

Testimony of the Honorable Sarah Bloom Raskin
Before the
Senate Democrats' Special Committee on the Climate Crisis
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Chairman Schatz and members of the Committee, thank you for inviting me here to speak with you today about managing the financial risk from climate change. I am heartened that your Committee is taking up this important issue and exploring it with the American people.

My name is Sarah Bloom Raskin. I am currently a Rubenstein Fellow at Duke University, where I work with the Global Financial Markets Center, the Center on Risk, and the Kenan Institute for Ethics. My work focuses on economic resilience, sustainable finance, and the role of policymakers in enhancing or weakening the ability of the economy to prosper. I was the Deputy Secretary of the U.S. Department of the Treasury from 2014 to 2017, a Governor of the Federal Reserve Board from 2010 to 2014, and the Commissioner of Financial Regulation for the State of Maryland from 2007 to 2010.

When historians look back at the end of the 21st century's second decade, they will notice something exceptional. They will see that it was in this decade when people around the world became gripped by the idea that when it comes to stemming greenhouse gases and their effects on the planet, more had to urgently be done. Remarkably, a marginal idea has now become mainstream: that emissions should be cut to net zero as soon as possible. In most enlightened countries, questions about the adverse impact on climate change from emissions and other potentially catastrophic environmental activity and whether climate change, itself, is real have

been left in the dust in favor of attempts to transition from a dangerous climate change path to a safer and more prosperous one.

It is this transition that I begin the focus on in my testimony today: what it means in the context of climate change, why it is relevant from the perspective of financial stability, and how it needs to be managed. In order to set the context for this transition, I will start by providing an assessment of the macroeconomic and financial impact of climate change.

The Macroeconomic and Financial Impact of Climate Change

Evidence is mounting regarding the role of carbon dioxide and other greenhouse gases (GHG) in climate change. Since the 1970s, there has been a warming trend of two-tenths of a degree per decade, and this warming has continued every year unabated.¹ Global warming leads to extreme weather events that cause significant economic losses.² Since the 1980s, the number of weather-related loss events has tripled,³ and by some estimates extreme weather events now cost the United States \$300 billion to \$500 billion every five years.⁴

¹ NASA EARTH OBSERVATORY, *World of Change: Global Temperatures*, <https://earthobservatory.nasa.gov/world-of-change/global-temperatures> (last visited March 2, 2020); Rebecca Lindsey and LuAnn Dahlman, *Climate Change: Global Temperature*, NOAA Climate.gov (Jan. 16, 2020), <https://www.climate.gov/news-features/understanding-climate/climate-change-global-temperature> (last visited March 2, 2020).

² THE NATIONAL ACADEMIES OF SCIENCE, ENGINEERING, AND MEDICINE, <https://sites.nationalacademies.org/BasedOnScience/climate-change-global-warming-is-contributing-to-extreme-weather-events/index.htm> (last visited March 3, 2020).

³ Peter Hoeppe, *Trends in Weather Related Disasters—Consequences for Insurers and Society*, 11 WEATHER AND CLIMATE EXTREMES 70, 73 (2016).

⁴ BANK OF AMERICA GLOBAL RESEARCH, *Emission Impossible? Global Climate Change Primer* (Jan. 30, 2020), at 5, https://www.bofam.com/content/dam/boamlimages/documents/articles/ID20_0127/Climate_Change.pdf (last visited March 4, 2020).

In addition, given the unabated warming trends and the increasing severity of events, we know that the costs currently posed by climate change pale in significance when compared with what might come. The far-sighted among you know that there are costs associated with broader global impacts on health, property, migration and political stability,⁵ as well as food and water purity and security.

The analysts who think about and attempt to measure the financial costs associated with climate change understand that there are at least two principal dimensions to currently identified risks that produce these financial costs: physical risks and transition risks.⁶ Let me describe each of these risks in turn.

