Center for American Progress

1333 H Street, NW, 10th Floor
Washington, DC 20005
Tel: 202 682.1611 • Fax: 202 682.1867

www.americanprogress.org

Written Testimony[1] of

Gregory Gelzinis
Associate Director, Economic Policy
Center for American Progress

Before the United States Senate
Committee on Banking, Housing, and Urban Affairs

21st Century Economy: Protecting the Financial System from Risks Associated with Climate Change.

March 18, 2021
10:00 AM EST

[1] This testimony includes material previously published by the author and material to be included in forthcoming publications, including Gregg Gelzinis, "5 Priorities for the Financial Stability Oversight Council" (Washington: Center for American Progress, forthcoming) and Gregg Gelzinis, "Addressing Climate-Related Financial Risk with Bank Capital Requirements: A Path Forward" (Washington: Center for American Progress, forthcoming).

Chairman Brown, Ranking Member Toomey, and Members of the Committee:

Thank you for the opportunity to testify before the Committee on this critical issue. My name is Gregory Gelzinis. I am an Associate Director for Economic Policy at the Center for American Progress, where I research, and advocate for, policies that would create a safer, more stable, and less predatory financial system—one that is well-positioned to support long-term economic growth.

The coronavirus pandemic has proven to be a terrifying reminder that our collective livelihoods can be upended by catastrophic exogenous shocks, seemingly at a moment's notice. It is incumbent on policymakers to use this experience as a catalyst towards addressing the impending exogenous shock that will likely disrupt our lives on a much greater scale: climate change. The climate crisis has profound implications for life and health, as it challenges our very ability to sustain a habitable planet. Climate change is also going to have a fundamental impact on every sector of our economy, including the sector we are here to discuss today: the financial sector.

The increase in frequency and severity of extreme weather events and long-term environmental shifts threatens an array of real assets and financial assets. From commercial and residential real-estate exposures along the coast to agricultural lending in the Midwest, climate change could severely impair the value of physical collateral, disrupt supply chains, limit economic activity, increase financial uncertainty, and strain profitability. These effects would reduce real-estate and commodity values, lower corporate equity prices, and limit the ability of businesses and households to repay debt.

In addition, the financial system is exposed to transition-related risks. If policymakers take the legal and regulatory actions necessary to meet emissions and temperature targets, financial institutions whose balance sheets don't align with the transition could face significant losses. Financial instruments tied to carbon-intensive sectors could face a severe repricing as policies restrict and raise the costs of emissions. Under certain scenarios, financial institutions could adjust to these transition effects abruptly, bursting the carbon bubble and creating what former Bank of England Governor Mark Carney has coined a "climate Minsky Moment."

Climate change does not only present risks to individual institutions. It also poses a systemic threat due to the potential magnitude of the physical and transition-related risks, the wide array of financial institutions and markets exposed to these risks, and the speed with which these possibly correlated risks could materialize.

These risks aren't theoretical. In just the past two years we've seen arguably the first climate bankruptcy in PG&E and witnessed energy companies, like BP and Total, write down the value of stranded assets, as energy price assumptions are re-calibrated.

The financial sector is finally starting to adjust to these risks and recent net-zero commitments from the largest Wall Street banks are a welcome development, although such commitments have been light on the details and lack near-term plans to meet those long-term goals. But it is

critical for regulators to step in and account for these risks in the supervision and regulation of the financial system. We can't let Wall Street write the rules and rely upon the disproven strategy of self-regulation, especially as these firms continue to finance the very drivers of the climate crisis that put their own balance sheets, as well as those of responsible firms, at risk.

Financial regulators have broad responsibilities under existing law to mitigate these climate-related risks. Markets regulators have a responsibility to protect investors, to promote transparency, and to foster healthy markets for securities and derivatives. Prudential regulators have a statutory mandate to ensure the safety and soundness of financial institutions and to promote the stability of the financial system. Climate change clearly falls within these mandates and a failure to mitigate climate-related risks would violate the duties Congress bestowed upon the financial regulators.

Thankfully, over the past few months a bipartisan collection of U.S. financial regulators have acknowledged that climate change falls within their remit. Even though the U.S. is several years behind its international peers, recent actions and announcements by the White House, Treasury Department, Fed, SEC, CFTC, FHFA, FDIC, and state-level regulators signal that momentum is building.

Like many economic variables, these risks won't be easy to model or quantify, given the inherent uncertainty climate change entails. But the potential magnitude of the risk demands regulators employ a precautionary principle and safeguard the financial system from the worst outcomes. Integrating climate change into corporate and financial disclosure requirements, fiduciary obligations, stress testing, supervision, capital requirements, and systemic risk oversight would bolster the resilience of the financial system and position it to serve as a source of strength to the economy during the low-carbon transition. If regulators fail to act with sufficient speed or refuse to use their full panoply of tools, it is imperative for Congress to insist that they do so. The stakes are too high.

I. Climate change poses significant risks to financial institutions and markets.

Climate change has fundamental implications for every sector of the economy, including the financial sector. Physical risks and transition risks are the two primary transmission channels through which climate change could impair financial institutions and markets. Physical risks stem from the increase in frequency and severity of extreme weather events and long-term environmental changes.[1] Transition risks refer to the potential impact that climate policy interventions, clean energy technological advancements, and shifts in consumer and investor sentiment can have on carbon-intensive financial exposures.

a. Transition risks

In order to stabilize global temperatures and mitigate the chances of catastrophic climate impacts on the planet, climate policymakers must take legal and regulatory steps to drastically decrease greenhouse gas ("GHG") emissions. The Paris Agreement, signed by the U.S. and 190+ other

parties in 2015, aims to limit global temperatures to well-below 2 degrees Celsius above pre-industrial levels, and ideally 1.5 degrees Celsius.[2] The Intergovernmental Panel on Climate Change's special report in 2018 underscored the imperative to keep warming to 1.5 degrees Celsius, given the severe consequences associated with even 2 degrees of warming.[3] The scientific projections suggest that global emissions must reach net-zero by 2050 to plausibly hit the 1.5 degree Celsius temperature target.[4] Achieving these climate goals requires a fundamental restructuring of the economy. This low-carbon transition isn't several decades away. In many respects, it has already begun. But further robust policy changes are required in the near-term to hit these targets and avoid catastrophic impacts on communities and the economy. Emissions must decline by at least 45% from 2010 levels by 2030 to remain on track.[5] The U.S. presently derives roughly 20% of its energy from clean sources, while 80% is derived from fossil fuels.[6] President Biden has committed to put the U.S. on a path to achieve 100% clean energy by 2050.[7]

If climate policymakers implement the legal and regulatory actions necessary to meet these emissions and temperature targets, financial institutions whose balance sheets don't align with the transition could face significant losses. Financial instruments tied to carbon-intensive sectors, e.g., fossil fuel companies, fossil-driven utilities, transportation, agriculture, chemical production, and mining and metals, could face a severe repricing as policies restrict and raise the costs of emissions. Companies engaged in high-carbon activities would face increased costs and the potential for fully or partially "stranded assets".[8] For example, the implementation of rigorous energy efficiency standards and other policy interventions that limit emissions would severely diminish the value of hydrocarbon reserves. Fossil fuel companies would have to write down the value of those stranded assets on their balance sheets, impairing their financial condition and reducing their ability to meet their financial obligations. This dynamic would create losses for their equity investors, creditors, and counterparties. Moreover, bank loans to fossil fuel companies are often secured by hydrocarbon reserves. Transition-related risks can therefore increase the likelihood of the loan's default, as well as the loss to the bank if the loan defaults, since the collateral would lose value.[9] This risk is not theoretical, as companies are beginning to face the prospects of transition-related write-downs. For example, British Petroleum wrote down $17.5 billion in assets in June 2020 after lowering its long-term fossil fuel price assumptions and Total SE took a $7 billion hit on Canadian oil sands assets in July 2020.[10]

The magnitude of potential financial losses and the prospect for broader stability issues in the banking system increase if the transition is "disorderly". Under such a scenario, policymakers slow-play the actions necessary to meet emissions and temperature targets, before eventually taking more aggressive and rapid actions to make up for lost time. Financial losses in the energy sector alone could reach $1-4 trillion, depending on the extent to which the transition is disorderly.[11] Taking a broader view of transition-related risks, an estimate from IRENA suggests an abrupt and disorderly transition could cause upwards of $20 trillion in financial losses.[12] Technological advancements and changes in investor sentiment could also quickly trigger many of these dynamics in advance of any actual legal or regulatory changes.

In either an orderly or disorderly scenario, financial institutions whose holdings and exposures are not aligned with a low-carbon economy could face severe losses, increasing risks to the economy, communities, and public funds. Research suggests that the direct and indirect

exposures to carbon-intensive sectors could propagate stress throughout the financial system and disrupt financial stability.[13] These transition-related risks impact credit, market, reputational, operational, and liquidity risks.[14] If financial institutions do not adjust to these transition-effects in a timely manner, the crystallization of losses could occur abruptly, bursting the carbon bubble and creating what former Bank of England Governor Mark Carney has coined a "climate Minsky Moment".[15]

A survey of institutional investors suggests the financial system is not reflecting these risks in asset prices, as 93% responded that the implications of climate change had yet to be priced into markets.[16] Research surrounding the projected physical impacts of climate change and scenario analyses probing transition-related impacts support this view held by institutional investors.[17] There are several reasons that investors have yet to price the impacts of climate change into valuations for a range of assets. These include a lack of granular, comparable, and reliable corporate disclosure of climate-related risks; backwards-looking pricing models that are not fit for purpose when analyzing forward-looking risks; and the temporal mismatch between short-term corporate thinking and medium-to-long term climate risk materialization.[18]

It's important to note that the low-carbon transition also provides incredible opportunities for financial institutions to finance clean energy projects and an array of green assets. It's going to take both public and private finance to fund the decarbonization of the economy and banks and companies that are safeguarded from transition-related risks will be best positioned to take advantage of these opportunities.

b. Physical risks

The current concentration of greenhouse gases in the atmosphere is significantly higher than it has been at any point in the last 800,000 years.[19] To maintain stable temperatures, energy coming into the planet must be balanced by energy leaving it. Greenhouse gases, particularly carbon dioxide, allow energy into the atmosphere, but trap energy as it attempts to leave—skewing the balance and increasing global temperatures. To this point, the earth has warmed by 1 degree Celsius, above pre-industrial levels. As a result, sea-levels are rising at an unprecedented rate—driven by melting ice sheets and the expansion of seawater as ocean temperatures rise.[20] Not only are sea-levels rising, but oceans are becoming significantly more acidic.[21] These environmental changes are driving more frequent and severe extreme weather events across the globe. The physical impacts of climate change have severe implications for life and health, and the overall ability to sustain a habitable planet. And, directly relevant to this hearing, they also pose risks to various economic sectors and the real and financial assets tied to them.

