Is the Green Energy Transition Dead?

Policy has shifted to prioritize energy security and industrial competitiveness over climate leadership. This will steer investment to the most economical energy sources, driving continued growth in renewables and fossil fuels—but slower decarbonization.

MARCH 19, 2025

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BRIDGEWATER

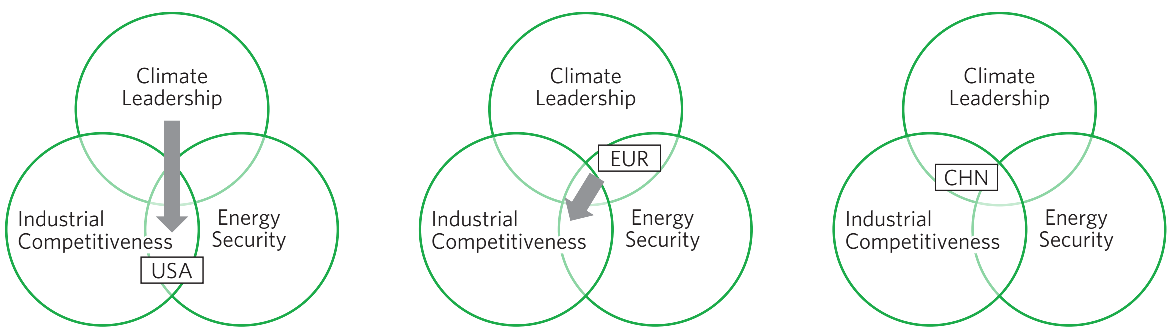
Across the world's major economies, policy is shifting to reinforce energy security and industrial competitiveness relative to climate leadership. The **United States**, under President Trump, is now pursuing an "all of the above" energy strategy that effectively prioritizes fossil fuel production and rolls back existing green subsidies. **Europe**'s historic commitment to the climate transition is being challenged by the risk of carbon pricing and high electricity prices hurting industrial competitiveness, with additional complications from the energy security threat posed by Russia's invasion of Ukraine. Meanwhile, **China**'s industrial policies have given it a commanding lead in many green technologies, but it is simultaneously expanding both the supply of renewables and its domestic coal production amid a deteriorating geopolitical environment and fundamental energy security concerns.

Policy Priorities of Major Economies

The **United States** is prioritizing energy security and industrial competitiveness, explicitly moving away from climate leadership

Europe has historically prioritized climate leadership and energy security but is navigating a major test on industrial competitiveness that has created tensions with its sustainability goals

China's industrial policy supports both climate leadership and competitiveness, and their need for energy security requires ongoing coal use in the short term

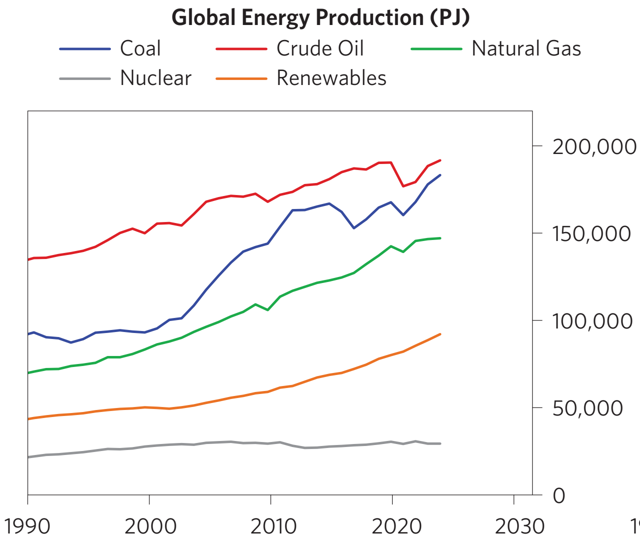


What will this new approach to energy policy mean for the future of the world's energy supply? We highlight two dynamics:

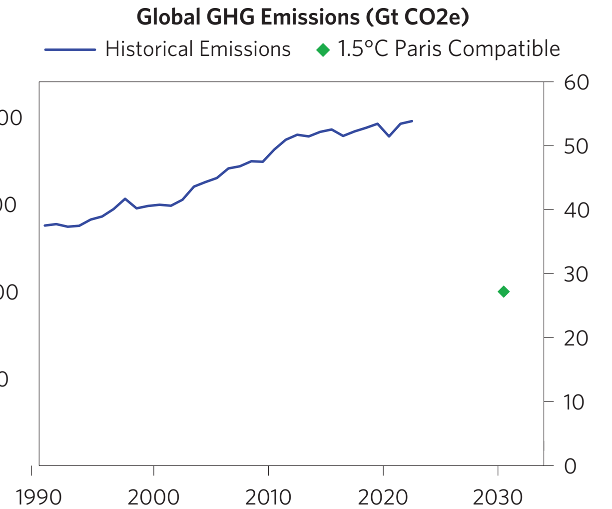
- **We are looking at an energy addition, not an energy transition.** Despite the last decade's ambitious goals of investing in renewable energy and phasing out fossil fuels, what we've seen so far has been an *addition* of renewable energy supply, not a *transition* away from fossil fuels. With climate goals increasingly deprioritized and total demand for power continuing to increase, we would expect this trend to continue. While renewables have increased as a share of total energy supply, in absolute terms fossil fuel production has been rising as well. **This nets out to total energy supply *and* greenhouse gas emissions being at all-time highs, reflecting the "all of the above" demand for greater quantity and redundancy in energy supply chains.**
- **The shift in policy priorities away from climate leadership will also drive a shift in investment toward the most economically viable energy sources—but renewables aren't dead.** Many renewables are economically competitive even without much government support, so investment and scale-up of these technologies will continue to meet new energy demands (like from AI). But because of fading policy supports, investor appetite for earlier-stage, less-cost-competitive

climate technologies is likely to moderate now that governments are taking their thumbs off the scales. Carbon pricing (which was already modest globally due to low political feasibility, particularly in markets with high fossil fuel reliance) is likely to recede further. **As a result of this shift, the physical risk from climate change damages is rising significantly, but near-term climate-transition risks are moderating because the cost of carbon and the risk of owning stranded assets has gone down.**

Below, we highlight how the energy market has evolved in recent years and the likely impact on energy investment going forward. In the rest of this report, we explore these dynamics in more detail—including a deep dive on how energy policy is changing across the US, Europe, and China and the outlook for specific energy technologies.

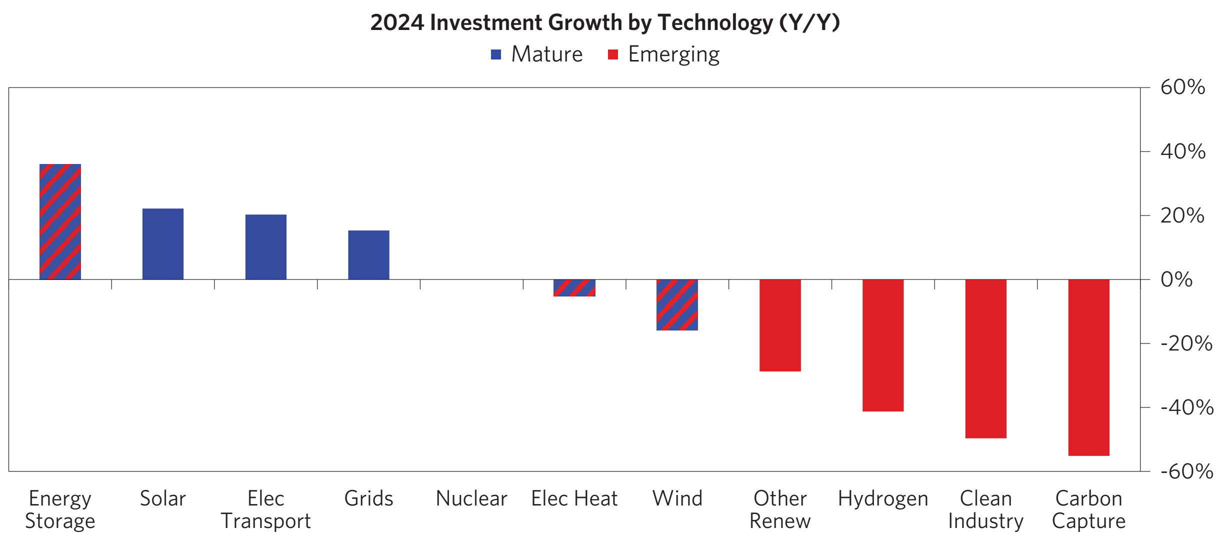


Fossil fuels have continued to grow alongside renewables over the last few decades...



