Energy transition investment outlook: Energy sector insights

KPMG International

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Key findings from energy respondents

Investment focus

65 percent

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

55 percent

invested in renewable and low-carbon energy.

54 percent

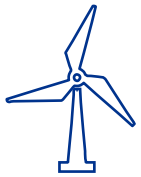
invested in energy storage and grid infrastructure.

69 percent

still invest in fossil fuels.

Top regions for investment

54 percent



target investments on markets in East Asia.

51 percent

target Europe.

43 percent

target North America.

Policy drivers

#1 **Regulatory compliance is the top reason for energy transition investments (followed by energy independence and reputation).**

68 percent

believe government policy is critical to the profitability of energy transition investments.

67 percent

say effective carbon tax systems attract investment in energy transition assets.

Policy barriers

58 percent

say government policy related to the energy transition creates unnecessary risks or complications.

56 percent

say government policy related to the energy transition adapts too slowly to market needs.

#1 **Regulatory risks are the top barrier to investments (followed by technology performance uncertainty and market volatility).**

Top five investment areas for the next two years

Renewable and low-carbon energy

Energy efficiency (including electrification)

Transport and related infrastructure

Energy storage and grid infrastructure

Critical minerals and materials

Source: KPMG Energy transition investment outlook

Introduction

The global push to decarbonize is reshaping the energy landscape, compelling companies to prioritize sustainability while navigating economic, regulatory and technological challenges.

Investments in energy transition assets are at the heart of this transformation, blending innovation, pragmatism and policy-driven strategies to meet the growing demand for cleaner energy. But these investments are not only about clean energy — the transition needs to progress without compromising energy security, reliability or affordability. There is a challenging balance to strike for both government and business leaders alike.

This report explores how the energy industry is investing to meet all these objectives and provides insights for investment decision-makers at energy companies and their partners in the public and private sector. The report draws on inputs from energy sector professionals and the KPMG Energy Transition Investment Outlook (which is based on a survey of 1,400 senior executives from 36 countries and 11 sectors).[1]

We track an accelerating trend:

7 out of 10

energy industry respondents (which includes those from utilities, renewables, oil and gas, and other parts of the energy industry) say that investment in energy transition assets is increasing rapidly.

But with such a diverse array of opportunities, where is the attention — and capital — flowing most heavily?

[1] Energy transition investment outlook: 2025 and beyond, KPMG International, November 2024.

1 Investments: Strength in diversity

Over the past two years, 65 percent of energy respondents reported investments in energy efficiency technologies, including electrification — the highest among the asset types surveyed.

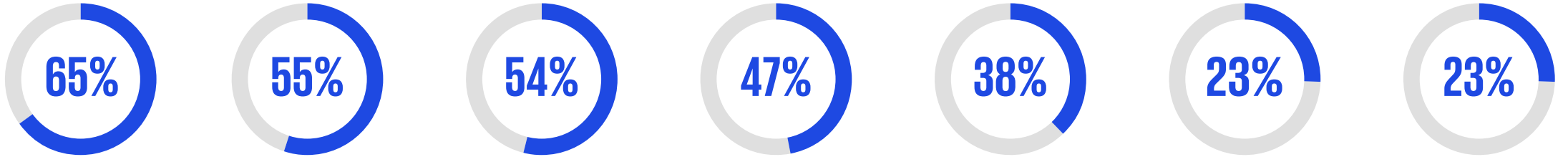
It is estimated that doubling the global rate of progress on energy efficiency could reduce energy costs by one-third and deliver 50 percent of worldwide CO_2 reductions by 2030.[2] Energy efficiency gains can be made using a diverse set of methods and technologies, including improved industrial processes, electrification, high-efficiency machines and building insulation. Many efficiency strategies are also enabled by digitalization, which can support the use of intelligent automation to manage energy consumption and optimize systems.[3]

Other significant areas of investment include renewable and low-carbon energy (55 percent, and energy storage and grid infrastructure (54 percent). Again, these categories cover several methods and technologies, and energy companies appear to be aware of the need to capitalize on many opportunities in parallel.

> “No single technology will solve the energy transition. From renewables to nuclear, from biofuels to carbon capture, we need all digital solutions on the table. The real challenge lies in securing the investment needed to turn decarbonization ambitions into reality.”

Wafa Jafri
Partner, Energy Deal Advisory, KPMG UK

Asset types that energy companies have invested in over the past two years



Source: KPMG Energy transition investment outlook

[2] Energy Efficiency 2023, IEA, November 2023.
[3] Digital technology: The backbone of a net-zero emissions future, MIT Technology Review, March 2023.