Under severe warming scenarios, the physical impacts of climate change could drive at least $2 trillion in losses to GDP annually (in today's dollars) by 2100, or loosely speaking, the economic equivalent of the 2008 financial crisis every 5 years.[22] Even under more moderate warming pathways, macroeconomic impacts could be severe.[23] The real-estate sector faces some of the most acute physical risks. Improved flood data, for example, shows that over 14 million properties could be at risk from 100-year floods.[24] The outdated FEMA maps estimate that only 8.7 million are at risk.[25] Zillow mapped flood risk data onto its real estate data and estimated that

roughly $900 billion in homes face serious risk from rising sea-levels, and that was prior to the publication of the aforementioned research on flood risk.[26] Climate change is already impacting agriculture.[27] Climate change erodes the quality of soil, increases invasive species and crop diseases, and leads to more frequent droughts and floods.[28] These physical impacts drive down crop yields and drive commodity price volatility. The fishing sector is also impacted by warmer and more acidic oceans.[29] The physical risks of climate change also impact the retail and tourism sectors and will have effects on a wide range of businesses and industries in affected geographic areas.[30]

The impact of sea-level rise, warming global temperatures, and more frequent and severe floods, hurricanes, droughts, wildfires, and other natural disasters could drive up losses for insurance companies, banks, private funds, investment companies, pension funds, and other market participants invested in exposed assets.[31] These risks threaten to reduce the value of a range of real assets and financial instruments tied to commercial and residential real-estate, agricultural lending, commercial and industrial lending, municipal and corporate bonds, and commodities. Physical risks can impair physical property, disrupt supply chains, limit economic activity, increase financial uncertainty, and strain profitability, which reduce real-estate and commodity values, lower equity prices, and limit the ability of borrowers to repay debt.[32] They can also directly damage and reduce the value of collateral that secures credit extended in some of these markets. In addition to the credit and market risks posed by the physical effects of climate change, they threaten to significantly increase claims for an array of property and casualty insurance business lines. Some may argue that many of these real assets and financial assets are or could be insured, protecting the financial institution or investor from losses.

Insurance companies, however, may, and in some cases have already started, to reduce the availability of insurance in certain geographies and business lines.[33] That would leave other financial actors increasingly exposed to physical-risk losses. Even if insurance companies stay in these impacted markets or geographies, the difficulty in modeling the non-linear effects of climate change could leave insurance companies themselves overly exposed to physical risks.[34] Similarly, given the non-linear nature of the risks, the credit default swap and debt markets will continue to have difficulty accurately pricing these risks, which can impact single issuers, geographic regions, or whole industries. Rapid re-pricings of debt securities may also impact equity and options holdings of the underlying issuers. Put simply, financial instruments tied to the fates of companies and municipalities, which may be held by public or private fund investors, pensions, and even individuals, may suffer significant losses.

These risks are not theoretical, and they are not far off in the distance. They are already here. Severe weather events have caused $106 billion in damage a year on average over the past 5 years, significantly higher than the 1980-2019 average of $43.9 billion.[35] Based on the projected intensification of these events, they could trigger trillions of dollars in losses for financial institutions and investors exposed to these assets in the coming years and decades.[36] Many have labeled the wild-fire driven bankruptcy of the utility company PG&E in 2019 as the first climate-related bankruptcy, initially wiping out around $20 billion in market capitalization (roughly 85% of the late 2018 level).[37] Even if policymakers are successful in limiting warming to 1.5 degrees Celsius above pre-industrial levels, extreme weather events will be substantially more severe and

frequent than they are today and long-term environmental shifts will continue to progress. Today, the world has warmed about 1 degree Celsius above pre-industrial levels and the destructive impacts are clear. Another 50% increase in warming will meaningfully exacerbate the physical impacts of climate change—and that's under the best-case scenario. It's worth underscoring that low- and moderate-income communities and communities of color are likely to be the hardest hit by physical risks and the least able to financially bear the resulting costs. Meanwhile, it is these very same communities that disproportionately suffer the consequences of the industrial pollution produced by the very drivers of the climate crisis.[38]

II. Financial regulators have a statutory responsibility to mitigate climate-related risks to financial institutions, investors, and the stability of the financial system.

A few years ago, it was a common refrain among some financial regulators that climate change fell outside their core mandates. To be clear, financial regulators are not being asked to set climate policy. That is the responsibility of Congress and other executive agencies. Financial regulators are simply being asked to do the jobs Congress assigned--to protect the financial system and broader economy from damaging financial risks.

Thankfully, many financial regulators—both Democrats and several Republicans appointed by President Trump—now acknowledge that climate-related financial risks fall squarely within their statutory mandates.[39] It is rapidly becoming a broadly bipartisan issue. But the original refrain, and the idea that efforts to get financial regulators to focus on climate-related risks are "the left" pushing a social engineering project, still appears in some corners.[40] It is therefore worth briefly clarifying how the aforementioned climate-related financial risks intersect with the mandates and authorities of various regulators. The specific policies that financial regulators can and should implement to mitigate climate-related financial risks are discussed in greater detail in Section IV of this testimony.

a. Markets regulators

The federal securities laws were created to ensure that investors and the public have essential information about companies so as to promote the efficient allocation of capital and protect investors. As Congress explained when adopting the Securities Act of 1933,

> Whatever may be the full catalogue of the forces that brought to pass the present depression, not least among these has been this wanton misdirection of the capital resources of the Nation … The bill closes the channels of such commerce to security issuers unless and until a full disclosure of the character of such securities has been made.[41]

The Securities and Exchange Commission ("SEC") was established in 1934 to promote the effective implementation and oversight of the new rules. Its mission is to protect investors; maintain fair, orderly, and efficient markets; and facilitate capital formation.

Information about companies and their risks is essential to facilitating the efficient allocation of capital and protecting investors. The climate-related financial risks outlined above intersect with that mission in several important ways. The Commission has broad authority to require disclosures by issuers to ensure that investors and the broader public have the information necessary to accomplish those statutory goals.[42] Over the years, corporate issuers and their allies have sought to constrict the Commission's disclosure framework to a narrowly defined "materiality" framework that is essentially tied to whatever the company itself (or its management) believes to have a significant impact on the company's finances. But the SEC's statutory authority is not limited to that constricted view.[43] Rather, the disclosure obligation must center the needs of investors and the public interest—as its statutory authorization makes clear. Corporations should not be deciding what information investors or the public require to make prudent capital allocation decisions or protect the public interest.[44] The physical and transition risks associated with climate change have implications for the ongoing operations of companies in every sector of the economy, both positive and negative. Understanding a company's direct and indirect greenhouse gas emissions, energy consumption, fixed-asset and supply chain exposure to extreme weather disruptions, and other climate-related factors are necessary for investors to make prudent capital allocation decisions. Investors have made it very clear that they want this information. A lack of transparency could drag on economic growth with overinvestment in certain sectors or companies, and underinvestment in others.

Whether and to what extent the SEC requires comprehensive, reliable, and comparable information from issuers of securities will have profound impacts on whether and how companies and investors are efficiently allocating capital and assessing risks. For example, much of the corporate debt securities markets are currently exempt from SEC disclosure obligations. If a large fossil fuel company sells billions of dollars in debt securities that are not due for fifteen years or more, what are the climate-related risks of those securities?

The SEC also oversees registered investment advisers and investment companies. A broad range of investors are looking for fund products that both limit their climate-related exposures and direct investment towards green climate solutions.[45] The SEC has a statutory responsibility to ensure that funds holding themselves out as "green" are not misleading investors, but these investors (as well as banks, insurance companies, pension funds, and others) can only manage their portfolios to meet these "green" expectations if they are getting comprehensive, reliable, and comparable information from the companies in which they invest.[46] To go back to the example above, how can an investment adviser assess the risks to its funds holding of a fossil fuel company's debt securities if the party best positioned to identify and disclose them hasn't done so?

Furthermore, as climate risk impacts the price outlook for various investments, entities with a fiduciary obligation overseen by the SEC must increasingly take such risks into account when providing investment advice to meet those obligations, regardless of their investment strategies.[47] Put simply, fiduciaries cannot ignore these risks. Climate change impacts other institutions under the SEC's jurisdiction, including broker-dealers, credit rating agencies, and auditing and accounting firms.[48] Broker-dealers are exposed to market risk posed by transition and physical

risks, credit rating agencies will need to update their rating methodologies to ensure climate-related risks to fixed-income issuances are factored in, and auditing and accounting firms will be increasingly essential to ensure that climate risks are accurately accounted for and company disclosures are reliable. If the SEC fails to integrate climate-related risks into its core regulatory framework, it will fall short of its statutory mission. Investors will be exposed to risks that were not sufficiently disclosed to them, capital will be inefficiently allocated, our markets will be anything but orderly, and it will serve as a drag on capital formation due to a loss of investor confidence in the resilience and transparency of markets.

The SEC's recent announcement under Acting Chair Allison Herren Lee that the agency's Division of Examinations team is focusing on companies' disclosures and compliance with the agency's 2010 climate risk-related guidance[49] and investment advisers' claims and practices regarding sustainable investing is a great step towards ensuring accountability under the existing rules. So, too, was the announcement of the SEC's creation of a Taskforce on Climate and ESG within the Division of Enforcement. However, the SEC's expectations for companies, investment advisers, broker-dealers and other essential market participants need to be modernized to reflect the magnitude of the risks and impacts of climate change on seemingly every aspect of our economy.

The Commodity Futures Trading Commission ("CFTC") is the primary derivatives regulator in the U.S. and is responsible for promoting the integrity, resilience, and vibrancy of derivatives markets. The agency has authority to impose disclosure requirements, margin and capital rules, risk management standards, and other safeguards on the firms and products under its jurisdiction.[50] The physical and transition risks caused by climate change could impact the value and volatility of commodity prices and drive losses at the market participants exposed to these assets, including through derivatives. For example, chronic droughts and an increase in crop diseases in the Midwest could impact corn prices and rising temperatures in the Mississippi Delta could impact rice yields. Moreover, the clean energy transition necessary to stabilize global temperatures will have a considerable impact on fossil fuels and metals commodities. Increased risk and volatility in these and other commodities markets could impact futures commission merchants, central counterparties, and other market participants. The CFTC also oversees swaps dealers and major swaps participants. Credit default swaps on a basket of energy companies or a commercial mortgage-backed security index, for example, could be affected by climate-related risks. The 2008 financial crisis showed the costs of an underregulated derivatives market, and it is imperative for the CFTC to appropriately account for climate-related risks in its regulatory and supervisory framework.

b. Prudential regulators and the Financial Stability Oversight Council

The prudential banking regulators, the Federal Reserve Board ("Fed"), Federal Deposit Insurance Corporation ("FDIC"), and Office of the Comptroller of the Currency ("OCC") have a statutory responsibility to ensure the safety and soundness of the banking organizations under their respective jurisdictions and to promote the overall stability of the banking system. The banking regulators play a critical function in our economy. Reducing the chances and severity of banking crises, protecting depositors and the public funds that stand behind insured deposits, and

ensuring our banking system is supporting productive economic investment instead of speculation all help to orient our economy towards long-term, sustainable, and equitable growth. When these regulators fall short, we've all-too-recently seen the resulting economic devastation that bank failures, fire-sales, runs, and a contraction of credit can have on businesses and households across the country. Congress has afforded banking regulators broad writs of authority to execute this critical mission in several statutes, including the Federal Deposit Insurance Act, the Bank Holding Company Act, the International Lending Supervision Act, and most recently, the Dodd-Frank Wall Street Reform and Consumer Protection Act, among others.[51] Through these statutes, regulators have significant authority to use supervisory tools, capital and liquidity requirements, stress testing, recovery and resolution planning, risk management requirements, and other prudential tools that they deem appropriate to address any risks to individual institutions—microprudential risks—as well as risks to the overall functioning of the banking system—macroprudential risks.