...leading to persistently high emissions far above what is needed to mitigate physical risks

Source: IEA

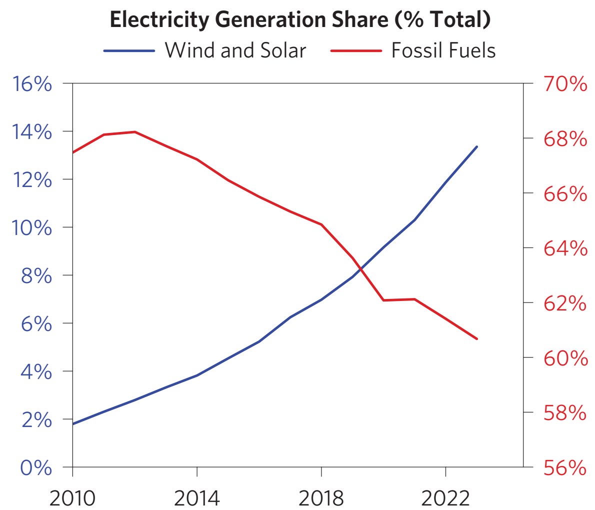


Investment in mature technologies has been growing steadily due to favorable economics, while investment in emerging technologies is likely to keep falling as policy supports fade

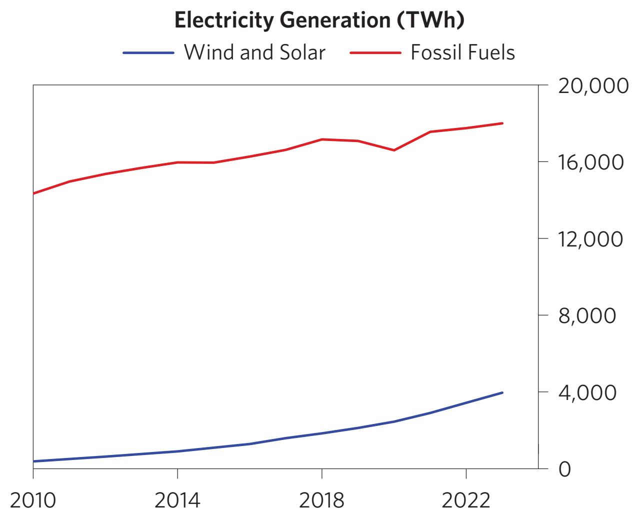
Source: Nat Bullard

So Far, It's Been an Energy Addition—Not a Transition

As the world's energy needs increase, we've seen massive buildouts of new renewable energy capacity to meet this demand. However, while we have seen low-carbon technologies such as wind and solar increasing as a *share* of global electricity generation, the *amount* from fossil fuels has continued to increase in line with the world's rising power needs. This buildout of low-carbon technologies has been financed by nearly USD 2 trillion per year, accounting for nearly 2% of global GDP, but it is still well short of the estimated amount required to keep temperature increases below 1.5° Celsius. We have also continued to see positive investment in oil and gas—which still receives considerable government support in many economies—though clean energy investment is now running at roughly double that of fossil fuels.

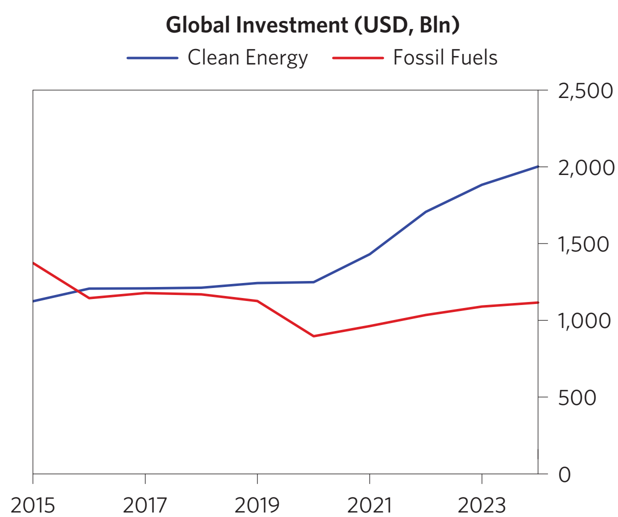


While renewables are replacing fossil fuels in generation share...



...fossil fuels are still increasing in *absolute* terms...

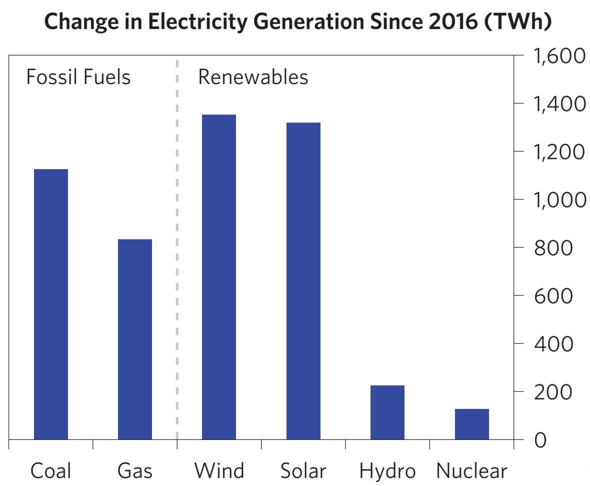
Source: Ember Energy



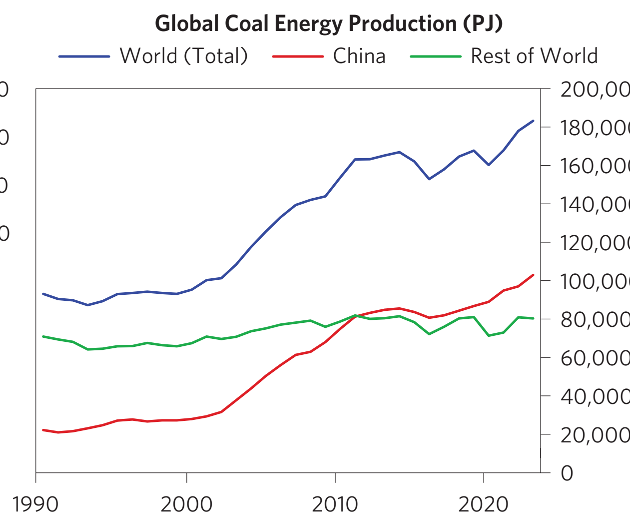
...with more investment going into clean energy, but still stable flows into fossil fuels

Source: IEA

As such, despite the massive growth in renewables, the current energy system is still 80% fossil-fuel-based—predominantly coal, oil, and natural gas. And despite governments agreeing to "phase down" the use of coal (and outright elimination in many developed economies), globally coal consumption has continued to grow over the last decade as a result of new projects, predominantly in China where coal is seen as a short-term energy security need.

