CENTER OF ANALYSIS OF INTERNATIONAL RELATIONS

ANALYSIS

Global Energy Investment 2024

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Introduction

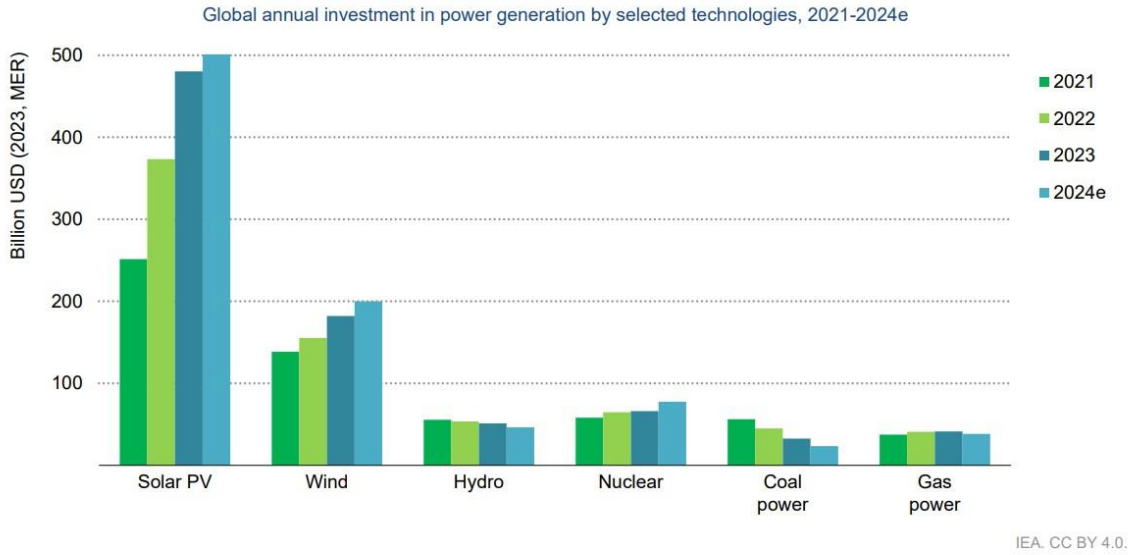
Global energy investment is poised to surpass USD 3 trillion for the first time in 2024, signaling a historic shift in global energy priorities. Of this investment, USD 2 trillion is dedicated to clean energy technologies and infrastructure, highlighting the accelerating transition toward renewable energy. These developments reflect growing commitments by governments, industries, and households to decarbonize energy systems and achieve sustainable growth. The International Energy Agency's (IEA) World Energy Investment Report 2024 sheds light on the evolving trends, challenges, and opportunities shaping the energy sector. This comprehensive analysis explores regional disparities, financing hurdles, and the pivotal role of innovation and collaboration in meeting energy goals.

1. Clean Energy Investment: A New Era

Clean energy investments have surged dramatically since 2020, now outpacing spending on fossil fuels. The transformation is particularly evident in renewable power, grids, and energy storage, which collectively account for most of the clean energy spending. In 2024, investments in clean energy are expected to reach USD 2 trillion, underscoring the urgency of the global energy transition.

Solar photovoltaic (PV) technology has emerged as a central pillar of this transformation. With over USD 500 billion projected for solar investments in 2024, solar energy is now the leading power generation source globally. A decade ago, each dollar spent on solar PV yielded significantly lower energy output than today. The advancements in efficiency, coupled with a 30% reduction in solar module prices over the past two years, have made solar energy more accessible and impactful.

Solar PV attracted a record USD 480 billion in spending in 2023 – more than all other generation technologies combined – while investment in coal power has fallen by 40% since 2021



Note: Gas-fired generation investment includes both large-scale plants and small-scale generating sets and engines. Hydropower includes pumped-hydro storage. 2024e = estimated values for 2024.

Other sectors such as wind energy and battery storage have also experienced notable growth. Wind power investments, while slightly lagging solar, continue to expand as offshore wind farms gain traction in Europe, China, and the United States. Battery storage investments have reached USD 40 billion, driven by increasing demand for grid stability and renewable energy integration.

