

# WALL STREET'S CARBON BUBBLE:

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THE GLOBAL EMISSIONS OF THE  
US FINANCIAL SECTOR

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# ACRONYMS AND ABBREVIATIONS

AUM	Assets under management
CDP	Carbon Disclosure Project
CO <sub>2</sub>	Carbon dioxide
CO <sub>2</sub> e	Carbon dioxide equivalent
CRA	Community Reinvestment Act
DOL	U.S. Department of Labor
EIOT	Environmentally extended input-output datasets
FDIC	Federal Deposit Insurance Corp.
FI	Financial institution
FSOC	Financial Stability Oversight Council
GDP	Gross domestic product
GHG	Greenhouse gas
GICS	Global Industry Classification Standard
GFANZ	Glasgow Financial Alliance for Net Zero
GSIB	Global systemically important banks
IPCC	Intergovernmental Panel on Climate Change
LISCC	Large Institution Supervision Coordinating Committee
M&A	Mergers and acquisitions
NZBA	Net-Zero Banking Alliance
PCAF	Partnership for Carbon Accounting Financials
SEC	U.S. Securities and Exchange Commission
SIFI	Systemically important financial institution
TCFD	Task Force on Climate-related Financial Disclosures

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The estimates of financed emissions in this analysis produced using publicly available information should not be seen as conclusive or final, nor do they cover the full range of activities by the selected institutions. The figures presented in this report should be seen as indicative estimates only. The opinions expressed in this report are based on the documents referenced in the endnotes. We encourage readers to read those documents. The information in this report, or on which this report is based, has been obtained from sources that the authors believe to be reliable and accurate. However, no representation or warranty, express or implied, is made as to the accuracy or completeness of any information obtained from third parties.

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# I. EXECUTIVE SUMMARY

In the latest assessment report of the IPCC, scientists warned that “unless there are immediate, rapid and large-scale reductions in greenhouse gas emissions, limiting warming to close to 1.5°C or even 2°C will be beyond reach.”<sup>1</sup> The report affirmed the dire nature of the climate crisis, with impacts that range from severe heat waves, droughts, and wildfires, to flooding, sea level rise, and more.

It is increasingly recognized that these climate-fueled events not only present harrowing impacts to ecosystems and communities, but also to our economy. Extreme weather events will cause physical damage to homes, businesses, infrastructure, and other assets and property. This damage, in turn, will diminish household income, economic productivity, and the ability of owners to pay back the loans or other financing associated with those assets. In addition, the necessary and inevitable transition away from fossil fuels to clean energy and the associated decrease in the value of fossil fuels and bankruptcies in the fossil fuel industry could cause major financial losses for financial institutions, insurers, and asset managers who do not rapidly adjust their portfolios.<sup>2</sup> Unfortunately, this is not only a hypothetical concern. Moody’s Investors Service just released new data showing that “G20 financial institutions have nearly \$22 trillion of exposure to carbon-intensive sectors.”<sup>3</sup>

The combined effect of these so-called physical and transition risks is profound. According to insurance provider Swiss Re, climate change could reduce global GDP by 11 percent to 14 percent by 2050 as compared with a world without climate change.<sup>4</sup> That amounts to a \$23 trillion loss, causing damage that would far surpass the scale of the 2008 financial crisis.<sup>5</sup>

Just like the 2008 crash, the people who will be most affected by the economic effects of climate change are the people who did the



least to cause it: communities of color and low-income communities in the United States and other industrialized countries, as well as the residents of developing nations.

Recognizing the severity of the climate crisis, President Joe Biden has pledged to reduce U.S. emissions 50 percent to 52 percent below 2005 levels by 2030.<sup>6</sup> However, the United States is currently not on track to meet this target.<sup>7</sup>

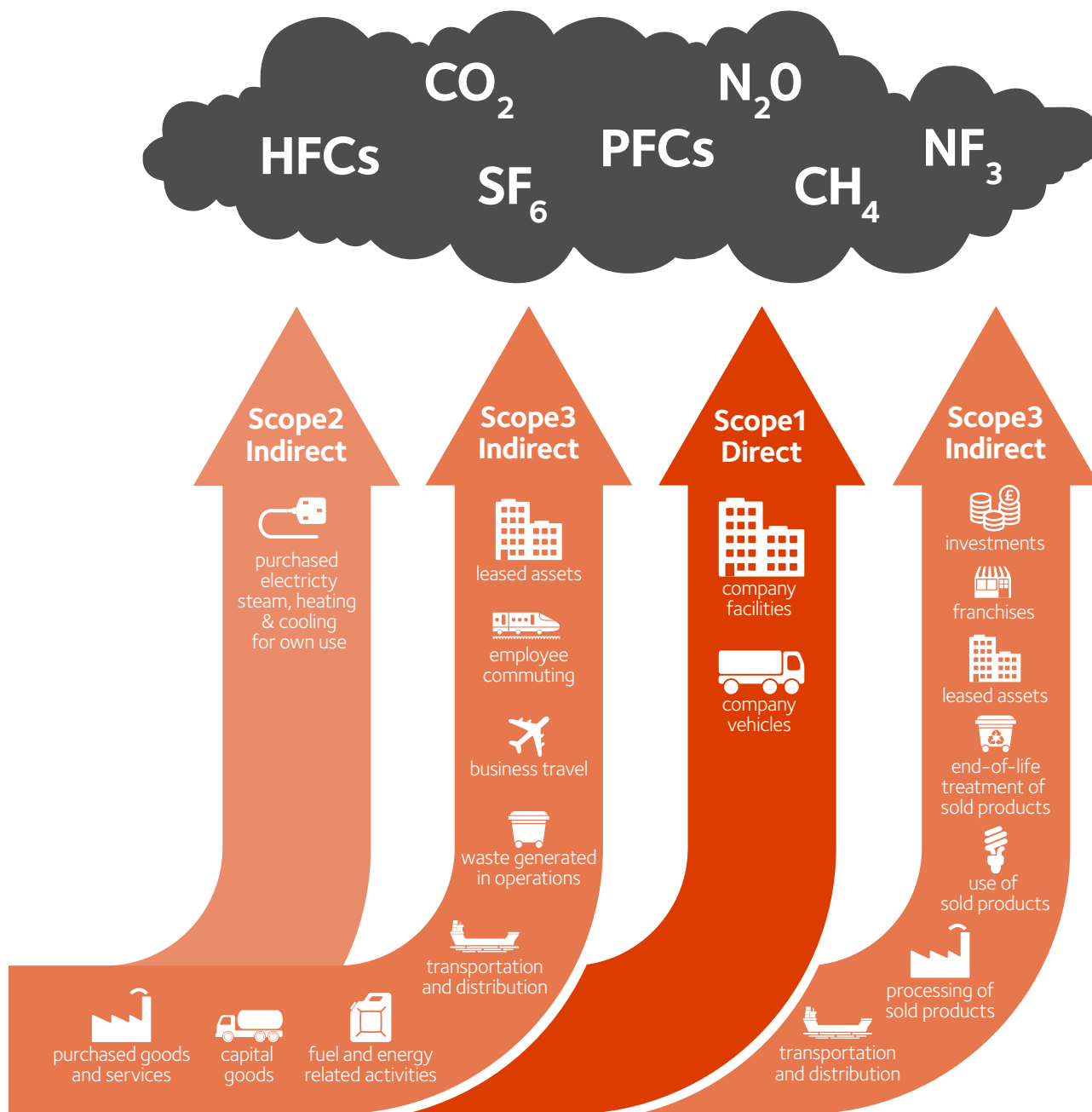
If we are going to avert the worst ecological impacts of climate change and avoid another financial crisis potentially far more dire than that of 2008, then the Biden administration and financial regulators must address emissions from the industry that is both fueling the climate crisis and threatening economic stability: the U.S. financial sector.

Closing the gap between U.S. emissions reductions goals and the actual U.S. emissions

trajectory is a crucial first step toward avoiding the worst impacts of climate change, including economic impacts that may be far more severe than those of 2008. The Biden administration and financial regulators must act quickly and decisively not only to address the emissions of the fossil fuel and other high-carbon emitting industries but to address the sector that drives them: the U.S. financial sector. Just as with 2008, large banks and other financial institutions are making potentially-catastrophic bets on doomed assets, and it would be reckless to trust them to self-regulate this time around.

To that end, the aim of this report is to shed light on the role that the U.S. financial sector plays in contributing to climate change through the emissions the sector finances and to highlight the most meaningful actions that the Biden administration and financial regulators can take to curb financial sector investments in an increasingly risky fossil fuel sector.

Figure 1: Overview of GHG Protocol scopes and emissions across the value chain



Using solely publicly available data, this report provides an indicative assessment of the size of the global carbon footprint that is financed by some of the largest U.S. financial entities—referred to in this report as U.S.-financed emissions. To estimate emissions from the lending and investment activities by these entities, our research uses the methodological principles of the Greenhouse Gas (GHG) Protocol’s Category 15: Investments<sup>8</sup> and the application guidelines provided by the Partnership for Carbon Accounting Financials (PCAF) in the Global GHG Accounting and

Reporting Standard for the Financial Industry.<sup>9</sup> This approach calculates a portion of the indirect (Scope 3) emissions of reporting financial institutions, currently covering the borrowers’ and investees’ total (absolute) Scope 1 and Scope 2 emissions (i.e., operations and offices) across a range of economic sectors.