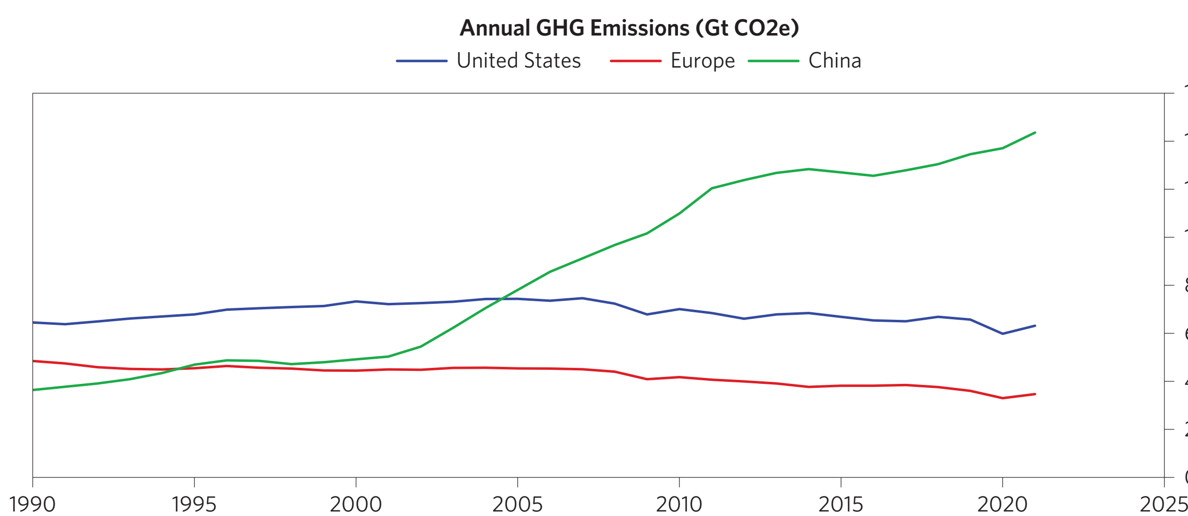


Source: Ember Energy



Source: IEA

In terms of total emissions, the complexion of rising total energy and additional rather than replacement renewable energy means that greenhouse gas emissions continue to reach new highs. Despite ambitious government commitments to reduce emissions, 2030 is rapidly approaching and the 1.5° Celsius Paris alignment target looks extremely unlikely. The emissions picture is very different by economy with much more decarbonization already underway in the US and Europe and rapid increases in emissions in China. Looking ahead, we are unlikely to see clear downward inflection points in emissions as the United States and Europe pull away from climate leadership to meet domestic needs, while China continues to tolerate massive amounts of coal in the short term alongside its renewables buildout.



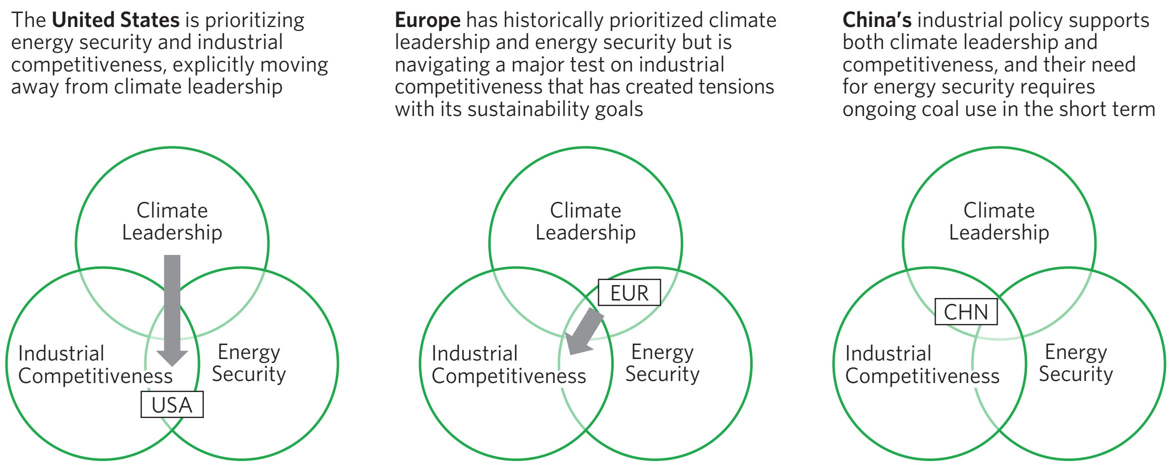
Source: Climate Action Tracker

Governments Are Prioritizing Industrial Competitiveness and Energy Security Over Climate Leadership

Below, we discuss some of the key recent policy changes in the US, Europe, and China. An enabling policy backdrop had been a critical part of the transition because unlike other technological transformations, the low-carbon transition needs to be rolled out at an *accelerated* pace to meet global climate goals, as many carbon-intensive capital assets have low turnover rates. So, even if the new technologies are mature and economically viable, they are not necessarily so profitable that consumers or companies will shift immediately, and many players will need policy inducement (either in carrot or stick form) to take steps consistent with the necessary pace of transition.

As a way to frame the challenge, there is a balance required between climate leadership, energy security, and industrial competitiveness. As the United States (and to a smaller extent Europe) retreat from climate leadership, this could leave room for China to extend its dominance in clean technologies, which are already a crucial part of their industrial policy. We summarize how each of the major regions is handling this and discuss each in turn below.

Policy Priorities of Major Economies



- **The United States**, which had previously taken steps on climate leadership under the Biden administration through clean energy subsidies under the **Inflation Reduction Act**, has now moved sharply in the direction of energy security and industrial competitiveness with President Trump's **"all of the above" energy strategy**. Trump has promised to **fast-track energy permitting**, with particular attention to fossil fuels, critical minerals, and nuclear energy, which are seen as potential avenues for domestic energy dominance (compared to renewables, where the United States is reliant on China for a large proportion of inputs) and a large contributor to the domestic economy (8% of GDP and 10.3 million jobs).

  In moving away from climate leadership, President Trump's executive orders have included a **rollback of IRA provisions** on renewables, green manufacturing, and electric vehicles (amounting to 50% of total IRA funding or USD 270 billion of loans under review); a **withdrawal from the Paris Agreement**; as well as **a halting of wind energy projects** (amounting to 80 gigawatts of planned offshore wind installations, although the impact on onshore wind is likely to be much smaller as only 10-15% of projects take place on federal lands).

  Trump is also looking to repeal various **Environmental Protection Agency measures**, including a fee on methane emissions from oil and gas production, and—crucially—the "endangerment" finding that has created the legal basis for legislation curtailing greenhouse gas emissions.

- **Europe** has been a pioneer over the last decade on climate leadership, beginning with the establishment of the **EU Emissions Trading System** (EU ETS) in 2005 that has gradually increased the cost of carbon for high-emitting domestic companies. However, these "stick" approaches have over time contributed to weakened industrial competitiveness, alongside other drivers like increased Chinese competition and the lack of a competitive tech sector.

  Moves to diversify away from Russian natural gas through policies such as **REPowerEU** were initially well received, as they complemented both climate leadership and energy security—but have since begun to create trade-offs for businesses and consumers as higher energy costs start to bite (electricity prices have doubled in countries like the United Kingdom and France since 2019), adding to the existing pressures on competitiveness.

  Following the **Letta and Draghi reports** calling for much-needed economic reforms (which would require massive investments of EUR 750 billion each year if fully implemented, amounting to 4.5% of EU GDP), the EU has started to explore new legislation seeking to protect its domestic industries, including the **Critical Raw Materials Act** aiming to increase the share of critical minerals produced in the EU and reduce reliance on Chinese imports; the **Carbon Border Adjustment Mechanism** to equalize the cost of imports that are not subject to carbon pricing; and relaxations on **near-term emissions requirements for autos**.

  Most recently, the **Clean Industrial Deal** proposes allocating EUR 100 billion to reduce energy costs and help domestic industries balance decarbonization and competitiveness, although some of this could come at the expense of existing cleantech subsidies. **Federal elections in Germany** also confirm this shift, with the new coalition government likely to favor the buildout of natural gas plants to support domestic energy security needs and a likely rollback of subsidies for heat pumps or green hydrogen amid competing policy priorities like defense and immigration.

