ENERGY TRANSITION
AND ENERGY SECURITY BULLETIN

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EDITOR'S NOTE

The global energy system is entering a period of profound structural transformation. Increasing electricity demand, the accelerating pace of the energy transition, geopolitical tensions, and the growing importance of energy security are reshaping the priorities of energy policy across the world. These dynamics are transforming not only how energy is produced and consumed, but also how energy systems are governed, regulated, and integrated into broader economic and geopolitical frameworks. Over the past two decades, global electricity demand has expanded significantly, driven by economic growth, technological change, and the electrification of many sectors of the economy. At the same time, the rapid expansion of renewable energy technologies has begun to alter the structure of electricity generation systems. Yet, despite this progress, fossil fuels continue to play a central role in global energy supply, illustrating that the energy transition is likely to remain a gradual and complex process.

Understanding these evolving dynamics requires a careful examination of both global and national energy systems. This bulletin aims to contribute to this discussion by providing a concise, data-driven overview of key trends shaping the global energy landscape. Drawing on international datasets and recent energy statistics, the analysis highlights changes in electricity generation patterns, the evolving balance between fossil fuels and renewable energy sources, and the implications of rising energy demand for energy policy. The first issue focuses on several interconnected themes. It examines the transformation of global electricity generation, analyzes the rapid growth of electricity demand in Türkiye and the evolution of the country's energy mix, and evaluates these developments through the analytical framework of the energy trilemma. By addressing the balance between energy security, affordability, and environmental sustainability, the bulletin aims to provide a broader perspective on the policy challenges shaping contemporary energy systems.

In addition, the issue considers recent geopolitical developments in the Middle East and their potential implications for global energy markets. Events in strategically important regions once again demonstrate how closely energy markets are linked to geopolitical developments and why energy security continues to occupy a central place in global energy policy debates. By combining empirical data analysis, policy context, and industry perspectives, this bulletin seeks to contribute to a more informed discussion on energy transition and energy security. It is intended to serve as an accessible analytical reference for academics, policymakers, students, and energy sector stakeholders interested in understanding the evolving dynamics of the global energy system.

Assoc. Prof. Basak Ozarslan
Director, Sustainability, Environment and Society Research Center
Istanbul Gelisim University

ENERGY USE PER PERSON, 2020 TO 2024

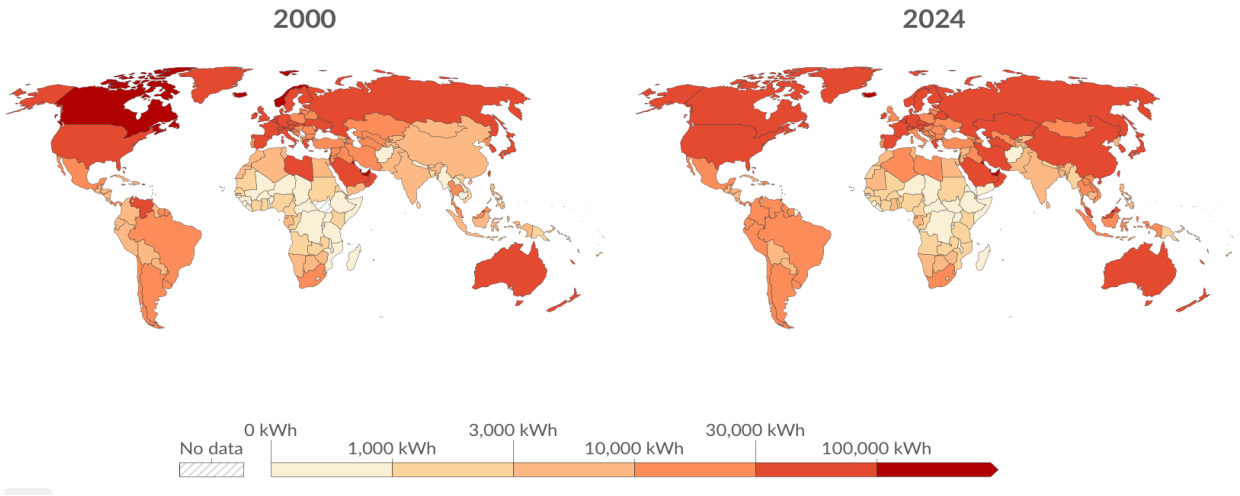

Figure 1. Energy use per person (2020–2024)
Source: Our World in Data, based on Energy Institute data (2026)

