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In Search of Resilience

A scenario-based assessment of energy and environmental security

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Credits

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Introduction

Geopolitical disruption, rising import exposure, accelerating electricity demand and the intensifying impacts of climate change are reshaping the way policymakers and corporates think about energy and environmental security. In this environment, resilience is no longer simply about withstanding shocks; it is about building systems, strategies and institutions capable of adapting to a more volatile world.

S&P Global's 2026 Energy Scenarios explore four distinct pathways through this uncertainty. Each offers a different route to resilience, and each demands compromise. Together, they show that the future of energy will be defined not by a single pathway, but by the ability of governments, energy companies and industrial consumers to manage trade-offs between security, affordability, competitiveness and climate risk.

Building resilience

In July 2025, we introduced three brand new Energy Scenarios (Adaptation, Fracture and Renaissance) alongside an updated and refreshed Base Case. Since then, the instability and uncertainty that has so far characterized the 2020s has only been amplified. The ongoing conflict in the Middle East between Iran, the United States and Israel is the latest and perhaps most consequential example of the upending of geopolitical norms that began in 2025. Whatever the outcome of the conflict, it is now clear that the post-WW2 period that previously defined the global geopolitical landscape has drawn to a close.

What follows is unknown. But with future market, geopolitical and environmental shocks increasingly likely, resilience has become the new mantra for policymakers and corporate strategists alike. S&P Global's Energy Scenarios, updated for 2026, explore this concept of resilience in different ways, each finding solutions to the twin challenges of energy and environmental security, but also sometimes demanding difficult compromise, depending on the pathway followed.

To learn more or to request a demo,
visit spglobal.com/energy-scenarios.

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The 2026 Energy Scenarios

The 2026 Energy Scenarios update the analysis we introduced in July 2025. The suite of outlooks comprises the Base Case as well as three alternative scenarios: Adaptation, Fracture and Renaissance.

The S&P Global Energy Base Case describes a world attempting to manage the instability and uncertainty of the early- to mid-2020s and facilitate an energy transition that conclusively pivots the global energy system away from fossil fuels, while still meeting the growing energy needs of developed and emerging economies alike.

In this effort, the world is not entirely unsuccessful: the energy system of 2060 is far less reliant on fossil fuels than in 2026, and greenhouse gas emissions see decades of sustained decline, although the transition away from fossil fuels remains incomplete by the end of the outlook period.

Base Case
Pragmatic transition with gradual decarbonization

Adaptation
Economic resilience outweighs emissions reduction

Fracture
Rapid innovation amid weak governance

Renaissance
Accelerated clean energy in a multipolar world

The **Adaptation scenario** balances fossil-fuel-powered economic growth against the risks of heightened global warming. Countries pivot toward strategies that emphasize adaptation to climate change via stronger, more resilient economies over emissions mitigation. This focus on economic growth underpins robust energy consumption and resilient demand for fossil fuels, especially oil and gas, over the long term.

The **Fracture scenario** explores the possibility of accelerated technological progress in a weak policy and governance environment. Fracture sees rapid technological advancements, but also complex governance issues and significant shifts in global energy dynamics as some markets decarbonize very rapidly, while others lag. The combination of poor governance and accelerated technological progress has profound implications for geopolitics and economics, as well as environmental issues such as climate change, creating a complex and often difficult future for energy markets and society at large.

In the **Renaissance scenario**, major shifts in the global balance of power result in a more multipolar geopolitical landscape. A faster-than-expected rise of key emerging markets and developing economies (EMDEs) play a significant role in driving strong global economic growth and a more accelerated pathway of clean energy technology (CET) uptake across the world.