2. Financing Challenges in a Changing Economic Landscape

The end of the era of cheap borrowing has introduced new challenges for the energy sector. Rising interest rates have increased the cost of financing energy projects, creating barriers for new developments, particularly in emerging markets.

Despite these challenges, supply chain pressures have eased, and prices for key materials like lithium, nickel, and cobalt—critical for batteries—have fallen sharply. This trend has provided some relief, enabling continued investment in clean energy projects. Additionally, well-managed public tenders and policy initiatives have played a crucial role in fostering investment in regions such as India, Brazil, and parts of Africa.

The IEA notes that global energy investments are increasingly funded by private and commercial sources, which account for 75% of total spending. Public finance contributes 25%, while national and international development finance institutions provide a mere 1%. This highlights the need for innovative financing mechanisms to ensure equitable access to clean energy technologies, particularly

in developing regions.

3. Regional Trends: Leaders and Laggards

Energy investment patterns vary significantly across regions, reflecting different economic conditions, policy frameworks, and energy priorities.

China remains the dominant force in global energy investments, with USD 680 billion projected for 2024. The country's leadership in solar cells, lithium battery production, and electric vehicle (EV) manufacturing has cemented its position at the forefront of the energy transition. Solar PV capacity additions in China multiplied by a factor of 2.5 in 2023, driven by falling module prices and robust domestic demand.

Africa has demonstrated remarkable progress, with clean energy investments nearly doubling since 2020 to over USD 40 billion in 2024. This growth reflects successful policy initiatives, infrastructure improvements, and international support. However, Africa still lags behind advanced economies and China in absolute terms, underscoring the need for continued investment.

Advanced economies have also made significant strides, with clean energy accounting for half of total power sector investments. The United States is set to spend more than USD 300 billion on clean energy in 2024, 1.6 times its 2020 level. The European Union's investment of USD 370 billion reflects strong policy support for renewable energy and grid enhancements.

4. Power Grids: A Critical Bottleneck

Power grid investments, often overlooked, are essential to the success of the energy transition. In 2024, global spending on grids is expected to reach USD 400 billion, a significant increase from the stagnation observed since 2015. This growth is driven by new policies and funding in Europe, the United States, China, and parts of Latin America.

Grid modernization efforts focus on integrating renewable energy sources, reducing transmission losses, and enhancing resilience against climate-related disruptions. However, challenges such as permitting delays, land availability, and the complexity of upgrading aging infrastructure persist. Addressing these issues

is crucial to unlocking the full potential of clean energy investments.

5. The Revival of Nuclear Energy

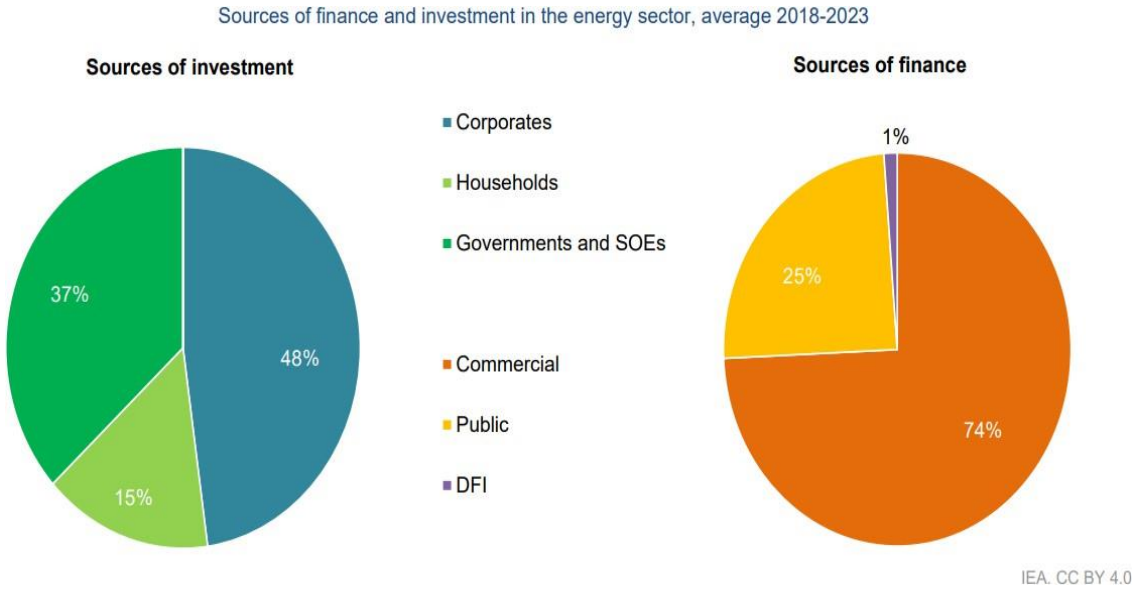
After years of decline, nuclear energy is experiencing a revival, with investments projected to reach USD 80 billion in 2024. This marks a nearly twofold increase compared to 2018 levels. While most of this spending is directed toward lifetime extensions of existing nuclear plants, there is renewed interest in developing new capacity.