Physical risks are costs associated with damage from increasingly severe weather events and costs associated with the cumulative deterioration in the sustainability of a given region as a location for production. When we think about the financial sector, we might not immediately think about physical risks because we associate the financial sector with holding mostly intangible assets, such as loans and securities, which are not immediately physical. But the financial sector itself incurs costs associated with physical risk when the physical structures that it insures, or that are pledged as collateral, are destroyed, corrupted, and otherwise damaged by climate events. In other words, banks and other lenders and investors are exposed to losses in their collateral or the assets underlying their investments, an exposure that is not understood by

⁵ John Podesta, *The Climate Crisis, Migration, and Refugees*, BROOKINGS INSTITUTION (July 25, 2019), <https://www.brookings.edu/research/the-climate-crisis-migration-and-refugees/> (last visited March 5, 2020).

⁶ See BANK OF ENGLAND, *Climate Change: What Are the Risks to Financial Stability?*, <https://www.bankofengland.co.uk/knowledgebank/climate-change-what-are-the-risks-to-financial-stability> (recognizing that climate change poses both “physical risks” and “transition risks”) (last visited March 2, 2020).

bank regulators and is not measured through current examination practices. This material omission may be more troublesome than the failure to appreciate the nature and scope of the risk inherent in derivative banking products in 2008.

Transition Risk: What It Is

In addition to costs from damage and deterioration related to the sustainability of a given region as a location for production – the physical risks – are costs associated with transition efforts to reduce carbon dependence and adopt alternative technologies. It has been estimated by the Intergovernmental Panel on Climate Change that the world needs to spend over \$800 billion annually until 2050 on energy-related mitigation investments if global warming is to be limited to no more than 1.5 degrees Celsius above pre-industrial levels.⁷ To put this amount in context, it is less than one percent of worldwide GDP.⁸

While there is going to have to be, by necessity, an important role for public investment in meeting this roughly \$800 billion in spending on efforts to reduce carbon dependence and adopt alternative technologies, the bulk of the adjustment is going to fall on the private sector. Because the adjustment itself is going to be costly and the cost is going to vary by the skill with which firms manage their transition, the costs associated with adjustment – or transition – have been described as costs associated with the transition risk of climate change. In other words, transition risk is the risk embedded in the process of adjustment towards a lower-carbon

⁷ INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, *Global Warming of 1.5 ° C*, at 95–96, https://www.ipcc.ch/site/assets/uploads/sites/2/2019/05/SR15_Chapter2_Low_Res.pdf (last visited March 2, 2020).

⁸ Worldwide GDP is around \$90.52 trillion. See INTERNATIONAL MONETARY FUND, *World Economic Outlook (October 2019)*, <https://www.imf.org/external/datamapper/NGDPD@WEO/OEMDC/ADVEC/WEOWORLD> (last visited March 2, 2020).

economy. We call them risks even though they are risks that come from positive opportunities – namely the steps that firms are taking to shift away from fossil fuels. But if market forces do not send investors, regulators, and households informational signals about how firms are engaging in this shift, the process of adjustment will be uninformed and choppy. An uninformed, choppy adjustment will lead to either an underinvestment in alternative technologies or an overinvestment in carbon-based ones.

Consider the fact that the world runs on fossil fuels. Oil is currently the single biggest contributor to the world’s energy mix, sometimes being cited at 36 percent of consumption, followed by coal at 27 percent and natural gas at 24 percent.⁹ Fossil fuels are in our paints, detergents and nail polish, our plastics, medical equipment, mattresses, clothes and coating in our television screens.

If you look at oil alone, in 2018 global demand reached a record 100M barrels a day, driven in part by the needs of rapidly industrializing emerging markets.¹⁰ At the same time that the world’s thirst for oil seems insatiable, governments are now recognizing the catastrophic risks of a warming planet, from rising sea levels and droughts to wildfires and crop failures. So how the world can provide abundant energy supplies while dramatically reducing emissions has become

⁹ See BP, *Statistical Review of World Energy 2019*, at 11, <https://www.bp.com/content/dam/bp/business-sites/en/global/corporate/pdfs/energy-economics/statistical-review/bp-stats-review-2019-full-report.pdf> (last visited March 2, 2020); U.S. ENERGY INFORMATION AGENCY, *Total Energy*, <https://www.eia.gov/totalenergy/data/browser/index.php?tbl=T01.03#/?f=A&start=200001> (last visited March 5, 2020); INTERNATIONAL ENERGY AGENCY, *Data and Statistics*, <https://www.iea.org/data-and-statistics?country=WORLD&fuel=Energy%20consumption&indicator=Carbon%20intensity%20of%20industry%20energy%20consumption> (last visited March 5, 2020).