2026 energy scenarios

2025	2025 (actual)
Global GDP (CAGR 2000-25)	2.8%
TPED (2000-25)	57%
Fossil fuel % of TPED in 2025	80%
GHG emissions (2000-25)	44%

2060	2026 Base Case	Adaptation	Fracture	Renaissance
Global GDP (CAGR 2025-60)	2.4%	2.7%	1.9%	2.7%
TPED (2025-60)	18%	34%	2%	-3%
Fossil fuel % of TPED in 2060	53%	65%	55%	32%
GHG emissions (2025-60)	-27%	5%	-26%	-68%
Global temp. (est. change by 2100)	2.6 °C	3.1 °C	2.6 °C	2.0 °C

Source: S&P Global Energy

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Pathways to resilience

All four 2026 scenarios build forward from the mid-2020s marked global increase in volatility and fragmentation of international relationships and trade. But the scenarios also take account of structural and long-term trends that have increasingly defined global energy markets in recent years, in particular the increased exposure of emerging economies to energy imports, and the growing role of electricity in meeting end-use demand. In addition, the scenarios are shaped by a world which is increasingly seeing the impacts of global climate change, driven by anthropogenic greenhouse gas (GHG) emissions.

Over the last 30 years, the major global energy demand centers have typically increased their reliance on imported energy in order to meet demand. In 2025 Europe met over 45% of its energy demand with imports; India 36% and China 22% (although in volumetric terms China is by far the world's largest energy importer).

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of its energy demand with imports;
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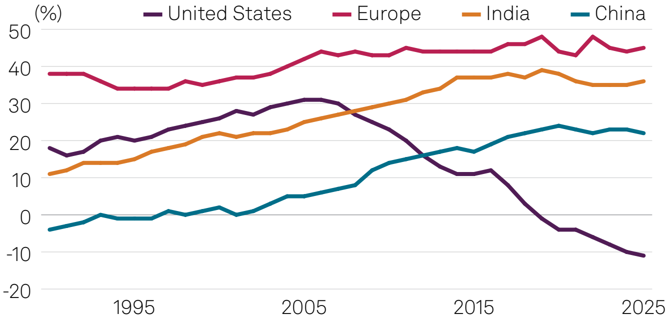
With the Iran war representing the second major global energy crisis in only four years (after Russia's invasion of Ukraine in 2022), the import exposure of major global economic centers has become a strategic risk that can no longer be taken for granted. Of the world's major economies the US stands alone in not only having reduced its exposure to energy imports since 2005, but also having switched to a net energy exporter status, a result of radically increased production of oil and natural gas over the last 20 years.

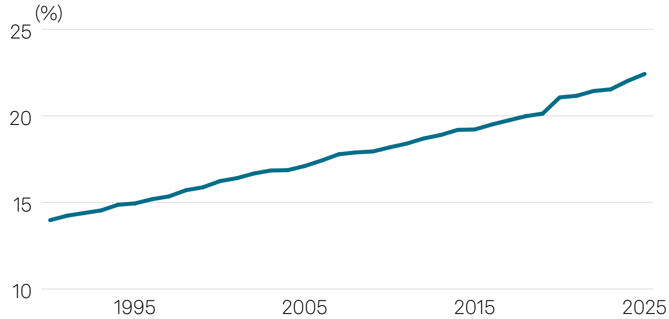
The second critical trend is the growth of electricity as the world's energy type of choice at the point of end use. Electricity is taking market share from other fuels in all sectors – from industry to transport, to residential and commercial. With the emergence of data center demand growth, electricity supply has become even more critical to the modern economy. Crucially, demand for electricity in emerging markets is now, on a per capita basis, significantly higher than it was in developed country peers at the same stage of economic development.

Key markets imported energy as share of total demand



Source: S&P Global Energy

Electricity share of global total final energy demand



Source: S&P Global Energy

In 2026, Europe endured numerous heatwaves, record-breaking temperatures and wildfires. In the Pacific Ocean, an El Niño is developing which could be the most intense ever recorded – and push 2027 global average temperatures to levels never before seen in human history.

In this age of uncertainty, the challenge is to maximize energy security (particularly in those economies exposed to energy imports) and provide ever-increasing electricity supply at an affordable level, all while trying to minimize environmental impacts – especially those related to the global climate.

Energy security

In defining pathways to resilience, the two extremes for energy security solutions are illustrated by the Adaptation and Renaissance scenarios. In the former, energy security emerges from a "stronger for longer" use of fossil fuels. Countries that are able to exploit domestic fossil reserves do so, but demand is also supported by robust international energy trade. In the latter, energy security emerges via the accelerated deployment of clean energy technology, which by default brings more energy production back inside countries' borders.

