Open Access

Contemporary Research Analysis Journal

e-ISSN: 3050-5909
p-ISSN: 3050-5895

Volume 02 Issue 03 March 2025

CrossRef DOI: 10.55677/CRAJ/03-2025-Vol02I03

Page no: 129-141

United States' Monetary Policy and Climate Action: How the US Federal Reserve Supports Renewable Energy

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ABSTRACT: In our world where climate change is gradually disrupting economic stability and threatening global financial systems. Growing scrutiny has been placed on the responsibility of central banks, especially the United States Federal Reserve (Fed), to address environmental risks. The Fed is essential in determining the nation's monetary policy, but its direct engagement in climate initiatives and support for renewable energy is somewhat restricted. Nonetheless, the Fed has become more aware of the financial threats associated with climate change and has started to incorporate climate-related factors into its overall policy framework. This research article tries to find how the Fed is integrating climate action into its monetary policy outline and its efforts including risk assessment and sustainable green finance. Moreover, this paper examines Fed action to measure and mitigate climate-related risks, including testing financial institutions for climate resilience and encouraging the transition to a low-carbon economy through the adoption and integration of sustainable financial practices. Furthermore, this paper investigates into how the Fed can stimulate green investments, promote climate-related financial disclosures, and maintain long-term economic stability in terms of environmental challenges. This can be done due to examining recent policy actions and directions in United States. While emphasizes that the Federal Reserve's integration of climate into its mandate demonstrates a deeper transformation toward alignment of monetary policy with global sustainability aims.

KEYWORDS: US Monetary Policy, Environmental Risks, Climate Change; Green Finance.

1. INTRODUCTION

As a central bank for the largest economy in the world, the U.S. Fed has a characteristic contribution to make to finance stability. Historically, the functions of the Fed have been centred on handling of monetary policy to keep price stability and tackle inflation, along with the operational capacity of the financial system. However, the changing nature of global risks, and in precisely climate change, forced a reassessment of what can be considered a threat to financial stability is nowadays is the most important challenges for global economy (Hamasalih et al., 2025). With the Fed reserve usually prioritizing price stability, low unemployment rate and financial stability, the institution's policy has changed in recent years with increasing awareness of climate change as an emerging financial risk (Mohammed et al., 2020). Climate change, with its wide-ranging impacts on industries, infrastructure and global trade, is being seen more and more as a top driver of financial system health nowadays (Hussein et al., 2025). The Federal Reserve among them, have known that their brief reaches beyond the financial stability necessities of the past, to embrace emerging risks and indeed, the crisis presented by the environment (Mahmood et al., 2019).

The combination of climate change into the Fed's monetary policy is part of a broader international trend of central banks become more engaged in attempting climate hazards. Unlike other monetary policies that address economic issues like inflation and interest rates. The Fed's engaged with climate action mainly centres on assessing how climate-related incidents including floods, wildfires and droughts could affect the economy and financial markets. The Fed is also responsible for supporting the transition to a more sustainable, low-carbon emission economy by making sure the financial sector is ready for the long-term shifts in the economy that accompany environmental policies and technologies.

Furthermore, climate-related financial risks are a tangible, quantifiable concern, rather than an abstract theory, and pose a real threat to the stability and resilience of markets themselves. The recent growth in climate-related litigation, the introduction of carbon taxes, and the rising uncertainty in the global markets all create an impetus for central banks to account for these risks in their outlines. By pre-empting this risk, the U.S. Federal Reserve, through its recent acknowledgment of climate change as a financial risk, will not only reduce the likelihood of localized financial losses but also reshape an economic system whose behaviour is misaligned with global sustainability and social goals (Muhammad et al., 2025).

This paper seeks to investigate that how the U.S. Federal Reserve is using its monetary policy to drive investment into a more sustainable, low-carbon economy, and at what measures, it is taking to ensure that the financial system is resilient to the effects of climate change (Palani et al., 2025). Since this research study highlights the developing role of the Fed, it builds on our understanding of how central banks can promote and support reforms that bolster sustainability, whereas maintaining financial stability and fostering long-term growth (Rahman et al., 2021). This analysis will make clear how important the Fed's approach is to the future of U.S. economic stability and to the worldwide shift to climate-oriented action. This article is driven by the growing awareness of an impending global crisis and the need to examine potential strains on financial systems (Salih 2018).

Research questions

1. What has the U.S. Federal Reserve done to learn new tools and policies to address climate-related financial risks? This question explores specific actions undertaken by the Fed, such as integrating climate stress tests, advancing green finance initiatives, and encouraging regulated entities to disclose climate risks.
2. What role does the U.S. Federal Reserve's monetary policy action play in facilitating the transition to the low-carbon economy? This question examines the Fed's critical role in redirecting financial flows toward more sustainable investments and whether its monetary policy can influence market behaviour in support of green finance.

2. THE ROLE OF FED'S EVOLVING IN CLIMATE ACTION:

2.1. Financial Stability and Climate Risk

The Federal Reserve has acknowledged that climate change presents significant risks to the financial system. Severe weather events, the shift to a low-carbon economy, and stranded assets in the fossil fuel sector can disturb financial markets. In response, the Fed has begun evaluating and addressing these risks through stress tests, scenario analyses, and increased oversight of financial institutions (Fatah et al., 2025).

2.2. Green Finance and Investment

The Federal Reserve's monetary policy indirectly aids renewable energy by creating a stable economic environment that encourages green investments. Low interest rates, a primary tool used by the Fed, lower the capital costs for renewable energy projects, enhancing their appeal to investors (Salih et al., 2019). Furthermore, the Fed's involvement in international networks such as the Network for Greening the Financial System (NGFS) helps to promote best practices for funding sustainable projects.