¹⁰ Amanda Cooper and Christopher Johnson, *Now Near 100 Million Bpd, When Will Oil Demand Peak?*, REUTERS (Sept. 20, 2018), <https://www.reuters.com/article/us-oil-demand-peak/now-near-100-million-bpd-when-will-oil-demand-peak-idUSKCN1M01TC> (last visited March 2, 2020).

the defining and all surpassing risk management challenge. While the world currently consumes 100M barrels of oil a day, there is credible evidence to suggest that the world can survive on far lower levels – 67M barrels per day by 2040 according to the International Energy Agency¹¹ – before ultimately removing it from our energy systems entirely.

If in fact the world needs to spend more than \$800 billion a year on energy-related mitigation investments to keep the earth from heating up more than 1.5 degrees, what might this mean for different sectors of the economy? *All* sectors of the economy will be affected – for example, the energy sector, the retail sector, the construction sector, the transportation sector, the agricultural sector, and the public sector.

The household sector too will be bearing a huge set of costs. Households are going to have to devote resources to retrofitting homes in order to reduce their carbon footprints and be resilient to climate damages.¹² While part of their costs may eventually be met by public investment and subsidies, the bulk of this expenditure will probably have to be met by individual families. If households do not have the means for these expenditures, they will need to finance their investment through some kind of home improvement loans.

¹¹ Tim Gould and Tae-Yoon Kim, *The World Can't Afford to Relax About Oil Security*, INTERNATIONAL ENERGY AGENCY (Sept. 19, 2019), <https://www.iea.org/commentaries/the-world-cant-afford-to-relax-about-oil-security> (last visited March 2, 2020).

¹² UNIVERSITY OF MICHIGAN CENTER FOR SUSTAINABLE SYSTEMS, *Factsheets: Sustainability Indicators* (Aug. 2019) (the average American household has a carbon footprint of 48 tons of carbon per year), http://css.umich.edu/sites/default/files/Carbon%20Footprint_CSS09-05_e2019.pdf (last visited March 2, 2020).

Another financial cost that will likely be borne by households is the cost associated with more expensive and/or more curtailed insurance policies.¹³ Indeed, the increased frequency of severe weather events could cause insurance companies to raise insurance premiums on household policies, cut back on coverage, eliminate coverage or all of the above – raise premiums, cut coverage, or eliminate coverage and force the property owner to bear the risk. Even allowing for some mitigation through public investment in improving infrastructure resilience to warmer climates, more expensive insurance premiums and exposures to non-insurance risks means that homeowners will have to rely on savings or emergency reserves to cover or absorb these increased costs and losses. If these changes in the cost and terms of household insurance policies occur with enough foresight and strategic planning, with thoughtful assistance, most American households will be able to plan their budgets accordingly, assuming their budgets can stretch to cover such expenditures. However, if these changes in the cost and coverage of household insurance policies occur without sufficient notice and planning, American households will suffer irreparable harm and loss; communities will be destroyed as damaged properties are abandoned by their owners. This could very well shock the wealth and sustainability of the average American household, and it would result in significant deterioration in net worth, if anything at all can be preserved. For example, a climate-driven increase in property losses could lead to widespread insurance price increases and household asset devaluations, leading homeowners to default, foreclosure, and eviction.

¹³ See Bradley Hope and Nicole Friedman, *Climate Change is Forcing the Insurance Industry to Recalculate*, WALL STREET JOURNAL (Oct. 2, 2018), <https://www.wsj.com/graphics/climate-change-forcing-insurance-industry-recalculate/> (last visited March 2, 2020).