- **China** has a head start on many climate technologies, such as renewables and electric vehicles, due to its **Renewable Energy Law passed** in 2005 and subsequent **Five-Year Plans**. While the initial focus on renewables was driven in part by energy security (to reduce China's reliance on oil and gas imports), this has since become a source of competitive advantage for the economy, as China now produces 80% of the world's solar modules and 75% of its lithium-ion batteries. China also controls much of the critical minerals needed to produce these technologies, including significant refining capacity for cobalt (75%), nickel (65%), lithium (65%), and copper (45%), which makes it harder for other players to develop robust end-to-end supply chains.

  Domestically, clean technologies including the **"new three" of EVs, batteries, and solar** contributed 10% of GDP in 2024, more than sectors like real estate. Last year, China met its **2030 renewable energy capacity target** six years ahead of schedule, having added 277 gigawatts of solar (46% year-over-year growth) and 79 gigawatts of wind (18% year-over-year growth) via RMB 6.8 trillion (5% of GDP) of investments. Additionally, the country's **"dual upgrade" program** will likely continue to include EV trade-in subsidies, while its **"investment projects related to areas of strategic importance"** include environmental protection and transport infrastructure as key priorities (alongside energy security).

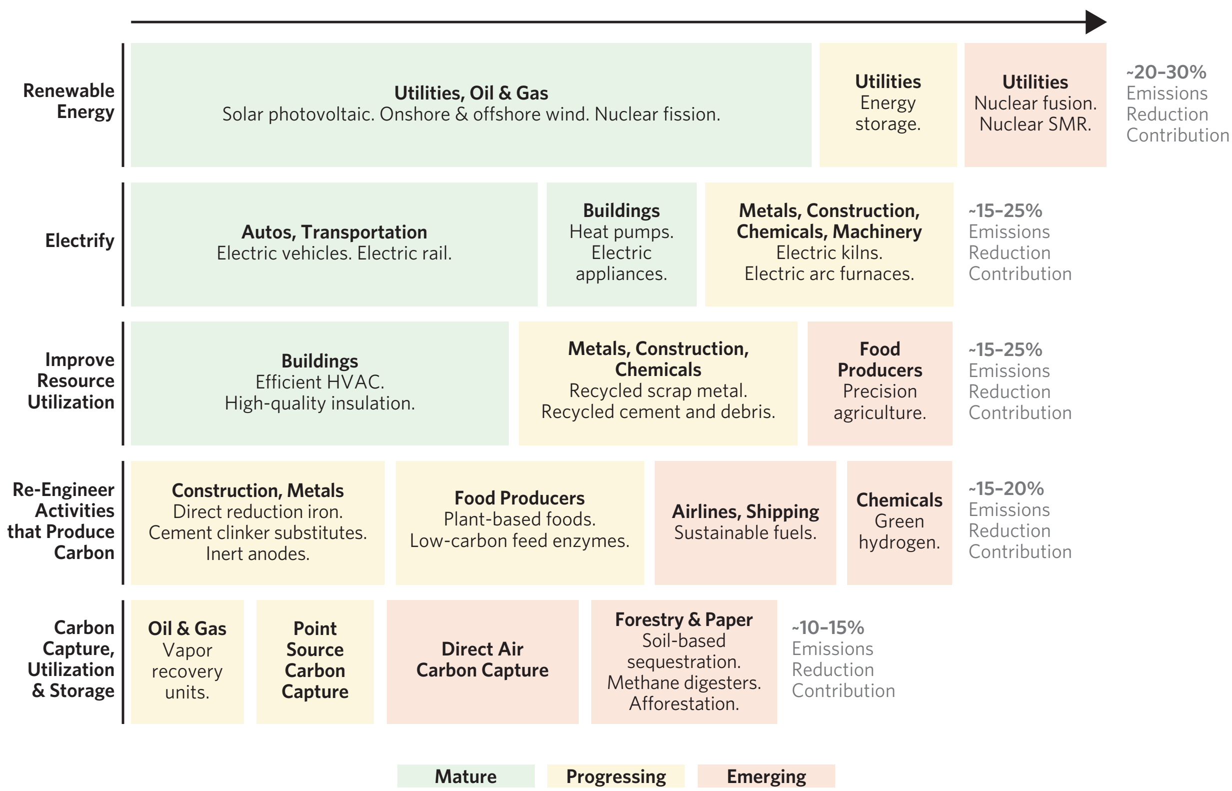
  A similar tone is reflected in China's first cohesive **Energy Law**, which came into effect in January 2025 and aims to prioritize renewables—including the first mention of hydrogen in national legislation—although its foundation is still energy security and thus includes support for "clean and efficient use of coal." In the most recent **Two Sessions** report, China reiterated the need to "better ensure both [energy] development and security," and has continued to increase its coal production (albeit at a more measured pace), creating tensions with the goal of climate leadership.

  As clean technologies mature, China has also been comfortable allowing them to compete more freely with incumbents, such as transitioning to a **market-based bidding** system for renewable electricity beginning in June.

Investors' Focus Will Change Too, Reflecting New Policy Priorities

With policy makers' thumbs off the scales, climate technologies will now need to compete on costs and economics, as companies can no longer rely on a "policy backstop" to make overambitious investments. As we covered in detail in a previous report, we estimate that about 40–50% of global emissions reductions required to achieve net-zero goals can come from scaling technologies that are already mature. These technologies are proven and cost-competitive enough to be deployed at commercial scale and are likely to see continued—albeit more measured—growth under a more volatile policy environment. By contrast, the technology is not yet there to address the remaining 50-60% of emissions, and the rollback of subsidies and other policy supports is likely to make the path toward feasibility more challenging for some of these.

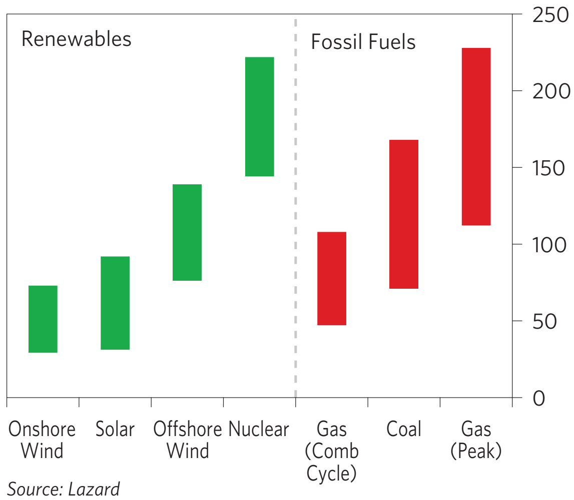
Decarbonization Pathways with Key Example Technologies, by Potential Emissions Reduction Amount



Source: Our World in Data, Bridgewater Analysis

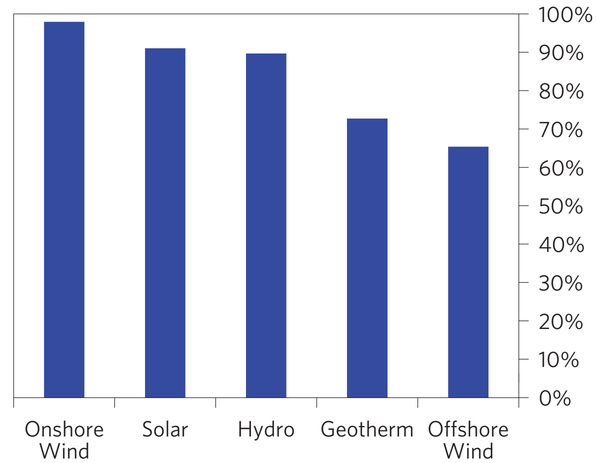
Looking ahead, we expect to see a greater divide between technologies that are already cost-competitive with fossil-fuel-based incumbents (e.g., solar, onshore wind)—particularly those that are also compatible with other economic or political priorities (e.g., nuclear, grid infrastructure)—compared to those with unresolved technological or economic questions (e.g., green hydrogen, carbon capture).