Supporters of an active role for Fed in climate action claim climate change-related financial risks, like physical risks stemming from extreme weather events and transition risks tied to the transition to a low-carbon economy, are increasingly critical threats to financial stability.

2.3. Climate-Related Disclosures

The Federal Reserve has promoted enhanced transparency in climate-related financial disclosures. By supporting standardized reporting of climate risks, the Fed assists investors in more efficiently directing capital toward renewable energy and other sustainable projects. This increased transparency also minimizes uncertainty, fostering long-term investments in clean energy infrastructure (Salih et al., 2019).

Yaqub (2024) proposed that Fed should be more active in steering the economy toward a greener future, through guiding financial flows to green investments via their accommodative policy stance and supporting the transition to a low-carbon economy.

Figure (1) shows the distribution of ESG (Environmental, Social, and Governance) ratings of S&P500 firms over four years (2017-2020) They are rated on a scale from CCC (lowest) to AAA (highest), and the number of companies per category is reported per year.

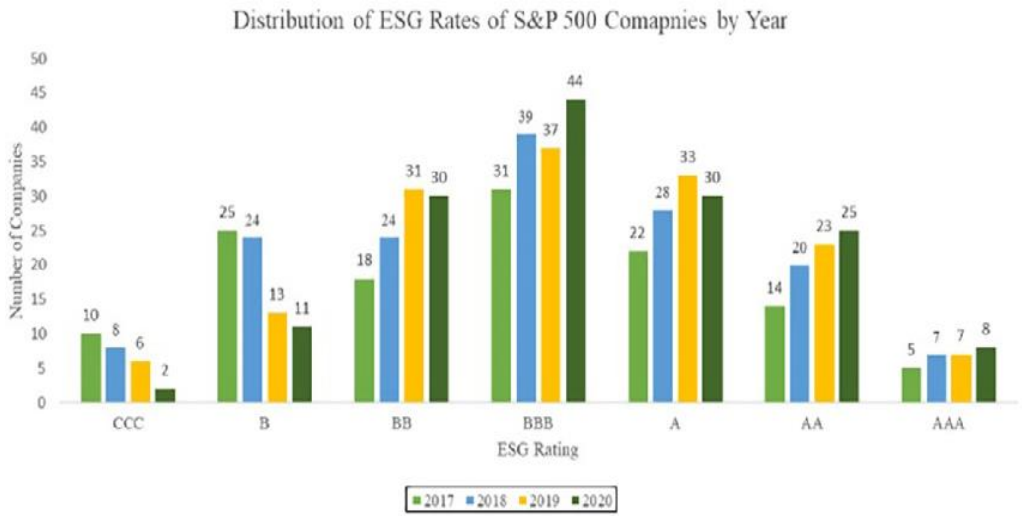


Figure (1): Distribution of ESG Rates of S&P 500 Companies by Year (The U.S. Securities and Exchange Commission).

The Figure highlight the change in ESG assessments for S&P 500 firms from 2017 to 2020 clearly; note from all firms the trend of improving ESG outcomes. Over this time period, the number of companies in the bottom ESG categories, such as CCC and B, has shrunk dramatically. Back in 2017 there were 10 rated CCC companies and this number reduced to only 2 in the year 2020. Likewise, the population of B-rated companies dropped from 25 in 2017 to 11 in 2020, meaning fewer companies are considered to have weak ESG practices.

Entering into the mid-level ratings, BB and BBB, the trend appears somewhat more volatile but still stable. The number of issuers rated BB was between 24 and 31 across the four years. Most notable growth was seen in the BBB rating category, which increased from 39 companies in 2017 to 44 in 2020. This indicates gradual improvements are being made by most companies in their ESG performance, with an overall movement from low to mid-tier ratings (Salih et al., 2020).

There are notable increases on this front — with investors pushing A, AA, and AAA ESG-rated companies up the curve. Firms were rated a or above on sustainability and corporate governance grew from 22 in 2017 to 30 in 2020, showing an increase in companies that have started implementing sustainability policies and practices. The AA category showed a notable rise too; the number of companies rose from 14 in 2017 to 25 in 2020. The AAA category, representing the most stringent ESG standards, experienced relative stability but continued to show slight growth, increasing from 5 companies in 2017 to 8 in 2020.

Overall, the trend seems to indicate that S&P 500 companies are making progress with ESG efforts due to rising regulatory demands, investor pressures, and internal sustainability goals (Salih et al., 2021). 1. Fewer Poorly Rated Companies and More Mid-Tier and High-Rated Companies As the numbers from the report indicates, there is a positive shift toward more companies improving their environmental, social, and governance practices. Despite improvements across the board, however, attaining the highest ESG scores is still problematic for many firms and evidenced by the fact that relatively few companies currently hold AAA ratings. That means that efforts have been made, but corporate sustainability lags.

On the other hand, in Figure 2, which highlights the key milestones in the U.S. Securities and Exchange Commission's (SEC) climate-related disclosure regulation and enforcement efforts? In February 2010, the SEC published Climate Change Guidance, updating guidance from the 1970s. This was an early move toward acknowledging climate-related risks as material to financial disclosures.