Nuclear energy offers a reliable and low-emission power source, complementing renewables like solar and wind. Countries such as China, France, and the United States are leading the charge, recognizing the role of nuclear energy in achieving net-zero goals.

6. Households: Catalysts for Change

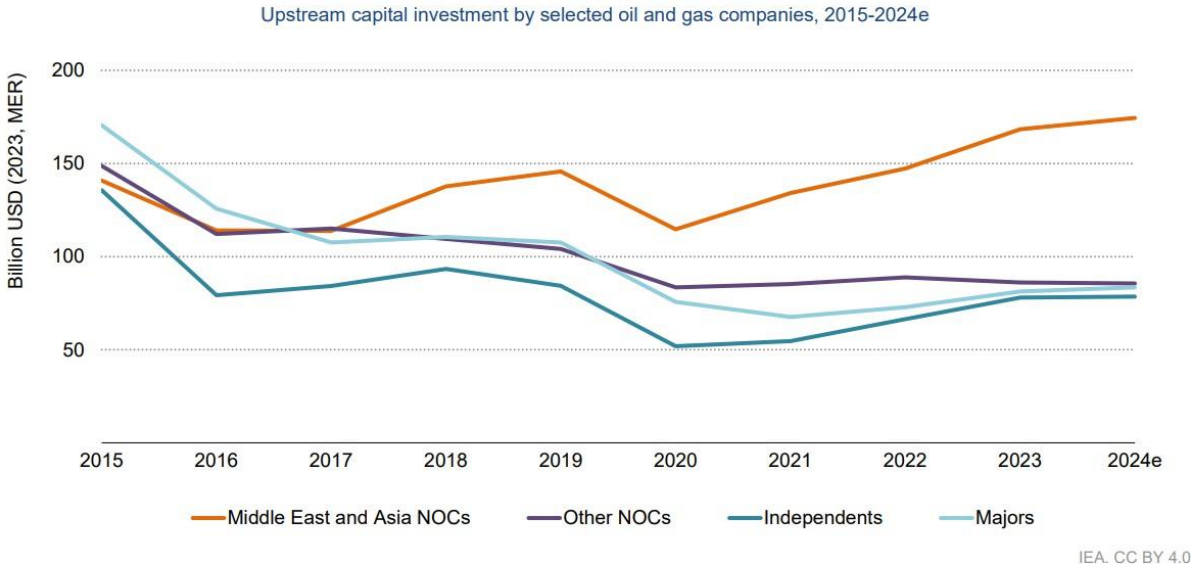
Private households have emerged as significant players in the energy transition, accounting for 18% of global energy investments in 2024, up from 9% in 2015. This growth is driven by rooftop solar installations, energy-efficient building technologies, and electric vehicle (EV) purchases.

In advanced economies, households have contributed to 60% of the increase in clean energy spending since 2016, reflecting the effectiveness of policy support. However, ensuring equitable access to clean energy technologies remains a challenge, particularly in developing regions.