Yet another financial cost that households are incurring and will continue to incur will be new spending on transportation.¹⁴ For example, there will be changes in the use of private cars and other types of transportation. And within the use of private cars there will be shifts from carbon-emitting cars to electric powered cars.¹⁵ If this shift takes the form of a steady annual switching rate, the depreciation rate of the existing stock of carbon-emitting cars will gradually increase, without any severe shock to the wealth of American households or deterioration in the credit risk embedded in the calculation and term of auto loans. However, if the switching rate from carbon-emitting cars to electric-powered cars is too slow, households will be scrambling to sell their carbon producing cars, which will lead to a loss of value.¹⁶

Another household cost that comes to mind is the following: Many households hold direct investment portfolios or defined benefit plans that could be exposed to carbon-related shocks to the values of the investments in their portfolios. So, for example, current market assessments of the value of carbon-related assets – such as the assets of oil producing firms – may turn out to be incorrect.¹⁷ The value of carbon-related assets may turn out to be too high if the speed or nature of climate change occurs more quickly than current projections. Similarly, the value of carbon-related assets may turn out to be too low if the speed or nature of climate change occurs more slowly than current projections. If the values of household investments do not match the value of those investments in an environment of reduced carbon dependence, there is the potential for abrupt depreciation or appreciation, with consequences for household net worth.

¹⁴ Lane, *supra* note 10.

¹⁵ By 2040, electric vehicles will make up the majority of passenger vehicle sales. See BloombergNEF, *Electric Vehicle Outlook 2019: Introduction*, <https://bnf.turtl.co/story/evo2019/page/1> (last visited March 2, 2020).

¹⁶ Lane, *supra* note 10.

¹⁷ J.-F. Mercure et al., *Macroeconomic Impact of Stranded Fossil Fuel Assets*, 8 NATURE CLIMATE CHANGE 588 (2018).

In short, it turns out that the pace at which the world adjusts to a lower level of carbon dependence is critical to the acquisition and preservation of household net worth. An abrupt, unanticipated transition would be more costly and more disruptive to households than a smooth, gradual, anticipated transition. Indeed, this pace is also critical to financial stability.

Transition Risk – Why It Matters

Again, the point is not that a readjustment of values is inherently unwelcome. It is not. Managing the transition by participating in the financing of decarbonization is a major opportunity for investors. It does imply a sweeping reallocation of resources and technological revolution, but this reallocation would generate new, creative investment at a pace, by some estimates, of roughly quadruple the present rate.¹⁸ Indeed, we see that “green” finance will be emerging as a force even stronger and more attractive than it is today, potentially reflecting an reallocation of capital that reflects fundamentals, including social impacts that previously had been neglected as externalities.

The point is that a dramatic, sudden and lagged reassessment and readjustment of financial assets, in other words, that which does not keep pace with the demand for carbon-based assets and the supply of alternative based ones, could lead to an immediate and potentially dramatic reduction in the value of property or the loss of property, itself. Such dramatic losses could lead to a corresponding drop in asset prices, potentially destabilizing markets, sparking potentially

¹⁸ Mark Carney, Governor of the Bank of England, *Breaking the Tragedy of the Horizon—Climate Change and Financial Stability* at Lloyd’s of London (Sept. 29, 2015), <https://www.bankofengland.co.uk/-/media/boe/files/speech/2015/breaking-the-tragedy-of-the-horizon-climate-change-and-financial-stability.pdf?la=en&hash=7C67E785651862457D99511147C7424FF5EA0C1A> (last visited March 2, 2020).

pro-cyclical catastrophic losses and leading to a persistent tightening of financial conditions.

These are hallmarks of financial instability. Plainly, it is a risk that would emerge if there were an abrupt and sudden reassessment/readjustment that the market and American households cannot bear.

Have we in the US ever experienced the result of a sudden reassessment and readjustment of financial assets that brought about a loss of financial stability and ushered in a recession? Sadly, yes. To turn the clock back to the most recent global financial crisis, it is worth remembering that even though the financial crisis hit most dramatically in 2008 and 2009, it was as early as 2005 that low-quality mortgage debt was a ticking time bomb.¹⁹ Early warnings about the complexity and predatory nature of many subprime mortgages, and the practices associated with them, were being ignored by the Federal Reserve, the Comptroller of the Currency, and the FDIC; enforcement actions, warnings, or even guidance about the issues related to complex mortgages were too little and too late. At the same time, well before the crisis, many subprime mortgages had adjustable rate features that would increase after a period of two or three years. Foresighted traders realized that these mortgages would experience “payment shock,” meaning that as the escalated monthly mortgage payment hit, a wave of defaults was more or less inevitable.²⁰ Once that began it was only a matter of time before house prices stopped increasing and the market turned. At that point, millions of speculative real estate investments would go bad, families would lose their homes, and thousands of mortgage-backed securities would suffer default. In this way, unless house prices continued to rise at record rates (enabling mortgage