In the Base Case, energy security is achieved via a pragmatic balance between the deployment of clean energy technology and the continued use of fossil fuels. All countries demonstrate some level of energy transition, but this is fastest and deepest in select economies, principally China and Europe. In Fracture, energy security is sought but not always achieved. Energy trade is volatile and imports not always guaranteed, but the ubiquity and low cost of clean energy technology – especially solar and batteries – offers emerging economies in particular the opportunity to develop their energy systems even against the background of the poor governance and weak institutions that are a global theme in this scenario.

Energy security is achieved via a pragmatic balance between the deployment of clean energy technology and the continued use of fossil fuels.

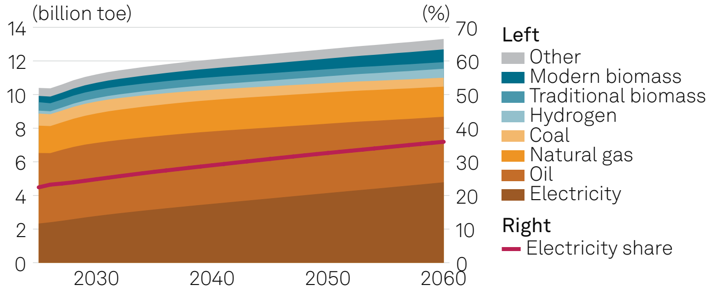
In 2026, Europe endured numerous heatwaves, record-breaking temperatures and wildfires.

Electricity demand and supply are the critical differentiators

Across the scenarios, trends in electricity demand and supply underly the various pathways to energy security. All outlooks show the continuation of the trend since 1990 for electricity to take an ever-larger share of end-use (or final) energy demand. In the Base Case, power demand grows from 22% of final energy demand in 2025 to 36% by 2060. Meanwhile, the share of renewables in the power supply mix grows ever stronger; by 2060 wind and solar combined will supply more than half of global power demand.

Base Case

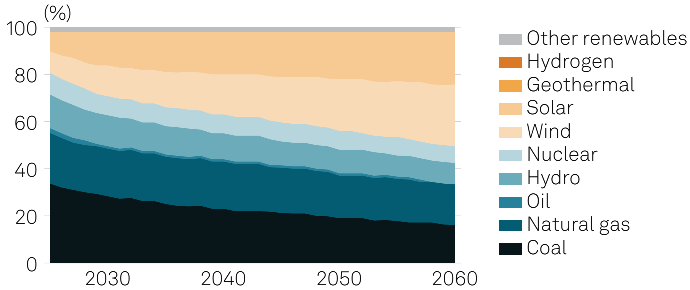
Global final energy demand and electricity share of final energy demand



Source: S&P Global Energy

Base Case

Global final energy demand and electricity share of final energy demand



Source: S&P Global Energy

Adaptation

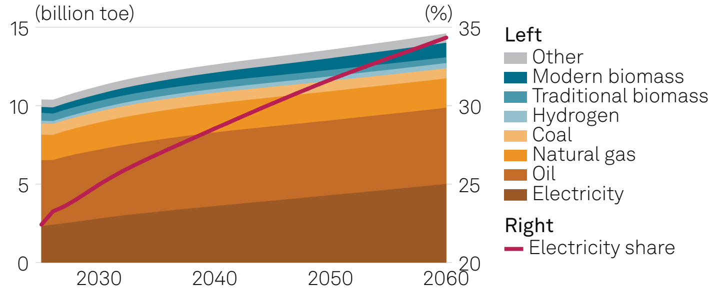
In Adaptation, electricity increases its share of end-use energy demand over the decades, though not to quite the degree seen in the Base Case. Moreover, end-use demand for fossil fuels grows marginally in absolute terms. Top-line demand growth is strongest of all scenarios in Adaptation, and the role of EVs weakest: these two factors alone ensure a much longer future for oil demand in the transportation sector, which helps to underpin long-term end-use fossil fuel consumption. Meanwhile, the contribution of wind and solar (and other renewables) to power generation grows, but again not to the same degree as in the Base Case, leaving a much larger role in the power mix for coal, and especially gas, through the long term.