Climate change poses microprudential risks to banks, including credit, market, liquidity, reputational, and operational risks. All banks, large and small, receive special public privileges due to the inherent fragilities of the banking business model and the key role banks play in providing credit, offering payment services, and most importantly, issuing deposits. These privileges include deposit insurance and access to the Fed's discount window, but also come with a regulatory and supervisory framework to mitigate moral hazard and the externalities failures can impose. Even though the failure of a $10 billion bank won't create a systemic crisis, regulators still have a responsibility to ensure the safety and soundness of the bank, since it still receives these public privileges, and its failure could still have a harmful impact on the local or regional economy. Individual banks are exposed to varying degrees of climate-related risk depending on the types of assets they hold and the geographic location of those assets. For example, a bank with a high concentration of coastal commercial real-estate exposure could face severe losses from rising sea-levels. A bank that finances agricultural loans could face losses if droughts, floods, and pests decrease the crop yield for a farmer who then can't meet her financial obligations. Moreover, a bank in the oil patch that focuses on reserve-based lending to oil and gas exploration and production companies could face losses if hydrocarbon reserves are devalued as a result of the clean energy transition, increasing both the likelihood of default on the loan and the loss to the bank if the loan does, in fact, default.

The prudential regulators not only have a responsibility to mitigate climate-related risks for individual institutions. They must also address the macroprudential risks created by climate change—that is, the risks to the overall functioning of the banking system and broader financial sector. As Federal Reserve Board Governor Lael Brainard has noted, "Climate change could pose important risks to financial stability. That is true for both physical and transition risks."[52] Climate change is a systemic threat due to the potential magnitude of the physical and transition-related risks it poses, the wide array of financial institutions and markets exposed to these risks, and the speed with which these possibly correlated risks could materialize.[53] Climate-related shocks could impair the normal functioning of the financial system and inflict damage on the broader economy. A physical or transition shock could cause severe losses at a systemically important financial institution or correlated losses across a string of financial institutions, leading to fire sales of impaired assets, creditor runs from distressed institutions, and second-order

counterparty losses and contagion at institutions that may not have been directly exposed to the initial shock.[54] These first- and second-order effects could create vicious feedback loops, undermine confidence in the financial system, and ultimately trigger a credit contraction and a broad increase in the cost of financial intermediation.

SEC Acting Chair Allison Herren Lee has cautioned that climate-driven financial stability disruptions "can also spread in ways that are less predictable because climate risk is unique in terms of its scope, breadth, and complexity."[55] In a particularly troubling financial stability scenario, a physical shock could trigger a near-simultaneous transition shock. After delaying robust and orderly decarbonization, a brutal string of natural disasters could spur policymakers to take aggressive and disorderly steps to stabilize global temperatures. In short, climate-related shocks could be immediately amplified by and transmitted throughout the financial system, disrupting the normal functioning of the system and leading to spillover effects on the real economy.[56] Another macroprudential concern short of a systemic crisis is that physical and transition risk-related losses could chronically erode the resilience of financial institutions over time and leave the system vulnerable to other shocks.

In addition to the macroprudential responsibilities and authorities afforded to the prudential banking regulators, the Dodd-Frank Act created a new financial stability watchdog—the Financial Stability Oversight Council ("FSOC"). Although the United States is notable for having many financial regulatory agencies, before the 2008 financial crisis, no one regulator or regulatory body was responsible for looking out across the financial system and addressing systemic risks. Financial regulators focused on their respective jurisdictions, while significant risks built up across jurisdictions and outside of any one regulator's purview. Risky financial activities and products sprouted in the cracks of the financial regulatory infrastructure as regulatory arbitrage, intentionally exploiting its fragmentation. The FSOC was structured to mitigate some of these regulatory design flaws. It is chaired by the secretary of the U.S. Department of the Treasury and brings together the heads of all eight federal financial regulators[57], and a voting member with insurance expertise, around one table.[58] The FSOC's goal is to improve coordination across agencies and tackle emerging financial sector risks and vulnerabilities before they trigger or amplify another financial crisis. Climate change has implications for every part of the financial system and, in turn, every financial regulator. It is the exact type of cross-cutting risk that the FSOC was designed to address. The FSOC can use its research and coordinating functions to drive better climate-related risk analysis, monitoring tools, and risk-mitigating policies at primary regulators. When necessary, it can also use its powerful statutory tools to directly address certain climate-related risks and push primary regulators to act.

It's important to note that the banking regulators and FSOC are not supposed to focus solely on the microprudential or macroprudential risks to which financial institutions are exposed. They also have a responsibility to mitigate risks created or exacerbated by financial institutions that could then drive losses elsewhere in the financial system. For example, Section 165 of the Dodd-Frank Act directs bank regulators to develop macroprudential regulations to "prevent or mitigate risks to the financial stability of the United States that could arise from the material financial distress or failure, ***or ongoing activities***, of large, interconnected financial institutions…"

(emphasis added).[59] That principle is embedded throughout the Dodd-Frank Act.[60] In the context of climate change, prudential regulators and the FSOC have a statutory mandate to mitigate climate-related risks created or exacerbated by financial institutions' ongoing activities. Notably, financial institutions that are major financiers of carbon-intensive activities are facilitating increased GHG emissions and intensifying climate change. Exacerbating the climate crisis will increase both the physical and transition risks of climate change and inflict larger losses on the financial system. With respect to physical risks, higher GHG emissions lead to higher global temperatures, which in turn cause more frequent and severe extreme weather events and damaging environmental changes.[61] The more significant the physical effects of climate change, the more likely and severe the financial system's associated losses will be. Furthermore, increased emissions today drive up projected warming pathways and increase the likelihood that a rapid and disruptive transition is required to stabilize global temperatures.[62]

D. Other regulators

This testimony focuses primarily on markets regulators, prudential banking regulators, and the FSOC, but climate change has implications for other state and federal regulators as well. Credit unions, which receive a distinct charter and are regulated by the National Credit Union Administration ("NCUA"), face similar microprudential risks as banks. The NCUA, likewise, has similar tools to promote the safety and soundness of credit unions. As mentioned earlier, the physical effects of climate change—particularly sea-level rise—poses significant risks to the commercial and residential real-estate markets. The Government Sponsored Enterprises ("GSEs"), Fannie Mae, Freddie Mac, and the Federal Home Loan Banks, have significant exposure to these markets. In fact, there is increasing evidence that banks are off-loading substantial flood risk to Fannie and Freddie.[63] The Federal Housing Finance Agency ("FHFA") is the prudential regulator for the GSEs and has broad authority to ensure their ongoing safety and soundness. Similarly, the Public Company Accounting Oversight Board (PCAOB), the Municipal Securities Rulemaking Board (MSRB), and the Financial Industry Regulatory Authority (FINRA) each have important roles to play. For example, to the extent that the SEC requires companies to make climate related estimates and disclosures, the PCAOB will have an essential role in ensuring that those estimates and disclosures are comparable and reliable. The Consumer Financial Protection Bureau could help consumers hold banks accountable on issues of sustainability, effectively empowering them to "vote with their deposits" by making it easier to seamlessly switch their bank accounts, something that is surprisingly challenging to do today.[64]

Finally, the insurance sector is arguably the most acutely exposed to the physical risks of climate change, since the core business model for property and casualty insurers involves guaranteeing the value of physical assets. Insurers' investments are also exposed to physical and transition-related risks. Insurance is primarily regulated at the state-level, meaning state insurance regulators have a critical role to play in mitigating these risks. But the FSOC and Federal Insurance Office ("FIO") must closely monitor such risks and use their own tools to address them, when necessary.

III. The U.S. is behind its international peers in addressing climate-related financial risks, but there are recent signs of progress.

International regulators have acknowledged the severity of climate-related risks and the need for financial regulators to act urgently to mitigate such risks. The Network for Greening the Financial System ("NGFS") was established in December 2017 by eight central banks as a coordinating body for those central banks and supervisors committed to tackling climate-related financial risks. Since then, the NGFS membership has expanded to 83 members and 13 observers, representing about 75% of global GDP and the vast majority of the world's systemically important financial institutions.[65] The NGFS has put out multiple research reports, sample supervisory guidance, model stress testing scenarios, and more over the past several years.[66] Many NGFS members have begun, in turn, to adapt their core regulatory and supervisory frameworks accordingly. The Basel Committee on Banking Supervision published the results of its climate-related stock take of how member jurisdictions are approaching climate-related risks.[67] Of the 27 jurisdictions surveyed, 24 had conducted climate-related research, 23 had raised the issue directly with banks, and 6 had issued supervisory guidance (with 5 more in the process of doing so).[68] Some jurisdictions have advanced mandatory climate disclosure frameworks and have implemented, or are in the process of implementing, climate-related stress testing and scenario analysis regimes.[69] In many jurisdictions, this activity has been driven by regulators under existing authority, while legislative bodies in certain jurisdictions have set comprehensive frameworks.[70]

The U.S. has made little progress on addressing climate-related risks, while U.S. financial institutions are lagging their international counterparts in curbing climate-risky activities. The tide is shifting, however, and recent actions are cause for optimism. In September 2020, the CFTC Climate-Related Market Risk Subcommittee, established by Commissioner Rostin Behnam, published the first official-sector commissioned report in the U.S. on climate-related financial risks.[71] In November 2020, the Fed included climate-related risks in both its Supervision and Regulation Report and Financial Stability Report, before ultimately joining the NGFS in December.[72] This was welcome news, as Governor Lael Brainard has been talking about the need for the Fed to focus on climate change for years.[73] Additionally, the Fed recently created a Supervision Climate Committee to evaluate and mitigate the microprudential risks posed by climate change.[74] SEC Acting Chair Allison Herren Lee has taken steps over the past two months to better integrate climate-related risk in the Commission's disclosure, examination, and enforcement functions.[75] FDIC Chair Jelena McWilliams announced that focusing on climate change's impact on the financial sector was recently added to the agency's performance goals for the first time.[76] FHFA Director Mark Calabria recently issued a fairly comprehensive public request for information regarding how the agency should integrate climate-related risks into its core functions.[77]

The Biden administration has also signaled that addressing climate-related financial risks would be a key priority within the all-of-government approach to the climate crisis. A recent executive order directed the Treasury Secretary to ensure the U.S. was present at international fora working on climate-related financial risks and the executive order reinforced the Paris Agreement's goal to align capital flows with a 1.5-degree Celsius warming pathway.[78] Secretary Yellen has

repeatedly emphasized the importance of this issue for multiple Treasury core functions, including the Secretary's role as Chair of the FSOC. She has even committed to establishing a "climate hub" at the Department.[79] Certain state-level regulators have also started to make real progress on this issue. The New York Department of Financial Services, in particular, has taken some nation-leading steps on this front.[80] The California Department of Insurance, under Dave Jones' leadership, also made notable progress during his tenure.[81]

The U.S. is behind our international counterparts. The building momentum, though, suggests the next few years could be a "leapfrog moment" for our country, as Sarah Bloom Raskin, former Treasury Deputy Secretary and a global leader on climate-related financial issues, has characterized the present opportunity for action.[82]

IV. Financial regulators have the tools to advance a robust policy agenda to mitigate climate-related financial risks.

The U.S. is moving beyond merely the identification and evaluation phase of this effort, but not fast enough. A bipartisan set of regulators acknowledge that climate change poses risks to the financial system and, therefore, falls within their statutory remit. We cannot, however, fall victim to the calls for self-regulation of these risks. It is welcome news that large U.S. banks are making net-zero commitments and that more companies are utilizing myriad voluntary disclosure frameworks, but many of these commitments do not set clear short-term goals and rely too heavily on promises of future emission offsets. In any event, these developments do not absolve regulators of their responsibility to ensure that firms are resilient to these risks and that investors have the information they need to appropriately allocate capital. The U.S. has tried self-regulation in the past, and that hands-off approach has proven catastrophic for workers, small businesses, and communities across the country. Private financial institutions do not have sufficient incentives to voluntarily self-insure against climate-related risks, especially tail risks. It is therefore critical for regulators to step in and ensure these risks are accounted for in regulatory and supervisory frameworks. Moreover, the absence of climate-related safeguards provides a hidden subsidy to the banks exposed to, and exacerbating, these risks. Banks that are not creating or exposed to these risks bear those costs.