¹⁹ Raghuram G. Rajan, *Has Financial Development Made the World Riskier?*, 12 EUROPEAN FINANCIAL MANAGEMENT 499, 520 (2006).

²⁰ Cristian deRitis et al., *Payment Shock and Mortgage Performance*, 19 JOURNAL OF HOUSING ECONOMICS 295 (Dec. 2010).

borrowers to refinance), the terms of the subprime mortgages would become binding conditions, activated mercilessly and stopping the boom in its tracks. As we know, this, in fact, is what happened. The transition to a mortgage market where monthly mortgage payments would be sustainable was ignored. And when federal intervention did in fact occur, the repricing of mortgages and mortgage-backed securities was so sharp and dramatic that what might have been a minor downturn had become a recession that was the longest and deepest of any since the Great Depression.

I bring up the financial crisis because like the belated and sudden devaluation that occurred in the context of subprime mortgages, one can imagine the effects of a belated and sudden devaluation that could occur in the context of mispriced carbon-dependent financial assets. A sudden devaluation could amount to \$1 trillion to \$4 trillion in losses in the energy sector alone.²¹ Across the entire industrial sector, losses from a sudden devaluation could reach \$20 trillion.²² Pricing assets in line with the policy goal of keeping global temperature rises under 2 degrees could cause the major stock market indexes to fall by 20%.²³ And with carbon-intensive companies making up a third of the world's leveraged loan market, a sharp decline in the value of fossil fuel assets could lead to mass defaults and contagion spreading throughout international credit markets.²⁴ Such potential sharp declines reflect the problem that widespread stranded assets – fossil fuel assets that are no longer valuable – would immediately eliminate the value of

²¹ Matt McGrath, *Carbon 'Bubble' Could Cost Global Economy Trillions*, BBC (June 4, 2018), <https://www.bbc.com/news/science-environment-44357243>, (last visited March 2, 2020).

²² Adam Tooze, *Why Central Banks Need to Step Up on Global Warming*, FOREIGN POLICY (July 20, 2019), <https://foreignpolicy.com/2019/07/20/why-central-banks-need-to-step-up-on-global-warming/> (last visited March 2, 2020).

²³ EUROPEAN SYSTEMIC RISK BOARD ADVISORY SCIENTIFIC COMMITTEE, *Too Late, Too Sudden: Transition to a Low-Carbon Economy and Systemic Risk*, at 13 (Feb. 2016), https://www.esrb.europa.eu/pub/pdf/asc/Reports_ASC_6_1602.pdf (last visited March 2, 2020).

²⁴ *Id.* at 12.

firms holding them. Limiting global warming to 2 degrees Celsius could wipe out \$360 billion worth of value from the world's largest oil companies, and limiting global warming to 1.5 degrees could wipe out nearly \$900 billion.²⁵

So the relevant question is: Have financial markets adequately priced in the likely near-term policy response to climate change? According to a recent report of Principles for Responsible Investment, the answer is no.²⁶ To quote from that report: "Financial markets today have not adequately priced-in the likely near-term policy response to climate change."²⁷ Indeed, the PRI – whose members include some 500 global asset managers – predicts a market response by 2025 that will be forceful, abrupt, and disorderly because of the delay in financial markets' adequately pricing in the likely near-term policy response.²⁸

To summarize, the above describes two principal categories of financial risk posed by climate change. One category relates to physical shocks such as a severe weather event or the cumulative deterioration in the sustainability of a given region where production occurs. The second category relates to the path of transition to a sustainable climate. If transition is excessively delayed or there is insufficient policy action, a sharp policy shift ultimately will be required or the market, itself, will provide a dramatic jolt. This sharp shift or jolt would create a sudden and potentially catastrophic loss in the value of property, together with an associated

²⁵ Patrick Jenkins, *Energy's Stranded Assets Are a Cause of Financial Stability Concern*, FINANCIAL TIMES (Mar. 2, 2020), <https://www.ft.com/content/17b54f60-5ba5-11ea-8033-fa40a0d65a98> (last visited March 5, 2020).