2 Ultimate goals and interim approaches

The diversified nature of energy transition investments — and the fact that 82 percent of the world's energy currently comes from fossil fuels[4] — highlights the need for a pragmatic approach. According to our research, renewable energy projects are scaling rapidly,[5] but companies are also reducing emissions by switching from coal to gas, or by reducing fugitive methane emissions, which are a significant contributor to greenhouse gases during oil and gas extraction.[6]

We often focus on zero-carbon technologies like hydrogen and renewables, but the transition is *also* about reducing the carbon intensity of existing fuels. There are many ways we can quickly and significantly lower carbon emissions while zero-carbon technologies scale up over time. For example, methane is a super pollutant, with global warming potential more than 80 times higher than CO_2 over 20 years. Companies are investing in Leak Detection and Repair (LDAR), flare reduction and gas capture, but more specific policies and regulatory measures are needed to drive wider corporate action.

Our survey shows that 69 percent of energy respondents are still investing in fossil fuels. These organizations have a need to balance legacy energy sources with both interim strategies and ultimate approaches, acknowledging the current energy system's reliance on hydrocarbons.

[4] 2024 Statistical Review of World Energy, Energy Institute in collaboration with KPMG and Kearney, June 2024.
[5] Turning the tide in scaling renewables, KPMG International, November 2023.
[6] Methane intensity target, Oil and Gas Climate Initiative, December 2024.

Case study

Giant deals done right

The complexity behind the headlines in major renewable energy transactions

On 27 December 2024, JSW Neo Energy, a prominent Indian power company, announced the purchase of approximately 4.7GW of renewable energy assets from O2 Power. It is one of the largest renewable energy transactions of recent times — not only in India, but anywhere around the world.

The deal involved a diverse mix of solar, wind and hybrid assets and projects. Some of the assets were operational, while others were under construction or in early development.

For the deal to go ahead, JSW Neo Energy needed to overcome significant challenges. Investments in energy transition assets come with a unique set of risks and complexities. For example, renewable energy projects often have long payback periods, so investors need to assess revenue and cost assumptions over the full term of each asset, including complex factors like energy prices, policies, taxes, subsidies, operational costs and maintenance requirements. Projects in earlier stages have additional intricacies, including commodity prices, supply chain issues, permits, grid connections, and dozens more.

JSW Neo Energy enlisted KPMG India to conduct an analysis of the financial and tax status of all assets involved in the deal. This included an assessment of key financial and tax risks, such as the financial terms with contracted customers, potential risk associated with different categories of assets and the potential for cost overruns.

KPMG India's due diligence work enabled JSW Neo Energy to significantly enhance their insight into the implications, opportunities and valuation of the transaction. The collaboration was instrumental in shaping the structure of the deal and directly led to the creation or refinement of several adjustments, conditions, representations, warranties and indemnities, as applicable to the transaction.

Strategic impact

This case demonstrates the importance of due diligence and strategic planning in large-scale renewable energy transactions. It helps ensure that companies like JSW Neo Energy can confidently make informed decisions that bring strategies to life, while aligning with growth ambitions, risk profiles and sustainability goals.

The acquisition not only scaled JSW Neo Energy's operational capacity but also provided it with important strategic assets, such as management expertise, land banks, and connectivity approvals — all essential for future expansions.

More expansions and more deals of this kind appear likely across India's burgeoning renewable energy sector. Remarkably, it took O2 Power only about five years to build the diverse 4.7GW portfolio that JSW Neo Energy has acquired, so the transaction certainly highlights the rapid growth potential within India's renewable energy sector, as well as its growing attractiveness to investors.

3 Regional dynamics: Emerging growth

Geography plays a crucial role in shaping investment strategies.[7] Most of the energy industry respondents we surveyed (69 percent) are based in one of three regions: East Asia (23 percent), Europe (34 percent) and North America (12 percent).

It should not be a surprise then to learn that these regions are also the top three in our survey for current investments in energy transition assets. This reflects a bias towards home markets, close to existing facilities and infrastructure. However, each of those regions also attracts significant interest from abroad, which is evident in the proportions focused on investments in each region — East Asia (54 percent), Europe (51 percent) and North America, (43 percent) — all of which are far higher than the proportions (above) by respondent location.