The researchers selected asset managers based on the value of their assets under management (AUM), commonly referred to as their “size.” Banks were selected based on their

Large Institution Supervision Coordinating Committee (LISCC) designation, which takes into account size and systemic importance.<sup>10</sup> This analysis thus includes a universe of eight banks and 10 asset managers (see Annex I), a fraction of all U.S. banks and asset managers. All entities are headquartered in the United States, and the global emissions associated with only these entities are included in this analysis. This means the analysis does not include the emissions financed by non-U.S. incorporated entities within the same parent company.

The process of researching and writing this report revealed critical limitations with respect to disclosures and PCAF methodology. Although PCAF is the most established of the carbon accounting methodologies and has provided a global standard with options to account for financed emissions, the standard still has gaps for both banks and insurers.<sup>11</sup>

Notably, PCAF's methodology does not currently incorporate or provide guidance for the accounting of Scope 3 emissions of any underlying loan or investment. This is in part due to substantial variation in the comparability, coverage, and reliability of data. For example, if a bank provided a loan to Exxon related to its oil drilling or refining operations, the Scope 3 emissions of Exxon—the combustion of the oil, in this example—would not be captured using the PCAF methodology. Considering that Scope 3 emissions account for an estimated 88 percent of total emissions from the oil and gas sector, this is an important limitation.<sup>12</sup> The exclusion of Scope 3 therefore means that the overall indicative figure for this assessment is likely a significant underestimate of the actual financed emissions of the entities selected.

PCAF's methodology also does not include the emissions associated with insurance underwriting or the securities underwriting and advisory services of banks. This is significant since, according to Rainforest Action Network et al., underwriting of bond and equity issuances accounted for 65 percent of bank financing for fossil fuels in 2020.<sup>13</sup>

Additionally, the research on asset managers only includes fixed income and equity, due to limitations in public reporting by asset managers that does not include other asset classes. This means that while the asset managers included in this analysis together manage 61 percent of the total U.S. AUM, only 21 percent was included in the indicative calculation. As previously stated, insurers were also excluded due to the lack of public disclosure and external methodology to calculate their carbon emissions.

Despite these and other limitations, our results found that just the portions of the portfolios of the eight banks and 10 asset managers studied in this report financed an estimated total of 1.968 billion tons CO<sub>2</sub>e based on year-end disclosures from 2020. (This total includes 668 million tons CO<sub>2</sub>e from banks and 1.3

billion tons CO<sub>2</sub>e from asset managers.) To put this figure in perspective:

- **If the financial institutions (FIs) in this study were a country, they would have the fifth largest emissions in the world, falling just short of Russia.**<sup>14</sup>
- **Financed emissions from the 18 institutions covered in this report are equivalent to 432 million passenger vehicles driven for one year.**<sup>15</sup>
- **Financed emissions from the eight banks studied in this report are equivalent to 80 million homes' energy use for one year.**<sup>16</sup>
- **Financed emissions from the 10 asset managers studied in this report are equivalent to 3 billion barrels of oil consumed.**<sup>17</sup>

Despite the scale of U.S.-financed emissions, discussions around how to steer the investments of the financial industry have focused mainly on the role of enhanced climate risk disclosure based on the assumption that with expanded disclosure, the market will correct itself. While enhanced disclosure is absolutely critical, it alone is not sufficient to deter financial institutions from fueling the climate crisis. In fact, financial institutions are not only continuing to heavily finance the fossil fuel industry, they are increasing their support for the industry: total fossil fuel financing from banks in 2020 was higher than in 2016, the year immediately following the signing of the Paris Agreement.<sup>18</sup>

Given the scale of U.S.-financed emissions and the severity of risks to our economy, communities, and planet, climate risk disclosure must be both strengthened *and* accompanied by ambitious regulatory action that mitigates these risks. There is broad recognition among policymakers and financial institutions that climate change poses significant threats to financial stability. It is, therefore, well within the mandate of banking and financial regulators to address climate change. However the urgency and severity of the risk requires we look beyond mandates to duty. To fulfill their missions of ensuring fair and orderly markets, ensuring the safety and soundness of banks, and maintaining the stability of the financial system, it is necessary that regulators act on climate change.<sup>19</sup>

To that end, we urge the Biden administration and financial regulators to swiftly take the following actions.

## Capital markets regulation

In order to mitigate the climate-related financial risks posed by asset managers' continued investment in fossil fuels and other high carbon-emitting industries, regulators should:

- **Mandate specific and robust climate-related disclosures:** The U.S. Securities and Exchange Commission (SEC) should establish robust reporting requirements for all companies so that investors can more accurately assess risk exposure. These should include disclosure by all financial institutions of the emissions embedded in their portfolios and the emissions attributable to the businesses for whom banks provide services. In each case, the portfolio emissions should include the Scope 1, Scope 2, and Scope 3 emissions of lenders, investees, and clients. According to a 2021 Center for American Progress paper by Alexandra Thornton and Tyler Gellasch, "Currently, the lack of standardized metrics, underlying data, assumptions, and methodologies—in addition to the voluntary nature of existing frameworks—has resulted in unreliable, inconsistent, and non-comparable disclosures."<sup>20</sup>
- **Ensure fiduciary responsibility and follow-through:** The SEC and U.S. Department of Labor (DOL) should create mechanisms to ensure that investment fiduciaries are acting upon the commitments they make to investors and the public. This should include commitments related to how fiduciaries will invest and how they will vote their shares.
- **Incorporate climate risk into the SIFI designation process:** The Financial Stability Oversight Council (FSOC) should incorporate climate risk into assessing whether nonbank financial institutions could pose a threat to U.S. economic stability and, therefore, be labeled as systemically important financial institutions (SIFI). Under the Dodd-Frank Act, the Federal Reserve is expected to supervise and regulate a SIFI in order to mitigate the risks it poses to the financial system.<sup>21</sup>

## Supervision and regulation of banks

Proper supervision and management are critical to ensuring that banks mitigate climate-related risks and make less risky choices. To that end, regulators should:

- **Issue supervisory guidance on climate-related risks:** Regulators should issue supervisory guidance on how to consider climate-related risks in the supervisory and examination processes. To make sure that banks take this guidance seriously, regulators should “incorporate climate risk into the supervisory ratings they assign to banks.”<sup>22</sup>
- **Incorporate climate risk into stress tests:** Bank regulators should establish and regularly administer climate-related stress tests that help identify their exposure to risks from climate change. Banks, too, should be required to run their own company-run stress tests. A September 2021 study published by the Federal Reserve Bank of New York provides a starting point for such tests; its methodology provides a process for identifying assets within a bank’s portfolio that are vulnerable to climate-related shocks and then calculating the likely capital shortfall resulting from such a shock.<sup>23</sup> Following stress tests, banks should be required to submit plans that outline how they will adjust their practices in order to mitigate their exposure to climate-induced financial risks.<sup>24</sup>
- **Develop scenario analysis:** As a complement to short-term focused stress tests, regulators should require that banks develop enhanced scenario analysis to assess longer-term vulnerabilities. Scenarios should include a variety of possible outcomes, including a 1.5°C-aligned scenario with little to no overshoot and limited reliance on carbon offsets and unproven negative emissions technologies in order to help assess climate-related risks.
- **Establish a reinvigorated Volcker Rule:** Passed as part of Dodd-Frank, the Volcker Rule prevents banks from making certain

types of speculative investments, such as those that contributed to the 2008 financial crisis. Bank regulators under the Trump administration weakened this Rule by loosening some of the restrictions on banks. The Biden administration should reverse these changes to reinstate a robust Volcker Rule. As part of a strong Volcker Rule, regulators should require that banks “ascertain the climate risk of investments structured to fall within exceptions to the Volcker Rule prohibitions, including exposure to the fossil fuel industry and coal- or gas-fired power plants” and “disclose to regulators and the public details of the exposure.”<sup>25</sup>

- **Prioritize economic and racial justice in the design of risk mitigation policies:** While taking steps to ensure that banks prudently manage climate risk, regulators must proactively address racial and economic justice issues that intersect with such climate-risk related reforms. According to Evergreen Action,

*Regulators should also take steps to drive investment in equitable green finance to ensure our transition to a clean energy economy is smooth and equitable. One way to do that is by improving the implementation of the Community Reinvestment Act (CRA), which was passed in 1977 with the goal of promoting investment in low- and moderate-income communities, to clarify that the climate needs of those communities meet the standards for CRA lending.*<sup>26</sup>

In addition, regulators should also provide for more stringent application of CRA requirements to ensure that they actually promote needed investment, including in climate mitigation and adaptation, for low- and moderate-income families.