The figure illustrates the global distribution of **energy use per capita** and how it has evolved between 2000 and 2024. The data reveal significant disparities in energy consumption levels across different regions of the world. High-income economies such as North America, parts of Europe, and Australia exhibit substantially higher per capita energy use compared to many countries in Africa and South Asia, where energy consumption remains relatively low. Over time, the map also reflects the gradual increase in energy consumption in several emerging economies, particularly in Asia, driven by economic growth, industrialization, and rising living standards. At the same time, many developed economies show relatively stable or modest changes in per capita energy use, partly reflecting improvements in energy efficiency and structural changes in their energy systems.

Overall, the figure highlights persistent global inequalities in energy access and consumption while also illustrating the growing role of emerging economies in shaping global energy demand. These patterns underline the importance of balancing expanding energy access with the objectives of energy efficiency and sustainable energy transition. In addition to these structural factors, several emerging technological and economic trends are also expected to influence future energy demand. The rapid expansion of digitalization, the growing number of data centers, and the increasing deployment of artificial intelligence technologies are contributing to rising electricity consumption worldwide. Similarly, the accelerating adoption of electric vehicles and the broader electrification of energy systems are likely to reshape global energy demand patterns in the coming years. These developments indicate that future energy demand will be shaped not only by economic growth but also by technological transformation and the ongoing restructuring of global energy systems.

Key Insights

1 Fossil fuels remain dominant in the global energy system

Despite rapid growth of renewable energy, coal and natural gas continue to account for a significant share of global electricity generation.

2 Renewable energy sources are expanding rapidly

Wind and solar power represent the fastest-growing sources of electricity generation, driven by declining technology costs and supportive climate policies.

3 Rising electricity demand complicates the energy transition

Global electricity demand continues to increase, requiring additional generation capacity and broader transformation of energy infrastructure.

ELECTRICITY CONSUMPTION PER CAPITA IN TÜRKIYE (2000–2024)

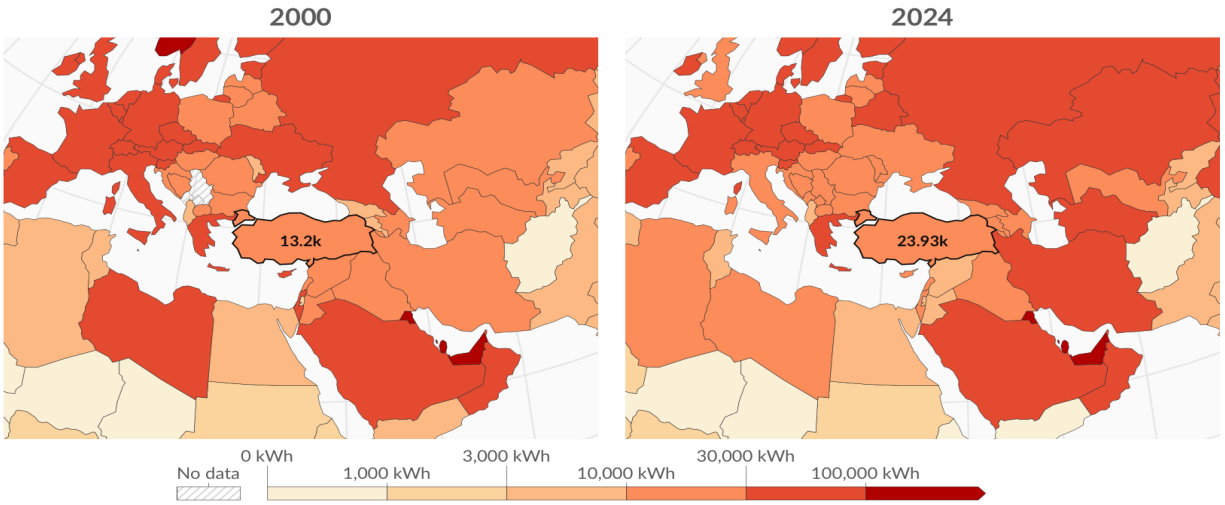

Figure 2. Electricity consumption per capita in Türkiye (2000–2024)

Source: Our World in Data, based on Energy Institute data. (2026)