²⁶ PRINCIPLES FOR RESPONSIBLE INVESTMENT, *What is the Inevitable Policy Response?*, <https://www.unpri.org/inevitable-policy-response/what-is-the-inevitable-policy-response/4787.article> (last visited March 2, 2020).

²⁷ *Id.*

²⁸ *Id.*

drop in asset prices. Many analysts now believe that a sudden transition could be sufficiently disruptive to trigger a recession.²⁹

This is the scenario in which the transition to a sustainable climate is excessively delayed. There are other disruptive transition scenarios besides those that are excessively delayed. For example, overly ambitious policy interventions could outpace the capacity of the economy to switch to low-carbon production techniques. Imagine households and investors revising their beliefs about the economic salience of climate change, even in the absence of immediate policy actions. We would see a sudden drop in demand for carbon emitting cars in advance of sufficient scale in the production of electric cars. This sudden drop could have a significant financial impact.

With the ability to articulate these different scenarios, we now can begin to understand why climate change constitutes a material financial stability risk.

Transition Risk and Implications for Financial Policy

The challenge for financial policy is how this risk is managed. This seems like an extraordinary challenge, but it really is not different from what financial firms – banks, insurance companies, pension funds, and asset managers – do to manage other risks they confront in the ordinary course of business. They need to understand what they are holding, and they must be informed about the extent to which their assets are affected by increasing financial risks associated with climate change.

²⁹ Margherita Giuzio et al., *Climate Change and Financial Stability*, EUROPEAN CENTRAL BANK: FINANCIAL STABILITY REVIEW MAY 2019, https://www.ecb.europa.eu/pub/financial-stability/fsr/special/html/ecb.fsrart201905_1~47cf778cc1.en.html#toc1 (last visited March 2, 2020).

Therefore, it is essential that the financial industry and its regulators understand what the industry is holding and establish the correct valuations for these holdings. It is this exercise in understanding and valuation that is the new challenge. How are firms supposed to do this? What are the common parameters that inform the industry and regulators to ensure that they establish reliable measurements and accurate values for assets they hold in terms of carbon emissions?

Optimally, there should be clear expectations laid out for financial firms. Clear expectations are essential to the establishment of effective guideposts or frameworks that would enable the market to adjust efficiently. So first, clear expectations need to be laid out for regulated firms. One can imagine supervisory guidance – as exists in other countries with central banks concerned about financial stability – that sets out reasonable expectations for commercial banks, insurers, and investment firms related to the effective management of financial risks caused by climate change.³⁰ Such guidance would address the management of financial risk through appropriate governance, reliable data, scenario analysis, adequate staff and systems, and full disclosure.

Indeed, as it relates to disclosure, sufficient information is required if climate risks can be assessed adequately. Climate risk assessment would require firms (presumably above a particular scale threshold) to calculate and disclose their carbon exposures, on the basis of what

³⁰ See BANK OF ENGLAND, *Enhancing Banks' and Insurers' Approaches to Managing the Financial Risks From Climate Change*, Policy Statement 11/19 (Apr. 15, 2019), <https://www.bankofengland.co.uk/prudential-regulation/publication/2018/enhancing-banks-and-insurers-approaches-to-managing-the-financial-risks-from-climate-change> (last visited March 2, 2020).

each firm holds in its portfolio and in terms of its future plans. Climate disclosures would require companies to reveal their carbon footprint, their climate-related risks, and what steps (if any) they are taking to prepare for a world that is trying to limit global temperature rise to 2 degrees above pre-industrial levels. These disclosures help ensure that bankers, investors, analysts, policymakers, and regulators have a fuller understanding of how prepared specific companies are to meet the challenge of transitioning to a low-carbon economy.