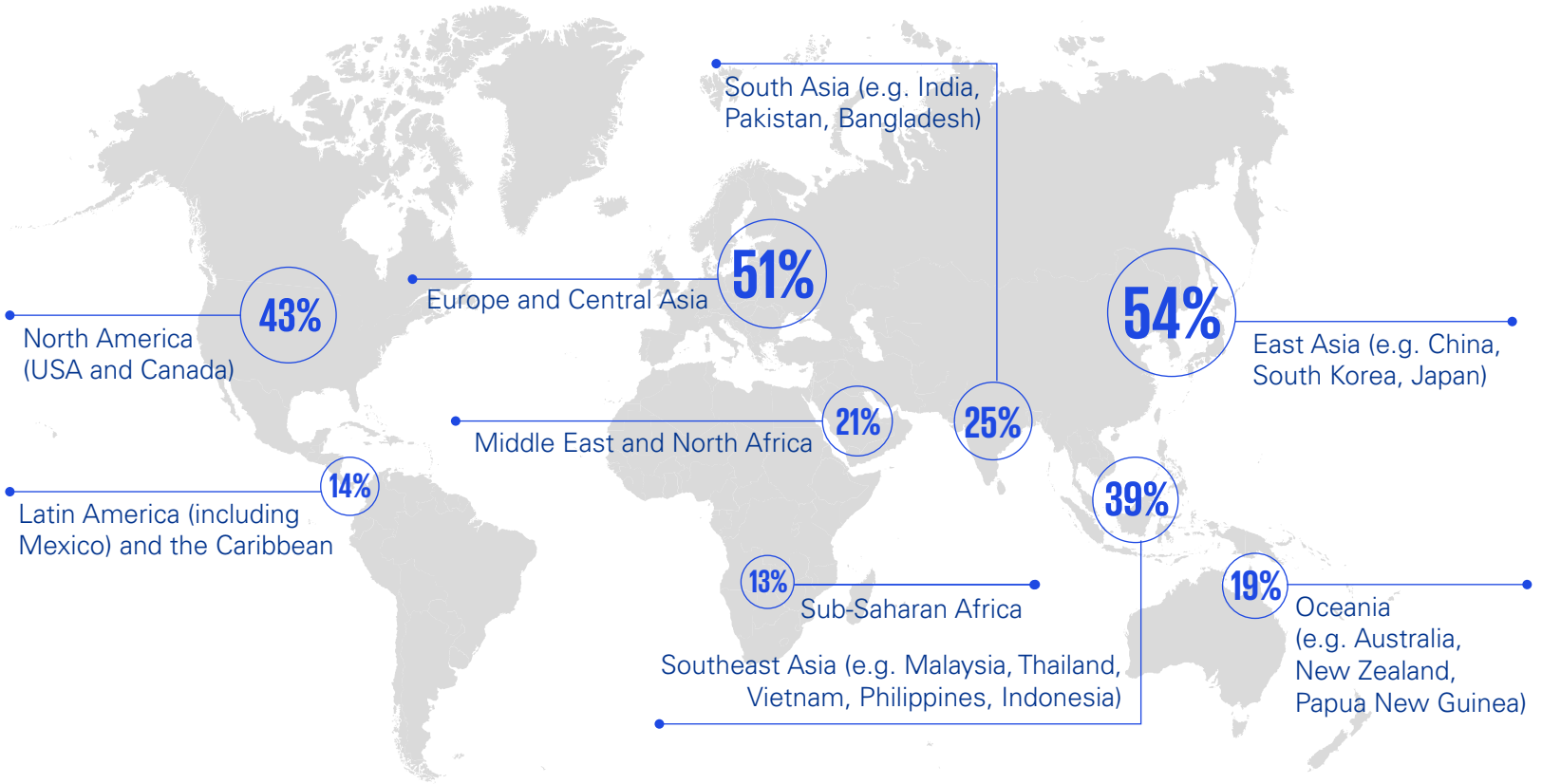
Southeast Asia appears to be the strongest of the emerging markets on this basis. Only 3 percent of our respondents are based there, but 39 percent of energy respondents overall are focused on investments in the region. Southeast Asia is attractive for several reasons, including strong climate ambitions and emerging policy support.[8] There is also high growth in energy demand — the region is expected to account for 25 percent of global energy demand over the next ten years[9] — plus abundant renewable resources. The latter includes not only an estimated 31 terawatts of solar and wind capacity,[10] but also significant hydropower resources in Myanmar and Laos,[11] and the world's largest geothermal potential in Indonesia (which is also aiming to be the carbon basin for the region).[12]

Southeast Asia exemplifies how global capital is shifting beyond traditional markets as investors look for scalable opportunities in nations with the right mix of policy, infrastructure, demand and finance. The globalization of energy transition investment is likely to grow stronger as much of the global community understands the importance of accelerating decarbonization in emerging and developing economies.

[7] Geopolitics of the energy transition, Journal of Geographical Sciences, April 2023.
[8] Clean energy and decarbonization in Southeast Asia, Center for Strategic and International Studies, May 2023.
[9] Southeast Asia's role in the global energy system is set to grow strongly over next decade, IEA, October 2024.
[10] Insider perspectives on Southeast Asia's clean energy transition, Asia & the Pacific Policy Studies, March 2024.
[11] Untapped hydropower can help Laos, Myanmar and Indonesia safely meet energy demand, Eco-Business, January 2023.
[12] Indonesia's Untapped Geothermal Energy Potential, Energy Tracker Asia, February 2024.