Regulators have the tools to mitigate these risks.[83] The question now is how urgently will regulators move to mitigate these risks and what specific safeguards will they employ? If regulators pursue a robust climate finance agenda, the U.S. financial system will be well-positioned to handle future climate shocks and to take advantage of the significant opportunities that the transition to a low-carbon economy presents. Meanwhile, the public will be spared the high costs of future bailouts and will benefit from a stable financial system.

One of the most important lessons policymakers should have learned from the 2008 financial crisis is the importance of deploying a precautionary principle when regulating the financial system. As Professor Hilary Allen describes it, "This principle is essentially a more sophisticated version of the old adage, 'better safe than sorry,' counseling regulators to err on the side of regulating an activity when the outcome of that activity is uncertain, but potentially irreversible

and catastrophic."[84] In the run-up to the 2008 crisis, many policymakers assumed financial crises were a thing of the past and did not cast a skeptical eye towards the development of new complex financial products and systemic interconnections.[85] A laissez-faire deregulatory approach, the opposite of the precautionary principle, dominated the three decades leading up to the crisis and set the stage for the resulting catastrophe. Regulators must have humility about their ability to predict the precise causes and complex effects of financial crises, which are high impact and low probability events that carry substantial inherent uncertainty. Regulators must act to ensure the financial system is resilient to extreme, but plausible, tail risk scenarios. The severe and lasting economic and social damage wrought by instability in the financial system warrants this type of precautionary approach to regulation—one that favors proactive and robust safeguards in the face of uncertain, but potentially catastrophic, risks.

Certainty regarding the near-term private costs of regulation and uncertainty regarding the precise value of social benefits from such regulation—which nevertheless are likely to be great in magnitude—should not unduly hamstring regulators. Climate-related financial risks are a special case that warrant a particularly proactive approach.[86] Climate change is itself a high impact and high probability phenomenon. It will certainly have significant negative effects on the planet, economy, and financial system. There is no doubt about the likelihood of climate change and no doubt about the general magnitude of its damaging impacts under various warming scenarios. It is also clear that the transition to a low-carbon economy, which is necessary to stabilize global temperatures, is going to impact financial institutions and markets. There is significant uncertainty, however, regarding the timeline of climate-related financial stability risks, the precise magnitude of the economic value at risk, and the exact manifestation of those risks on a range of financial assets, markets, and institutions. The answers to many of these questions hinge on the level of emissions going forward and the resulting warming pathway, as well as the future actions taken by policymakers, technological advancements, and shifts in market sentiment. The uncertainty is fueled by difficulties modeling climate change and its impacts, including its non-linear nature, the existence of tipping points, and the interactions with complex environmental systems.[87] It is clear, however, that climate-related risks could have a catastrophic impact on financial institutions and markets, and ultimately disrupt financial stability.

This policy effort will be an iterative process. Given the urgency of the issue and the magnitude of the risk, it is important for regulators to not let the perfect be the enemy of the good and to act with urgency. As Fed Governor Lael Brainard recently stated, "Despite the challenges, it will be critical to make progress, even if initially imperfect, in order to ensure that financial institutions are resilient to climate-related financial risks and well-positioned for the opportunities associated with the transition to a more sustainable economy."[88] Regulators should advance a comprehensive and vigorous agenda to mitigate climate-related financial risks—an agenda that embodies the precautionary principle.

a. Markets regulators[89]

Disclosure

The SEC should establish a mandatory climate risk disclosure framework.[90] Investors need reliable, consistent, and comparable data on climate-related risks. The myriad voluntary disclosure frameworks that have developed over the past several years have helped get the ball rolling on this important issue, but only a mandatory standardized regime can provide the reliable, consistent, and comparable information necessary for investors to make prudent decisions when they allocate capital. The disclosures should include both specific line-item requirements and additions to the narrative-based disclosures in the management discussion and analysis, such as those called for by the Task Force on Climate-related Financial Disclosures.[91]

The line-item disclosure should at least include clear metrics regarding the exposure of corporate assets, facilities, supply chains, services, and products to water stress, natural disasters and environmental shifts, water insecurity, heat stress, and additional physical risk-related factors.[92] Companies should also be required to disclose metrics regarding their energy consumption, scope 1, 2, and 3 emissions, and their transition-related emissions targets. For financial institutions, the Commission should require disclosure of the emissions financed by the firm.[93] Moreover, the management discussion and analysis should include transition plans and the board and management strategy for addressing climate-related risks. This is not a comprehensive list of all of the necessary elements of a corporate climate risk disclosure framework, but the aforementioned metrics should be core components. Additionally, climate disclosures should not be considered in a vacuum. Investors have been asking for a broad array of ESG information, much of which intersects with how companies are thinking about their climate risk. SEC Acting Chair Lee recently spoke to the interconnected nature of ESG factors, saying, "We know climate presents heightened risks for marginalized communities, linking it to racial justice concerns."[94] Lee also pointed out the risk to investors from companies that make public commitments regarding carbon neutral policies, but secretly donate to political candidates with anti-climate justice records. It's important that climate risk disclosure be part of a comprehensive ESG disclosure regime.

Restoring the Application of Securities Laws

The SEC must also ensure that this framework applies to all large companies and offerings. Over the past several decades, and particularly since the passage of the Jumpstart Our Business Startups (JOBS) Act, ever larger companies and offerings are proliferating outside of the SEC's disclosure and accountability framework. That should be reversed.[95]

Efforts to promote the disclosure and accountability of the public markets could include limiting the application of Rule 506 and requiring additional disclosure requirements on issuers making use of the exemption, as well as eliminating or modifying Rule 144A.[96] Without restoring the primacy of the public capital markets, the SEC's efforts to promote transparency will be severely undermined—and climate risks will continue to be insufficiently identified, assessed, and addressed.

Restoring Rights

For years, long term investors have engaged with companies and their management teams to promote better identification, assessment, and management of risks, including climate risks. Oftentimes, investors have used shareholder proposals and their powers to vote to hold companies and their executives accountable. Unfortunately, these tools have been undermined in recent years. The SEC should promote investor engagement, including through easing submissions for shareholder proposals and expanding the ability of investors to shape corporate action, such as by reducing dual class share structures and adopting universal proxy ballots. Investors can and must be empowered to protect their interest in corporate sustainability.

Fiduciary Requirements

The SEC and Department of Labor should require investment fiduciaries to develop and implement policies and procedures that clearly outline how the adviser identifies, evaluates, and addresses climate-related risks and opportunities. SEC Acting Chair Allison Herren Lee has suggested the Commission could pursue this type of requirement under existing law and that there is precedent for requiring "policies and procedures around a specific topic of particular importance."[97] This type of sustainable investment policy would help provide clarity to investors as to how fiduciaries are integrating climate-related considerations into the advice they are providing, without dictating outcomes that fiduciaries would be required to follow.[98] Relatedly, the SEC could require investment advisers and broker dealers to ascertain the climate-related preferences of investors and factor those preferences into their investment decisions.

Additional tools

Capital markets regulators have an array of additional tools that could be used to mitigate climate-related risks to the firms and markets under their jurisdiction.[99] The SEC should (i) require credit rating agencies to disclose how they are integrating climate-related risk into their rating methodologies and ensure they are applying those models consistently; (ii) enforce existing accounting standards with respect to climate-related risks and expand those standards to more fully integrate the risks; (iii) ensure that auditors have the skills and knowledge necessary to audit for compliance with accounting standards as they relate to climate risks; and (iv) establish and enforce a clear taxonomy that promotes standardized labeling for "green" or "ESG" funds and securities to prevent greenwashing.[100] In addition, the CFTC should adapt its margin and capital requirements to account for climate-related risks to specific entities and markets under its jurisdiction.[101]

b. Prudential regulators

Stress Testing

The Federal Reserve should establish climate-related stress tests for the largest banks in the country.[102] The stress tests would probe how bank balance sheets would be impacted by

hypothetical severely adverse climate scenarios over the next 15-30 years. The time horizon of the climate-related stress tests should be much longer than the nine-quarter horizon for the annual macro stress tests to allow regulators to explore how the worst effects of climate change could impact bank balance sheets. The scenarios should include both physical and transition risks. Banks should then be required to submit detailed remediation plans that outline how they plan to adjust their balance sheets and financing activities over time to mitigate their exposure to these risks. Unlike the annual macroeconomic bank stress tests, these tests should not quantitatively set capital requirements. The inherent difficulties in projecting losses over such a lengthy time horizon make these stress tests ill-suited for setting bank-by-bank capital requirements immediately.

Even though the quantitative results of the tests shouldn't directly set capital requirements, it is critical for the stress tests to have teeth and not become a box checking exercise of little value. Regulators should therefore include a qualitative objection component in the climate-related stress tests. If the remediation plans are inadequate in scale or granularity, or if climate change is insufficiently integrated into banks' internal controls, governance, risk management, or capital planning processes, the Fed should invoke the qualitative objection and restrict banks' planned capital distributions today. The climate-related stress tests would provide transparency regarding banks' climate-risk exposure, force banks to embed climate risk into their core business functions and require them to provide regulators with actionable plans to adjust their balance sheets over time to limit climate-related risks.

Conducting several iterations of the climate-specific stress tests should improve regulators' understanding of climate-related variables, scenario design, and modeling. Ultimately, near-term climate-related variables and shocks should be introduced into the severely adverse scenario of the nine-quarter annual macroeconomic stress tests, the Comprehensive Capital Analysis and Review ("CCAR"). These annual stress tests directly feed into banks' capital requirements, as regulators use both static and dynamic tools to ensure capital adequacy.[103] Adding climate variables and shocks to these tests would help integrate climate considerations into the bank capital framework.