Levelized Cost of Electricity (USD/MWh)



Source: Lazard

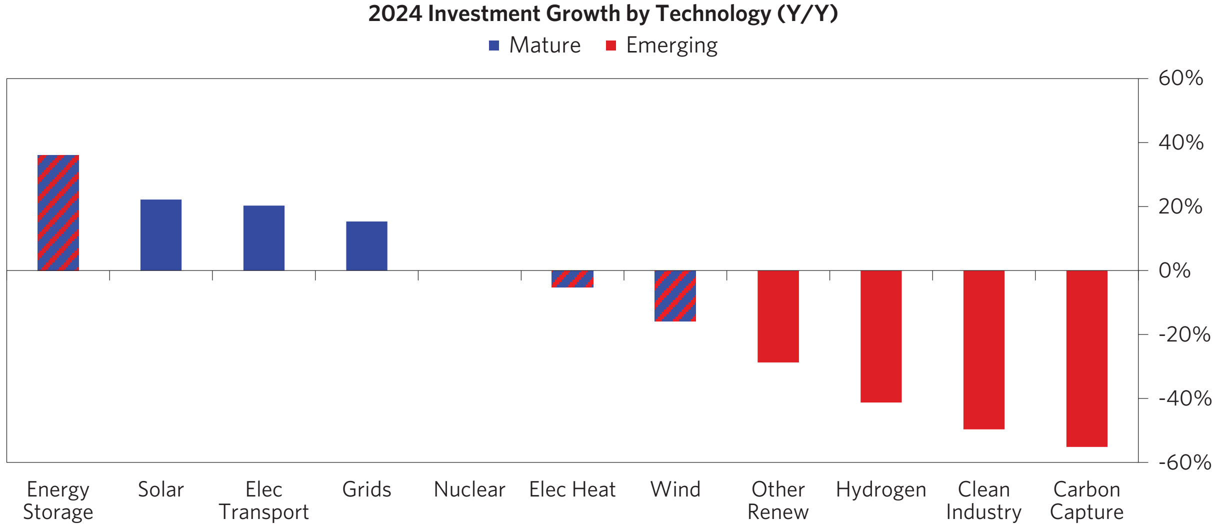
% Projects Competitive with Fossil Fuels



Source: IRENA (2024), Renewable power generation costs in 2023, International Renewable Energy Agency, Abu Dhabi

While supportive policies have helped to accelerate the development and adoption of climate technologies, underlying investments are driven by fundamental economic logic relating to cost efficiency, consumer preferences, and operational practicalities. Globally, more than 90% of climate investment flows already go to mature technologies, which are cost-competitive with fossil-fuel-based incumbents and thus likely to continue growing. By contrast, the remaining 5–10% goes toward emerging technologies that are unlikely to be profitable in the absence of subsidies and whose share has already been shrinking. For mature technologies like solar, recent policy shifts are unlikely to change their overall trajectory, and investment and scale-up will continue (albeit at a more disciplined pace). For immature technologies (like hydrogen and carbon capture), the shifts represent a material headwind.

2024 Investment Growth by Technology (Y/Y)



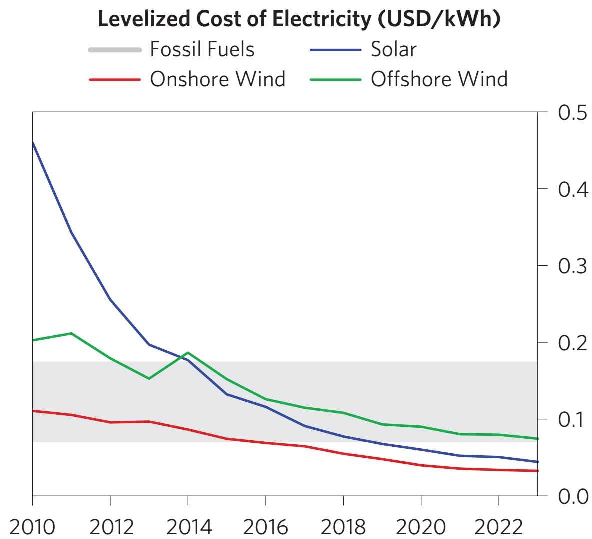
Investment in mature technologies has been growing steadily due to favorable economics, while investment in emerging technologies is likely to keep falling as policy supports fade

Source: Nat Bullard

In the appendix, we walk through the outlook for the major energy technologies in the context of an extended policy pullback.

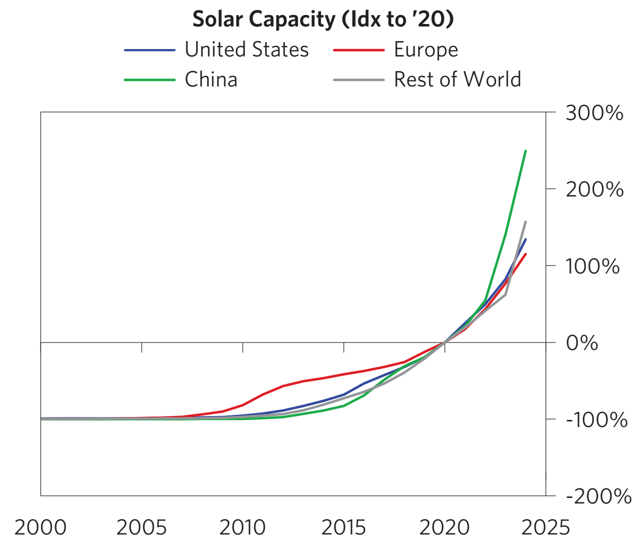
Appendix: The Outlook for Energy Technologies

For mature technologies like solar, investment scale-up continues. While it is true that many solar projects in the United States were catalyzed by the Inflation Reduction Act, solar energy has also continued to flourish in other parts of the world over the same time period, due to its favorable economics following decades of technological progress and rapidly decreasing cost curves (which was further supported by record-low prices for solar modules over the last few years as a result of a global oversupply). As such, we do not expect a massive reversal in this trend even as IRA subsidies are reined in. In their end-of-January forecast, the US Energy Information Administration continued to project 26 gigawatts of solar capacity to be added in 2025 (lower than 2024 but still a ~50% increase from new additions in 2023), while new large-scale projects announced by the Trump administration such as the Stargate AI venture are likely to be powered in part by solar energy, based on economic rather than sustainability considerations. Likewise, in the EU, solar was the fastest-growing power source in 2024, surpassing coal generation for the first time (an 11% versus 10% share of electricity generation) with further growth likely, especially if high natural gas prices persist. In the UK, residential solar installations have grown by five times since 2020, despite the lack of policy incentives. Finally, in China, a record 45% expansion of solar capacity in 2024 helped the country meet its 2030 renewable energy generation target six years ahead of schedule, and the country's new Energy Law (passed in January 2025) establishes further buildout of renewables as a strategic priority.



Solar energy is already competitive with fossil fuels...

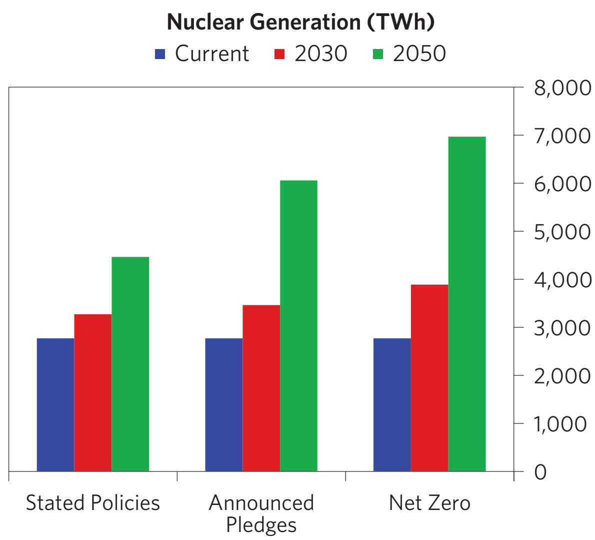
Source: IRENA (2024), Renewable power generation costs in 2023, International Renewable Energy Agency, Abu Dhabi