The figure illustrates the evolution of electricity consumption per capita in Türkiye between 2000 and 2024. The data show a significant increase in electricity consumption over the past two decades. This growth is closely associated with economic expansion, industrial development, urbanization, and improvements in living standards. The rising level of electricity consumption also indicates the growing energy demand in Türkiye and highlights the continued importance of energy security in national energy policy. Increasing electricity demand requires expanding generation capacity and diversifying the energy production portfolio. In recent years, the expansion of renewable energy investments has started to reshape Türkiye's electricity generation structure. However, the rapid growth in energy demand continues to raise important questions regarding energy import dependency and long-term energy security. As a result, the increase in electricity consumption represents a critical policy issue that requires integrated strategies combining energy security, renewable energy development, and energy efficiency policies

Key Insights

1 Electricity demand is rapidly increasing

Electricity consumption per capita in Türkiye has risen significantly, reflecting strong economic growth and industrial development.

2 Rising demand reinforces the importance of energy security

The increase in electricity consumption highlights the strategic importance of energy security in Türkiye's energy policy.

3 **Energy transition presents strategic opportunities**

The expansion of renewable energy investments offers an opportunity for Türkiye to reduce its dependency on imported energy resources.

GLOBAL ELECTRICITY GENERATION BY SOURCE (2000–2024)

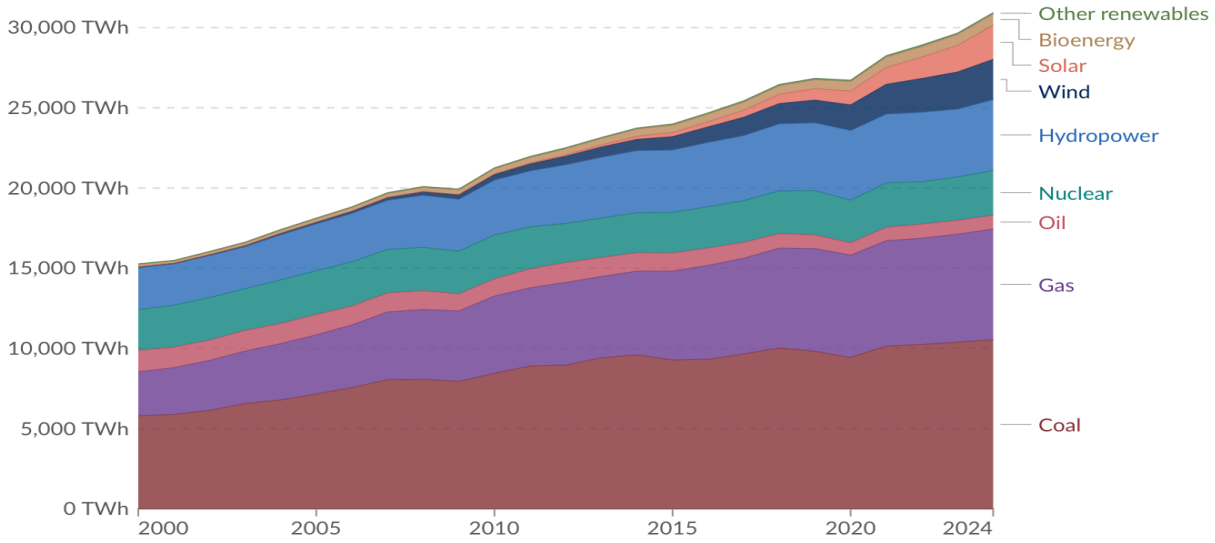

Figure 3. Global electricity generation by source (2000–2024)

Source: Our World in Data, based on Energy Institute data (2026)

The figure illustrates the evolution of global electricity generation by energy source between 2000 and 2024. Over this period, total global electricity production has increased significantly, rising from approximately 15,000 TWh in 2000 to nearly 30,000 TWh in 2024. This growth reflects increasing global energy demand driven by economic expansion, population growth, urbanization, and electrification. The figure also shows that fossil fuels continue to play a dominant role in global electricity generation. Coal remains the single largest source of electricity production worldwide, particularly in rapidly growing Asian economies. Natural gas also contributes a substantial share of global electricity generation, while the role of oil has gradually declined over time. At the same time, renewable energy sources have expanded considerably in recent years. Wind and solar power have experienced rapid growth due to technological progress, declining costs, and supportive climate policies. Hydropower continues to represent a major renewable energy source globally, while nuclear energy maintains a relatively stable share of electricity production. Overall, the figure highlights two key dynamics shaping the global energy system. On the one hand, renewable energy production is expanding rapidly. On the other hand, fossil fuels remain a significant component of global electricity generation. This indicates that the global energy transition is progressing gradually rather than occurring abruptly.