### Capital requirements of banks

In order to help ensure that banks can internalize climate-related risks, start mitigating those risks, and reduce their overexposure to climate-related financial risk throughout the U.S. financial system, regulators should:

- **Increase risk weighting for fossil fuels:** Regulators should increase risk weights for fossil fuel assets, and banks should be required to fund riskier investments with more equity capital and less debt. According to a 2021 Center for American Progress report authored by Gregg Gelzinis, the risk weights should be calibrated based on several factors, including: “1) the extent to which the company generates revenue from fossil fuel-related activities; 2) differentiation in transition risk intensity among oil, gas, and coal exposures; and 3) the length of the exposure.”<sup>27</sup>
- **Implement climate risk surcharges on global systemically important banks (GSIBs):** Regulators should implement a climate risk surcharge on GSIBs. This would force banks to internalize costs associated with risky fossil fuel financing and, therefore, help ensure banks’ resilience to systemic risks.<sup>28</sup> The size of the surcharge should correspond with the firm’s climate risk contribution score, which would use the bank’s financed emissions as a proxy.
- **Tighten limits for exposure to segments of the fossil fuel industry and to climate risk overall:** Regulators should set concentration limits to segments of the fossil fuel industry in order to limit the exposure of lenders and identify ways to lower the overall exposure that banks face to climate risk without negatively impacting availability of credit to low-income communities and communities of color.
- **Adjust deposit insurance premiums to reflect climate-related risks:** The Federal Deposit Insurance Corp. (FDIC) should adjust deposit insurance premiums to reflect those climate-related risks to banks. This is in alignment with the Federal Deposit Insurance Corporation Improvement Act, which mandates that the FDIC set higher premiums based on higher risks faced by banks.<sup>29</sup>

## II. INTRODUCTION

In the latest assessment report of the Intergovernmental Panel on Climate Change (IPCC), scientists warned that “unless there are immediate, rapid and large-scale reductions in greenhouse gas emissions, limiting warming to close to 1.5°C or even 2°C will be beyond reach.”<sup>30</sup> The report affirmed the dire nature of the climate crisis, with impacts that range from severe heat waves, droughts, and wildfires, to flooding, sea level rise, and more.

Now, shortly after the 26th Conference of the Parties (COP26) to the U.N. Framework Convention on Climate Change, and after another season of climate-fueled disasters in the United States<sup>31</sup> and around the world,<sup>32</sup> the urgency for ambitious action on climate change has never been greater.

While President Biden has raised climate ambition, pledging to reduce U.S. emissions 50 percent to 52 percent below 2005 levels by 2030, the United States is currently not on track to meet this goal.<sup>33</sup> Despite the need to close the gap in our current emissions trajectory and climate targets, the U.S. financial sector—which finances greenhouse gas emissions equal nearly to that of the entire nation of Russia—is often sidelined from political and policy discussions on emissions reduction strategies.

If the Biden administration and financial regulators do not address the global emissions made possible by the support of the U.S. financial sector—referred to in this report as U.S.-financed emissions—the consequences will be dire for not only our climate but also our economy.

Extreme weather events threaten physical damage to homes, businesses, infrastructure, and other assets—all of which will diminish household income, economic productivity, and the ability of owners to pay back the loans or other financing associated with those assets. In addition, the necessary and

inevitable transition away from fossil fuels to clean energy poses complex challenges to market stability. If the administration does not prioritize a managed transition away from a fossil fuel-based energy system and economy, the transition could be unnecessarily chaotic and full of economic shocks. If not well managed, the associated decrease in the value of fossil fuels and bankruptcies in the industry could cause major financial losses for financial institutions, such as banks, asset managers, and insurers who do not rapidly adjust their portfolios.<sup>34</sup> Due to the potential magnitude of the losses, these consequences would spread throughout the financial system and lead to dire impacts for the entire U.S. economy.

The combined effect of these so-called physical and transition risks is profound. For

example, according to insurance provider Swiss Re, climate change could reduce global GDP by 11 percent to 14 percent by 2050 as compared with a world without climate change.<sup>35</sup> That amounts to a \$23 trillion loss, causing damage that would far surpass the scale of the 2008 financial crisis.<sup>36</sup> Moody’s Investors Service recently released new data showing that “G20 financial institutions have nearly \$22 trillion of exposure to carbon-intensive sectors.”<sup>37</sup>

Just like the 2008 crash, the people who will be most affected by the economic effects of climate change are the people who did the least to cause it: communities of color and low-income communities in the United States and other industrialized countries, as well as the residents of developing nations.





## FOSSIL FUEL ASSETS: THE NEW SUBPRIME MORTGAGES?

In order to keep global warming under 1.5 degrees Celsius, there is a finite limit to total emissions, known as the “carbon budget.” To remain within that budget, global net anthropogenic CO<sub>2</sub> emissions must decline by 45 percent from 2010 levels by 2030.<sup>38</sup> This will require a rapid phase-out of the largest sources of emissions, including emissions from fossil fuel production.

Unfortunately, the potential emissions from currently operating oil, gas, and coal fields and mines alone would send the world past 2°C of warming.<sup>39</sup> Instead of heeding warnings, the fossil fuel industry plans to increase production through 2030, producing twice as much emissions as the carbon budget allows.<sup>40</sup> This means that, if the world is to achieve the 1.5°C warming limit, a portion of existing fossil fuel projects will turn into “stranded assets,” defined by the International Energy Agency as “those investments which have already been made but which, at some time prior to the end of their economic life... are no longer able to earn an economic return.”<sup>41</sup> Companies are therefore raising and spending capital for projects that will not provide the returns investors expect.

The market is now carrying a significant amount of “unburnable carbon.” This means, according to Ben Caldecott, there is a “disconnect between the current value of the listed equity of global fossil fuel producers and their potential commercialisation under a strict carbon budget constraint.”<sup>42</sup> This disconnect is termed the “carbon bubble.”

As described in a paper by David Comerford and Alessandro Spignati:

*[A]nalogously to the subprime mortgage problem that precipitated the 2008–09 Financial Crisis, the global economy is once again mis-pricing assets as markets overlook this ‘unburnable carbon’ problem. This issue is termed the ‘Carbon Bubble’ because the imposition of climate policy consistent with the Potsdam Climate Institute’s calculations would mean the fundamental value of many fossil fuel assets must be zero as they cannot be used. Their current market value must therefore be made up of a zero fundamental value, and a ‘bubble’ component: the Carbon Bubble.<sup>43</sup>*

The scale of this mispricing problem is significant. According to Carbon Tracker Initiative, “governments and global markets are currently treating as assets reserves equivalent to nearly 5 times the carbon budget for the next 40 years.”<sup>44</sup> Based on some estimates, the impact of losses from stranded fossil fuel assets may “amount to a discounted global wealth loss of \$1–4 trillion.”<sup>45</sup>

As demonstrated in this example, the continued refusal by companies and financial institutions to adapt their business activity to align with a carbon-constrained future in a timely manner may lead to large losses in value throughout the global financial system. If asset repricing occurs abruptly, this inaction will lead to sudden, painful financial and economic shocks that could precipitate a global financial crisis.

There is now an emerging consensus about the risks that climate change poses to our economy and increased attention—including from voices within the financial sector—to the role that financial institutions must play in a managed transition. For example, insurance giant Swiss Re stated, “Climate change poses the biggest long-term risk to the global economy.”<sup>46</sup> The Network of Central Banks and Supervisors for Greening the Financial System, which includes nearly 100 central banks and supervisors, is working to share best practices with respect to environment and climate risk management in the financial sector.<sup>47</sup>

In a recently released report from the FSOC, chaired by Treasury Secretary Janet Yellen, U.S. financial regulators collectively affirmed, “Climate change is an emerging threat to the financial stability of the United States.”<sup>48</sup> FSOC regulators further acknowledged their role in addressing climate-related financial risks: “It is the responsibility of the Council and its members to ensure the financial system’s resiliency to climate-related financial risks.”<sup>49</sup> The Federal Reserve has also acknowledged the climate change-related financial risks to our economy.<sup>50</sup> Treasury Secretary Janet Yellen has said that “climate change is an existential risk to our future economy.”<sup>51</sup> And

President Biden, in a May 2021 executive order, not only acknowledged the climate-related financial risks but also called for strategies to “mitigate the risk and its drivers, while accounting for and addressing disparate impacts on disadvantaged communities and communities of color.”<sup>52</sup>

Despite this normative progress, the U.S. financial sector has not yet responded in a manner that suggests an understanding of either the scale of the crisis or the sector’s role in causing it. Much-lauded climate efforts are largely voluntary in nature and lack detailed measurable targets for near-term emissions reductions. Even when it comes to such voluntary initiatives, U.S. financial institutions are lagging behind their European peers, despite their outsized role in contributing to global financed emissions.<sup>53</sup> For example six U.S. banks—JPMorgan Chase, Citi, Wells Fargo, Bank of America, Morgan Stanley, and Goldman Sachs—rank in the top 15 of the biggest financiers of fossil fuels in the world.<sup>54</sup> And the top four financiers of fossil fuels are all U.S. banks: JPMorgan Chase, Citi, Wells Fargo, and Bank of America.<sup>55</sup>