At COP29 (the 29th Conference of the Parties to the United Nations Framework Convention on Climate Change), developed countries tripled their commitment to public finance for developing countries — to US$300 billion per year by 2035 — to support their climate goals. It was acknowledged that more is needed, and there was also a commitment to work towards US$1.3 trillion per year by 2035 from public and private sources.[13] Part of the idea here is that public funding commitments help to attract further private funding. This can take several forms, from blended finance to public-private partnerships, while public funds can also support infrastructure development, which in turn opens new opportunities for private investors.

Where are energy organizations investing?



[13] COP29 UN Climate Conference Agrees to Triple Finance to Developing Countries, Protecting Lives and Livelihoods, United Nations Framework Convention on Climate Change, November 2024.

4 The driving forces: Compliance and energy security

One thing is common across all regions: a diverse but interrelated set of forces is now driving investment in energy transition assets. Regulatory compliance and energy independence are the leading forces among our survey respondents, but reputation, financial returns and several other factors also play a significant role.

Energy independence is an appealing ambition for many nations. Recent geopolitical uncertainty, trade disputes, military conflicts and supply chain risks have seen nations enact policies to encourage greater independence, often via support for renewable energy and related infrastructure. But energy independence isn't just about moving away from hydrocarbons; it demands a shift in mindset, where governments take a more proactive lead in shaping new energy systems.

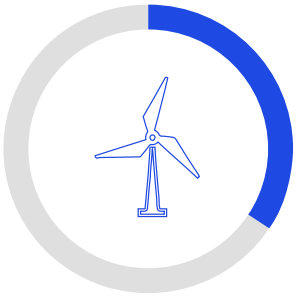
The private sector can benefit from aligning closely with government shifts towards energy independence.

> "For businesses, embracing the energy transition provides more than a social license to operate. It is also an opportunity to build long-term business resilience, new partnerships and competitive advantages. In this way, aligning with government energy and climate objectives can support win-win outcomes."

Daisy Shen
Head of Climate and Sustainability
KPMG China

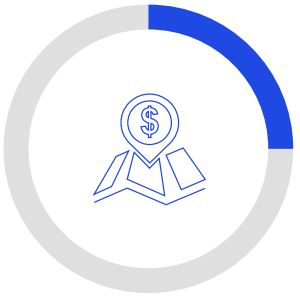
Top ten reasons why energy organizations are investing in energy transition assets

Regulatory compliance

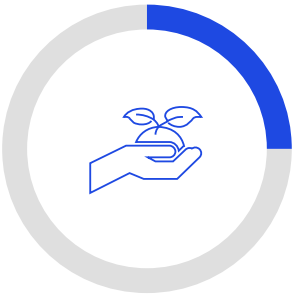


Energy independence or security

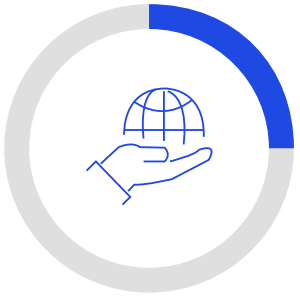
Reputation or brand positioning



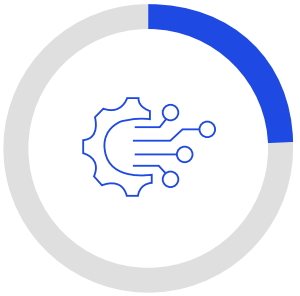
Financial returns



Environmental impact

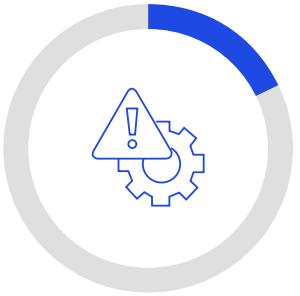


Social impact

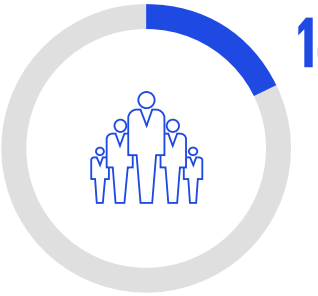


Technological development

Energy costs



Risk management



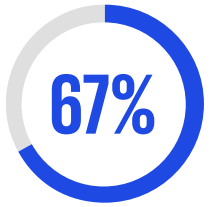
Stakeholder pressure

Source: KPMG Energy transition investment outlook

5 Policy drivers and policy barriers

Government policy is pivotal to stimulating and sustaining the energy transition. A strong majority (68 percent) of energy industry respondents believe that government policy is critical to the profitability of investments in energy transition assets. We have already seen that regulatory compliance is the strongest force driving energy transition investments, and many (67 percent) also say that an effective carbon tax system makes a region/country more attractive for investments in energy transition assets.