Fracture

The Fracture scenario shows complex regional, governance and technology dynamics which simultaneously result in an electricity end-use share of final energy demand which is second-highest in all the outlooks by 2060 (37%) even while delivered electricity is lowest in absolute terms. In Fracture, clean energy technology is available but not always deployed in the most effective or robust fashion, which prevents this scenario from achieving the accelerated energy transition seen in Renaissance (below). Nevertheless, end-use consumption of fossil fuels does fall in absolute terms in the Fracture scenario, and the role of renewables in the power sector does grow. By 2060, non-hydro renewables represent 65% of global power supply – with this total significantly higher in select countries, including China.

Adaptation

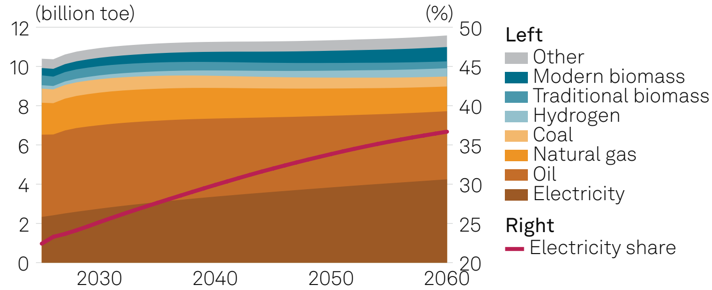
Global final energy demand and electricity share of final energy demand



Source: S&P Global Energy

Fracture

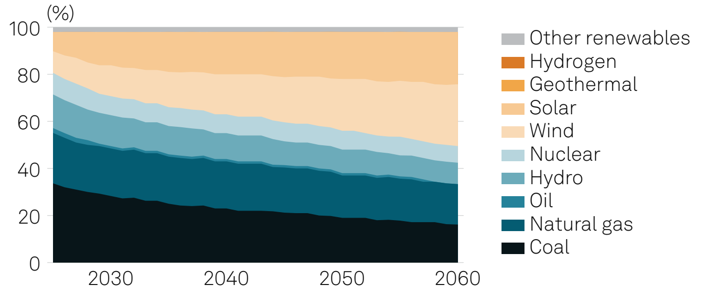
Global final energy demand and electricity share of final energy demand



Source: S&P Global Energy

Adaptation

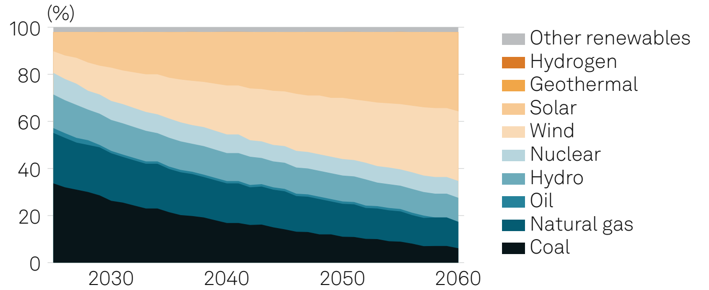
Global final energy demand and electricity share of final energy demand



Source: S&P Global Energy

Fracture

Global final energy demand and electricity share of final energy demand



Source: S&P Global Energy

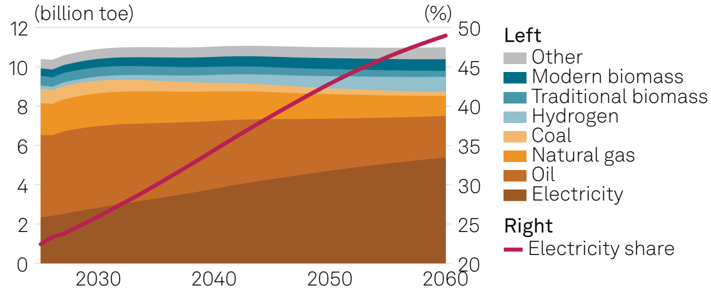
Renaissance

Renaissance is the scenario in which the twin trends of electrification of end-use energy demand and the decarbonization of power generation reach their apogee. A concerted and deliberate shift to “electrify everything” in almost all countries (or at least, electrify everything it is plausible to electrify) leads to power reaching almost 50% of end-use demand by 2060. Oil demand shrinks by about half and coal demand is almost totally eliminated from the last remaining industrial sectors where it is currently in use.