This is not surprising given the lack of any requirements for 1.5°C-aligned fossil fuel

phase-outs for members of such voluntary initiatives as the Net-Zero Banking Alliance (NZBA) sub-sector of the Glasgow Financial Alliance for Net Zero (GFANZ). Due to the lack of concrete targets, campaigners have warned GFANZ leadership that signatory banks may use the voluntary initiative to greenwash their image by promising to meet ambiguous and largely rhetorical commitments that fail to translate into meaningful reductions in financed emissions.<sup>56</sup>

To protect our climate, our economy, and communities across the globe, the Biden administration and U.S. financial regulators must take ambitious action to curb lending from the U.S. financial sector to fossil fuels and other high carbon-emitting sectors. To that end, this report will:

- Describe the approach and scope used to determine U.S.-financed emissions
- Present key findings which demonstrate the extent of U.S.-financed emissions
- Present the case for regulation
- Lay out key recommendations for the Biden administration and financial regulators

# III. APPROACH AND SCOPE

## APPROACH OVERVIEW

Carbon accounting is the process of consistently measuring, tracking, and reporting GHGs generated, avoided, or removed by an entity over time. The Global GHG Accounting and Reporting Standard (“the standard”) devised by the PCAF is the leading carbon accounting methodology for estimating the carbon emissions financed by banks and other financial institutions. It incorporates the established carbon accounting standard, the Greenhouse Gas Protocol. To estimate emissions from lending and investment activities by the selected entities, the researchers followed and applied the methodological principles of the GHG Protocol’s Category 15: Investments<sup>57</sup> and the application guidelines provided by the PCAF.<sup>58</sup>

Financial data were sourced from public disclosures such as regulatory disclosures for banks (10-K forms and Pillar 3 disclosure) and fund identifiers for asset managers, which provide the fund composition and investment weight in most cases. For asset managers, reported emissions data for holdings were sourced from company-level disclosures in sustainability reports, as well as disclosures to institutions such as the Carbon Disclosure Project (CDP) and the Task Force on Climate-related Financial Disclosures (TCFD). Financial data for holdings were sourced from the company or issuer’s annual reporting.

The analysis was completed using the year-end disclosures from 2020. Full details of the methodology and its limitations are set out in sections VII and VIII.

While substantial limitations and barriers described in section VIII likely resulted in a significant underestimate of financed emissions, it is worth noting that the approach taken by this analysis differs from prior efforts to calculate financed emissions of banks or asset managers. This is due to the scope of the assessment, which does not focus only on carbon-intensive sectors but expands across several asset classes, geographies, and industries beyond those related to fossil fuels. As a result, the level of granularity of the calculations and values differ from previous efforts and is more holistic in nature.

## SCOPE OVERVIEW

In order to assess the U.S. financial sector’s emissions, the researchers first determined which financial institutions and which of the emissions within the industry’s complex chain of operations would be included in this analysis. Entities were selected based on their size in terms of AUM and/or their systemic importance as defined by U.S. regulators. All entities are headquartered in the United States and the global emissions associated with only these entities are included in the indicative analysis. This means the analysis does not include the emissions financed by non-U.S. incorporated entities within the same parent company. It is important to note that this is not a complete list of financial entities in the United States but, by accounting for some of the largest entities in the sector, it aims to be an indicative sample.

## LIST OF ENTITIES

The list of entities selected for analysis of U.S.-financed emissions includes banks

and asset managers. Insurance providers are omitted from the analysis due to data and methodological limitations. The initial basis of selection was based on the level of representation and importance a financial institution has within the U.S. financial sector, as defined by regulatory entities and/or its share of the market.

The selection of U.S.-incorporated banks and U.S. entities of internationally headquartered banks was based on the list of institutions outlined in the LISCC supervisory program. All firms currently outlined by the committee are covered by the assessment.

The selection of asset managers (incorporated in the United States) was based on the value of their AUM in 2020. The 10 entities selected represent close to 60 percent of the total AUM from all asset managers headquartered in the United States. Based on the size and coverage of these entities, the researchers considered this an indicative sample of asset management activities in the United States, particularly the industrial and sectoral exposure of asset managers. See Annex I for a full list of entities.

Where an entity may fall under more than one investor type or is a subsidiary of a larger group and evaluated under another investor type, the researchers assessed data availability to avoid duplication in the final report. For example, although Goldman Sachs and BNY Mellon are both banks and have an asset management branch, the emissions associated with the activities of each entity are calculated and reported separately.

# IV. KEY FINDINGS

## THE U.S. FINANCIAL SECTOR: A HIGH-CARBON SECTOR

Despite the limitations and barriers discussed in Section VIII and the limited subset of institutions and portfolios studied, our results found that in 2020, banks and asset managers analyzed in this study financed at least an estimated 1.968 billion tons CO<sub>2</sub>e based on year-end disclosures.

**To put this figure in perspective, if the financial institutions in this study were a country, they would have the fifth largest emissions in the world, falling just short of Russia.<sup>59</sup>**

Banks financed an estimated total of 668 million metric tons of carbon dioxide equivalent (tCO<sub>2</sub>e) through the \$5.3 trillion of credit exposure assessed by the researchers. And asset managers financed an estimated total of 1.3 billion tCO<sub>2</sub>e with more than \$27.3 trillion in AUM.

Moreover, with respect to banks, we found:

- Financed emissions from the eight banks studied in this report are equivalent to 145 million passenger vehicles driven for one year or 80 million homes' energy use for one year.<sup>60</sup>
- The utilities, energy, and materials sectors contributed the most to the overall emissions when aggregated for all banks, accounting for an estimated 37 percent of total financed emissions.
- Residential mortgages, or residential real estate loans, account for close to 15 percent of overall credit exposure and have a notable contribution to overall emissions as the fifth-largest contributor.

With respect to asset managers, we found:

- Financed emissions from the 10 asset managers are equivalent to 287 million passenger vehicles driven for one year or

3 billion barrels of oil consumed.<sup>61</sup>

- The utilities, energy, and materials sectors contributed the most to the overall emissions when aggregated for all asset managers, accounting for an estimated 74 percent of total financed emissions. However, these three sectors accounted for only 7 percent of total AUM.
- The IT, financial, and healthcare sectors have the greatest value of AUM among the sample analyzed, accounting for 38 percent of total investment weight. However, these sectors only account for 5 percent of total emissions estimated.

## LIKELY A SIGNIFICANT UNDERESTIMATE OF FINANCED EMISSIONS

This analysis was carried out in alignment with the guidelines set by PCAF, the most established of the carbon accounting methodologies. Although PCAF has provided a global standard with options to account for financed emissions, the standard still has gaps for both banks and insurers as well as for some of the instruments handled by asset managers.

Existing carbon accounting methodologies note that capital providers and owners generate financed emissions but exclude emissions associated with service providers. Guidance on accounting for service provision, such as insurance and securities underwriting and mergers and acquisitions (M&A) advisory, is not yet provided. This is important as underwriting of securities is increasingly the mechanism by which banks support high-carbon industries. Rainforest Action Network et al. found that 65 percent of the 2020 fossil fuel financing it identified was provided through such services.<sup>62</sup>

Similarly, the emissions associated with key asset classes for asset managers, such as currency and derivatives, cannot be captured under available methodologies. Taken together

these exclusions create a substantial limitation, as key activities for banks and asset managers could not be assessed.

Furthermore, the standard covers only the emissions associated with absolute Scope 1 and Scope 2 emissions across all sectors. Therefore, analysis being carried out by the finance sector does not incorporate Scope 3 emissions of any loan or investment. As noted by the standard, there is substantial variation in the comparability, coverage, transparency, and reliability of Scope 3 data per sector and data source. The exclusion of Scope 3 likely means that the overall indicative figures in this assessment—substantial as they are—are likely a significant underestimate.

Exclusion of key financing activities and Scope 3 from even the leading carbon accounting methodologies present financial institutions, regulators, and governments with a deceptively positive assessment of their financed emissions and climate impact. Until such gaps are filled, and until both financial and nonfinancial entities are required to disclose their Scope 3 emissions, the true extent of financial institutions' exposure to and contribution to climate risk will be misjudged and underestimated.

Finally, in addition to the limitations of PCAF, the estimates of financed emissions in this report are likely a significant underestimate for several reasons. First, the figures in this report are based on research of eight banks and 10 asset managers. While the entities were selected based on their importance and/or size in terms of AUM and/or their systemic importance as defined by US regulators, it is still just a sample of U.S. financial institutions. Moreover, due again to limitations associated with PCAF, only a sample of the portfolios of each financial institution were assessed. In particular, the emissions associated with key asset classes beyond equity and fixed income, such as sovereign debt, money markets, currency, and derivatives cannot be captured under available methodologies.