Key Insights

1 **Global electricity generation has nearly doubled**

Rising energy demand has significantly expanded global electricity production over the past two decades.

2 **Fossil fuels remain dominant**

Coal and natural gas continue to account for a large share of global electricity generation.

3 **Renewable energy is growing rapidly**
Wind and solar power have become the fastest-growing sources of electricity generation in recent years.

ELECTRICITY GENERATION BY SOURCE IN TÜRKIYE (2000–2025)

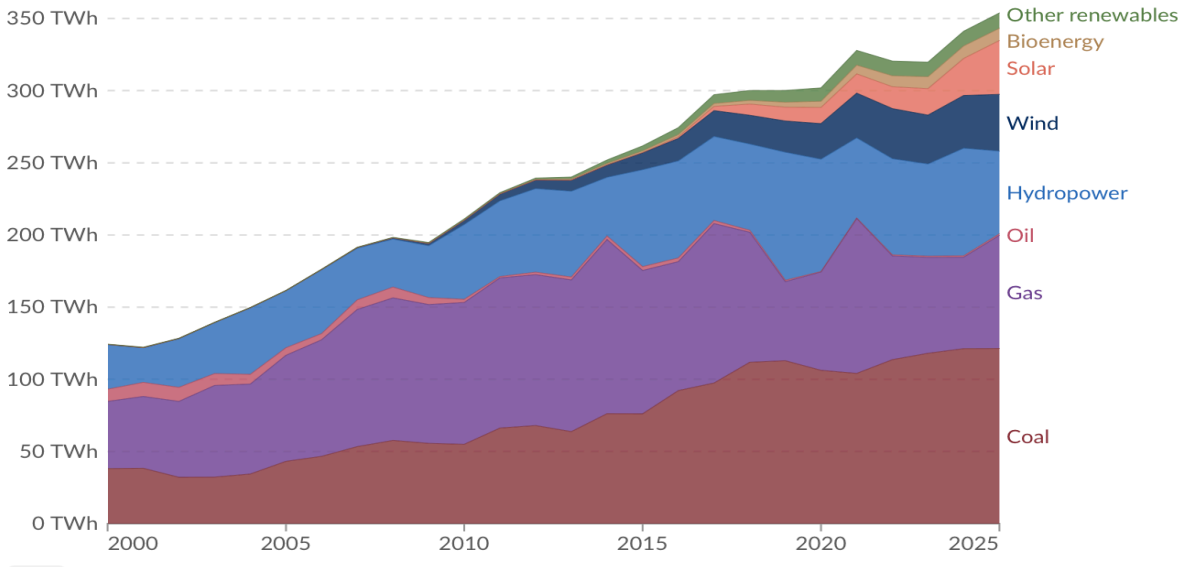

Figure 4. Electricity generation by source in Türkiye (2000–2025)
Source: Our World in Data, based on Energy Institute data (2026).

The figure illustrates the evolution of electricity generation by energy source in Türkiye between 2000 and 2025. The data show that Türkiye's electricity generation system has historically relied heavily on fossil fuels. In particular, natural gas and coal have played a central role in the country's electricity production portfolio. Since the early 2000s, the rapid increase in electricity demand has required significant expansion of generation capacity. During this period, natural gas power plants became a key component of electricity generation. However, the reliance on imported natural gas has also contributed to Türkiye's energy import dependency. At the same time, the figure highlights a noticeable increase in renewable energy generation in recent years. The expansion of wind and solar power has contributed to a more diversified electricity generation mix. Hydropower also continues to play an important role in Türkiye's renewable energy production. Despite this progress, fossil fuels still account for a significant share of electricity generation. This indicates that Türkiye's energy policy must balance energy security, import dependency, and long-term energy transition objectives.

Key Insights

1 **Türkiye's electricity generation has historically relied on fossil fuels**
Natural gas and coal have been the main pillars of electricity production for many years.

2 **Renewable energy investments have accelerated**
Wind and solar power are increasingly contributing to the diversification of Türkiye's electricity generation mix.