On the power generation side, the same mantra to electrify everything is applied to renewable deployment, pushing this to the highest level of output in any of the scenarios.

Renaissance

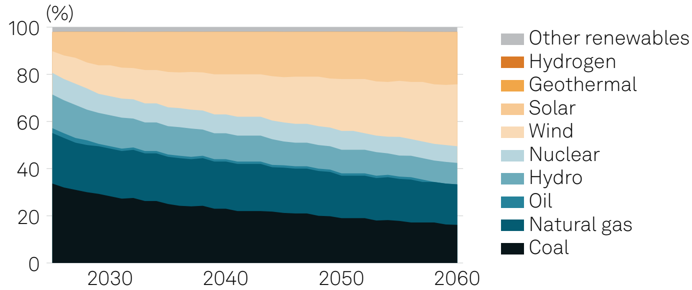
Global final energy demand and electricity share of final energy demand



Source: S&P Global Energy

Renaissance

Global final energy demand and electricity share of final energy demand



Source: S&P Global Energy

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Resilience Outcomes

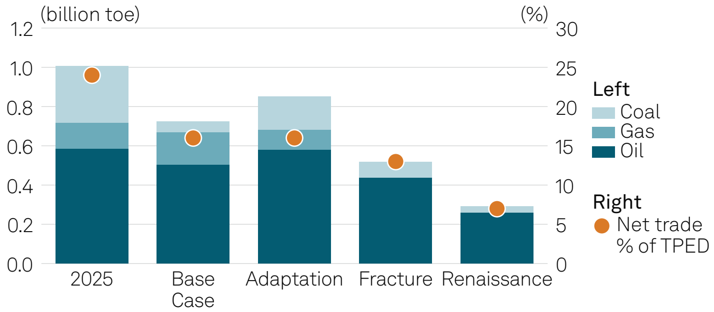
Evolution of global energy trade

Electrification of energy demand and the decarbonization of power generation are the foundations of energy security, but energy security is ultimately defined by a country (or region's) dependence on imported energy. If energy imports represent a large share of energy demand, then secure and reliable trade is imperative. If trade is unreliable or volatile, minimizing import exposure and reshoring energy production is critical.

For China, the strategic development of a clean energy technology industry has a marked impact on future energy import levels. In 2025, China is the world's largest energy importer, and imports are needed to meet almost 1/4th of total energy demand. By 2060, this picture has changed dramatically across all scenarios. In the Base Case, imports represent only 16% of energy demand, with this share falling to 7% in the rapid-decarbonization Renaissance scenario. In India, imported energy meets about 35% of demand in 2025. By 2060, the Base Case sees about the same share of energy met by imports, although in volume terms there has been material growth. The Adaptation scenario facilitates open international energy trade: here, in 2060 India's energy imports are about double the 2025 level in volume terms, and the share of demand has also risen slightly to 40%. Only in Renaissance is there a material decline in both energy imports in volume and demand share terms – a result of the very rapid electrification and decarbonization of the power sector in this scenario.

China

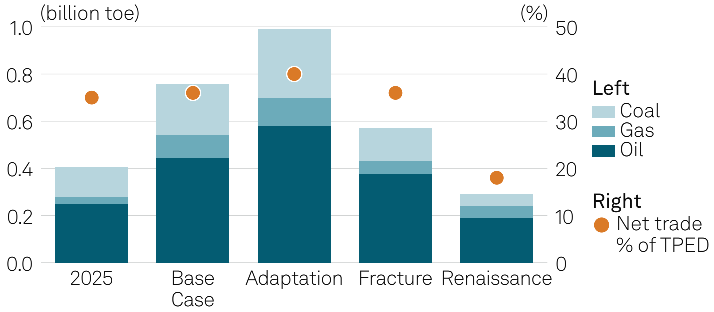
Key markets net energy trade of oil, gas and coal and net energy trade share of total primary energy demand



Source: S&P Global Energy

India

Key markets net energy trade of oil, gas and coal and net energy trade share of total primary energy demand