Banks have pushed back against the creation of climate-related stress tests.[104] They have argued that there is significant uncertainty around climate-related shocks and their effects, and that they'd be tough to model. It is true that there is substantial inherent uncertainty around climate-related risks and potential warming and transition pathways. But stress tests are not designed to predict the future. They are used to test bank balance sheets against extreme, but plausible, scenarios. That's a threshold the Fed should be able to meet. There are certainly data, modeling, and scenario decisions that the Fed will have to weigh carefully. Those challenges are by no means insurmountable given the purpose and role of stress testing. Moreover, banks have lamented the long time horizon of the scenarios as it relates to assumptions regarding bank balance sheets. It is certainly true that a bank's balance sheet could look very different in 2045 than it does in 2021. Stressing a bank's 2021 balance sheet against longer-term risks, however, demonstrates just how significantly a bank may have to adjust its balance sheet over time to avoid catastrophic climate-related losses. The Fed could then ensure banks are, in fact, adjusting their balance sheets over time to avoid these long-term risks. It's also important to note that

while the most severe climate-related risks may take decades to materialize, there are potential risks in the more immediate future—particularly with respect to transition risks. In order to hit 2050 emissions and warming targets, rigorous action is required in the near-term. Those legal and regulatory developments, or technological advancements and shifts in investor sentiment, could crystallize transition-related losses in the short-term and should be included in CCAR at some point soon.

The arguments banks are making against climate-related stress tests rhyme with the arguments they deployed against the initial stress tests in 2009, the Supervisory Capital Assessment Program, and the annual macroeconomic tests that were developed in the wake of the crisis, CCAR.[105] For 12 years banks have fought tooth and nail with the Fed over what constitutes appropriate or realistic scenarios, models, and assumptions. One particular example is instructive. In CCAR, the Fed included an assumption that bank balance sheets would grow during the stress testing time horizon. This was a prudent assumption, since regulators want banks to be capitalized enough to serve as a source of strength during a downturn and historical evidence suggested that there would be pressure on bank balance sheets to expand as businesses and households sought liquidity. While it may be prudent from a microprudential standpoint to assume banks could keep a static balance sheet or shrink to conserve capital during a stress period, that would lead to a severe contraction in credit if a range of banks all took that approach. After years of pressure from banks, the Fed relented and watered down the balance sheet growth assumption and changed it to assume a flat balance sheet.[106] Then, in early 2020, the global financial system experienced a real-life stress test due to the COVID-19 shock and bank balance sheets grew significantly.[107] Banks were not pushing the Fed to adopt a flat balance sheet because it was more realistic or grounded in historical evidence. They did so because a flat balance sheet assumption weakened the stress tests by reducing required capital. Similarly, when it comes to climate-related stress tests, banks will continue to advance arguments that seek to reduce the severity of projected losses or the procedural consequences of the stress tests. Regulators must see the arguments for what they are.

Supervision

Banking regulators should clearly define climate-related supervisory expectations for banks. As Governor Lael Brainard stated recently, "Supervisors have a responsibility to ensure that financial institutions are resilient to all material risks—including those related to climate change—both currently and into the future."[108] It is critical for banks to integrate climate risk into their governance, risk management, internal controls, capital planning, and self-run scenario analyses. The banking regulators should integrate these expectations into supervisory guidance, supervisory manuals, and the supervisory ratings systems.

Governance: The board of directors and senior management should clearly assign responsibilities for climate-related risks within the bank's governance structure. This issue requires attention at the highest levels of the bank to ensure that climate-related factors are being appropriately integrated throughout the bank's core business and risk functions.

Risk Management: Banks should have the policies and procedures in place to identify, evaluate,

report, and mitigate climate-related risks. Both the physical and transition-related risks associated with climate change pose serious credit, market, liquidity, reputational, and operational risks for many banks. It is vital for banks to account for all of these risks in their core risk management frameworks.

Internal Controls: It is important for banks to have the policies and procedures in place to effectively monitor the integration of climate-related factors into core risk and business functions. Strong internal controls can help the bank evaluate the effectiveness of climate-related risk management, governance, capital planning, model use, compliance, audit and other functions, and address any clear deficiencies in a timely manner.

Capital Planning: As part of the normal capital planning process, in which banks evaluate their capital needs and determine how to manage their capital resources, banks should take climate-related risks into account.

Scenario Analyses: While the Fed should establish supervisory stress tests, banks should be expected to conduct their own company-run stress tests and scenario analyses. The Fed will only use a handful of the thousands of potential climate-related scenarios that could play out. It's important for banks to think through and attempt to model a wide range of potential scenarios.

Capital Requirements[109]

Banking regulators should use capital requirements to address both the microprudential and macroprudential risks posed by climate change.

Banking regulators should first focus on the credit and derivative exposures that face the most pronounced transition-related risks: fossil fuel assets and infrastructure. Bonds, loans, and derivative transactions for companies that derive a meaningful portion of their revenue from the extraction, exploration, transportation, storage, exporting, or refining of oil, natural gas, or coal should be the top priority. The risk-weights should be calibrated based on several factors, including: (i) the extent to which the company generates revenue from fossil fuel-related activities; (ii) differentiation in transition risk intensity among oil, gas, and coal exposures; and (iii) the length of the exposure. Regulators could also incorporate additional variables, such as treating financing for new and existing fossil fuel reserves and infrastructure differently, but should not spend years trying to over-engineer the risk-weights and adding needless complexity. Next, banking regulators should use the information gleaned from enhanced corporate climate risk disclosure and climate-related stress testing to make additional transition risk adjustments to the risk-weighted capital framework. Financial instruments tied to other carbon intensive sectors are also susceptible to transition risks, including the utility, transportation, mining, chemical production, and metal and mining, building materials, and agricultural sectors.[110] In addition, regulators could use stress testing and engagement with climate scientists and climate economists to improve modeling approaches regarding the physical risks of climate change and increase risk-weights for the most exposed assets accordingly.

In order to bolster big banks' resilience to the systemic risks they are inflating, and to require

them to internalize these external costs they are placing on others, banking regulators should also implement a macroprudential climate risk contribution capital surcharge. This additional risk-weighted and leverage capital buffer should apply to bank holding companies with more than $100 billion in assets and nonbank financial companies designated by the Financial Stability Oversight Council (FSOC) as systemically important. The climate capital surcharge should be calibrated based on a firm's climate risk contribution score, which would measure the bank's level of financed GHG emissions, including emissions from its lending, underwriting, trading, and off-balance sheet activities.

The capital surcharge that applies to global systemically important banks (G-SIBs) provides a useful conceptual example of how bank capital requirements can be used to mitigate a financial externality.[111] The basic formula for the expected losses that a bank places on the financial system and broader economy is a function of the bank's probability of default, or its likelihood of failure, and its loss-given default, or the losses that would be placed on the financial system or economy if it failed. The failure of a large, complex, and interconnected bank would have a much greater negative impact on the financial system and broader economy than the failure of a smaller bank.[112] Thus, the loss-given default of a larger bank is much higher than that of a smaller bank. Assuming the probability of default is generally equal, the expected loss of a large systemic bank is higher than that of a small bank. The G-SIB surcharge was designed to bring the expected loss for systemic banks in line with those of smaller banks by lowering their probability of default through raising their capital requirements. When the G-SIB surcharge rule was finalized, former Federal Reserve Chair Janet Yellen stated, "A key purpose of the [G-SIB] capital surcharge is to require the firms themselves to bear the costs that their failure would impose on others".[113] The Fed also noted that a related goal of the G-SIB surcharge was to "create incentives for SIFIs to shrink their systemic footprint, which further reduces the risks these firms pose to financial stability."[114]

Using the expected loss framing, financing emissions is effectively contributing to an increase in the probability of default, and expected loss, of the financial system as a whole. Banks that are major financiers of carbon-intensive activities are facilitating increased GHG emissions and intensifying climate change. Exacerbating the climate crisis will increase both the physical and transition risks of climate change and inflict larger losses on the financial system. With respect to physical risks, higher GHG emissions lead to higher global temperatures, which in turn cause more frequent and severe extreme weather events and damaging environmental changes.[115] The more significant the physical effects of climate change, the more likely and severe the financial system's associated losses will be. Furthermore, increased emissions today drive up projected warming pathways and increase the likelihood that a rapid and disruptive transition is required to stabilize global temperatures.[116] Firms should be required to internalize these costs and the capital surcharge would disincentivize risky carbon-financing activities.

Community Reinvestment Act

The banking regulators should also look to their obligations under the Community Reinvestment Act to help drive mitigation and adaptation efforts in low- and moderate-income communities, and communities of color. Regulators should use race and environmental justice metrics to better

target CRA assessment areas.[117] Regulators should also clarify the types of adaptation and mitigation activities that qualify for credit under the CRA, including energy efficient affordable housing, community solar projects, and green infrastructure.[118] It is also vital for regulators to strengthen the overall enforcement and accountability of the CRA to ensure it is meeting the needs of these communities, as intended by the statute.

State insurance regulation

State insurance commissioners should require insurance companies operating in their state to disclose their fossil fuel investments and underwriting activities. This disclosure would improve regulators', investors', and the public's understanding of insurers' exposure and contribution to the climate crisis. Regulators should ensure companies set targets and pathways to reduce those high-emissions activities. The FIO should issue a data call to collect this information from the insurance industry if state insurance commissioners do not use their authorities to act.

Commissioners should establish climate-risk stress tests and scenario analyses to help quantify climate-related risks on an industry-wide and company-by-company basis—and create stronger risk management rules and supervision based on the results. The stress tests should gauge the short- and medium-term resiliency of insurers' balance sheets in the face of both physical and transition risks. Longer term scenario analyses could complement the stress tests by probing how insurance companies plan to shift their asset allocation and business practices to align with different warming scenarios over a longer time horizon. The FIO should evaluate these stress testing frameworks and make recommendations to state insurance regulators on best practices around scenario design and supervisory models, where appropriate.

Climate-related risks should also be integrated into the risk-based capital (RBC) framework for insurers. The RBC requirements are meant to ensure the resilience of insurers and are calculated based on the riskiness of their assets and underwriting activities. Increasing the loss-absorbing capital required for assets and underwriting activities that are most exposed to climate-related risks would help promote the stability of the sector. This policy should focus on insurers' fossil fuel investments and underwriting, which both expose insurers to transition-related losses and increase the physical risks that will be borne by others in the future. In addition, regulators should require insurers to include climate-related risks in their Own-Risk and Solvency Assessments.

c. Financial Stability Oversight Council

As a start, the FSOC should embed a focus on climate change and climate-related capabilities into its operating structure. Chartering a Climate Risk Committee to handle the portfolio of ongoing climate-related work would be a good initial step toward this end. Relatedly, the FSOC should work with the director of the Office of Financial Research ("OFR") to establish a Division of Climate Risk Analysis. The OFR should spearhead the FSOC's data collection, analysis, and research priorities on climate-related financial risks, working with member agencies on their needs. These recommendations would complement Secretary Yellen's important commitment to establish a "climate hub" at Treasury.