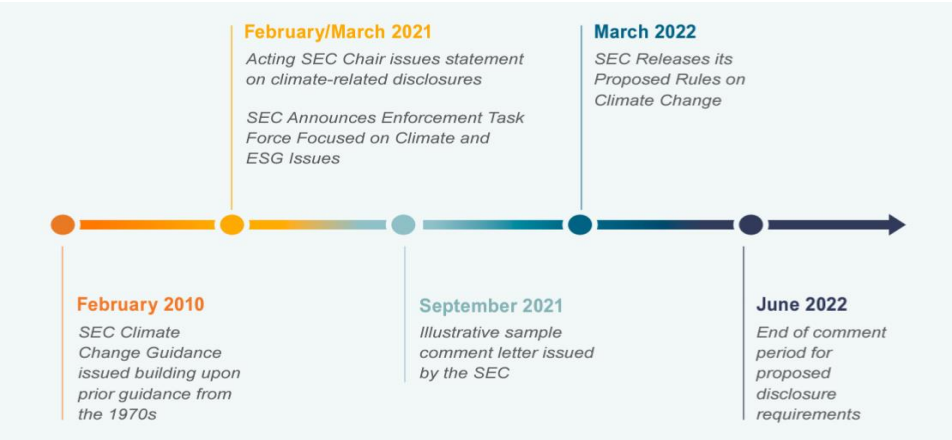


Figure 2: SEC Climate-Related Disclosure Timeline (The U.S. Securities and Exchange Commission).

In February/March 2021 the then Acting SEC Chair issued a statement noting the significance of climate related disclosures. In this context, the SEC also announced in March 2021 the formation of an Enforcement Task Force regarding climate and ESG (Environmental, Social, and Governance) concerns, indicating a more pronounced regulatory attention on sustainability (Salih 2021). In 2021, the SEC published an illustrative sample comment letter in September that helped to clarify to companies how disclosures related to climate should be approached (Wei et al., 2017).

The SEC's Proposed Rules on Climate Change were issued in March 2022, and sought to implement comparable disclosure requirements across publicly traded companies so that investors receive comparable and dependable information regarding climate risk material to their financials. The timeline ends in June 2022 with the expiration of the comment period for its proposed new disclosure requirements. This stage allowed stakeholders to give feedback before the SEC headed toward enacting the regulations (Salih et al., 2025).

In sum, this timeline represents the SEC's growing focus on climate-related disclosures and ESG, starting to bring corporate reporting into alignment with the increasing investor and regulatory focus on climate risks.

2.4. Research and Advocacy

The Fed has expanded its research initiatives to comprehend the economic impacts of climate change and the shift to renewable energy. Through published studies and active participation in public discussions, the Fed highlights the significance of climate action and its connection to economic stability.

2.5. Political and Ethical Factors:

Political and ethical factors further complicate the debate. Smith and Rajan (2017), Draghi, (2019) and de Galhau and Weidmann, (2020) argue that Fed should not be decided on whether to be responsible for guiding what money goes or whether to manipulate the prosperity of some sectors and industries. It is particularly acute in the significant question of maintaining political neutrality and independence of central banks. Others, such as Piketty (2014) and Stiglitz, (2017), have questioned the ethics of whether Fed should actively steer economic activity in the direction of a green future, appealing that this may eventually open them up to political influence. The direct involvement by Fed in climate action say, in the areas of asset purchasing or prioritization in investments in the real economy may call into question their credibility as independent institutions and lead to friction with government policy and/or market participants. Finally, it remains to be seen what role, if any, Fed will play in climate action. The on-going challenges posed by climate change to global markets have made the role of central banks in climate action a highly relevant topic, but the trade-offs between financial stability, money creation, and tangible environmental impact will be key to unlocking a solution (Yaqub, 2019).

The political and ethical landscapes of climate policy have changed markedly under the new U.S. administration of President Donald Trump. There has been a turn to isolationism in global climate politics, as the most prominent representatives of political power chose to withdraw from the Paris Agreement and reduce contributions to international climate funds (Ali et al., 2024). The administration's push for energy independence has spurred a series of open-ended policies that put domestic oil and natural gas production at the center of the agenda, while it has sought to speed up permit approvals and offer support for the fossil fuel industry. Moreover, regulatory rollbacks have been called for through "Project 2025," an initiative to reorganize agencies like the EPA and DOE to be more favorable toward fossil fuel growth and less so toward environmental stewardship (Fatah et al., 2025; Mohammed et al., 2020).

3. HOW THE US FEDERAL RESERVE SUPPORTS SUSTAINABILITY

Increasingly, climate change, as a global systemic risk, has led to considerable debate on the role of the U.S. Federal Reserve Fed in support of sustainability. The conversation has been changing: should the Fed integrate sustainability into its policy framework and, if so, how should it be involved in counteracting climate risks? The literature on this question is a mixture of theoretical flights of fancy and empirical evidence regarding the ability of central banks to start advocating for sustainability, striking a balance between their traditional mandates and the increasing demand for climate action.

A core theoretical rationale for the Fed's engagement with sustainability is articulated by scholars like Carney (2015), who argues that climate change presents a 'tragedy of the horizon,' where the long-term risks of climate change are not properly factored into decisions about the allocation of financial resources, as they are perceived to be too far off in the future to matter. Moreover, Carney (2015) pointed out that financial system could be underplaying these risks, with the potential to destabilise markets and erode the resilience of economies. According to recent findings, Battiston et al. (2017) argue that if the financial sector fails to recognize these risks, we can expect asset mispricing and a suboptimal allocation of capital (Aivas et al., 2025). Such concerns argue for why the Fed needs to be involved in working to ensure the stability of the financial system by integrating climate-related risks into its regulatory and policy structure.

Furthermore, others have challenged statements about the Fed’s roles in sustainability in theoretical terms for example Schütz (2022) who suggest that central banks can actively stimulus the financial system toward more sustainable trajectories. The concept of

"green finance" has entered this debate, where it is argued that the central banks can steer investment flow towards "green" and "low-carbon" projects, using their monetary and financial market tools (Paxshan et al., 2024). This model is consistent with the developing body of literature that has developed through decades of calls to action around the fact that the financial sector has a main role to play in financing the transition to a low-carbon economy. Central banks, such as the European Central Bank (ECB), have started buying green bonds and integrating climate risks into their asset purchase programs and some scholars are calling for the Fed to do the same. Scholars such as Sullivan (2024) have contended that the Fed should not just seek to decrease climate-related financial risks but, in fact, should also work to encourage green financial products to guide financial markets in line with sustainability objectives.