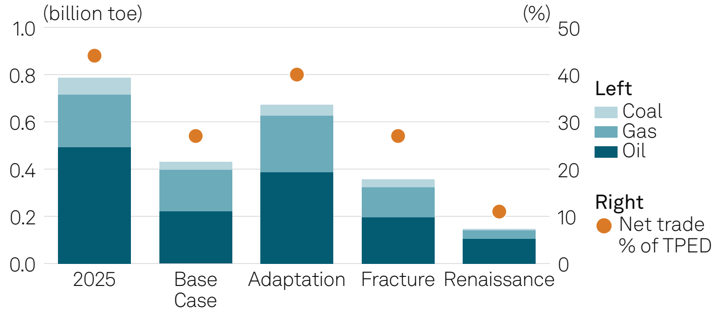


Source: S&P Global Energy

In the wake of the Ukraine war and loss of gas supplies from Russia, EU policymakers leaned into accelerated decarbonization as a solution not just for emissions mitigation, but also for enhancing energy security. Despite the lack of a domestic cleantech industry akin to China's, the EU nevertheless sees declining imports of energy across all scenarios between 2025 and 2060, and a sharp reduction in the import share of energy demand. Only in the Adaptation scenario does the openness of global energy trade through the long-term mean EU energy imports stay above a 40% share of demand in 2060 – with few concerns arising around energy security issues.

Europe

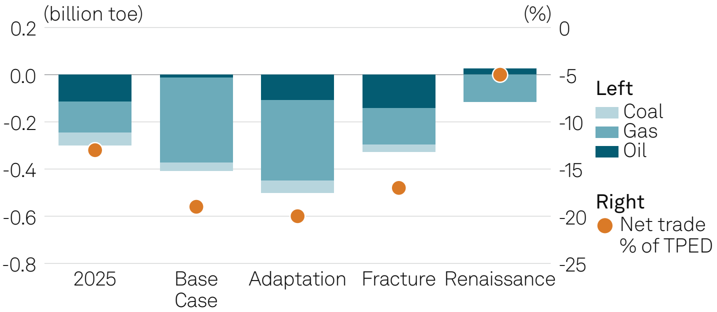
Key markets net energy trade of oil, gas and coal and net energy trade share of total primary energy demand



Source: S&P Global Energy

US

Key markets net energy trade of oil, gas and coal and net energy trade share of total primary energy demand



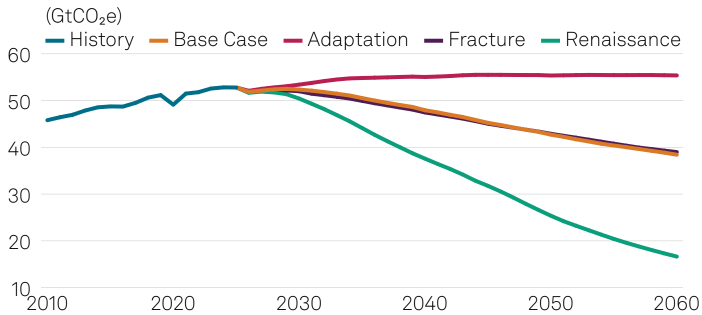
Source: S&P Global Energy

Greenhouse gas emissions

Global GHG emission trends closely follow the energy supply and demand paths illustrated by each of the scenarios. Once again, Adaptation and Renaissance define the extremes. As a result of the "higher for longer" fossil fuel signature of Adaptation, global GHG emissions grow until 2040 and then only plateau: emissions are almost at parity (+5%) with 2025 levels by 2060. In Renaissance, the global drive to revive multilateral climate policy and invest heavily in clean energy technology means by 2060, global GHG emissions are 68% below 2025 levels – and some markets are approaching true net-zero status. In Renaissance, decarbonization is not just a power sector story – all sectors contribute to decarbonization.