Today responsible companies are eager to make candid climate disclosures. There are hundreds of climate disclosure initiatives, with the largest – the Carbon Disclosure Project – receiving disclosures from nearly 8,400 companies.³¹ Another significant disclosure initiative, the Task Force on Climate-related Financial Disclosures, has more than 900 member organizations with a combined market capitalization of \$11 trillion.³²

But for such disclosures to be most useful, standardization is required. It ensures comparability. A common taxonomy is essential for a shared understanding of the information disclosed and the definitions of sustainable financial products. Going beyond individual securities, a common approach to the development of benchmark indices is also necessary, in view of the importance of benchmarks in asset allocation.

Fortunately, such a common approach has been launched. Unfortunately, neither the Federal Reserve nor any of the US financial regulatory bodies are participating in the establishment of

³¹ CARBON DISCLOSURE PROJECT, *CDP Scores*, <https://www.cdp.net/en/scores> (last visited March 2, 2020).

³² TASK FORCE ON CLIMATE-RELATED FINANCIAL DISCLOSURES, *TCFD Supporters*, <https://www.fsb-tcfid.org/tcfid-supporters/> (last visited March 2, 2020).

this common approach. The Network for Greening the Financial System was launched in December 2017 and provides a platform for central banks and supervisory authorities to share knowledge and develop common strategies.³³ At the technical level, its current agenda consists of: (a) sizing the macroeconomic and systemic risks associated with climate change;³⁴ (b) reviewing disclosure practices and environmental-related credit risks;³⁵ and (c) determining how central banks and supervisors should incorporate climate change factors into their operations and monitoring activities in support of the transition to appropriately priced portfolios.³⁶ Through such initiatives, the global community of central banks and financial regulators is itself undergoing a transition, with climate change much higher on the agenda compared to a few years ago.

Regular, timely disclosures would reduce the likelihood of a “Minsky moment.” The concept of Minsky moments – named after the economist Hyman Minsky – is a sudden collapse in the value of assets, resulting in a financial crisis.³⁷ Without regular, timely climate disclosures, a sudden and unexpected substantial devaluation of carbon-dependent assets could trigger another financial crisis. But with regular climate disclosures, companies would publish information on their exposure to climate-related risks and their actual and planned responses to new regulations and changes in consumer demand. This information should ensure financial stability, e.g., it

³³ NETWORK FOR GREENING THE FINANCIAL SYSTEM, *Origin and Purpose*, <https://www.ngfs.net/en/about-us/governance/origin-and-purpose> (last visited March 2, 2020).

³⁴ NETWORK FOR GREENING THE FINANCIAL SYSTEM, *Workstream “Macrofinancial,”* <https://www.ngfs.net/en/about-us/governance/workstream-macrofinancial> (last visited March 2, 2020).

³⁵ NETWORK FOR GREENING THE FINANCIAL SYSTEM, *Workstream “Microprudential/Supervision,”* <https://www.ngfs.net/en/about-us/governance/workstream-microprudential-and-supervision> (last visited March 2, 2020).

³⁶ NETWORK FOR GREENING THE FINANCIAL SYSTEM, *Workstream “Scaling up Green Finance,”* <https://www.ngfs.net/en/about-us/governance/workstream-scaling-green-finance> (last visited March 2, 2020).

³⁷ Justin Lahart, *In Time of Tumult, Obscure Economist Gains Currency*, WALL STREET JOURNAL (Aug. 18, 2007), <https://www.wsj.com/articles/SB118736585456901047> (last visited March 2, 2020).

would promote steady price and valuation changes, avoid dramatic changes, and, thereby, avoid potentially catastrophic losses that are associated with a dramatic and sudden change in market values.

Climate disclosures would also enable policymakers and regulators to understand the market. By seeing how the market reacts to certain information under changing circumstances, policymakers and regulators would be able to make informed decisions and fashion effective and timely remedies.

In addition to disclosure, regulators should begin to collect data and create models that would enable them to carry out meaningful climate-related stress tests. A recent international survey of central bankers and regulators found that while only 15% of respondents include climate-related vulnerabilities in their stress tests, 79% plan to include these vulnerabilities in future stress tests.³⁸ Of course, planning to make a plan will not mitigate climate-related vulnerabilities. Kicking the can down the road never does.