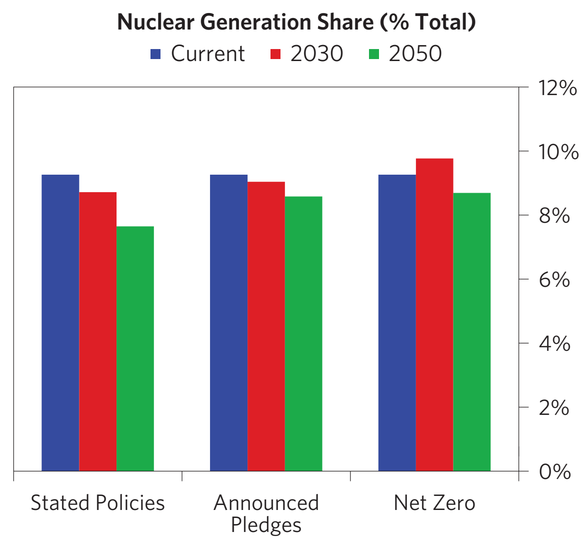
...leading to a massive global buildout over the last few years regardless of policy

Source: Ember Energy

Nuclear energy through fission is a mature proven technology. Nuclear energy provides around 10% of the world's power through 430 reactors today. This is set to expand with annual global nuclear investment expected to double under announced pledges by 2030 from ~USD 65 billion to ~USD 115 billion, with 60 more plants under construction and 20 participants at COP28 committing to tripling capacity by 2050. China's nuclear-buildout plan is especially ambitious, aiming to construct more than 150 new reactors by 2035 (at a total cost of ~USD 440 billion). Nuclear is an important existing power source in geographies such as France and Central/Eastern Europe (Slovakia, Ukraine, Hungary), where it makes up more than 50% of grid capacity. The recent discourse on nuclear has shifted considerably as a result of a renewed focus on energy security and increased demand for baseload (nonintermittent power generation) coming from data centers and AI, with major announcements of nuclear restarts (e.g., Three Mile Island). Trump's executive orders included explicit support for nuclear, including streamlining the regulatory review process for new nuclear power plants. However, further expansion of new nuclear builds remains held back by high upfront capital costs and substantial regulatory hurdles. As you can see below, even in the most aggressive scenarios, while nuclear generation could increase by ~50% by 2030 and double by 2050, the share of nuclear in the overall electricity generation mix is expected to stay reasonably flat.



Nuclear capacity is expected to increase under most scenarios...

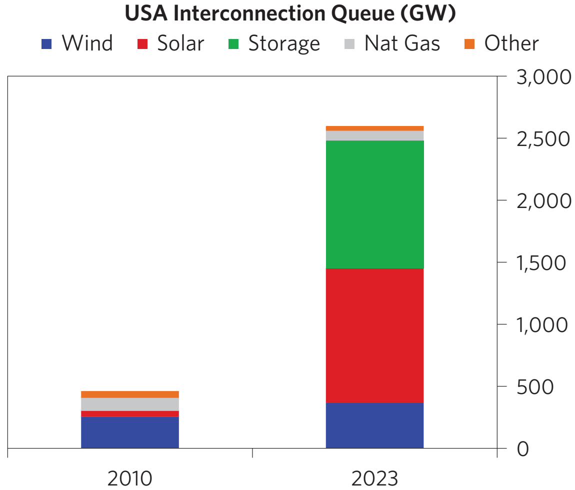


...but still makes up a relatively small share of the overall energy mix

Source: IEA

Grid investments will likely be needed regardless of the speed of the climate transition, given rising projections of overall power consumption—especially with new sources of demand such as AI. In the United States, some of the Trump administration's policies could accelerate the speed of transmission-infrastructure permitting and environmental reviews. The US interconnection system queue has expanded by 30% from 2022 to 2023 and tripled over the last two decades, and the country could require up to 10,000 new miles of transmission to switch to clean electricity by 2035. Europe will require similar investments, as most member states' electric grids are underprepared relative to the expected buildout of new wind and solar capacity (although the need for cross-border transmission makes policy and planning more challenging). In Germany, for example, while major parties disagree on whether the energy buildout should prioritize renewables (e.g., SPD), fossil fuels (e.g., AfD), or a mix of the two (e.g., CDU/CSU), they all agree on the need to improve grid infrastructure. Finally, China is preparing to invest more than USD 800 billion in electricity grids through 2030, and spending on power transmission outpaced spending on power capacity for the first time since 2018, as curtailment rates—when energy producers are blocked from the grid—are starting to rise again after falling consistently over the last decade, leading authorities to double the "red line" limit from 5% to 10%.

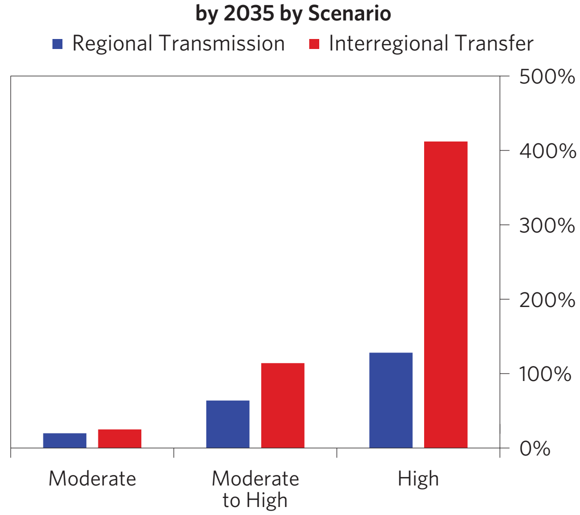
USA Interconnection Queue (GW)



Massive increase in interconnection queue, dominated by renewables...

Source: Berkeley Lab

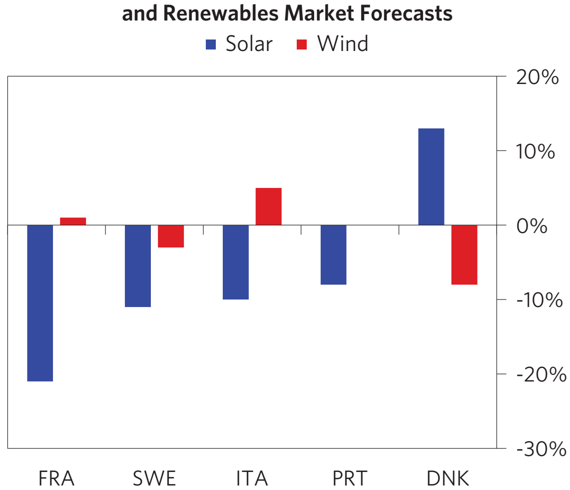
Median USA Grid Capacity Increase Needed by 2035 by Scenario



...requiring large capacity increases over the next decade

Source: DOE

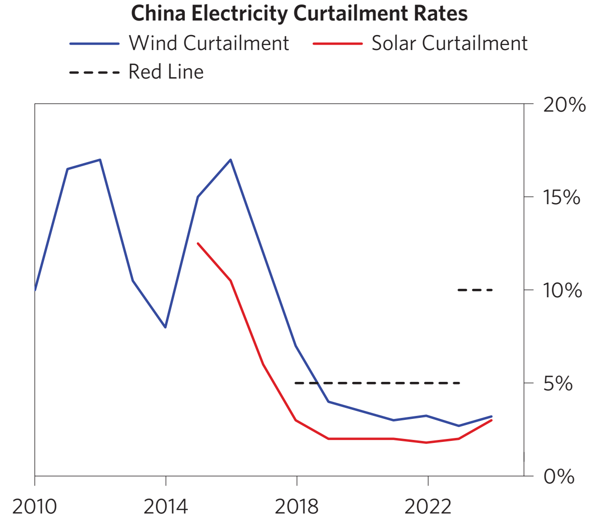
Gap Between Grid Plans and Renewables Market Forecasts



Likely capacity gaps in most EU economies based on the current pace of renewables expansion...