On the empirical side, there is a lot of research on how central banks like the Fed can influence financial stability and promote sustainability such as Tekdogan and Atasoy (2021), Schnabel (2021) and Ahmad and Satrovic (2023). Studies Martinez-Diaz, and Keenan (2021) make an argument for integrating climate risks in the assessment of financial stability and supervisory outlines. These scholars contend that the Fed should address climate-related risks by guiding regular stress tests and advocating for enhanced disclosure of climate-related risks by financial institutions (Yaqub 2024). An important volume of empirical studies demonstrate that climate-related financial risks, precisely transition risks crossing over to a low-carbon economy, could cause financial markets to become unstable. Indeed, one of the reasons for concern about financial stability, according to recent reports by the Financial Stability Oversight Council (FSOC), is climate change, signifying a movement towards considering those risks as part of the Fed's remit (zia et al., 2025).

Indeed, empirical study also underscores the challenges and potential downsides of the Fed's foray into climate action. A common refrain is not to bring climate change policy into the Monetary Policy arena, as noted by Cochrane (2022), as the Federal Reserve's primary responsibility is price stability and financial stability. Cochrane argues that bringing the Fed into the world of sustainability might invite the kind of political meddling that would lead to "green washing" in which the appearance of on-the-side action does not turn into action. The empirical data are consistent with the argument that excessive central bank intervention caused the distortion of financial flows and the undermining of their main role of protecting financial stability. In addition, Haldane (2017) states concerns regarding central banks moving out of their traditional roles and warns that doing so could erode their credibility and agency.

Taking the perspective of policy makers, the concern is the lack of legal and institutional powers available to the Fed to fully embrace sustainability in its mandate. Related Empirical work comes from the fact that sustainability is still an exception to the rule. Martinez-Diaz, and Keenan (2021) contend that the law under which the Fed reserve at this time operates may not obviously grant the institution the ability to address climate risk, which would need, in their view, to be amended in the Federal Reserve Act. In the absence of such legal contexts, central banks may find themselves limited in their capacity to make decisions with climate impact or channel funds toward green investments. Still other scholars such as Brunnermeier et al. (2020) contend that although the Fed may be constrained by existing legislation, it is a force of compel for the integration of climate risks into financial institutions' practices without direct green asset purchases or changes in its legal mandate. In fact, the Fed reserve has supervisory authority that it can wield to make sure that financial institutions price climate-related risks appropriately and disclose their exposure to those risks (Yaqub, 2024).

In summary, the theoretical and empirical literature regarding the Fedand its role in encouraging sustainability reveals contradictory perspectives. Scholarly consensus explains that climate change will be materially important for financial stability with some arguing that the Fed has a mandate to act on such risks and others stating that the Fed should start integrating climate into its monetary and financial stability framework (Yaqub et al., 2024). But there are concerns over the political and economic implications of central bank engagement in climate action. The literature therefore stresses the importance of finding balance between giving the Fed the space to promote sustainability, and not putting it outside its traditional mandate, while not letting climate change related risks go unaddressed in the financial circuit. With this expanding body of research, we will certainly see future studies, which examine more empirical assessments of the Fed carrying out its actions and what their success will or will not be in propelling the green transition and maintaining financial stability (Abdulrahman et al., 2025). At present, the Fed does not directly enter green bonds purchase or carry out a formal green bond purchase program in the way that the European Central Bank (ECB) or the Bank of England has. Green finance was seldom a concern for Federal Reserve policy actions, which have been mostly centered on monetary stability, inflation targeting, and financial stability (Yaqub et al., 2025).

Table (1) summarizing significant initiatives and policies by the Fed to address sustainability and climate risk since 2008. Although the Federal Reserve has not imposed broad green finance policies like some other central banks, but its method has progressively shifted to include environmental and climate risks into its financial stability framework.

Table (1): U.S. Federal Reserve's Initiatives and Policies Related to Sustainability (2008–2025) (Source: US Federal Reserve).

Year	Initiative/Policy	Description	Focus Area
2008	International Financial Crisis Response,	The Fed's reaction to the 2008 financial crisis was to provide liquidity support, which also decreased the potential cost of economic collapse, thus indirectly supporting resilience in the face of decarbonisation-related transforms to the economy.	Financial Stability & Economic Growth
2015	Financial Stability Report	Although not directly addressing climate change, the Fed began including wider risks in the context of financial stability that would eventually cover climate risks.	Financial Stability
2017	Commitment to Financial Stability Oversight Council (FSOC).	FSOC started to consider the systemic risk of climate-related financial instability. Direct policy implementation was not taken, but the discussion around climate risks and financial stability began.	Systemic Risk & Financial Stability,
2020	Support for Sustainable green Finance	Through quantitative easing programs that enabled the private banks and corporations to issue green bonds, the Fed implicitly took steps toward sustainability.	Sustainable Finance
2021	Climate Change and Financial Stability Report	The Federal Reserve recognized climate change in various degrees as a risk to financial stability and integration of climate-related risks into the Federal Reserve's stress testing framework.	Climate Risk & Financial Stability
2021	Financial Stability Oversight Council (FSOC)	FSOC also acknowledged the possible economic risks of climate change, such as transition risks from transitioning to a low-carbon economy.	Financial Stability & Climate Risk
2021	Pilot Climate Stress Test Participation	The Fed joined other banking regulators in initiating a testing of the financial system's resilience to climate-related risks, such as physical risks and transition risks.	Climate Risk & Stress Testing
2022	Monetary Policy and Climate Change Research	The Federal Reserve published a series of research papers examining the implications of climate change for monetary policy and economic stability, laying the groundwork for integrating these two issues in future policymaking..	Climate Change & Economic Policy
2023	Speech on Climate Risks	Fed Chair Jerome Powell delivered a speech outlining the possible reverberations of climate risks in the financial sector, a signifier of the Fed's increasing dedication to embedding climate into the core of its financial stability work.	Climate Risk & Financial Stability
2024	Commitment to Sustainable green finance Supervision	The Federal Reserve stepped up its oversight efforts to mandate that banks in its purview disclose climate-related risks and stress test their financial resiliency in a warming world.	Bank Supervision & Climate Risk
2025	Increase of Climate-Focused Stress Tests	The Federal Reserve started improving stress-testing models to more fully account for climate-related financial risks.	Stress Testing & Climate