The Dutch Central Bank has been carrying out climate-related stress tests since 2017,³⁹ and last year the Bank of England introduced a framework for its own climate-related stress tests.⁴⁰ Such tests examine banks' ability to cope with the transition to a low-carbon economy. For example, climate-related stress tests would permit regulators to assess how banks would respond to the

³⁸ MAZARS and OMFIF, *Tackling Climate Change: The Role of Banking Regulation and Supervision*, at 7, <https://www.omfif.org/tacklingclimatechange/> (last visited March 2, 2020).

³⁹ DE NEDERLANDSCHE BANK, *Increasing Climate-Related Risks Demand More Action From the Financial Sector* (Oct. 5, 2017), <https://www.dnb.nl/en/news/news-and-archive/dnbulletin-2017/dnb363837.jsp> (last visited March 2, 2020).

⁴⁰ Caroline Binham, *Bank of England to Set Up Tough Climate Stress Tests*, FINANCIAL TIMES (Dec. 18, 2019), <https://www.ft.com/content/bacdb162-217e-11ea-92da-f0c92e957a96> (last visited March 2, 2020).

sudden implementation of a large carbon tax, or what would happen in the event of a fire sale of carbon-based assets.

Conclusion

Transitioning to a low-carbon economy is necessary if we want to create a sustainable climate. But transitioning carries its own dangers, especially if the transition is abrupt and poorly managed and executed. Across the world, central banks and regulators increasingly are recognizing the risks that the transition poses for the financial system.⁴¹ But, unfortunately, the Federal Reserve is not taking these risks seriously. Among the developed world's monetary authorities, the Federal Reserve is one of the few that have not joined the Network for Greening the Financial System. The Network's members read like a who's who of major monetary authorities: the Bank of England, the Bank of Canada, the Bank of Japan, the Swiss National Bank, the European Central Bank, and dozens of others.⁴² The Federal Reserve's conspicuous absence from such an important Network is extraordinary, irresponsible, and almost unbelievable.

Minimizing both physical risks and transition risks is well within the Federal Reserve's mandate⁴³; the Federal Reserve should use its oversight authority to ensure a prudent transition to a low-carbon economy, a transition that does not destabilize the financial system.

⁴¹ See BANK FOR INTERNATIONAL SETTLEMENTS, *The Green Swan: Central Banking and Financial Stability in the Age of Climate Change* (Jan. 2020), <https://www.bis.org/publ/othp31.pdf> (last visited March 4, 2020).

⁴² NETWORK FOR GREENING THE FINANCIAL SYSTEM, *Membership*, <https://www.ngfs.net/en/about-us/membership> (last visited March 2, 2020).

⁴³ See BOARD OF GOVERNORS OF THE FEDERAL RESERVE SYSTEM, *Financial Stability Report – May 2019* (“Promoting financial stability is a key element in meeting the Federal Reserve's dual mandate for monetary policy regarding full employment and stable prices. . . . Monitoring and assessing financial stability also support the Federal Reserve's regulatory and supervisory activities, which promote the safety and soundness of our nation's

And because we are already aware of transition risks, we can foresee the dangers, plan for the future, and take the proper steps to mitigate the risks and promote financial stability. Indeed, if we want to encourage a market reaction to climate change and climate policies that avoids financial instability, we need to foster the development of climate-related financial risk management technology, including the systemic collection, analysis, and transparency of reliable information. If investors could get essential reliable information about the carbon intensity of investments and how firms are adapting to a warmer world, they would be able to assess risks to firms' business models accurately and express their view in the market. They could compare different investments based on their long term viability in a warming world and in a decarbonizing economy. Capital could then become priced to correspond with known climate risks and the evolving reliance and use of fossil fuels. Informed decisions allow us to mitigate the financial impact of climate risks and fashion timely remedies ahead of a crisis. That would ensure more meaningful pricing for investors, encourage sustainable forms of energy production, and smooth our transition to a lower-carbon economy.

Thank you for the opportunity to offer this testimony, and I look forward to your questions.

banks and other important financial institutions.”), <https://www.federalreserve.gov/publications/2019-may-financial-stability-report-purpose.htm> (last visited March 2, 2020).