However, there are smaller, yet still significant, numbers who highlight policy barriers. For example, 58 percent say that government policy related to the energy transition creates unnecessary complications or risks, and 56 percent say that policy is too slow to adapt to market needs. Plus, regulatory or policy risks are also cited as the biggest barrier to investments in the energy transition.



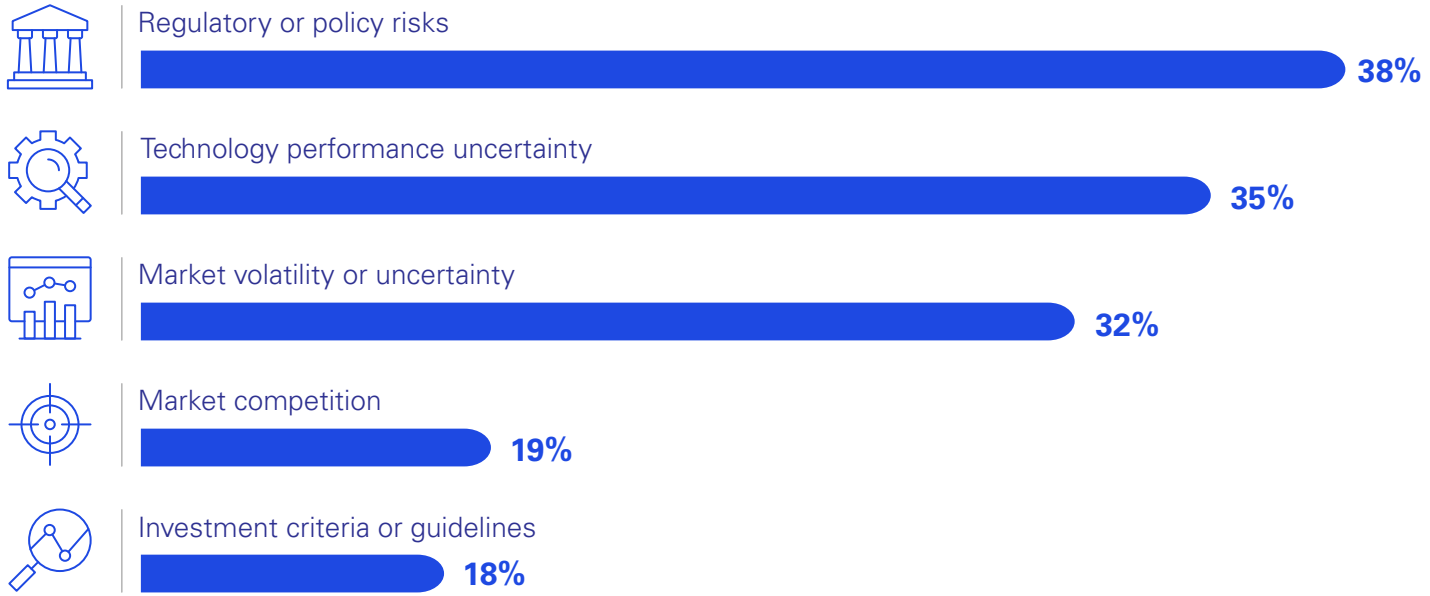
Say an effective carbon tax system makes a region/country more attractive for investments in energy transition assets

Believe government policy related to the energy transition creates unnecessary complications or risks

This dichotomy — where policy is both enabler and obstacle, both opportunity and risk — highlights the policy-driven nature of the energy transition. It also shows just how much responsibility lies with governments, and how the private sector needs to work closely with policymakers to ensure success. Corporate strategies must align with national and sectoral policies. This alignment helps ensure companies stay ahead in the energy transition, particularly in countries like China, where ambitious policies drive substantial investments.

China exemplifies how coordinated policy and ambition can catalyze progress. It has become the world leader in renewable energy manufacturing, and it is mobilizing massive infrastructure projects — using ultra-high-voltage transmission lines[14] and hydrogen networks[15] — to connect geographically distant centers of energy production and consumption. Not many countries are governed like China, but their example shows the power of aligned and coordinated strategies — something all countries can strive for in their own way.

Top barriers to pursuing investments in energy transition assets



Source: KPMG Energy transition investment outlook

[14] Advancing climate goals with ultra-high voltage power lines, NextTrends Asia, August 2022.
[15] China to build 6,000km hydrogen pipeline network to transport green H2 from renewables-rich regions, Hydrogen Insights, June 2023.

6 Transition takes teamwork

Different governments also need to work together, particularly within their region. Collaboration between China, Japan and Korea in sectors like hydrogen and electric vehicles shows how shared innovation and investment can achieve mutual goals in energy transition.