Source: Ember Energy

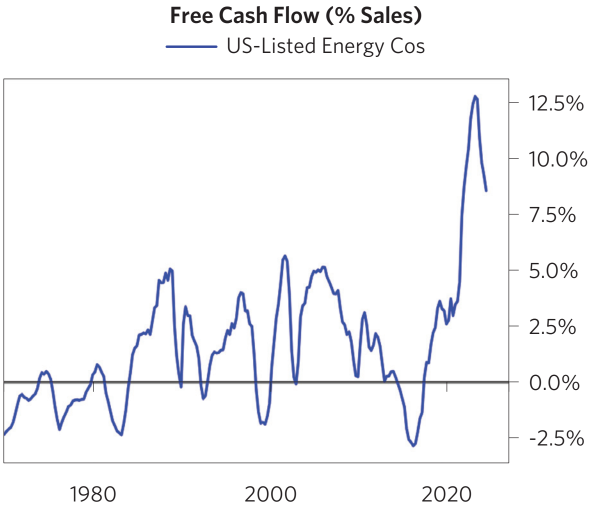
China Electricity Curtailment Rates



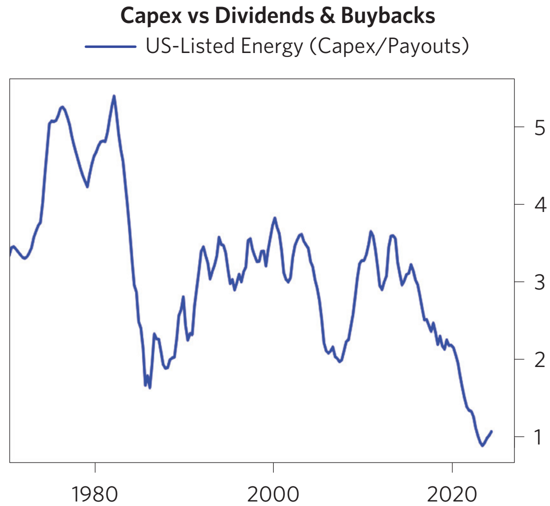
...while curtailment in China is rising again after years of decline

Source: S&P

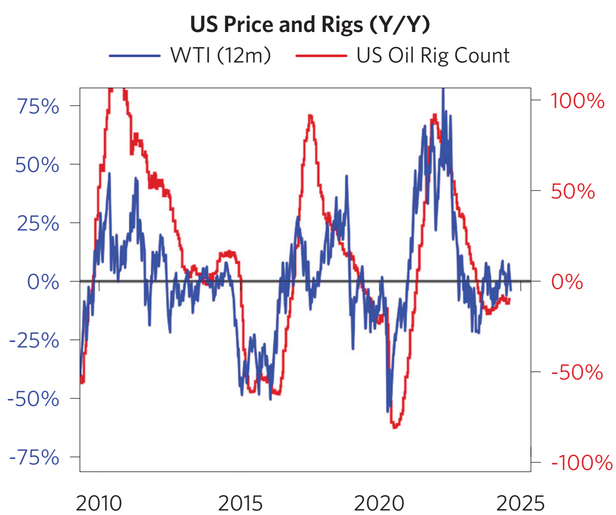
Oil companies continue to face capital-discipline pressures. They have learned from previous boom-bust cycles to be more disciplined in their capital investments, which are driven by long-term demand and supply projections rather than short-term shifts in policy. As we shared previously, we expect the Trump administration's efforts to increase US oil production to have limited impact because capital discipline—not regulation—is the main constraint. Trump has limited ability to boost oil supply, while natural gas production is already set to increase in the US due to secular tailwinds from increasing demand from power generation (partly from the AI boom) and the buildout of liquefied natural gas export capacity to satisfy foreign demand. According to a survey by the Dallas Fed, although a majority of oil and gas executives expect permitting times for drilling to decrease under Trump, a similar share said they had "no plans to increase their investments" beyond what they had initially committed to prior to the US elections.



US oil and gas producers have ample cash flow to invest...



...but are focusing on capital discipline and returning capital to shareholders...



...and in that context, activity will mostly be responsive to price

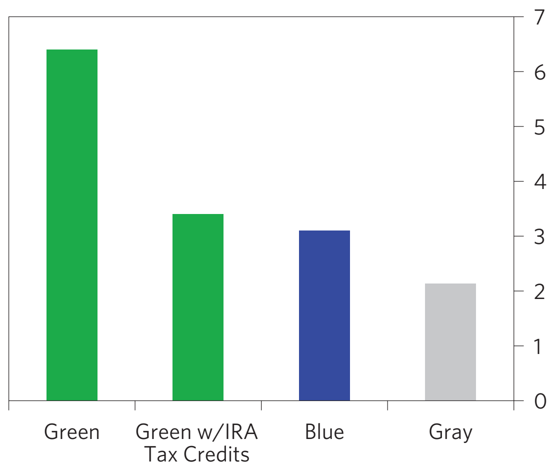
Offshore wind (a small share of total wind generation compared to onshore wind, which is highly economical), has, by contrast, been ambitiously expanding capacity without similar capital discipline, leading to financial underperformance. For example, Ørsted invested USD 35 billion in new offshore wind projects without sufficiently hedging input costs, which were hit by supply-chain bottlenecks, commodity-price inflation, and rising interest rates. Due to its high capital requirements, offshore wind is 10-20% more exposed to upside cost shocks than onshore wind or solar. As a result, Ørsted was forced to write down more than USD 5.5 billion in assets, the latest being a USD 1.7 billion impairment on the Sunrise Wind megaproject in New York in January. Under pressure from investors, Ørsted's new CEO has already announced a 20% capex reduction through 2030, which will strengthen its balance sheet at the expense of rapid growth. Other wind developers have also been taken by surprise by rising costs. Even before President Trump's executive orders, companies like Avangrid and Shell had canceled offshore wind projects in the United States, while projects like Equinor's Empire Wind and BP's Beacon Wind projects saw up to 60% increases relative to the original agreed-upon strike prices due to "rampant inflation, global supply chain disruptions, and soaring interest rates." In Europe, similar cost increases have also forced offshore wind developers to sit out of various clean-energy auctions (e.g., the UK in 2023, Denmark in 2024), as they were unable to generate sufficient returns on investment based on the price offered by the government.

- *"**The significant adverse developments from supply chain challenges, leading to delays in the project schedule, and rising interest rates have led us to this decision**, and we will now assess the best way to preserve value while we cease development of the projects." **"It is without a doubt proven that this was the wrong decision. I want to be absolutely clear that we are taking away all learnings from this into future project development and timing for capital commitments."** —Mads Nipper, outgoing Ørsted CEO*
- *"We'll reduce our investment program toward 2030 through **a stricter, more value-focused approach to capital allocation**. We do this to ensure a stronger balance sheet, supporting a solid investment-grade rating, and to ensure that we only invest our capital in the most financially attractive opportunities." —Rasmus Errboe, incoming Ørsted CEO*

Immature climate technologies, by contrast, face considerable headwinds. While mature climate technologies are likely to continue growing, albeit at a more measured pace, many of the technologies we expect to be worst-hit by the pullback in climate policies (e.g., President Trump's executive orders) are also those which have faced challenges around their economics and have relied on government subsidies.

Green hydrogen, for example, has been highly reliant on policy supports. The IRA had provided for massive subsidies to bring down the costs of green hydrogen, although a lack of clarity around eligibility for 45V tax credits led to delays in multiple projects, including Air Products' exit from a USD 4 billion Texas megaproject amid pressure from investors to take fewer risks on capital spending. President Trump's latest executive orders to remove IRA subsidies could further complicate this, although the challenges faced by green hydrogen are not limited to the United States. In Europe, an estimated one-fifth of the hydrogen pipeline was either canceled or delayed in 2024, due to higher-than-expected costs and uncertainty around demand. This has come as potential industrial customers like airlines have scaled back their ambitions for hydrogen-powered planes (e.g., Airbus cutting capex in hydrogen technologies by 25%). As shown below, investments in hydrogen demand (e.g., for fuel-cell vehicles, clean ammonia, or clean steel) have not grown nearly as quickly as investments in hydrogen supply, which has led to concerns over the economic viability of the sector in the absence of government supports.

