size

Less than 100 employees	280
100–999 employees	560
1,000–9,999 employees	420
10,000+ employees	140

Seniority

C-suite executive (or equivalent)	560
Direct report to a C-suite executive	468
Manager reports direct to C-suite	372

Involvement

Responsible for investment decisions relating to energy transition assets	409
Analyst, advisor or committee member involved in investment decisions relating to energy transition assets	332
Subject matter expert consulted on aspects of investment decisions relating to energy transition assets	211
Has a role that is primarily focused on evaluating and investing in energy transition assets	179
Is required to have a detailed understanding of investment decisions relating to energy transition assets	269

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Adam Hamilton
Director, Energy and Natural Resources
KPMG UK

Mike Hayes
Climate, Decarbonization and Nature Leader
Global Head of Renewable Energy
KPMG International

Gavin Geminder
Global Head of Private Equity
KPMG International

Wafa Jafri
Partner, Energy Strategy
KPMG UK

Adrian Scholtz
Partner, Lead of Global Energy Deals
KPMG International

Kishlay Sinha
Director, Energy Corporate Finance
KPMG UK

James Suglia
Global Head of Asset Management
KPMG International

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Erin Dodds

Lyndie Dragomir

Nicole Duke

Evalueserve

Lindsey Keck

Jessica LoSchiavo

Marsha Toomey

Contacts at KPMG Caucasus and Central Asia

Gabit Musrepov
Partner, Consulting, GRCS, ORS and ESG Practice
KPMG Caucasus and Central Asia

E: gmusrepov@kpmg.kz

Vitaliy Yakovlev
Managing Partner of KPMG Azerbaijan
Partner and Head of infrastructure at Deal Advisory
KPMG Caucasus and Central Asia

E: vitaliyyakovlev@kpmg.com

Nodirbek Vakhidov
Managing Partner
KPMG Uzbekistan

E: nvakhidov@kpmg.com

Giorgi Chemia
Director at Deal Advisory
KPMG Georgia

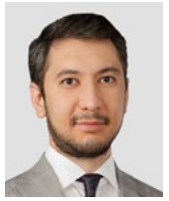
E: gchemia@kpmg.com

Timur Syzdykov
Partner, Deal Advisory
KPMG Caucasus and Central Asia

E: tsyzdykov@kpmg.com

Saltanat Sandykbayeva
Partner, Deal Advisory
KPMG Uzbekistan

E: ssandykbayeva@kpmg.kz



Farrukh Abdullakhanov
Partner, Head of consulting
KPMG Uzbekistan

E: **fabdullakhanov@kpmg.com**

kpmg.kz

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