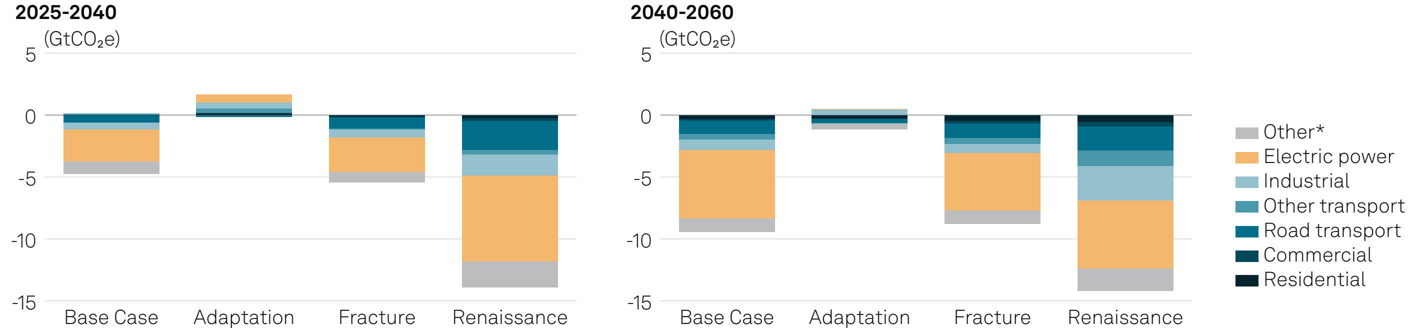
In the Base Case and Fracture, global GHG emission trends are almost identical at the total level. In both outlooks, global emissions by 2060 are approximately 25% lower than 2025 levels, though this similarity at the global level masks regional disparities between the two scenarios. In the Base Case, regional decarbonization trends are more balanced, while in Fracture some markets (China especially) reduce emissions more quickly, with this decline offset by a slower rate of decline in the fossil-heavy regions and markets of the world.

Global greenhouse gas emissions



Source: S&P Global Energy

Global energy-related GHG emissions, change by sector



*Other includes agriculture, district heating, own use, distribution losses, also accounts for adjustments in emissions due to blending of gas-works gas, hydrogen and biomethane into the natural gas network.

Source: S&P Global Energy

All scenarios demand compromise

All of the 2026 scenarios find resilience in different ways, but all pathways to resilience demand some compromise. For Renaissance, the lower-emissions future minimizes climate impacts (though, as a 2-degree pathway, does not eliminate them) while also maximizing domestic energy supply via an accelerated buildout of clean energy technology. But this buildout requires significant investment in infrastructure and pre-commercial energy technologies. It also requires a policy framework that is geared towards decarbonization globally, is stable, and is supported (even if it implies higher costs) by consumers, governments and corporates alike.

Adaptation also requires a return to good governance, though here most specifically in the arena of international energy trade. Adaptation posits that a solution to the Hormuz crisis is eventually found that decisively and permanently opens the Strait – while the reverberations of the energy crises of the 2020s create global agreement that the free flow of energy around the world is too important to fall victim to geopolitical schisms. Adaptation also demands compromise in the area of environmental security, with GHG emissions remaining stubbornly high for many decades hence. Adaptation is thus the warmest of all the scenarios, and implicit within that is an elevated risk of climate-related financial, ecosystem and infrastructure damage throughout the remainder of this century.

In Fracture, a difficult geopolitical framework means guaranteed energy security via the free flow of coal, oil and gas across borders is impossible. The low cost and easy availability of clean energy technology do offer some optionality for countries looking to diversify energy supply or to build out power systems, but with the poor governance background of Fracture, effective implementation is always a challenge. The accelerated energy transition described by the Renaissance scenario remains out of reach, and while GHG emissions do decline significantly to 2060, and 2.6 degree warming pathway does imply an elevated (vs. to today) risk of climate damage. In the slower economic growth outlook of Fracture, this means economies – many of them in the emerging world – are more poorly placed to adapt to the changing climate.

The low cost and easy availability of clean energy technology do offer some optionality for countries looking to diversify energy supply or to build out power systems

The Base Case is a story of pragmatism, where resilience and compromise are balanced in almost equal measure. Global energy trade is more reliable than in Fracture, although a return to the pre-Hormuz crisis, pre-Ukraine invasion status quo is never achieved. Cleantech is deployed globally, but a focus on cost effectiveness and practicality over emissions mitigation mean that the ambitious decarbonization policies of the post-Paris Agreement are not met. A pathway to warming of 2.6 degrees above pre-industrial levels by 2100 does mean increased climate impacts, but unlike Fracture, a larger and more dynamic global economy is better positioned to withstand these challenges.