FSOC member agencies should then make it an early priority to coordinate on the development of agency-specific commitments to integrate climate-related risks into their respective core functions. These clear and actionable goals could be developed after consultation with the public through an agency request for information and announced in advance of the U.N. Climate Change Conference (COP26) in November 2021, which features a robust private finance agenda.[119]

Over the long term, the FSOC should use its statutory authorities to address any identified gaps with respect to climate-related financial risks. The FSOC's Section 120 authority to issue recommendations to primary regulators could help pressure regulators to act where they have the existing authority to do so. Primary regulators have substantial authority to use disclosure requirements, stress testing, capital frameworks, supervision, fiduciary obligations, and more to mitigate climate-related risks and align the financial system with the low-carbon transition. These tools have the power to improve the resilience of the financial system to climate-related shocks and to facilitate the decarbonization of the economy. The FSOC should stand ready to push unwilling regulators to act, or go further, when necessary.

Furthermore, the FSOC should integrate climate-related risk as a factor into its designation guidance.[120] There are currently two statutory standards under which a nonbank financial company can be designated as systemically important. If a firm's material financial distress could destabilize the financial system, it can be designated under the first standard. That standard is agnostic to the cause of the material distress, so there is not an obvious climate-related intersection. Under the second standard, designation can occur if "the nature, scope, size, scale, concentration, interconnectedness, or mix of the activities" of the nonbank financial company could threaten financial stability.[121] Under this standard, therefore, the FSOC could evaluate a firm's contribution to climate-related financial risks through its carbon-financing activities. Financing high-emission activities intensifies climate change and increases physical and transition risk-related losses for financial institutions and the economy in the future, exacerbating systemic risk. It is unlikely that the FSOC would designate any firm solely based on climate-related risk considerations, but the council could reasonably add these considerations to the calculus under the second standard.

Separately, the Federal Reserve should apply robust climate-related prudential regulation to nonbank financial companies that are designated as systemically important under either standard, regardless of whether climate considerations are factored into the decision to designate them. Depending on the former primary regulator of the designated company, it may or may not have faced climate-related financial regulation previously. As the new primary prudential regulator, the Fed is responsible for bolstering the resilience of designated nonbank financial companies, and it is important that these systemic firms can weather climate-related shocks, among other risks.

d. Role of Congress

Congress has an important role to play in ensuring our financial system is resilient to climate-related shocks and is positioned to support the low-carbon transition. First, stringent congressional oversight of the financial regulators will prove crucial. As outlined in this testimony, financial regulators have wide-ranging authority under existing law to address climate-related risks. Through letters, hearings, investigations, and other mechanisms, Congress can press regulators to act with appropriate speed and to deploy their full suite of tools to rigorously address these risks. Several members of this Committee have been pushing regulators for years, which is one of the reasons progress has been made in the past few months.

Second, if regulators fail to act swiftly enough or refuse to implement a robust agenda around climate financial risks, Congress should step in and insist they do so. In advance of the 2008 financial crisis, regulators refused to use the tools at their disposal to address the risks financial institutions were creating and the risks to which the financial system was exposed. Several important provisions in Dodd-Frank did not create new authorities per se—they required regulators to implement policies that could have been implemented under pre-crisis law. If regulators again fail to check a build-up of risk in the financial system, Congress should direct them to do so in advance of another catastrophe. Several important bills, including those authored or co-sponsored by members of this Committee, have been introduced in the past few years. Some notable recent bills include:

- The Climate Risk Disclosure Act, introduced by Senator Warren and Representative Casten, would direct the SEC to develop a comprehensive mandatory climate risk disclosure framework.[122]
- The Climate Change Financial Risk Act, introduced by Senator Schatz and Representative Casten, would require the Fed to establish a climate-related stress testing framework.[123]
- The Addressing Climate Financial Risk Act, introduced by Senator Feinstein and Representative Casten, would direct the banking regulators to develop climate-related supervisory guidance, direct the FSOC to update its nonbank designation guidance to include climate risk, require a report from the Federal Insurance Office on climate risk, among other provisions.[124]

Finally, Congress could consider additional policy measures or adjustments to financial regulators' mandates to more intentionally align private capital flows with explicit climate-related targets. Regulators have broad responsibilities to bolster the resilience of the financial system to climate-related risks and, if used appropriately, those authorities will ensure the financial system serves as a source of strength for the economy as it decarbonizes. But the "risk" framing is somewhat of a constraint and Congress could more directly mobilize private capital to achieve climate-policy ends. For example, banks could be given green-finance mandates as one of the obligations that comes with the special public privileges they are afforded.[125]

V. Conclusion

Climate-related risks are building in the financial system and financial institutions themselves are exacerbating these risks. It is incumbent on U.S. financial regulators to step in and perform the jobs Congress assigned to them. Integrating climate-related risks into the regulatory and supervisory framework through mandatory disclosure, stress testing, supervision, capital requirements, fiduciary obligations, and more would bolster the resilience of the financial system, mitigate the risks created by financial institutions, and position the financial system to support the low-carbon transition. These risks are not theoretical, and they are not far off in the distance. They are here. Regulators have a chance to address these risks head on, before catastrophe strikes. It is critical to learn the lessons of the 2008 crisis, move urgently, and avoid a climate-driven financial crisis.

---

[1] Bank of England, "Climate change: what are the risks to financial stability?," available at https://www.bankofengland.co.uk/knowledgebank/climate-change-what-are-the-risks-to-financial-stability.
[2] United Nations Climate Change, "The Paris Agreement," available at https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement.
[3] The Intergovernmental Panel on Climate Change, "Special Report: Global Warming of 1.5 degrees Celsius," (2018), available at https://www.ipcc.ch/sr15/.
[4] Id.
[5] United Nations, "Climate Action: Key Findings," available at https://www.un.org/en/climatechange/science/key-findings.
[6] U.S. Energy Information Administration, "U.S. energy facts, explained," available at https://www.eia.gov/energyexplained/us-energy-facts/.
[7] Dan Murphy, "Renewables chief hails 'crucial' Biden climate agenda as administration plans massive energy overhaul," *CNBC*, January 25, 2021, available at https://www.cnbc.com/2021/01/25/renewable-energy-chief-hails-crucial-biden-climate-change-plans-.html.
[8] Financial Stability Board, "The Implications of Climate Change for Financial Stability," (2020), available at https://www.fsb.org/wp-content/uploads/P231120.pdf.
[9] Office of the Comptroller of the Currency, "Comptroller's Handbook: Oil and Gas Exploration and Production Lending," (2018), available at https://www.occ.treas.gov/publications-and-resources/publications/comptrollers-handbook/files/oil-gas-exploration-prod-lending/index-oil-gas-exploration-production-lending.html.
[10] Laura Hurst, "'Stranded Assets' Risk Rising With Climate Action and $40 Oil," Bloomberg, August 11, 2020, available at https://www.bloomberg.com/news/articles/2020-08-11/why-climate-action-40-oil-create-stranded-assets-quicktake?sref=S5RPfkRP; Ron Bousso, "BP wipes up to $17.5 billion from assets with bleaker oil outlook," Reuters, June 15, 2020, available at https://www.reuters.com/article/us-bp-writeoffs/bp-wipes-up-to-17-5-billion-from-assets-with-bleaker-oil-outlook-idUSKBN23M0QA.
[11] Matt McGrath, "Carbon 'bubble' could cost global economy trillions," *BBC*, June 5, 2018, available at https://www.bbc.com/news/science-environment-44357243.
[12] International Renewable Energy Agency, "Stranded Assets and Renewables: How the energy transition affects the value of energy reserves, buildings, and capital stock," (2017), available at https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2017/Jul/IRENA_REmap_Stranded_assets_and_renewables_2017.pdf.
[13] Rosetta Dollman et. al., :"Low-Carbon Transitions and Systemic Risk" (Vivid Economics, 2020), available at https://www.vivideconomics.com/wp-content/uploads/2020/10/Low-Carbon-Transitions-and-Systemic-Risk-Final-1.pdf ; Network for Greening the Financial System, "Technical supplement to the First NGFS Comprehensive Report," (2019), available at https://www.ngfs.net/en/technical-supplement-first-ngfs-comprehensive-report; Climate-Related Market Risk Subcommittee, "Managing Climate Risk in the U.S. Financial System" (Washington: Commodity Futures Trading Commission, 2020), available at https://www.cftc.gov/sites/default/files/2020-09/9-9-20%20Report%20of%20the%20Subcommittee%20on%20Climate-Related%20Market%20Risk%20-%20Managing%20Climate%20Risk%20in%20the%20U.S.%20Financial%20System%20for%20posting.pdf;

Patrick Bolton et. al. ,"The green swan," (Bank for International Settlements, 2020), available at https://www.bis.org/publ/othp31.htm.
[14] Hugues Chenet et. al., "Finance, climate-change and radical uncertainty: Towards a precautionary approach to financial policy" Ecological Economics 183 (2021), available at https://www.sciencedirect.com/science/article/pii/S092180092100015X?via%3Dihub ; Bolton et. al., "The green swan,"; Graham Steele, "Confronting the 'Climate Lehman Moment': The Case for Macroprudential Climate Regulation" Cornell Journal of Law and Public Policy 30 (1)(2020): 109-157, available at https://www.lawschool.cornell.edu/research/JLPP/upload/Steele-final.pdf; Network for Greening the Financial System, "A call for action: Climate change as a source of financial risk," (2019), available at https://www.ngfs.net/sites/default/files/medias/documents/ngfs_first_comprehensive_report_-_17042019_0.pdf; Climate-Related Market Risk Subcommittee, "Managing Climate Risk in the U.S. Financial System."
[15] Mark Carney, "Breaking the tragedy of the horizon - climate change and financial stability," Bank of England, Speech at Lloyd's of London, September 29, 2015, available at https://www.bis.org/review/r151009a.htm.
[16] Bloomberg, "Climate change and artificial intelligence seen as risks to investment asset allocation, finds new report by BNY Mellon Investment," September 16, 2019, available at https://www.bloomberg.com/press-releases/2019-09-16/climate-change-and-artificial-intelligence-seen-as-risks-to-investment-asset-allocation-finds-new-report-by-bny-mellon-investm.
[17] Felix Suntheim and Jerome Vandenbussche, "Equity Investors Must Pay More Attention to Climate Change Physical Risk," International Monetary Fund, May 29, 2020, available at https://blogs.imf.org/2020/05/29/equity-investors-must-pay-more-attention-to-climate-change-physical-risk/; See for example, De Nederlandsche Bank, "An energy transition risk stress test for the financial system of the Netherlands," (2018), available at https://www.dnb.nl/media/pdnpdalc/201810_nr-_7_-2018-_an_energy_transition_risk_stress_test_for_the_financial_system_of_the_netherlands.pdf and Irene Monasterolo, Assessing climate risks in investors' portfolios: a journey through climate stress-testing," U.N. Principles for Responsible Investment, March 2, 2020, available at https://www.unpri.org/pri-blog/assessing-climate-risks-in-investors-portfolios-a-journey-through-climate-stress-testing/5526.article.
[18] Madison Condon, "Market Myopia's Climate Bubble," Boston University School of Law, Law and Economics Research Paper Forthcoming (2021), available at https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3782675.
[19] U.S. Environmental Protection Agency, "Climate change indicators: Atmospheric Concentrations of Greenhouse Gases," available at https://www.epa.gov/climate-indicators/climate-change-indicators-atmospheric-concentrations-greenhouse-gases.
[20] Robinson Meyer, "The Oceans We Know Won't Survive Climate Change," *The Atlantic*, September 25, 2019, available at https://www.theatlantic.com/science/archive/2019/09/ipcc-sea-level-rise-report/598765/.
[21] National Oceanic and Atmospheric Administration, U.S. Department of Commerce, "Ocean acidification," (2020), available at https://www.noaa.gov/education/resource-collections/ocean-coasts/ocean-acidification.
[22] Matthew E. Kahn et. al., "Long-term macroeconomic effects of climate change: A cross-country analysis," National Bureau of Economic Research Working Paper 26167 (2019), available at https://www.nber.org/system/files/working_papers/w26167/w26167.pdf.
[23] Id.
[24] Christopher Flavelle et. al., "New Data Reveals Hidden Flood Risk Across America," *The New York Times*, June 29, 2020, available at https://www.nytimes.com/interactive/2020/06/29/climate/hidden-flood-risk-maps.html.
[25] Id.
[26] Diana Olick, "Rising seas threaten nearly $1 trillion worth of US homes, and most of them are moderately priced: Zillow," *CNBC*, October 18, 2017, available at https://www.cnbc.com/2017/10/18/rising-seas-threaten-nearly-1-trillion-worth-of-us-homes-zillow.html.
[27] U.S. Environmental Protection Agency, "Climate Impacts on Agriculture and Food Supply," available at https://19january2017snapshot.epa.gov/climate-impacts/climate-impacts-agriculture-and-food-supply_.html.
[28] Id.
[29] Id.
[30] Renee Cho, "How climate change impacts the economy," Earth Institute at Columbia University, June 20, 2019, available at https://blogs.ei.columbia.edu/2019/06/20/climate-change-economy-impacts/.
[31] Network for Greening the Financial System, "A call for action: Climate change as a source of financial risk."
[32] Financial Stability Board, "The Implications of Climate Change for Financial Stability."