Theme(s) in the U.S. Federal Reserve's Sustainability Initiatives:

- Recognition of climate-related risks: The Fed has gradually recognized that both physical and transition risks posed by climate change are a material threat to financial stability.
- Research and Reports: From 2021, the Federal Reserve published reports and conducted research on the potential impact of climate change on financial stability and systemic risk, showing increasing involvement in tackling these issues.
- Supervisory Actions: In 2022, the Fed went a step further and began taking tangible steps to include climate risks into its supervisory framework for financial institutions, requiring banks to provide disclosures about their exposure to climate-related risks.
- Stress Testing: Over the years, the Fed's stress-testing frameworks have factored in climate-related risks from environmental disasters to policy-adjustments in order to test the durability of the financial sector.

The U.S. Federal Reserve does not publish a dataset on the percentage of banks reporting climate-related risk exposure over time. This meaning that although the Fed has stood back from insisting on climate-related disclosures of its supervised financial institutions in recent years, these financial institutions have begun to reveal additional climate risk information, driven largely by regulatory pressure and the ascendancy of Environmental, Social and Governance (ESG) reporting frameworks (Yaqub 2024). As per practice, regulated banks need to report on climate-related risks based on the different regulatory frameworks, the first leading being the Task Force on Climate-related Financial Disclosures (TCFD) that has welcomed many international financial institutions to report on climate-related disclosures. As part of its supervisory role, the US Federal Reserve has advised financial firms to consider such risks and report them.

Figure (3) displays renewable energy investment in US dollar from 2015 to 2024 in billion US dollars. The data starts from 2015. The first year declined slightly in the years of 2015 and 2016, which may show that there were some economic problems, policy change or investor confidence issues at that time. Nevertheless, growing interest and commitment toward renewable energy projects showed an upward trend since 2017.

From 2017 to 2020, the size of investment saw growth of around 20%, suggesting market maturity (Rahman et al., 2921). The acceleration in capital investments after 2020 suggests likely drivers, including advancements in technology, policy incentives, and global trends in sustainability, particularly for green energy, which help explain the increase in capital inflows. In 2024, the size of investment reached nearly 600 billion dollars.

The steep increase after 2020 could be related to heightened global interest in renewable energy as a means of addressing global warming, as well as government policies favouring clean energy transitions. Declining renewable technology costs, emerging supply-side markets, private sector engagement, and pressure on regulators may have driven this increase. This indicates a bright future for investments in renewable energy, a sector that's gaining significance in the economy.