A pathway to warming of

2.6 degrees

above pre-industrial levels by 2100 does mean increased climate impact

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Strategic implications

Resilience is becoming the organizing principle for energy policy, industrial strategy and corporate capital allocation. The 2026 scenarios do not describe a single linear transition from fossil fuels to clean energy, but instead a world in which energy security, environmental security, affordability, industrial competitiveness and geopolitical positioning interact in increasingly complex ways. For policymakers and corporates alike, the task is not to predict which future will arrive, but to build strategies that remain robust across several plausible futures.

For policymakers, this points to a necessary broadening of energy strategy. Decarbonization remains essential, but it is no longer sufficient as a standalone framework. Governments must also contend with energy import exposure, electricity system reliability, clean technology supply chains, climate adaptation and consumer affordability. The Base Case suggests that policy succeeds where it is pragmatic, durable and focused on system-wide outcomes. Renaissance shows the upside of coordinated policy, accelerated infrastructure build-out and sustained public support for clean energy deployment. Adaptation and Fracture, meanwhile, expose the costs of either prioritizing economic resilience over environmental mitigation, or allowing technology progress to outrun governance capacity.

Managing energy system resilience means accelerating investment in grids, storage, firm low-carbon power, permitting reform and demand-side flexibility, while maintaining credible plans for oil, gas and critical minerals security. It also means treating climate adaptation spending as a core part of economic resilience. A warmer world is now embedded in all plausible outlooks; the difference between scenarios lies in the scale of future damages and the capacity of economies to absorb them.

Decarbonization remains essential, but it is no longer sufficient as a standalone framework.

From policy ambition to execution

For energy companies, the scenarios argue against binary positioning. Fossil fuels remain material in every outlook, but their strategic role changes by scenario, region and sector. In Adaptation, long-duration demand for oil and gas supports upstream investment, LNG infrastructure and conventional energy supply chains, provided trade remains open and geopolitical risks are managed. In Renaissance, value migrates more rapidly toward power, networks, flexibility, low-carbon fuels, critical minerals and carbon management.

Fracture creates a more volatile operating environment: technology costs fall, but policy coherence and trade reliability weaken. The Base Case points to a middle path in which disciplined investment in hydrocarbons coexists with an expanding set of low-carbon growth options.

Fossil fuels remain material in every outlook, but their strategic role changes by scenario, region and sector.

For energy corporates, portfolio resilience matters more than simple portfolio greenness. Companies will need to stress-test assets against divergent demand, price, policy and climate outcomes; preserve optionality across molecules and electrons; and avoid over-committing to strategies that depend on a single political or technology pathway. The winners are likely to be those that can combine reliability in conventional supply with credible participation in the build-out of future energy systems. For industrials, electricity becomes the critical input to competitiveness, not just a utility cost. Across all scenarios, power demand rises in importance; in the more accelerated pathways, access to abundant, reliable and low-carbon electricity becomes a decisive determinant of industrial location, supply-chain configuration and operating margin.

Across the scenarios, three strategic tests stand out. The first is exposure: how vulnerable is a country, company or asset to imported energy, volatile trade, carbon costs, physical climate risk or constrained power supply? The second is flexibility: how quickly can policy frameworks, capital plans, supply chains and operating models adapt as technology and geopolitics evolve? The third is credibility: can governments and corporates sustain the investment, public support and execution discipline required for their chosen pathway?

> Resilience is not the alternative to transition. It is the condition under which any transition must now be judged.

Resilience will be built through diversification, not retreat. Energy security does not mean autarky; environmental security does not mean emissions mitigation alone; industrial strategy does not mean protectionism without competitiveness.
The most resilient actors will be those that manage interdependence intelligently: diversifying supply, investing in domestic capability where strategically necessary, maintaining access to global markets where advantageous, and preparing for a future in which shocks are more frequent and trade-offs more explicit. Resilience is not the alternative to transition. It is the condition under which any transition, or any enduring energy system, must now be judged.

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