# V. THE CASE FOR REGULATION

## THE IMPACTS OF U.S.-FINANCED EMISSIONS

The findings of this report make clear that the U.S. financial sector is a major contributor to climate change. Given that the indirect emissions of the U.S. financial sector are just below the total emissions of Russia, it should be considered a high-carbon sector and treated as such. Therefore, if President Biden and his administration do not put in place measures to mitigate U.S.-financed emissions, the United States will almost certainly fall far short of its targets to achieve a 50 percent to 52 percent reduction from 2005 levels in 2030 and net zero emissions economy-wide by no later than 2050.

The implications of falling short would be dire. Continued unfettered emissions supported by the financial industry would mean that the deadly wildfires, droughts, heat waves, hurricanes, floods, and other extreme weather events that Americans and communities around the world are already experiencing will

only become worse, and efforts to mitigate emissions will only become more challenging and costly.

Ironically, the financial sector itself is at great risk from the very emissions that it is financing. As noted above, the physical damage to homes, businesses, property, crops, infrastructure, and other assets caused by extreme weather events has ripple effects in our economy. For example, owners of these assets may no longer be able to pay back the loans or other financing as a result of the damage. Household wealth can decrease, and overall economic productivity in areas affected by extreme weather events can plummet. In addition, the necessary and inevitable transition away from fossil fuels to clean energy, and the associated decrease in the value of fossil fuels and bankruptcies in the industry, could cause major financial losses for financial institutions, insurers, and asset managers who do not rapidly adjust their portfolios.<sup>63</sup>

These physical and transition risks threaten to destabilize our entire financial system and economy if not addressed through proactive policymaking to ensure a managed transition. Some estimates show that climate change could cut global economic output by 11 percent to 14 percent by 2050, amounting to \$23 trillion in global economic losses.<sup>64</sup> To put this figure in context, \$23 trillion is equivalent to three to four times the scale of the 2008 financial crisis.<sup>65</sup>

Low-income communities and communities of color are already disproportionately vulnerable to climate and economic shocks due to systemic racism and inequality. For example, catastrophic flooding disproportionately harms Black neighborhoods.<sup>66</sup> These same communities would be disproportionately impacted by a climate-induced financial crisis, as we saw with the 2008 financial crisis, which widened the already yawning racial wealth gap.<sup>67</sup> The longer U.S. regulators wait to address emissions financed by U.S. firms, the more severe the impacts will be.



## WHY DISCLOSURE ALONE IS NOT ENOUGH

Much of the initial discussion around how to steer the investments of the financial industry has been focused on the role of climate-risk disclosure. Disclosure is an essential and foundational step in mitigating market risk. However, disclosure alone is not enough and must be paired with prudential regulation. Proponents of a disclosure-only approach advocate that once information on climate risks is available, the market will appropriately price those risks. The accurate pricing of risk—one of the essential functions of the securities markets—would, in theory, lead financial actors to make better investment decisions, without the need for additional regulatory tools.

Many of the world's biggest public companies support this approach. The TCFD, which was established to develop recommendations on climate-related disclosures, is now supported by more than 1,500 institutions with a combined market capitalization of \$12.6 trillion.<sup>68</sup>

While voluntary frameworks such as the TCFD are important, voluntary climate risk disclosure regimes alone are insufficient to deter financial institutions from fueling the climate crisis. Based on the outcomes of the financial crisis of 2008, it is likely that those in charge of the largest financial institutions expect to receive taxpayer-funded assistance from the government if their failures to manage climate risks lead to a financial crisis. This moral hazard disincentivizes financial institutions from prudently managing risk, meaning that even with stronger, more specific mandatory disclosure policies, financial institutions are working under the wrong set of incentives in regards to risk management. Even mandatory disclosure does not address this issue. Rather, policies are required that prohibit financial institutions from externalizing the consequences of their risky behavior.

Financial institutions' investment patterns bear this out: While participating in voluntary disclosure regimes, they are continuing to heavily finance the increasingly risky fossil fuel industry. In the five years after adoption of the Paris Agreement in December 2015, the world's largest 60 banks have provided \$3.8 trillion to the fossil fuel industry.<sup>69</sup> Moreover, financing in 2020 remained higher than in 2016, demonstrating that financing has not only continued, but increased. U.S. banks, as noted above, have led the way in financing these risky investments.<sup>70</sup>

## WHILE DISCLOSURE IS AN IMPORTANT FOUNDATION FOR UNDERSTANDING CLIMATE RISK, IT MUST BE BOTH STRENGTHENED AND ACCOMPANIED BY AMBITIOUS REGULATORY ACTION TO MITIGATE RISKS.

Another issue with voluntary regimes is a lack of standardization, and thus a lack of comparability and consistency of disclosures. This undermines one of the purported goals of frameworks such as the TCFD, which is for "investors, lenders, and insurers" to "have a clear view of which companies will endure...as the environment changes."<sup>71</sup> When companies can opt in or out of disclosures, it reduces comparability and the ability for market participants to reliably form a clear picture across an entire industry. In fact, it increases the risk of information asymmetry, which could distort participants' decisions.

Additionally, disclosed information only affects behavior if it is deemed salient by the intended audience. Voluntary disclosure regimes are not accompanied by any liabilities or penalties for false or misleading data. If market participants deem voluntary climate disclosures to be of poor quality, and thus not salient, the potential for such disclosures to impact decision-making is further reduced.

## FROM DISCLOSURE TO MITIGATION

In short, the theory that disclosure is an adequate driver of action that preempts the need for additional regulation is too often disproven. Given the scale of U.S.-financed emissions and the severity of risks to our economy, communities, and planet, general climate risk disclosure can no longer be the sole, or even primary, intervention to drive the financial sector towards climate action. While disclosure is an important foundation for understanding climate risk, it must be both strengthened and accompanied by ambitious regulatory action to mitigate risks. As outlined earlier, the voluntary pledges from alliances such as GFANZ may not get the U.S. banking industry where it needs to be if the industry is indeed serious about managing its exposure to risky fossil fuel investments and keeping warming to 1.5°C.

Regulators in other countries have acknowledged this and are now moving towards implementing policies to begin *mitigating* climate-related financial risk.

Both the European Central Bank and The Bank of England recently announced plans to begin exploring the possible introduction of increased capital requirements that would add higher risk weights for certain unsustainable assets held by banks.<sup>72</sup> According to the European Central Bank, "To ensure financial stability, the unique features and the systemic dimensions of climate-related risks may require the application of macroprudential policies complementary to banks' own risk management and direct supervision."<sup>73</sup> The government of India also recently committed to "exploring how climate scenario exercises can be used to identify vulnerabilities in RBI [Reserve Bank of India] supervised entities' balance sheets, business models and gaps in their capabilities for measuring and managing climate-related financial risks" as well as integrating climate into regular financial stability monitoring.<sup>74</sup> Banque de France has also emerged as a leader on this issue. The French central bank has gone further than other central banks by including a phased withdrawal from fossil fuel investments in its Responsible Investment Charter.<sup>75</sup>

Thankfully, the Biden administration, regulators, and supervisors already have the tools they need to catch up to their counterparts in other countries and develop substantive regulation of the financial sector to mitigate risk and reduce U.S.-financed emissions. After the financial crisis of 2008, Congress passed the Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010 to help promote financial stability in the United States.<sup>76</sup> Importantly, Dodd-Frank created the FSOC, a body composed of financial regulators with the express mandate of "identifying risks to the financial stability of the United States; promoting market discipline; and responding to emerging risks to the stability of the United States' financial system."<sup>77</sup> As this report makes clear, climate change may in fact be the ultimate threat to U.S. financial stability. It is therefore not only within the mandate of financial regulators to address climate change, but necessary to fulfill their mission of maintaining U.S. financial stability.

# VI. RECOMMENDATIONS

Given the substantial levels of financed emissions and the risks associated with them, this report recommends that the Biden administration and banking and financial regulators take the following regulatory actions.

## Capital markets regulation

In order to mitigate the climate-related financial risk of asset managers, regulators should:

- **Mandate specific and robust climate-related disclosures:** The SEC should establish robust reporting requirements for all companies so that investors can more accurately assess risk exposure. These should include disclosure by all financial institutions of the emissions embedded in their portfolios and the emissions attributable to the businesses to whom investment banks provide services. In each case, the portfolio emissions should include the Scope 1, Scope 2, and Scope 3 emissions of lenders, investees, and clients. Currently, the lack of standardized metrics, underlying data, assumptions, and methodologies—in addition to the voluntary nature of existing frameworks—have not resulted in reliable, consistent, and comparable disclosures.<sup>78</sup>
- **Ensure fiduciary responsibility and follow-through:** The SEC and DOL should create mechanisms to ensure that investment fiduciaries are acting upon the commitments they make to investors and the public. This should include commitments related to how fiduciaries will invest and how they will vote their shares.
- **Incorporate climate risk into the SIFI designation process:** The FSOC should incorporate climate risk into the process to determine whether nonbank financial institutions could pose a threat to U.S. economic stability and, therefore, should be labeled as SIFIs. Under the Dodd-Frank Act, once the FSOC has labeled an institution

with the SIFI designation, that institution is subject to supervision and regulation by the Federal Reserve.<sup>79</sup>

## Supervision and management of banks

Proper supervision and management are critical to ensure that banks internalize climate-related risks and, therefore, make less risky choices. To that end, regulators should:

- **Issue supervisory guidance on climate-related risks:** Regulators should issue new

supervisory guidance on how to consider climate-related risks in the supervisory and examination processes. Moreover, as part of incorporating climate risk into supervision, regulators should “incorporate climate risk into the supervisory ratings they assign to banks.”<sup>80</sup>

- **Incorporate climate risk into stress tests:** The Federal Reserve should establish and regularly administer climate-related stress tests that help identify their exposure to risks from climate change.