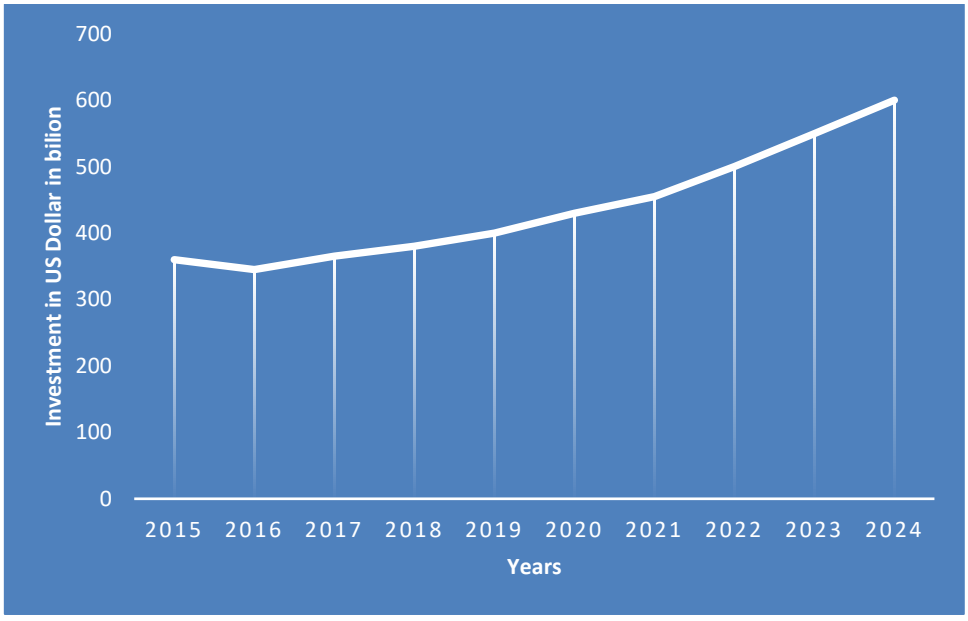


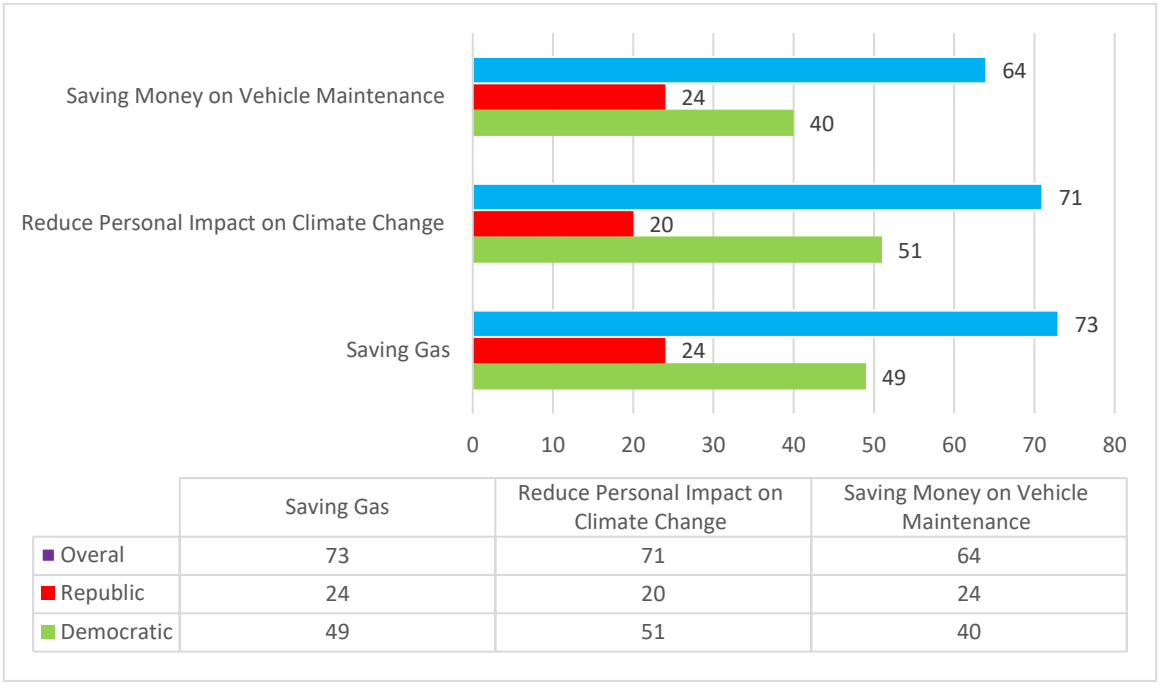
Figure (3): Investment (USD Billion) in renewable energy from 2015-2024 in USA. (International Energy Agency (IEA)).

If this trend continues, investment in renewable energy sources could continue to grow for the next several years, making it the most powerful sector of the overall energy sector. However, to maintain this momentum will require on-going policy support, improvements in storage and infrastructure, and efforts to encourage further private sector investment. The steady upward trend in investment reflects growing confidence in the sector and its importance in the future energy mix.

Let us move to another Figure which is related to "American Motivate to Buy Electric Vehicle" in Figure (4) displays why Americans say they are interested in buying an electric vehicle, broken down by political affiliation Republican, Democratic and the population overall. It has three main reasons: saving gas, reducing one's own contribution to climate change, and saving money on maintaining a vehicle. There is a horizontal Figure (4) showing three different colours representing each group in politics: The overall population in the colour blue, Republicans in red and Democrats in green.

Saving gas is, unsurprisingly, the number 1 reason for Americans to shift to electric vehicles, with an overall commonality of 73%. Divided by politics, only 24% of Republicans share this sentiment, while 49% of Democrats report feeling motivated. That indicates Democrats are more willing than republicans to look at potential fuel savings as a key factor in buying electric vehicles.

The second factor, reducing personal impact on climate change, has a high overall motivation of 71%. However, political groups differ starkly. Only one in five Republicans say this is a reason to buy an electric vehicle, while just over half of Democrats say this is a reason. It shows a clear partisan divide, with Democrats being more aware of the environmental cost of the vehicle they choose, compared to Republicans.



	Saving Gas	Reduce Personal Impact on Climate Change	Saving Money on Vehicle Maintenance
Overal	73	71	64
Republic	24	20	24
Democratic	49	51	40

Figure 4: American Motivate to Buy Electric Vehicle (2024) (The University of Chicago).

The third reason, savings on vehicle maintenance, is also an important driver for Americans as a whole, with 64% citing this as a reason for buying an electric vehicle. By political group, 24% of Republicans say this is a motivating factor, compared to 40% of Democrats. While the divide between the two camps is there, it is not nearly as stark as is the case with climate change concern.

Generally, this Figure indicates that saving gas is the most universally appealing concern, followed by environmental issues and maintenance costs. However, political identity is a key factor in determining consumer sentiment toward electric cars. The motivation among Democrats is much higher for all three factors, by climate change and cost savings, but more likely on partisan lines, while it is significantly lower across the board for Republicans, especially for climate reasons. The takeaway from this analysis is that political ideology has an effect on American consumers' buying behavior with respect to electric vehicles.

The Figure (5) shows the U.S. power generation was a combination of renewable and non-renewable resources in 2023. Wind energy produced about 10 percent of all electricity generation. The growth and adoption of wind energy has accelerated in recent years driven primarily by technology related benefits, incentive based policies and investment in wind farms across multiple states, particularly in high wind potential zones like Texas, Iowa and Oklahoma (Abdlaziz et al., 2025). However, more efficient wind turbines have since made wind energy a major power source for the U.S. electricity grid. Solar energy constituted roughly 4 percent of the nation's electricity generation. Still, solar power has been growing rapidly thanks in particular to falling costs for solar panels, government subsidies, and cause adoptive by residential, commercial and utility scale projects yet solar accounts only for a smaller share than wind. The southwestern states (i.e. California, Arizona, and Nevada) have especially high solar energy production due to good climate conditions as well.

The rest of electricity generation 86%, to be precise came from other sources, including fossil fuels (coal, natural gas), nuclear power, and other renewables (hydroelectric, biomass). Natural gas is the overwhelming source of electricity in the U.S. because it is relatively inexpensive and provides reliable energy production output. Reputation coal, though losing ground with new energy technologies and in battle with utility regulation, still exists.