3 **Energy import dependency remains a key policy challenge**
Türkiye's reliance on imported natural gas continues to raise important energy security concerns.

SHARE OF ELECTRICITY GENERATION BY ENERGY SOURCE (2020–2025)

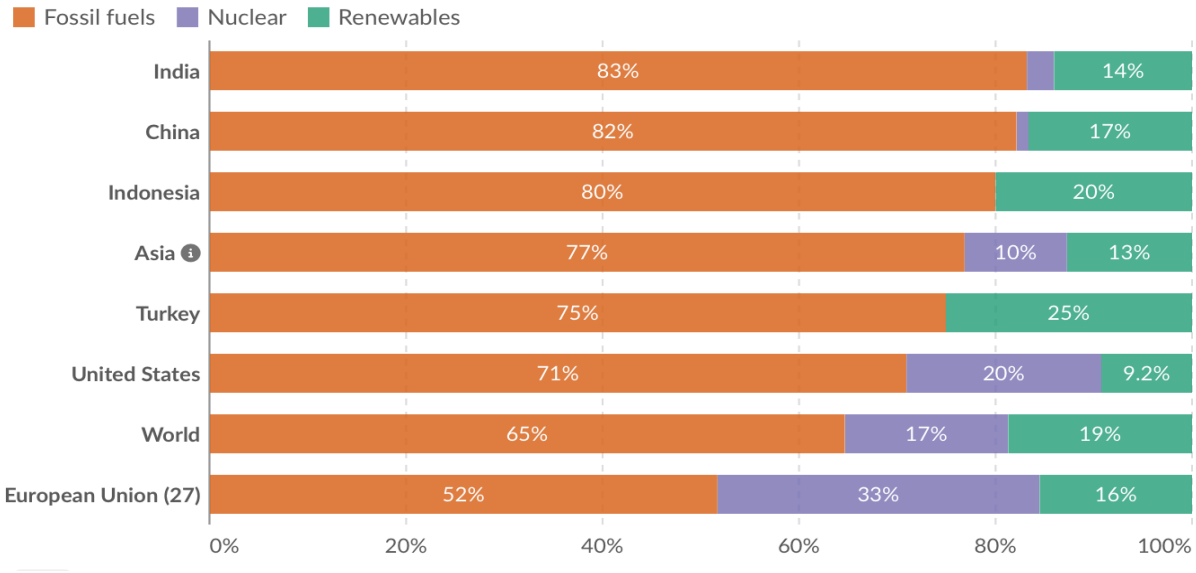

Figure 5. Share of electricity generation by energy source (2020–2025)
Source: Our World in Data, based on Energy Institute data (2026).

The figure compares the share of electricity generation by energy source across selected countries and regions. It presents the relative contribution of fossil fuels, nuclear energy, and renewable energy sources to electricity generation. The data indicate that fossil fuels continue to dominate global electricity production. Globally, approximately two-thirds of electricity generation is still based on fossil fuels. In rapidly growing economies such as China, India, and Indonesia, fossil fuels account for a particularly large share of electricity generation. In contrast, the European Union shows a higher share of renewable and nuclear energy in its electricity mix. This reflects European energy policies aimed at reducing carbon emissions and accelerating the transition toward cleaner energy sources. In the case of Türkiye, fossil fuels still represent a large share of electricity production. According to the figure, approximately three quarters of Türkiye's electricity generation relies on fossil fuels, while renewable energy sources account for around 25 percent of total generation. Overall, the figure highlights that the pace of energy transition varies significantly across countries. Differences in energy policies, natural resource endowments, and levels of economic development play an important role in shaping national energy systems

Key Insights

1 **Fossil fuels still dominate global electricity generation**
Approximately 65% of global electricity production is still based on fossil fuels.

2 **Energy transition progresses at different speeds**

The EU has a higher share of renewable and nuclear energy, while fossil fuels remain dominant in many emerging economies.

3 Türkiye still relies heavily on fossil fuels

A large share of Türkiye's electricity generation comes from fossil fuels, although renewable energy investments have been increasing.

ENERGY TRILEMMA PERSPECTIVE

The concept of the **energy trilemma** provides an important analytical framework for understanding the transformation of energy systems. The energy trilemma refers to the need to balance three fundamental objectives within energy policy: energy security, energy equity (accessibility and affordability), and environmental sustainability.