[33] Deloitte Center for Financial Services, "Climate risk: Regulators sharpen their focus," (2019), available at https://www2.deloitte.com/us/en/pages/financial-services/articles/insurance-companies-climate-change-risk.html; Christopher Flavelle, "Wildfires Hasten Another Climate Crisis: Homeowners Who Can't Get Insurance," The New York Times, September 2, 2020, available at https://www.nytimes.com/2020/09/02/climate/wildfires-insurance.html.
[34] Bradley Hope and Nicole Friedman, "Climate Change Is Forcing the Insurance Industry to Recalculate," The Wall Street Journal, October 2, 2018, available at https://www.wsj.com/graphics/climate-change-forcing-insurance-industry-recalculate/.
[35] Adam B. Smith, "2010-2019: A landmark decade of U.S. billion-dollar weather and climate disasters." National Oceanic and Atmospheric Administration, January 8, 2020, available at https://www.climate.gov/news-features/blogs/beyond-data/2010-2019-landmark-decade-us-billion-dollar-weather-and-climate.
[36] Tom Kompas, U.S. $23 trillion will be lost if temperatures rise four degrees by 2100," Phys.org, August 15, 2018, available at https://phys.org/news/2018-08-trillion-lost-temperatures-degrees.html.
[37] Russell Gold, "PG&E: The First Climate-Change Bankruptcy, Probably Not the Last," The Wall Street Journal, January 18, 2019, available at https://www.wsj.com/articles/pg-e-wildfires-and-the-first-climate-change-bankruptcy-11547820006.
[38] Michela Zonta and Zoe Willingham, "A CRA to Meet the Challenge of Climate Change" (Washington: Center for American Progress, 2020), available at https://www.americanprogress.org/issues/economy/reports/2020/12/17/493886/cra-meet-challenge-climate-change/.
[39] Ann Saphir, "Fed has a role in combating climate change risk, Powell says," Reuters, January 29, 2020, available at https://www.reuters.com/article/us-usa-fed-climatechange/fed-has-a-role-in-combating-climate-change-risk-powell-says-idUSKBN1ZT031; Lael Brainard, "Strengthening the Financial System to Meet the Challenge of Climate Change," Board of Governors of the Federal Reserve System, December 18, 2020, available at https://www.federalreserve.gov/newsevents/speech/brainard20201218a.htm; Martin J. Gruenberg, "Remarks by Martin J. Gruenberg, Member, FDIC Board of Directors, The Financial Stability Risks of Climate Change at the Center for American Progress," Federal Deposit Insurance Corporation, December 18, 2020, available at https://www.fdic.gov/news/speeches/spdec1820.html; Victoria Guida, "Q&A: FDIC Chairman Jelena McWilliams," Politico Pro, March 8, 2021; Federal Housing Finance Agency, "FHFA Issues RFI on Climate and Natural Disaster Risk Management at the Regulated Entities," Press Release, January 19, 2021, available at https://www.fhfa.gov/Media/PublicAffairs/Pages/FHFA-Issues-RFI-on-Climate-and-Natural-Disaster-Risk-Management-at-the-Regulated-Entities.aspx.
[40] Walter Russell Mead, "Climate Finance May Foul the Economy," The Wall Street Journal, December 7, 2020, available at https://www.wsj.com/articles/climate-finance-may-foul-the-economy-11607381333?mod=article_inline.
[41] H. Rep. 73-85 (1933), at 2-3.
[42] Alexandra Thornton and Andy Green, "The SEC's Time to Act" (Washington: Center for American Progress, 2021), available at https://www.americanprogress.org/issues/economy/reports/2021/02/19/496015/secs-time-act/.
[43] Id.
[44] Id.
[45] See for example, U.N. Principles for Responsible Investment, "The evolution of responsible investment: an analysis of advanced signatory practices," March 4, 2021, available at https://www.unpri.org/asset-owner-resources/the-evolution-of-responsible-investment-an-analysis-of-advanced-signatory-practices/7254.article.
[46] Securities and Exchange Commission, "SEC Announces Enforcement Task Force Focused on Climate and ESG Issues," Press Release, March 4, 2021, available at https://www.sec.gov/news/press-release/2021-42.
[47] Tyler Gellasch and Alexandra Thornton, "Modernizing the Social Contract With Investment Fiduciaries," (Washington: Center for American Progress, 2020), available at https://www.americanprogress.org/issues/economy/reports/2020/11/18/492982/modernizing-social-contract-investment-fiduciaries/.
[48] Allison Herren Lee, "Playing the Long Game: The Intersection of Climate Change Risk and Financial Regulation," U.S. Securities and Exchange Commission, November 5, 2020, available at https://www.sec.gov/news/speech/lee-playing-long-game-110520.
[49] It's worth acknowledging that members of this Committee played a vital role in pushing the SEC to implement climate-related disclosure guidance in 2010. See, Office of U.S. Senator Jack Reed and Office of U.S. Senator

Christopher Dodd, "Dodd, Reed Praise SEC Decision on Climate Risk Disclosure," Press Release, January 27, 2010, available at https://www.reed.senate.gov/news/releases/dodd-reed-praise-sec-decision-on-climate-risk-disclosure.
[50] Climate-Related Market Risk Subcommittee, "Managing Climate Risk in the U.S. Financial System."
[51] 12 U.S.C. Chapter 16; 12 U.S.C. Chapter 17; 12 U.S.C. Chapter 40; Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010, Public Law 111-203, 111th Cong., 2 sess. (July 21, 2010), available at https://www.congress.gov/bill/111th-congress/house-bill/4173/text.
[52] Brainard, "Strengthening the Financial System to Meet the Challenge of Climate Change."
[53] Network for Greening the Financial System, "Technical supplement to the First NGFS Comprehensive Report."; Climate-Related Market Risk Subcommittee, "Managing Climate Risk in the U.S. Financial System"; Bolton et. al., "The green swan."
[54] Steele, "Confronting the 'Climate Lehman Moment.'"
[55] Lee, "Playing the Long Game: The Intersection of Climate Change Risk and Financial Regulation."
[56] Ibid.
[57] The voting members representing the eight federal financial regulators are the chair of the Federal Reserve, comptroller of the currency, director of the Consumer Financial Protection Bureau, chair of the Securities and Exchange Commission, chair of the Federal Deposit Insurance Corporation, chair of the Commodity Futures Trading Commission, director of the Federal Housing Finance Agency, and chair of the National Credit Union Administration.
[58] In addition to the 10 voting members, the FSOC also includes five nonvoting members: the director of the Office of Financial Research, the director of the Federal Insurance Office, and representatives from state insurance, banking, and securities regulators.
[59] Section 165, Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010.
[60] For example, see, Section 171 and Section 113, Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010.
[61] Chapter 3, The Intergovernmental Panel on Climate Change, "Special Report: Global Warming of 1.5 degrees Celsius."
[62] Chapter 4, The Intergovernmental Panel on Climate Change, "Special Report: Global Warming of 1.5 degrees Celsius."
[63] Irina Ivanova and Rachel Layne, "U.S. taxpayers are at risk for homes threatened by climate change," CBS News, October 2, 2019, available at https://www.cbsnews.com/news/banks-shift-mortgages-on-disaster-prone-properties-to-taxpayers-study-shows/.
[64] Divya Vijay and Andy Green, "Switching to Responsible Banking," (Washington: Center for American Progress, 2021), available at https://www.americanprogress.org/issues/economy/reports/2021/02/26/496444/switching-responsible-banking/.
[65] Network for Greening the Financial System, "Membership," available at https://www.ngfs.net/en/about-us/membership.
[66] Network for Greening the Financial System, "NGFS Publications," available at https://www.ngfs.net/en/liste-chronologique/ngfs-publications.
[67] Basel Committee on Banking Supervision, "Climate-related financial risks: a survey on current initiatives," (2020), available at https://www.bis.org/bcbs/publ/d502.pdf.
[68] Id.
[69] Bank of England, "The 2021 biennial exploratory scenario on the financial risks from climate change," December 18, 2019, available at https://www.bankofengland.co.uk/paper/2019/biennial-exploratory-scenario-climate-change-discussion-paper ; Paul Weiss, "In Global First, the United Kingdom Moves Toward Mandatory Climate-related Disclosures by 2025," November 25, 2020, available at https://www.paulweiss.com/insights/esg-thought-leadership/publications/in-global-first-the-united-kingdom-moves-toward-mandatory-climate-related-disclosures-by-2025?id=38652.
[70] European Commission, "A European Green Deal," available at https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_en.
[71] Climate-Related Market Risk Subcommittee, "Managing Climate Risk in the U.S. Financial System."
[72] Board of Governors of the Federal Reserve System, "Federal Reserve Board announces it has formally joined the Network of Central Banks and Supervisors for Greening the Financial System, or NGFS, as a member," Press Release, December 15, 2020, available at

https://www.federalreserve.gov/newsevents/pressreleases/bcreg20201215a.htm; Board of Governors of the Federal Reserve System, "Financial Stability Report: November 2020," available at https://www.federalreserve.gov/publications/2020-november-financial-stability-report-purpose.htm; Board of Governors of the Federal Reserve System, "Federal Reserve Supervision and Regulation Report: November 2020," available at https://www.federalreserve.gov/publications/2020-november-supervision-and-regulation-report.htm.