While clean energy dominates the narrative, fossil fuels continue to play a significant role in the global energy mix. Upstream oil and gas investments are set to rise by 7% in 2024, reaching USD 570 billion. National oil companies (NOCs) in the Middle East and Asia are driving this growth, accounting for most of the increase in spending since 2017.

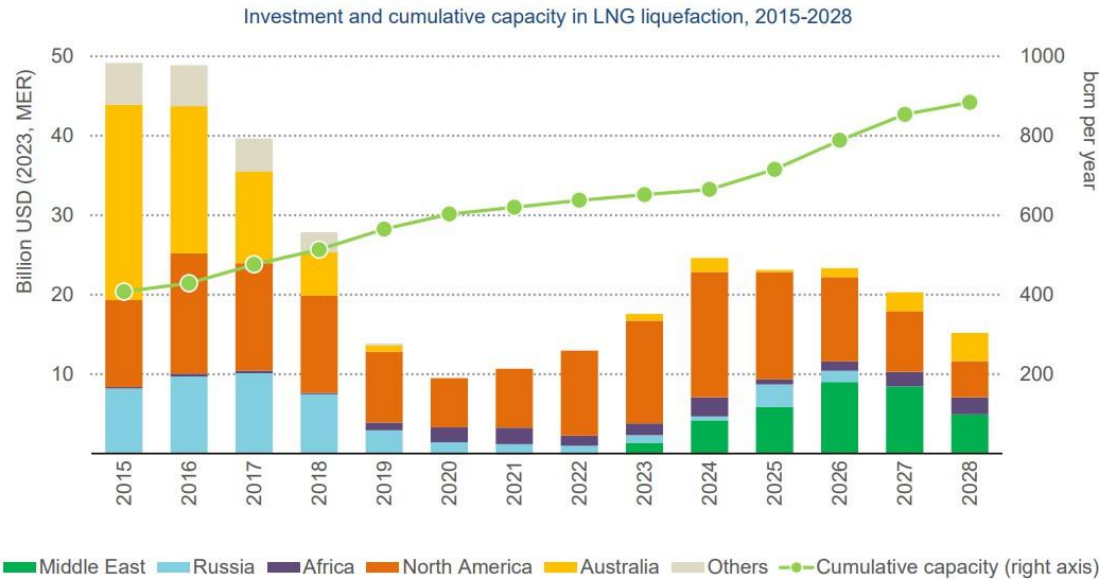
Upstream oil and gas investment increased globally by 9% in 2023 and looks set for a 7% rise in 2024, with most increases coming from Middle East and Asian NOCs



The liquefied natural gas (LNG) market is undergoing a major expansion, with new

projects in the United States and Qatar expected to add 250 billion cubic meters of capacity by 2030. However, the shift toward a buyers' market and the increasing competitiveness of renewables may challenge the long-term viability of LNG investments.

Newly approved LNG projects, led by the United States and Qatar, bring a new wave of investment that could boost global LNG export capacity by 50%



Coal investments have also risen steadily in recent years, particularly in China, India, and Indonesia. In 2023, over 50 GW of unabated coal-fired power generation was approved, the highest level since 2015. However, this trend runs counter to global climate goals and underscores the need for stronger policy interventions.

Conclusion

Global energy investment is undergoing a transformative shift, with clean energy technologies dominating new spending. Investments in renewable power, grids, and energy storage are setting the stage for a more sustainable future. Solar PV, wind energy, and battery storage have become key drivers of this transition, supported by falling costs and advancing technologies.

While significant progress is evident, challenges such as financing constraints, grid bottlenecks, and regional disparities remain critical. Efforts to modernize infrastructure and enhance equitable access to clean energy are essential to

sustaining momentum.

Fossil fuels, though still substantial in the energy mix, are facing increasing pressure from the growth of renewables and net-zero targets. The global energy landscape is at a pivotal juncture, requiring innovation, robust policies, and collaboration to ensure a sustainable and inclusive energy future.

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