## Capital requirements of banks

Capital requirements determine the level of equity that banks must use to fund their assets, thereby restricting the amount of debt they can employ. Restricting debt diminishes the level of risk that banks undertake.

Capital requirements, therefore, increase the likelihood that banks can absorb losses in times of financial difficulty, so that if banks are making risky investments, they do so at their own risk. In order to help ensure that banks can internalize climate-related risks, start mitigating those risks, *and* reduce their overexposure to climate-related financial risk throughout the U.S. financial system, regulators should:

- **Increase risk weighting for fossil fuels:**

Regulators should increase risk weights for fossil fuel assets and banks should be required to fund riskier investments with more equity capital and less debt. According to a 2021 Center for American Progress report authored by Gregg Gelzinis, the risk weights should be calibrated based on several factors, including: “1) the extent to which the company generates revenue from fossil fuel-related activities; 2) differentiation in transition risk intensity among oil, gas, and coal exposures; and 3) the length of the exposure.”<sup>85</sup>

- **Implement climate risk surcharges on GSIBs:**

Regulators should implement a climate risk surcharge on GSIBs. This would force banks to internalize costs associated with risky fossil fuel financing and, therefore, help ensure banks’ resilience to systemic risks.<sup>86</sup> The size of the surcharge should correspond with the firm’s climate risk contribution score, which would use the bank’s financed emissions as a proxy.

- **Tighten limits for exposure to segments of the fossil fuel industry:**

Regulators should set concentration limits to segments of the fossil fuel industry in order to limit the exposure of lenders.

- **Adjust deposit insurance premiums to reflect climate-related risks:**

The FDIC should adjust deposit insurance premiums to reflect those climate-related risks to banks. This is in alignment with the Federal Deposit Insurance Corporation Improvement Act, which mandates that the FDIC set higher premiums based on higher risks faced by banks.<sup>87</sup>

Banks, too, should be required to run their own company-run stress tests. A September 2021 study published by the Federal Reserve Bank of New York provides an important model for such tests; its methodology provides a process for identifying assets within a bank’s portfolio that are vulnerable to climate-related shocks and then calculating the likely capital shortfall resulting from such a shock.<sup>81</sup> In addition to stress tests, banks should be required to submit plans that outline how they will adjust their practices in order to mitigate their exposure to climate-induced financial risks.<sup>82</sup>

- **Develop scenario analysis:** As a complement to stress tests, regulators should require that banks develop enhanced scenario analysis including a 1.5°C-aligned scenario with little to no overshoot in order to help assess climate-related risks.

- **Establish a reinvigorated Volcker Rule:** Passed as part of the Dodd-Frank Financial Reform and Consumer Protection Act, the Volcker Rule prevents banks from making certain types of speculative investments, such as those that contributed to the 2008 financial crisis. Bank regulators under the Trump administration weakened this Rule by loosening some of the restrictions on banks. The Biden administration should reverse these changes to reinstate a robust Volcker Rule. As part of a more robust Volcker Rule, regulators should

require that banks “ascertain the climate risk of investments structured to fall within exceptions to the Volcker Rule prohibitions, including exposure to the fossil fuel industry and coal- or gas-fired power plants” and “disclose to regulators and the public details of the exposure.”<sup>83</sup>

- **Prioritize economic and racial justice in the design of risk mitigation policies:**

While taking steps to ensure that banks prudently manage climate risk, regulators must proactively address racial and economic justice issues that intersect with such climate-risk related reforms. According to Evergreen Action,

*Regulators should also take steps to drive investment in equitable green finance to ensure our transition to a clean energy economy is smooth and equitable. One way to do that is by improving the implementation of the Community Reinvestment Act (CRA), which was passed in 1977 with the goal of promoting investment in low- and moderate-income communities, to clarify that the climate needs of those communities meet the standards for CRA lending.*<sup>84</sup>

In addition, regulators should also provide for more stringent application of CRA requirements to ensure that they actually promote needed investment, including in climate mitigation and adaptation, for low- and moderate-income families.

# VII. METHODOLOGY

## OVERVIEW

To estimate emissions from lending and investment activities by the selected entities, the researchers followed and applied the methodological principles of the GHG Protocol’s Category 15: Investments<sup>88</sup> as well as the application guidelines from the Global GHG Accounting and Reporting Standard for the Financial Industry and developed by the PCAF.<sup>89</sup>

There are three options specified by the standard to estimate financed emissions:

- Option 1: Reported emissions, which uses verified or unverified emissions calculated by investees or borrowers
- Option 2: Physical activity-based emissions, which uses the primary physical activity data of an investee or borrower’s energy consumption or production to estimate emissions
- Option 3: Economic activity-based emissions, which uses economic activity data such as an investee or borrower’s enterprise value, revenue, or assets and combines it with sector-level emission factors per unit of revenue or assets to estimate emissions

The standard also allocates a data quality score to an estimation based on the options and data used in the calculation. The underlying data considerations for each option, as well as the underlying data quality score assigned by the standard (1 being the highest, 5 being the lowest), are illustrated in Table 1.

Given that the analysis is based solely on publicly available data, the researchers employed option 1 in select cases and option 3 in most cases depending on this availability. It is worth noting that accessing physical activity

Table 1: PCAF’s data score quality for equity, fixed income, and corporate loans.

Data quality	Options to estimate financed emissions	When to use each option
Score 5	Option 3: Economic activity-based emissions	Outstanding amount in the company is known. Emission factors for the sector per unit of revenue (e.g., tCO <sub>2</sub> e per EUR/USD of revenue earned in a sector) and asset turnover ratios for the sector are known.
Score 4	Option 3: Economic activity-based emissions	Outstanding amount in the company is known. Enterprise value including cash, and the company’s revenue are known. Emission factors for the sector per unit of revenue (e.g., tCO <sub>2</sub> e per EUR/USD of revenue earned in a sector) are known.
Score 3	Option 2: Physical activity-based emissions	Outstanding amount in the company is known. Enterprise value including cash is known. Primary physical activity data of the company’s energy consumption OR company’s production and emission factors specific to the selected primary data are known.
Score 2	Option 1: Reported emissions	Unaudited emissions are collected from the borrower or investee company and then allocated to the reporting FI using the attribution factor.
Score 1	Option 1: Reported emissions	Audited emissions are collected from the borrower or investee company directly or indirectly via verified third-party providers (e.g., CDP) and then allocated to the reporting FI using the attribution factor.

data from borrowers or investees is not possible and, therefore, was not considered.

Financial data were sourced from public disclosures such as regulatory disclosures for banks (10-K forms and Pillar 3 disclosure), and fund identifiers for asset managers, which provide the fund composition and investment

weight in most cases. For asset managers, reported emissions data for holdings were sourced from company-level disclosures in sustainability reports, as well as disclosures to institutions such as the CDP and TCFD. Financial data for holdings were sourced from the company or issuer’s annual reporting.



## BANKS: DATA COLLECTION, ACCOUNTING METHOD, AND ASSUMPTIONS

As part of their broader activities, banks act as asset owners (i.e., lending) and service providers (i.e., underwriting and M&A). For this assessment, the banks' disclosed credit exposure provides the basis for the calculations carried out, given their ownership of the emissions resulting from the activities they finance. Although credit represents only one part of a bank's activities, there is an acceptable degree of visibility related to each bank's lending activities per industry and geography. The asset classes covered in this assessment include business loans to several industries

and residential mortgages. In particular, the assessment covers 37 sub-industries, from energy to information technology (IT). Table 2, below, outlines some of the key assumptions based on the data collection for banks.

It is worth noting that, although the information from banks' disclosure enables an estimate, the data are limited and require estimates to be made using "Option 3: Economic activity-based emissions." In addition, as per data quality score guidelines provided by the standard, the approach enabled by the publicly available data earns a "5," the lowest data quality score possible for an estimation.