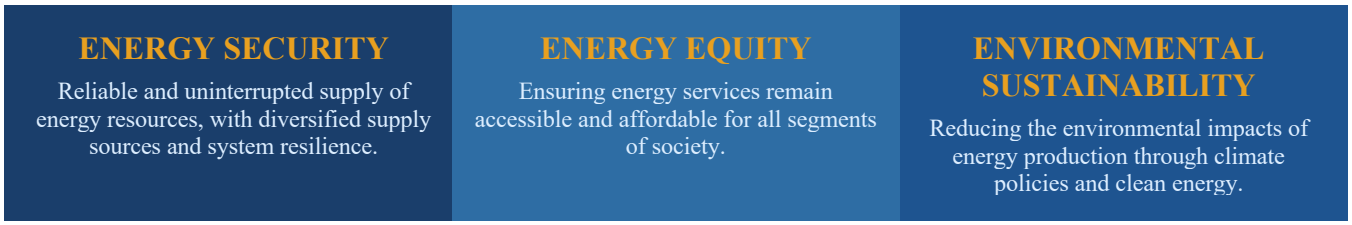

Figure 6. The Energy Trilemma Framework

Source: Adapted from World Energy Council Energy Trilemma Framework

Global energy data show that balancing these three objectives remains a major challenge. While renewable energy investments have accelerated significantly, many countries continue to rely on fossil fuels due to energy security concerns. Rising energy demand and existing infrastructure contribute to a gradual rather than immediate energy transition. The figures presented in this bulletin illustrate how the energy trilemma manifests in real-world energy systems. The global electricity generation data highlight the environmental sustainability dimension of the trilemma, showing the gradual expansion of renewable energy sources alongside the continued dominance of fossil fuels. At the same time, the rapid growth of electricity demand in Türkiye reflects the energy equity and affordability dimension, as expanding energy access and economic development drive higher energy consumption. Finally, the structure of Türkiye's electricity generation mix illustrates the energy security dimension, as countries seek to balance domestic energy resources, import dependence, and diversification of energy supply.

INDUSTRY PERSPECTIVES

The transformation of energy systems is not shaped solely by government policies and academic debates. Investment decisions and technological strategies adopted by energy companies also play a critical role in shaping the pace and direction of the global energy transition. In this context, perspectives from industry actors provide valuable insights into how energy security concerns, technological innovation, and market dynamics influence energy investment decisions.

Bobby Hollis, VP for Global Energy at Microsoft

Renewable energy investments contribute not only to reducing carbon emissions but also to strengthening energy security. Energy sources such as wind and solar help diversify energy supply and make national energy systems more resilient to fossil fuel market volatility.

Executives at Fortescue

Wind power can provide relatively stable electricity generation and will continue to play an important role in future energy systems. The company has announced plans to expand renewable energy investments as part of its broader decarbonization strategy.

According to the International Energy Agency's World Energy Investment 2025 report, global energy investment reached approximately 3 trillion in 2025, with around 2 trillion directed toward clean energy technologies — highlighting that the energy transition represents not only an environmental transformation but also a major economic shift. Recent developments in the global energy sector indicate that the ongoing energy transition is increasingly reflected in investment patterns. In recent years, investment flows have gradually shifted towards renewable energy, electrification, energy efficiency, and grid infrastructure. Examining the sectoral distribution of global energy investments provides important insights into the structural transformation taking place in the energy industry.

EVOLUTION OF GLOBAL ENERGY INVESTMENT BY SECTOR (2015-2025)