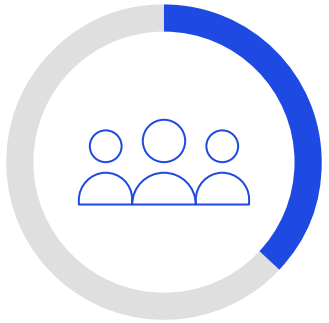
Like countries, no single organization has all the skills, resources and requirements needed to establish most new energy value chains, markets and infrastructure. Take, for example, a new plant being built at the site of a steelmaking facility in Ghent, Belgium. It won't be processing any iron ore.[16] Instead it will accept sewage, from the surrounding region of Flanders, and use this to generate steam and green electricity, both of which will be used by the steelworks. This project demands a diverse mix of capabilities, bringing together companies in steelmaking, construction, water treatment, energy, finance and consulting. It is one of many examples of new inter-industry collaborations driven by the energy transition.

Energy industry respondents to our survey know the importance of partnerships. Over nine in ten prioritize finding partners to share risks, access skills or secure the influence or relationships needed for success in energy transition investments. Partnerships with financial investors are the most common strategy energy industry respondents use for such investments, while public-private partnerships are also a significant route for many.

At the same time, multinational corporations from a variety of industries are driving strategic partnerships to advance their own investments in energy transition assets. Large multinational corporations across various industries are increasingly forming strategic partnerships to advance investments in energy transition assets. In 2024, a leading technology company and a major global investment firm announced a collaboration to develop significant new renewable energy capacity in multiple regions over the next several years. The project, focused on wind, solar and other carbon-free technologies, is part of the company's broader commitment to transitioning to zero-carbon energy. The deal is several times larger than previous corporate power purchase agreements, highlighting the expanding role of the private sector in accelerating global renewable energy efforts.

[16] Aquafin win: from dirty water to clean energy, KPMG Belgium, July 2024.

What are the most common strategies energy companies use when investing in energy transition assets?



37%

Partnerships with financial investors (e.g. infrastructure funds, private equity)

30%

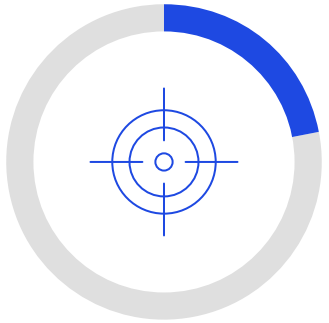
Green bonds and sustainability-linked loans

29%

Power-purchase agreements

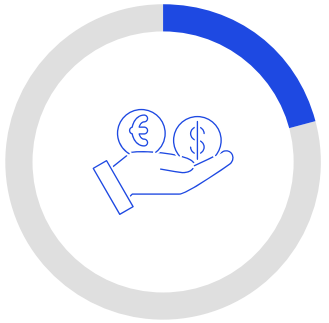
25%

Public-private partnerships



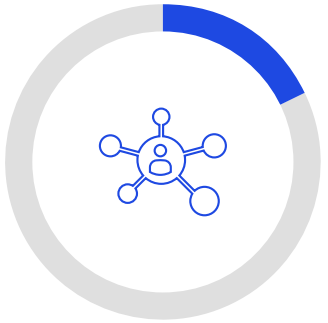
22%

Mergers and acquisitions



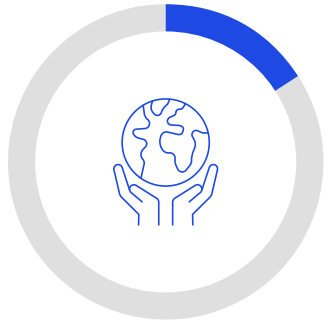
21%

Venture capital (including incubators or accelerator programs)



18%

Joint ventures with operational or developer partners



16%

Carbon credits and offsets

Source: KPMG Energy transition investment outlook

7 The importance of government-business alignment

Public funding is often a key component, committing board rooms, legislators and regulators to a common cause. Blended finance — combining public and private capital — is essential to de-risk energy investments and mobilize the trillions needed to accelerate global energy transition. But it is important that all such investments are aligned with clear transition plans, robust measurement standards and transparent reporting to ensure accountability and real impact.