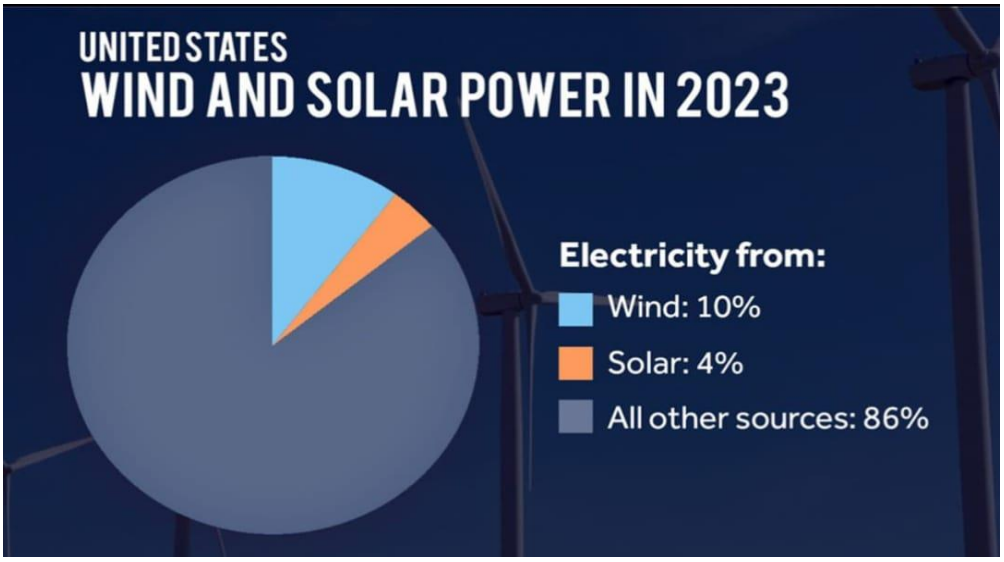


Figure (5): Electricity generation in the United States came from a mix of renewable and non-renewable sources in 2023 (United States Environmental protection agency).

Nuclear power is an established and reliable source of electricity, a steady state of carbon-free energy. Hydroelectric power, especially from big dams in the Pacific Northwest, also helps, but it is limited by geographical constraints (Abdlaziz et al., 2025). Overall, despite growing use of wind and solar energy, the U.S. electricity grid is still heavily reliant on energy sources that have been around for decades. Investments in renewable energy and technology innovations are also on the rise; therefore, the share of wind and solar energy will tend to increase in the future.

Pie Figure (6) on the second image explains how indirect contributions to sustainability and green energy come from the U.S. Federal Reserve. It notes how monetary policy affects financing conditions through interest rates, capital frameworks, and financial regulations. The Figure indicates that the Fed also puts its stamp on longer-term financing, which is important for sustainable investments. It also showcase for the promotion of green energy now in private-sector.

Figure (6): The Indirect Ways the U.S. Federal Reserve Supports Sustainability and Green Energy (US Federal Reserve).

Figure (6) also illustrates how financial institutions and regulatory frameworks contribute to channelling funds towards sustainability-oriented investments. “By influencing capital markets and lending practices, the Federal Reserve can incentivize financing in green projects.” It highlights the role of economic policy and interest rate changes in enabling green financing and growth in sustainable investment." That ultimately, sound monetary policies and financial structures go a long way in encouraging long-term green energy investments and sustainability (Abdlaziz et al., 2025).

This pie Figure depicts the indirect ways US Fed supports sustainability and green energy. It depicts different elements including the impact of monetary policy, interest rates, and regulatory structures that promote investment in those sustainable energy activities.

Figure (7) showing the percentage of energy installations planned in the U.S. for 2023 Note: Solar represents 54% of all new power generation, so more than half of all new generation is renewable. This means a heavy focus on sustainable energy solutions. Battery storage arrives at a solid 17%, reflecting a rapidly growing piece of the energy-storage tech puzzle underpinning the accelerating roll-out of renewable energy infrastructure.

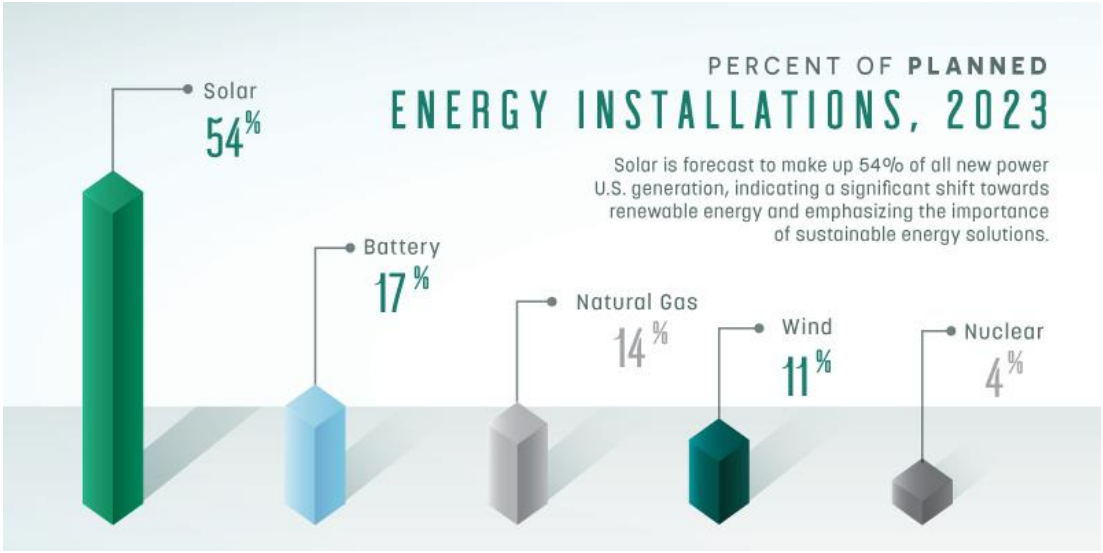


Figure (7): Energy installation 2023. (U.S Energy Administration 2025).