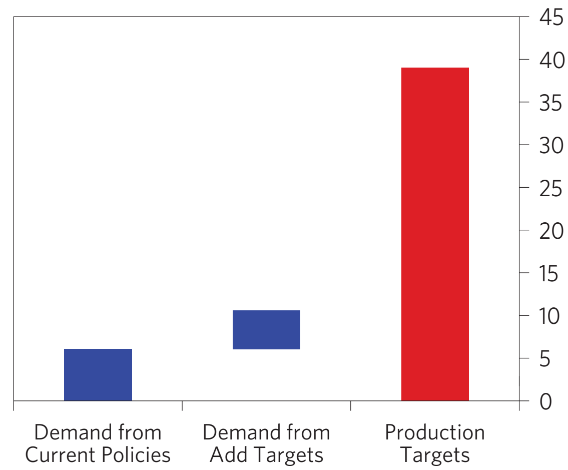
Hydrogen Production Cost (USD/Kg)



Green and blue hydrogen are not competitive without subsidies...

Source: InsideEVs

Hydrogen Supply vs Demand from Government Targets (Mtpa)



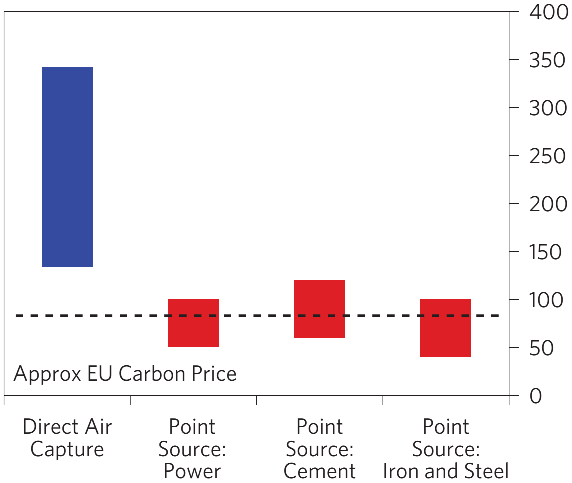
...while demand growth is unlikely to keep pace with targeted increases in supply

Source: IEA

- **Air Products:** *"We are not going to make a commitment on FID on that project until the rules for the implementation of IRA are finalized." "The project did not meet our criteria, which was that we do not make final investment decision until we have an anchor customer."*
- **Shell:** *"It is not cost-effective to proceed with the project. The market for blue hydrogen is not there, nor are there any signs that the market is on its way to maturing."*
- **Airbus:** *"Hydrogen has the potential to be a transformative energy source for aviation. However, we recognize that developing a hydrogen ecosystem—including infrastructure, production, distribution and regulatory frameworks—is a huge challenge requiring global collaboration and investment."*

Carbon capture investments have followed a similar trend, declining by more than 50% in 2024 amid concerns around economics. In economies like the United States, which accounts for almost half of global carbon capture investment, the main "customer" of CCUS projects is the government, which makes the sector especially vulnerable to shifts in climate policy. As shown below, around 85% of carbon capture funding in the United States comes from the Department of Energy or outlays from the Bipartisan Infrastructure Law, while the remaining 15% is often only profitable with the use of 45Q tax credits—where take-up also slowed in 2024 due to questions around their interpretation. Outside the United States, major carbon capture projects were also canceled in Canada (Capital Power) and Sweden (Vattenfall), with the lack of a stable revenue source being cited by both companies as one of the reasons for the cancellations.

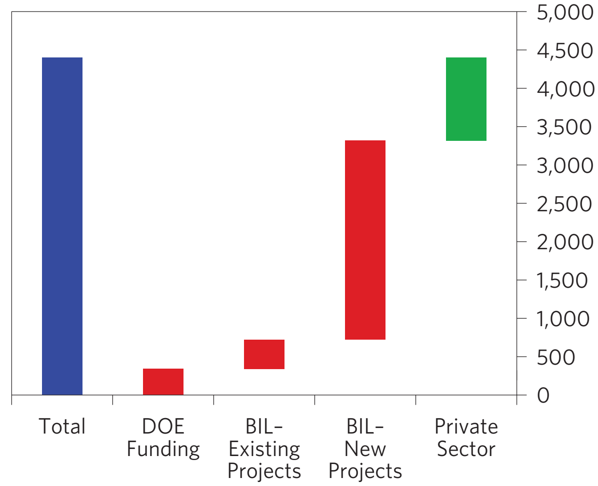
Levelized Cost of CCUS by Sector (USD/tonne)



Most forms of carbon capture cost more than the prevailing price of carbon...

Source: IEA

Breakdown of USA 2023 Carbon Capture Investments (USD, Bln)



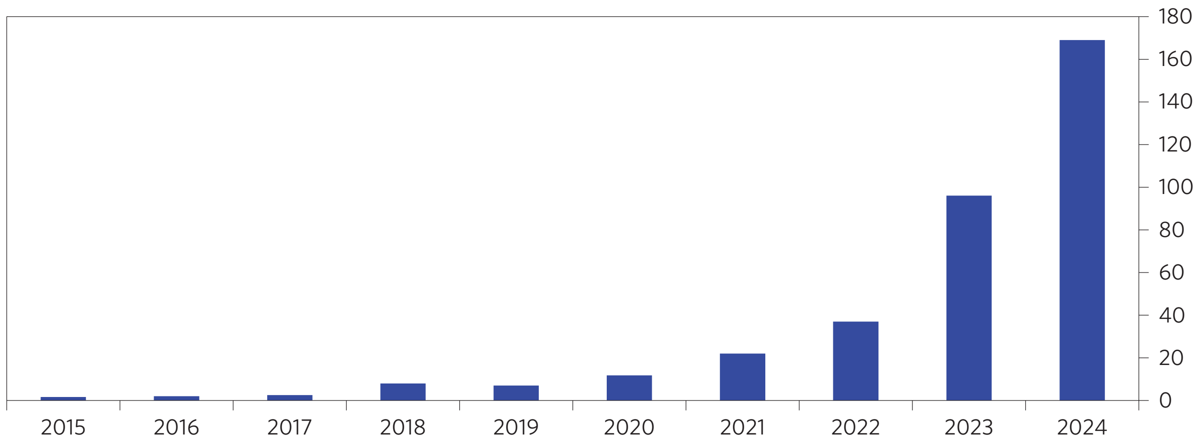
...leading to most investments needing to be financed or subsidized by the government

Source: CBO

- **Capital Power:** *"The economics didn't work,* ***and the economics didn't work because we don't have a long-term price on carbon****...What was proposed by the federal government in budget '23 was to introduce this carbon contract for differences. And the intent with that was to provide the insurance policy or backstop...So, we had visibility between now and 2030, but* ***we didn't know what the price was going to be after that****. And to underwrite the project, we would've needed that visibility because what underpins the economics of this is offsetting our carbon tax.* ***There wasn't a revenue generating source behind it."***
- **Vattenfall:** *"****The market for carbon dioxide capture is too immature*** *and the economy to implement the project is lacking."*

Energy storage, by contrast, is an example of an emerging technology that continues to see broad policy support due to it providing other economic or political benefits. It can help fill the need for nonintermittent power generation required for data centers and alleviate grid-connection bottlenecks by increasing the capacity utilization of existing intermittent sources of power like wind and solar. As such, despite being earlier in its development, energy storage has been one of the fastest-growing clean technologies over the last few years and is expected to grow a further 10 times by 2035. China—where geographical gaps between renewable energy generation and consumption are largest—has been a major engine of this growth, due to supportive policies such as a mandate for new solar and wind projects to be co-located with 5–20% of equivalent energy storage capacity. From an economic standpoint, investment was also supported by low prices for lithium-ion batteries, which fell by 20% in 2024. Overall, battery costs have halved since 2015 while efficiency (in terms of energy density) has doubled over the same period.

Annual Battery Energy Storage Installations (GWh)



Source: Nat Bullard

Important Disclosures and Other Information