The key data points used for the calculations were the following:

- Attribution data:
  - Outstanding investment in the industry and geography
  - Asset turnover ratio per sector or activity (based on the researchers' internal data)
- Emissions data:
  - GHG emissions per sector (sourced from environmentally extended input-output datasets (EEIOT))
  - Turnover per sector or activity (calculated using the asset turnover ratio and the outstanding exposure per sector)

Table 2: Summary of assumptions for banks

Bank name	Assumptions
Bank of America	<ul style="list-style-type: none"> <li>• Commercial Credit Exposure by Industry includes US small business commercial exposure and the notional amount of unfunded, legally binding lending commitments net of amounts distributed (i.e., syndicated or participated) to other FIs.</li> <li>• Distribution of geographic non-US credit exposure was derived from the "Top 20 Non-US Countries Exposure".</li> <li>• Real estate industry exposure assumed to be commercial real estate (CRE) exposure due to limited information.</li> <li>• "Residential mortgage loans" (from the Consumer credit portfolio) includes the fully insured loan portfolio. Given that the geographic exposure was not available for the latter, the residential mortgage loans breakdown was applied as a proxy.</li> <li>• All activities classified under "Individuals" or "Trusts" were not included given the lack of granularity available. As a result, coverage of credit exposure is not 100%</li> </ul>
BNY Mellon	<ul style="list-style-type: none"> <li>• Industry exposure figure excludes wealth management loans and other residential mortgages.</li> <li>• Since the total non-US exposure is 70% of total firmwide non-US exposure, the remaining 30% was allocated under "Rest of the world". To estimate the US exposure, the total non-US exposure was subtracted from the industry exposure figure.</li> <li>• Country exposure includes lending (composed of loans, acceptances, issued letters of credit, net of participations, and lending-related commitments). Central banks, banks, securities, and others are excluded.</li> <li>• CRE total was aggregated with "Real estate" within the industry table since it is reported separately and not included in the commercial industry table.</li> <li>• Total residential mortgage figure includes wealth management loans and mortgages and other residential mortgages. Geographic distribution of wealth management loans and mortgages was used as a proxy due to the lack of data for other residential mortgages.</li> <li>• Activities classified under "Manufacturing and energy and utilities" were not included given the lack of granularity available. As a result, the coverage of credit exposure is not 100%.</li> </ul>
Citigroup	<ul style="list-style-type: none"> <li>• Corporate credit portfolio includes direct outstandings (which includes drawn loans, overdrafts, bankers' acceptances, and leases) and unfunded lending commitments (includes unused commitments to lend, letters of credit, and financial guarantees). The total credit exposure by industry was considered to be the total credit figure.</li> <li>• Total credit exposure by industry excludes funded and unfunded exposure, primarily related to the delinquency-managed credit portfolio of the private bank.</li> <li>• Geographic distribution of exposure was calculated with the Portfolio Mix Geography percentages and credit industry total.</li> <li>• Real estate industry exposure is assumed to be all CRE exposure as disclosed, given that the 10-K language is ambiguous.</li> <li>• The exposure for residential mortgages was taken from the consumer credit portfolio.</li> <li>• All activities classified under "Other industries" or "Public sector" were not included given the lack of granularity available. As a result, the coverage of credit exposure is not 100%.</li> </ul>

Goldman Sachs	<ul style="list-style-type: none"> <li>• Total credit risk exposure figure excludes “Wealth management”, “Residential real estate”, “Consumer”, and “Other” since these categories are reported separately in other tables. However, residential real estate emissions were calculated.</li> <li>• Real estate industry exposure includes corporate and CRE loans as the latter are reported separately as a loan category with no further information.</li> <li>• Activities classified under “Other – including special purpose vehicles” were not included given the lack of granularity available. As a result, the coverage of credit exposure is not 100%.</li> </ul>
JP Morgan Chase	<ul style="list-style-type: none"> <li>• Total credit exposure by industry used in this exercise is considered to be the total credit portfolio figure extracted from wholesale credit exposure before considering (subtracting) loans held-for-sale and loans at fair value, as well as receivables from customers.</li> <li>• The geographic distribution of exposure data used in this exercise was extracted from the “Top 20 country exposures (excluding the US)” which represents 90% of the total firmwide non-US exposure. The remaining 10% was allocated under “Rest of the world”, and US exposure was calculated by subtracting the total non-US exposure from industry exposure.</li> <li>• Total non-US exposure includes “Lending and deposits” and “Other”. It excludes “Trading and investing” since these are securities.</li> <li>• Real estate industry exposure (from the commercial/corporate portfolio) was assumed to include CRE as the 10-k language is ambiguous and there is limited information on separate CRE credit exposure tables.</li> <li>• Residential real estate is part of consumer loans. Multifamily credit exposure is included in the commercial portfolio. It is assumed that this is separate from residential real estate. The residential real estate figure excludes mortgage loans insured by US government agencies.</li> <li>• Activities classified under “Individuals” or “Individual entities &amp; all other” were not included given the lack of granularity available. As a result, the coverage of credit exposure is not 100%.</li> </ul>
Morgan Stanley	<ul style="list-style-type: none"> <li>• Non-US geographic exposure was extracted from the 10-K form and excludes sovereign exposure since it consists of financial contracts and obligations entered into, or with, sovereign and local governments.</li> <li>• Geographic US exposure figure was calculated by subtracting 10-K’s top non-US exposure from total Industry exposure.</li> <li>• Real estate industry exposure (reported under “Institutional securities”) is assumed to also cover CRE as the 10-K language is ambiguous.</li> <li>• “Total residential mortgages” relates to residential real estate exposure under the wealth management business segment. As no geography breakdown was provided, the US was used as a proxy.</li> <li>• Activities classified under “Other industries” or “Public sector” were not included given the lack of granularity available. As a result, the coverage of credit exposure is not 100%.</li> </ul>
State Street	<ul style="list-style-type: none"> <li>• Disclosed counterparties in Pillar 3 include: governments, central banks and supranationals, commercial banks, brokers/dealers, funds, and other (corporates and insurance companies). These were then aggregated under the “Financial services” industry classification based on State Street’s 10-K filing where it is stated that the bank “assumes significant credit risk to counterparties, many of which are major financial institutions”.</li> <li>• Total credit exposure excludes cash.</li> <li>• CRE exposure was not disclosed in Pillar 3 and has been added from 10-K filings, where it is reported. It is assumed as the only real estate amount for the purpose of estimation.</li> <li>• CRE exposure is assumed to be only US-based exposure given that, in the 10-K filing, the CRE amount is only provided in domestic exposures.</li> </ul>
Wells Fargo	<ul style="list-style-type: none"> <li>• The total industry credit exposure used in this exercise is the total commitment including outstanding loans and unfunded credit commitments, and excluding letters of credit.</li> <li>• Country exposure includes: lending and deposits (includes outstanding loans, unfunded credit commitments, and deposits with non-US banks).</li> <li>• Country exposure excludes: securities and derivatives &amp; other (represents foreign exchange contracts, derivative contracts, securities resale agreements, and securities lending agreements)</li> <li>• US exposure was calculated assuming the remaining portion of industry exposure minus non-US top 20 exposure.</li> <li>• Given that CRE loans are reported separately from commercial and industrial loans, these were added as part of the real estate industry exposure.</li> <li>• Total residential mortgage is comprised of family first and junior lien mortgage loans. It excludes government-insured/guaranteed loans.</li> <li>• Activities classified under “Diversified” or “Miscellaneous &amp; other” were not included given the lack of granularity available. As a result, the coverage of credit exposure is not 100%.</li> </ul>

As outlined by the standard and based on data availability from 10-K disclosures, the researchers employed the use of data from EEIOT datasets, providing region/country and industry-specific emission factors per unit of economic activity (e.g., kg of CO<sub>2</sub>/USD of revenue) to estimate the exposure of each bank's lending activity on a global scale. Asset turnover ratios were employed, as per the standard's guidelines, to estimate turnover per industry and geography and enable the attribution of emissions per institution (i.e., financed emissions).

For this assessment, the researchers collected geographical and industry credit exposure data reported by banks, including mortgages where these were relevant, in their 10-K reports for 2020. It is worth noting that to calculate the share of overall credit exposure per industry and geography for each bank's exposure, given limitations in the 10-K and Pillar 3 disclosures (for State Street), it was assumed that banks have credit exposure in every industry and within each geography disclosed.

The initial steps in the assessment carried out by the researchers included the following:

- The researchers mapped the classification of activities outlined by banks in their 10-K reports to the Global Industry Classification Standard (GICS), an industry taxonomy.<sup>90</sup>
- Subsequently, the researchers mapped these activities to the EEIOT activities, providing GHG emission factors per sector.
- Based on the industrial classification mapping, the asset turnover per industry and country was identified.
- Finally, the attribution of overall emissions was based on the outstanding investment or loan provided to a sector or activity and the use of an asset turnover ratio specific to the country and industry.

This approach was implemented for all asset classes except mortgages to estimate emissions financed in tCO<sub>2</sub>e, following the formula below:

$$\sum_c \text{Outstanding investment}_c \times \text{Asset turnover ratio}_s \times \frac{\text{GHG emissions}_s}{\text{Turnover}_s}$$

Where c = borrower or investee company and s = sector.