Natural gas accounts for 14% as it continues to play a role in the energy mix despite the transition to renewables. Wind energy makes up 11%, further solidifying its position as a major source of renewable energy. Nuclear energy accounts for 4%, which suggests the sector is not growing much. Figure (7) underscores the growing importance of clean energy sources and the movement from fossil fuels in U.S. energy planning.

Regarding how U.S. renewable electricity generation, figure 10, shows the variations in energy sources among the top 10 states that produce renewable electricity. Figure (8). California has the most diversified mix, including solar, wind, hydroelectric, biomass and geothermal sources. Texas comes next, mainly with wind and solar power. (The third-ranked state, Washington, generates most of its renewable electricity from hydroelectric sources).

The Midwest states, led by Iowa, Kansas and Oklahoma, are now almost entirely powered by wind, mirroring the region's excellent wind-sculpted topography. By contrast, however, hydroelectric is king of the hill in the Pacific Northwest, particularly in Washington and Oregon, where a wealth of water resources allow for extremely large-scale hydroelectric plants. Solar power is most prominently represented in California and North Carolina, benefiting from high exposure to solar energy. Biomass is less prominent but appears in more states, and geothermal energy shines only in California.

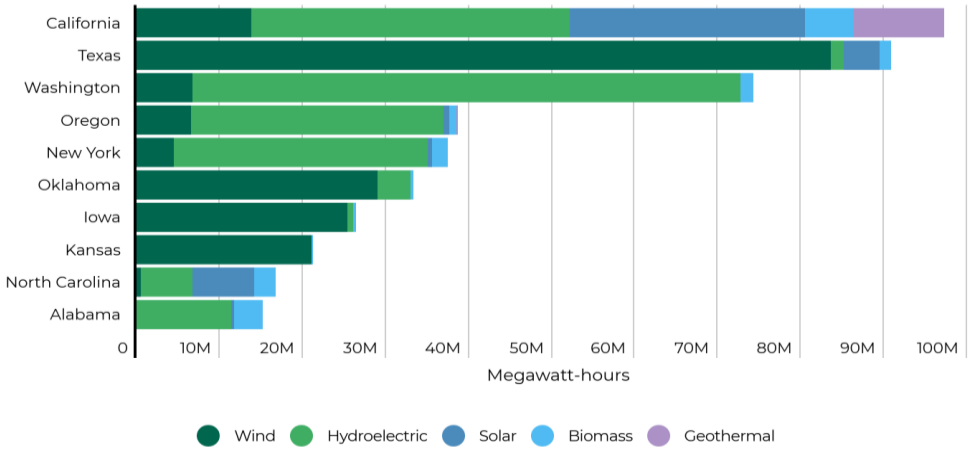


Figure (8): the Top 10 States for Total Renewable Electricity Generation (2024) (US Energy Information administration's Net Generation by State dataset).

The renewable energy generation of these areas reflects geographic advantages as well as policies that differ state-to-state. States with high wind availability in the Midwest have taken advantage of large-scale wind farms, and states with vast river systems have utilized hydroelectric generation. Solar had a growing share of the grid, an indicator of investment in photovoltaic (PV) infrastructure. Figure (8) highlights the range of approaches states have for generating renewable energy based on natural resources and state policy decisions.

CONCLUSION

The Federal Reserve is playing an increasingly important role in tackling climate risks in the financial system, and moving to promote a greener and more resilient economy. With environmental risks threatening financial stability as never before, the Fed has started factoring climate into its policy framework in a sign of its departure from monetary and regulatory roles in which it focused on financial variables. The Fed's focus on green investments, improving financial disclosures on climate risks, and recognition of the economic impacts of climate change demonstrates its potential to emerge as a transformative institution in a low-carbon economy. This transition reflects the increasing acknowledgement that climate change represents not simply an environmental challenge, but also a systemic financial threat that calls for proactive central bank intervention. Recent policy decisions of the Fed serve as an example of this systemic change in central banking where an alignment with global sustainability challenges has brought the conventional dichotomy of monetary policy from financial regulation into one portfolio. Incorporating climate-related risks into frameworks for monetary and financial stability is a break from the longstanding view that central banks should avoid taking a stand on environmental issues. Instead, the study highlights how climate risks threaten price stability, economic growth and financial markets and require monetary authorities to take a more forward-looking and dynamic approach. The Fed's growing role reflects recognition that climate risks that go unaddressed could pose threats to lucrative, sound markets, resulting in asset devaluation and economic volatility.

Moreover, these results contribute to the growing conversation around central banks and climate action, highlighting the increasing acknowledgment from policymakers that sustainable financing and economic stability is inextricably linked. The study concludes that there is need for on-going policy innovation, regulatory reforms, and increased collaboration between central banks, financial institutions and government agencies to identify and alleviate climate-related risks to financial sector stability. With climate change the challenge of our time, the financial system needs to evolve to consider climate as a crucial risk factor in determining its capital allocation and investment strategies.

In very brief, this note reiterates the need for all central banks, including the Fed, to embrace a more variable and diversified regime of monetary policy and financial supervision. In order to make the financial system resilient against environmental uncertainties, the Fed needs to strengthen framework that will promote sustainable investments and keep adapting its strategies that cover climate-related financial risks. As climate change dominates the global economic landscape, and with the spectre of financial instability looming ever larger, central banks are coming under pressure to lead the way in ushering markets toward a sustainable and stable future.

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