[73] Lael Brainard, "Why Climate Change Matters for Monetary Policy and Financial Stability," Board of Governors of the Federal Reserve System, November 8, 2019, available at https://www.federalreserve.gov/newsevents/speech/brainard20191108a.htm.

[74] Pete Schroeder, "U.S. Fed taps official to lead new climate change team," *Reuters*, January 25, 2021, available at https://www.reuters.com/article/usa-fed-climate/u-s-fed-taps-official-to-lead-new-climate-change-team-idUSL1N2K02GM.

[75] Allison Herren Lee, "Statement on the Review of Climate-Related Disclosure," Securities and Exchange Commission, February 24, 2021, available at https://www.sec.gov/news/public-statement/lee-statement-review-climate-related-disclosure; Securities and Exchange Commission, "SEC Division of Examinations Announces 2021 Examination Priorities," Press Release, March 3, 2021, available at https://www.sec.gov/news/press-release/2021-39; Securities and Exchange Commission, "SEC Announces Enforcement Task Force Focused on Climate and ESG Issues," Press Release, March 4, 2021, available at https://www.sec.gov/news/press-release/2021-42.

[76] Victoria Guida, "Q&A: FDIC Chairman Jelena McWilliams," Politico Pro, March 8, 2021.

[77] Federal Housing Finance Agency, "FHFA Issues RFI on Climate and Natural Disaster Risk Management at the Regulated Entities."

[78] Executive Office of the President, "Executive Order 14008: Tackling the Climate Crisis at Home and Abroad," Federal Register 86, (19)(2021): 7619-7633, available at https://www.whitehouse.gov/briefing-room/presidential-actions/2021/01/27/executive-order-on-tackling-the-climate-crisis-at-home-and-abroad/.

[79] Kate Davidson, "Yellen Is Creating a New Senior Treasury Post for Climate Czar," The Wall Street Journal, February 12, 2021, available at https://www.wsj.com/articles/yellen-is-creating-a-new-senior-treasury-post-for-climate-czar-11613138479.

[80] Linda A. Lacewell, ""Industry letter: Climate Change and Financial Risks," New York State Department of Financial Services, October 29, 2020, available at https://www.dfs.ny.gov/industry_guidance/industry_letters/il20201029_climate_change_financial_risks.

[81] California Department of Insurance, "New analysis of climate risk exposure of insurers' investments released," January 4, 2019, available at http://www.insurance.ca.gov/0400-news/0100-press-releases/2019/release006-19.cfm.

[82] Sarah Bloom Raskin, "US climate finance is approaching a leapfrog moment," *Financial Times*, January 11, 2021, available at https://www.ft.com/content/ffa4f748-9f4e-406e-9cd1-8200cc40047f.

[83] Veena Ramani et. al., "Addressing Climate as a Systemic Risk," (Boston: Ceres, 2020), available at https://www.ceres.org/resources/reports/addressing-climate-systemic-risk.

[84] Hilary J. Allen, "A New Philosophy for Financial Stability Regulation," Loyola University Chicago Law Journal 45(2)(2013): 173-231, available at https://lawecommons.luc.edu/luclj/vol45/iss1/4/.

[85] Saule T. Omarova, "License to Deal: Mandatory Approval of Complex Financial Products," Washington University Law Review 90 (1)(2012): 63-140, available at https://scholarship.law.cornell.edu/facpub/1011/.

[86] Hugues Chenet et. al., "Finance, climate-change and radical uncertainty: Towards a precautionary approach to financial policy."

[87] Jay Cullen, "After 'HLEG': EU Banks, Climate Change Abatement and the Precautionary Principle," Cambridge Yearbook of European Legal Studies 20(2018): 61-87, available at https://poseidon01.ssrn.com/delivery.php?ID=998105006000066123067109123099110121053040051018055094125101013098095100071066121123041031008002042043044095087119029125023090025010021006031093092026116106082123064084010120095120000002105019127111094125025018015096118089080102088120064064119090101&EXT=pdf&INDEX=TRUE.

[88] Lael Brainard, "The Role of Financial Institutions in Tackling the Challenges of Climate Change," Board of Governors of the Federal Reserve System, February 18, 2021, available at https://www.federalreserve.gov/newsevents/speech/brainard20210218a.htm.

[89] For purposes of this hearing, the capital markets recommendations focus exclusively on climate-related risks. Many of these policies, however, should account for a wide variety of relevant Environmental, Social, and Governance issues.

[90] Thornton and Green, "The SEC's Time to Act."
[91] Task Force on Climate-related Financial Disclosures, "Implementing the Recommendations of the Task Force on Climate-related Financial Disclosures," (2017), available at https://assets.bbhub.io/company/sites/60/2020/10/FINAL-TCFD-Annex-Amended-121517.pdf.
[92] Id.
[93] For an example of one such methodology, see Partnership for Carbon Accounting Financials, "About," available at https://carbonaccountingfinancials.com/about.
[94] Allison Herren Lee, "A Climate for Change: Meeting Investor Demand for Climate and ESG Information at the SEC," Securities and Exchange Commission, March 15, 2021, available at https://www.sec.gov/news/speech/lee-climate-change.
[95] Tyler Gellasch and Lee Reiners, "From Laggard to Leader," (Durham, N.C.: Global Financial Markets Center at Duke Law, 2021), available at https://web.law.duke.edu/sites/default/files/centers/gfmc/From-Laggard-to-Leader.pdf.
[96] Id.
[97] Lee, "Playing the Long Game: The Intersection of Climate Change Risk and Financial Regulation."
[98] Gellasch and Thornton, "Modernizing the Social Contract with Investment Fiduciaries."
[99] Gellasch and Reiners, "From Laggard to Leader."
[100] Id.
[101] Climate-Related Market Risk Subcommittee, "Managing Climate Risk in the U.S. Financial System."
[102] Office of U.S. Senator Brian Schatz, "Schatz introduces new legislation to ensure U.S. financial system is prepared for climate change," Press Release, November 20, 2019, available at https://www.schatz.senate.gov/press-releases/schatz-introduces-new-legislation-to-ensure-us-financial-system-is-prepared-for-climate-change.
[103] Board of Governors of the Federal Reserve System, "Federal Reserve Board approves rule to simplify its capital rules for large banks, preserving the strong capital requirements already in place," Press Release, March 4, 2020, available at https://www.federalreserve.gov/newsevents/pressreleases/bcreg20200304a.htm.
[104] Francisco Covas, "Challenges in Stress Testing and Climate Change," Bank Policy Institute, October 19, 2020, available at https://bpi.com/challenges-in-stress-testing-and-climate-change/.
[105] Brett Waxman et. al., "The Fed Increases Large Banks' Capital Requirements," Bank Policy Institute, June 29, 2018, available at https://bpi.com/the-fed-increases-large-banks-capital-requirements/; Gregory Baer, "Letter Re: Stress Testing Transparency proposals," The Clearing House, January 22, 2018, available at https://www.federalreserve.gov/SECRS/2018/January/20180130/OP-1588/OP-1587_012218_131945_561382171941_1.pdf.
[106] Board of Governors of the Federal Reserve System, "Federal Reserve Board approves rule to simplify its capital rules for large banks, preserving the strong capital requirements already in place."
[107] Jeremy Kress, "Big banks are growing due to coronavirus — that's an ominous sign," The Hill, May 1, 2020, available at https://thehill.com/opinion/finance/495719-big-banks-are-growing-due-to-coronavirus-thats-an-ominous-sign?rnd=1588363588#.
[108] Brainard, "The Role of Financial Institutions in Tackling the Challenges of Climate Change."
[109] The author includes a more detailed description of the mechanics of these capital-related policy proposals in a forthcoming paper, Gregg Gelzinis, "Addressing Climate-Related Financial Risk with Bank Capital Requirements: A Path Forward" (Washington: Center for American Progress, forthcoming).
[110] Task Force on Climate-related Financial Disclosures, "Implementing the Recommendations of the Task Force on Climate-related Financial Disclosures."
[111] Board of Governors of the Federal Reserve System, "Federal Reserve Board approves final rule requiring the largest, most systemically important U.S. bank holding companies to further strengthen their capital positions," Press Release, July 20, 2015, available at https://www.federalreserve.gov/newsevents/pressreleases/bcreg20150720a.htm.
[112] Amy G. Lorenc and Jeffery Y. Zhang, "The Differential Impact of Bank Size on Systemic Risk," Finance and Economics Discussion Series, Board of Governors of the Federal Reserve System (2018), available at https://www.federalreserve.gov/econres/feds/files/2018066pap.pdf.
[113] Board of Governors of the Federal Reserve System, "Federal Reserve Board approves final rule requiring the largest, most systemically important U.S. bank holding companies to further strengthen their capital positions."

[114] Board of Governors of the Federal Reserve System, "Calibrating the GSIB Surcharge," July 20, 2015, available at https://www.federalreserve.gov/publications/2015-calibrating-thegsib-surcharge-introduction.htm.
[115] Chapter 3, The Intergovernmental Panel on Climate Change, "Special Report: Global Warming of 1.5 degrees Celsius."
[116] Chapter 4, The Intergovernmental Panel on Climate Change, "Special Report: Global Warming of 1.5 degrees Celsius."
[117] Zonta and Willingham, "A CRA to Meet the Challenge of Climate Change."
[118] Id.
[119] Mark Carney, "Building a Private Finance System for Net Zero: Priorities for private finance for COP26," 26th U.N. Climate Change Conference, November 2020, available at https://ukcop26.org/wp-content/uploads/2020/11/COP26-Private-Finance-Hub-Strategy_Nov-2020v4.1.pdf.
[120] Addressing Climate Financial Risk Act of 2020, S. 5041, 116th Cong., 2 sess. (December 17, 2020), available at https://www.congress.gov/bill/116th-congress/senate-bill/5041?s=1&r=32.
[121] See Section 113 of the Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010.
[122] Office of U.S. Senator Elizabeth Warren, "The Climate Risk Disclosure Act of 2019: One pager," available at https://www.warren.senate.gov/imo/media/doc/The%20Climate%20Risk%20Disclosure%20Act%20of%202019%20-%20One%20Pager.pdf.
[123] Office of U.S. Senator Brian Schatz, "Schatz introduces new legislation to ensure U.S. financial system is prepared for climate change."
[124] Office of U.S. Senator Dianne Feinstein, "Feinstein Introduces Bill to Minimize Climate Change Risk in Financial System," Press Release, December 17, 2020, available at https://www.feinstein.senate.gov/public/index.cfm/press-releases?ID=27A04819-E44D-435C-AB06-FBC9D6051EB2.
[125] For an example of this type of legislation, see Climate Protection and Sustainable Communities Act of 2020, H.R. 9059, 116 Cong. 2 sess., available at https://www.congress.gov/bill/116th-congress/house-bill/9059?q=%7B%22search%22%3A%5B%22kennedy%22%5D%7D&s=5&r=1.