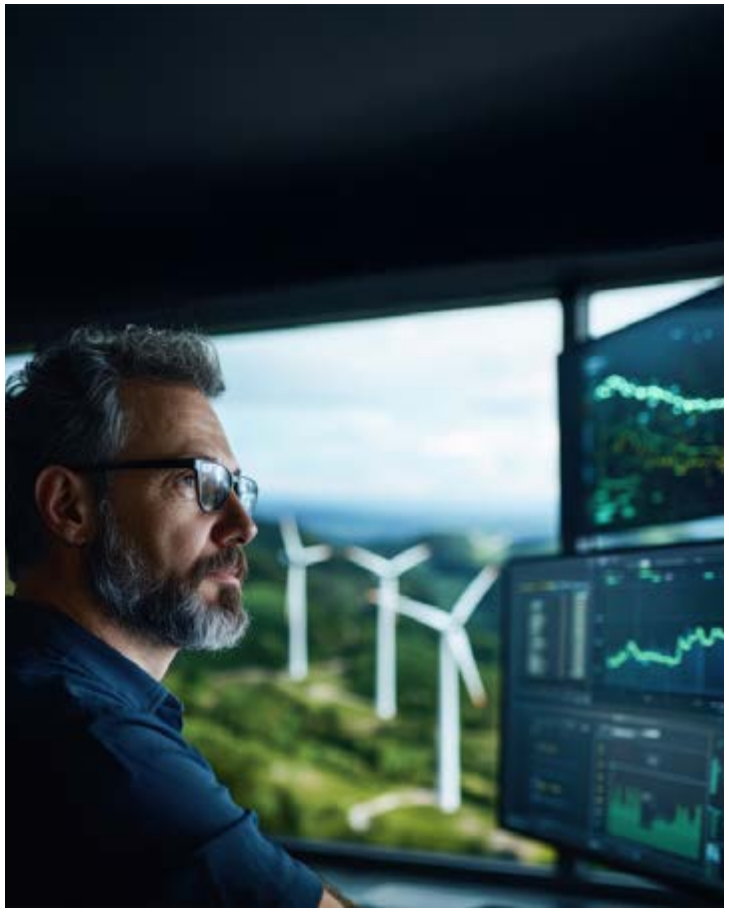
Multilateral Development Banks (MDBs) have a key role to play in enabling effective blended finance initiatives. At COP29, a joint statement from the world's most prominent MDBs announced that their annual collective climate financing for low-and middle-income countries would reach US$120 billion by 2030, and crucially, that MDBs aim to mobilize US$65 billion from the private sector.[17]

Another area where both governments and businesses need to align is around targets. Targets help to focus progress towards stopping global warming, but every climate-related goal needs to be reached with a strong business plan. One of the biggest mistakes in renewables investments is prioritizing gigawatt targets over commercial returns. This approach often leads to unsustainable strategies.

Nothing new is needed to avoid this mistake. Organizations — public and private — need to ensure that business fundamentals like financial analysis and risk management always lead investment decisions, and that these are not compromised by focusing too narrowly on targets.

[17] Multilateral development banks to boost climate finance, World Bank, November 2024.

8 Outlook: A challenging but promising future



Over the next two years, energy industry executives expect renewable (and low-carbon) energy to be the most attractive energy transition asset type, followed by energy efficiency (including electrification), transport and related infrastructure, and energy storage (and grid infrastructure).

Today's emerging technologies could become significantly more important in the next decade. Areas like carbon capture,[18] green hydrogen,[19] synthetic fuels,[20] small modular reactors[21] and geothermal energy[22] offer compelling benefits. But while these innovations hold promise, they face significant hurdles, including high costs, inadequate or prohibitive regulations, and long development times.

As the energy sector navigates this transformative era, it must balance ambition with realism. The transition to a sustainable energy system is complex and multifaceted, requiring both incremental improvements and bold innovations. Success will depend on the ability to overcome barriers, leverage partnerships, and align corporate strategies with broader societal goals.

The energy transition is inherently complex, and there's no single roadmap. We must invest in diverse approaches, understand the trade-offs and aim to ensure no one is left behind.

[18] The Role of Carbon Capture in Power Generation, Power Magazine, December 2024.
[19] Unlocking the potential of green hydrogen, Enerdata, October 2024.
[20] Evolution of transport fuels, KPMG, June 2024.
[21] European Industrial Alliance on SMRs, European Commission, June 2024.
[22] IEA: Technology breakthroughs are unlocking geothermal energy's vast potential in countries across the globe, Energy Global, December 2024.

The most attractive areas for investment in the next two years

37%
Renewable and low-carbon energy

33%
Energy efficiency (including electrification)

32%
Transport and related infrastructure

32%
Energy storage and grid infrastructure

24%
Critical minerals and materials

18%
Carbon capture, utilization and storage

16%
Fossil fuels with offsets/decarbonization

Source: KPMG Energy transition investment outlook

Key takeaways for energy industry leaders

Business fundamentals come first

While climate-related goals are essential for long-term sustainability, they must be firmly anchored in economic feasibility and robust business strategies. Energy companies should:

- Conduct rigorous financial modeling to help ensure renewable investments meet risk-adjusted return thresholds comparable to traditional energy assets.
- Leverage advanced analytics and scenario planning to evaluate the profitability and scalability of green energy ventures before committing to large-scale deployment.
- Develop hybrid strategies that integrate renewables with existing assets to help maintain financial stability while advancing decarbonization goals.
- Align capital allocation with market signals, avoiding overinvestment in emerging technologies that lack a clear commercialization path.