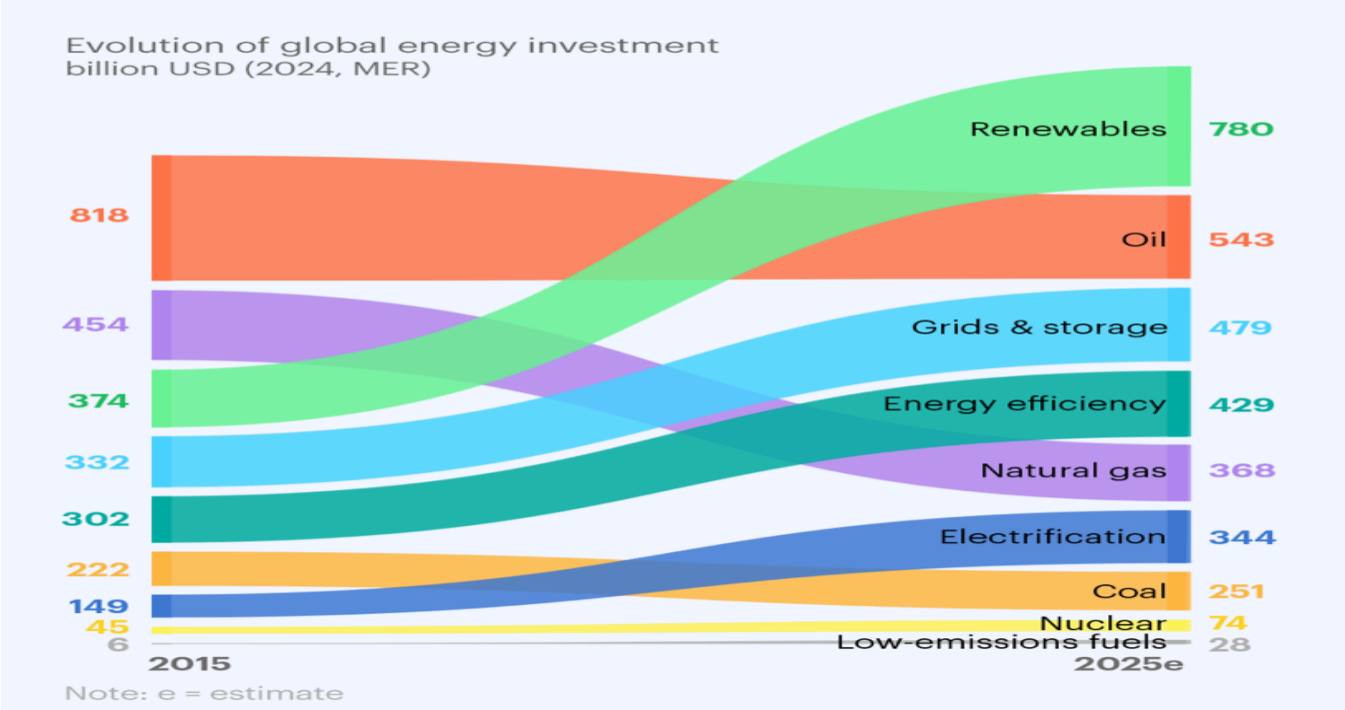

Figure 7. Evolution of global energy investment by sector (2015-2025)

Source: International Energy Agency, (2025)

The figure illustrates the changing structure of global energy investments between 2015 and 2025. Investments in renewable energy, electrification, energy efficiency, and grid infrastructure have increased significantly, while

investments in traditional fossil fuel sectors such as oil and natural gas have experienced comparatively slower growth. These trends highlight the ongoing structural transformation of the global energy system and the increasing strategic importance of low-carbon energy technologies. The figure clearly demonstrates that investment priorities in the global energy sector are gradually shifting toward clean energy technologies, reflecting the strengthening financial foundations of the global energy transition.

GEOPOLITICAL DEVELOPMENTS AND ENERGY MARKETS: THE IRAN CRISIS

Recent geopolitical developments provide a clear illustration of how energy security concerns can rapidly influence global energy markets. Events in strategically important regions of the global energy system demonstrate that geopolitical tensions remain a significant source of volatility in oil and gas markets. In this context, escalating geopolitical tensions involving Iran in early 2026 have introduced considerable uncertainty into global energy markets. Rising military tensions between Iran, the United States, and Israel have increased security risks around critical energy infrastructure in the Persian Gulf and the Strait of Hormuz.

STRAIT OF HORMUZ

~20%

of global oil trade passes through this critical chokepoint

BRENT CRUDE PRICE SURGE

~2 / barrel

Prices rose above $90 per barrel following escalation of tensions, reflecting rapid incorporation of geopolitical supply risks into global oil markets.

Geopolitical tensions in the Gulf region also affect natural gas markets. The region plays a crucial role in global LNG trade, and security risks have contributed to increased volatility in both European and Asian gas markets. These developments reinforce the need for diversified energy supply strategies and increased investment in domestic and renewable energy resources.

DATA SOURCES

DATA SOURCES

Our World in Data
Energy Institute — Statistical Review of World Energy
International Energy Agency — World Energy Outlook
World Energy Council

NEWS SOURCES

Reuters
Associated Press
Financial Times