Policy collaboration is critical

A dynamic regulatory environment requires energy leaders to proactively engage with policymakers to shape pragmatic and effective regulations. Companies should:

- Advocate for stable, predictable policy frameworks that provide clarity on subsidies, carbon pricing and permitting processes.
- Partner with government entities and industry coalitions to codevelop policy solutions that balance sustainability goals with economic competitiveness.
- Utilize real-time regulatory intelligence to anticipate legislative shifts and adjust investment strategies accordingly.
- Push for harmonized policies across jurisdictions to help reduce compliance complexities and enhance cross-border energy trade.

Transparent communication builds trust

Investor confidence and public perception are increasingly tied to how well companies articulate their sustainability journey. To foster trust, energy firms should:

- Establish rigorous ESG (environmental, social and governance) reporting frameworks that go beyond compliance, providing investors with clear, quantifiable performance metrics.
- Communicate challenges candidly, demonstrating how risks (such as supply chain constraints, technology scalability, or policy shifts) are being managed.
- Use digital platforms and investor briefings to deliver consistent and compelling sustainability narratives that align with financial performance.
- Engage stakeholders — including local communities, regulators and institutional investors — through collaborative forums that address concerns and demonstrate long-term commitment.

By prioritizing financial prudence, policy engagement and transparent communication, energy industry leaders can drive both profitability and sustainability in an evolving global energy landscape.

How KPMG can help

KPMG **energy transition deal advisory professionals** help investors navigate the evolving energy landscape and deploy capital effectively across established and emerging markets.

We can help identify strategic investment opportunities across the value chain — including infrastructure, supply chains, asset-light models and emerging technologies. Our global organization of industry, regulatory and financial specialists can provide buy-side support, from pre-deal strategy to post-deal transformation.

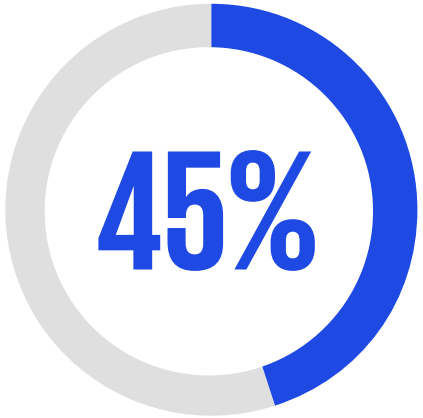
Our policy and regulatory teams assess government resilience, subsidy regimes and local market dynamics to help de-risk long-term investments. We also help form strategic partnerships, leveraging secured off-take agreements and innovative models to enhance project viability.

With deep experience in emerging markets, we help investors capitalize on first-mover advantages and high-growth opportunities. For private equity managers, we collaborate to help unlock energy transition exposure and drive value creation ahead of exit.

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.

The energy perspective of the *Energy transition investment outlook* draws on the views of 420 investment decision-makers from the energy industry.



were members of the C-suite

20

countries and jurisdictions

Authors

Wafa Jafri
Partner, Energy Deal Advisory
KPMG UK

Wafa is a partner and UK co-lead of Energy and Natural Resources Strategy at KPMG UK. Since joining KPMG she has worked with all major energy companies and a variety of global manufacturing companies, advising on creating and executing energy transition plans. Wafa advises clients on strategy, partnerships and deals in the energy transition space. Given her passion for energy transition and delivering net zero, she is on the board for the Aldersgate Group, an organization championing a competitive and environmentally sustainable economy. Prior to joining KPMG, Wafa worked for the Department of Energy and Climate Change, providing advice to the Secretary of State for Energy, Ministers and senior officials at HMG on energy policy, and at RWE where she worked in the Corporate Strategy team for the generation business across Europe.

Daisy Shen
Head of Climate and Sustainability
KPMG China

Daisy Shen has 24 years of 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.

Contacts

Anish De
Global Head of Energy,
Natural Resources and Chemicals
KPMG International
E: anishde@kpmg.com

Mike Hayes
Climate, Decarbonization and Nature Leader
Global Head of Renewable Energy
E: mike.hayes@kpmg.ie

Trevor Hart
Lead of Global Mining,
Partner, KPMG Australia
E: thart@kpmg.com.au

Gillian Morris
Lead of Global Chemicals,
Partner, KPMG US
E: gillianmorris@kpmg.com

Colm O'Neill
Lead of Global Power and Utilities,
Partner, KPMG Ireland
E: colm.oneill@kpmg.ie

Jonathan Peacock
Lead of Global Oil and Gas,
Partner, KPMG UK
E: jonathan.peacock@kpmg.co.uk

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