**Table 3: Banks' classification of residential mortgage exposure**

Bank	Sub-classification in 10-K	Credit segment in 10-K
Bank of America	Residential mortgage	Consumer credit portfolio
BNY Mellon	Wealth management loans and mortgages Other residential mortgages loans Mortgages	Loans
Citigroup	Residential real estate	Consumer credit portfolio
Goldman Sachs	Residential real estate	Residential real estate loans
JP Morgan Chase	Residential real estate	Consumer loans
Morgan Stanley	Residential real estate	Wealth management business segment
Wells Fargo	Residential mortgage	Consumer portfolio

For residential mortgages, the researchers identified that banks classified or reported their credit exposure to mortgages under a different category or business segment, as shown in Table 3 below.

In addition, a separate approach was used based on the standard's recommendations, which was based on the geographic distribution of each bank's mortgage exposure. The calculation was based on national- and state-level statistical data to estimate average dwelling type, area, and energy consumption. Emissions were estimated using emission factors specific to the geography and energy source (e.g., grid emission factors). The key data points used for the calculation were the following:

- Outstanding amount
- Estimated building energy consumption per square meter (m<sup>2</sup>)
- Estimated area financed in m<sup>2</sup> based on the average dwelling type
- Standard emission factors specific to the energy source

The estimates were calculated using the formula below:

$$\sum_b 100\% \times \text{Estimated energy consumption from statistics}_b \times \text{Floor area}_b \times \text{Average emission factor}_c$$

Where b = building and c = energy source.

## ASSET MANAGERS: DATA COLLECTION, ACCOUNTING METHOD, AND ASSUMPTIONS

The portfolio-level exposure of the 10 largest asset managers in terms of the value of AUM is assessed based on the data publicly available from each institution. Each asset manager's portfolio encompasses a diverse portfolio of asset classes, geographies, and positions. Following an assessment of disclosure from the 10 largest asset managers, all were found to disclose their fund positions although to varying proportions of total AUM. This information was located as part of their public disclosure through their fund centers or annual fund/strategy reports available on their website. The following approach was used to estimate financed emissions based on the available data:

- For the funds where data are made publicly available by an asset manager (e.g., through the fund center, fund identifiers, etc.), a carbon accounting of Scope 1 and Scope 2 emissions for investees was carried out as per PCAF guidelines for equity and/or fixed income portfolios, with the calculation ranging between a data quality score of 1 and 3.
- Once the emissions from the available funds under equity and fixed income strategies were calculated and attributed to the asset manager, an average investment carbon intensity (tCO<sub>2</sub>e/USD million invested) for equity and fixed income was calculated based on the intensity of each underlying fund.

- These intensities were subsequently used as proxies and applied the remaining value of AUM for equity and fixed income for which no data were publicly available. This enabled an estimate of total emissions financed by each asset manager for the entirety of their reported equity and fixed income AUM.

- It is worth noting that this level of estimation has several limitations, including that it assumes similar positions and spreads as that of the sample for the strategies managed for which no data are available.
- It also fails to account for other asset classes such as real estate, money markets, real assets, commodities, and others.

It is worth noting that data availability was more limited for some asset managers than others. Table 4 outlines the limitations related to the disclosure of the value of AUM for two asset managers and the steps taken by the researchers to provide a solution.

Table 4: Summary of assumptions for asset managers

Asset manager name	Residential mortgage exposure classification
Bank of New York Mellon Investment Management	As the equity and fixed income AUM value is not disclosed, an industry-based proxy was generated to estimate the equity and fixed income split as a proportion of total AUM.
Vanguard	As the equity and fixed income AUM value is not disclosed, an industry-based proxy was generated to estimate the equity and fixed income split as a proportion of total AUM



# VIII. LIMITATIONS AND BARRIERS

## Publicly available data

The quantitative work in this report was based wholly on publicly available data. This led to substantial limitations, particularly for banks, where no publicly available disclosure related to fee income from services (e.g., underwriting and M&A) was available. Granular data at the investee level for credit exposure was also unavailable. This led to a calculation based only on sector and geography and required the researchers to make several assumptions to allocate exposure across industries and geographies.

This generated substantial limitations for the assessment. In addition, transaction-level assessments or attributions, such as the assessment of syndicated loans, were rendered impossible due to the lack of publicly available data.

## Boundary of the assessment

Given that transaction-level data were unavailable for the estimations of credit exposure, one of the key limitations of this assessment is that estimates do not account for Scope 3 emissions of the counterparties to the financial institutions (i.e., the borrowers). The exclusion of Scope 3 emissions results in the indicative figures calculated for this assessment being underestimated values. This is an important limitation, as Scope 3 emissions account for a substantial portion of the investees' emissions for industries such as energy-, oil-, and gas-related activities; mining; transportation; materials; and others.<sup>91</sup> This underestimate is particularly notable for those industries where Scope 3 dominates the overall carbon footprint. For example, according to the financial firm MSCI, the Scope 3 emissions of the integrated oil and gas industry are more than six times the level of its Scope 1 and Scope 2 emissions.<sup>92</sup>

## 10-K categorization

The lack of a harmonized reporting framework for 10-K reporting influenced the accuracy of calculations made for banking institutions. In particular, the way industry classification and aggregation were conducted varied for each institution. This presented a limitation in that a degree of assumption and subjectivity was required to map these industries to the industrial classification used in EEIOT datasets, which provides industry- and geography-specific emission factors.

An example is the aggregation of credit exposure for "Food and beverage manufacturing." These inherently different activities would generally require separate emission factors per type of food and beverage, for example. In addition, the share of credit exposure for each of the three activities is not disclosed, requiring assumptions on how to distribute these accordingly.

Furthermore, several activities are grouped by banks under an industrial classification labeled as "Other" or "Other activities," which could encompass a wide variety of activities, including exposure to carbon-intensive sectors. The researchers conducted extensive research to identify solutions to enhance the transparency of this "Other" category further, with limited success.

Together, these limitations stemming from the banks' narrow reporting generate substantial barriers to accuracy. In addition, they generated barriers to comparability, as evidenced by the feedback received from banks, which focused on the lack of clarity surrounding granularity of the data used, industrial classification, and attribution. As outlined previously, the nature of the data used compromises the comparability of

emission values. Feedback from banks also demonstrated that there remain internal challenges surrounding data collection for the various industries, requiring categorizations that are difficult to understand from a carbon accounting standpoint.

## METHODOLOGICAL LIMITATIONS

The work presented in this report was carried out as much as possible in alignment with the guidelines set by the Global GHG Accounting and Reporting Standard for the financial industry to the greatest extent enabled by the data. This created limitations for the scope and coverage. Although PCAF has provided a global standard with options to account for financed emissions, it still has gaps for both banks and insurers. Methodologies to date note that capital providers and owners generate financed emissions but consider that service providers do not. As a result, and as can be evidenced in PCAF, guidance on accounting for service provision, such as underwriting and M&A advisory, is not yet provided. This created a significant limitation in the coverage of the assessment, as key activities for banks and insurers could not be assessed.

In addition, the emissions associated with other key asset classes for asset managers, such as cash, currency, and derivatives, cannot be captured under available methodologies. Coverage of sovereign bonds is particularly low due to current methodological limitations and due to data availability. Sovereign emissions data are available for developed country issuers but notably limited for emerging markets, municipalities, and cities. This, therefore, left a substantial portion of an asset manager's total AUM outside of the scope of the assessment. This affects the results of some asset managers more than others.

In addition to methodological limitations, the coverage of equity and fixed income was affected by each asset manager's disclosure. The analyzed amount represents all available positions that were disclosed by the fund and for which data were available. However, disclosure for asset managers was never 100 percent of the total value of equity and fixed income AUM. This was more evident for some asset managers, such as BlackRock, PIMCO, and BNY Mellon, than it was for others

A final but important limitation is the use of averaged data (EEIOT datasets in particular) across most of the assessment, which required economic activity-based emissions factors. This was used extensively not only in

the calculation of emissions for bank credit exposure but also for estimates for asset manager equity investments where no public data were available. To align with the standard, our researchers maintained its use of EEIOT data, although there are substantial limitations.

The first notable limitation is the geographic range of the datasets, which provide data for a limited number of countries and regions. The second limitation is that annual updates are not provided, meaning that the dataset does not always reflect the latest changes in sectoral and country carbon intensities. The third limitation regards the industrial classification provided by EEIOT datasets, which does not map easily with those of more

generic industry classification standards. This creates challenges to industry mapping; for example, mapping the disclosed industries in 10-K filings to the EEIOT datasets was a key barrier that required subjectivity.

Finally, EEIOT datasets have a degree of inaccuracy that stems from the use of macroeconomic data applied to specific activities, which, although useful as an estimate, lack the resolution of bottom-up data collection. This can lead to markedly high numbers in some instances and require calibration, such as the redistribution among geography/industry categories or assigning a similar emission factor from a similar geography or industry as a proxy.



# ANNEX 1: LIST OF FINANCIAL INSTITUTIONS IN SCOPE

## **Banks**

Based on the LISCC list

1. Bank of America
2. Bank of New York Mellon Corp.  
(BNY Mellon)
3. Citigroup
4. Goldman Sachs
5. JPMorgan Chase
6. Morgan Stanley
7. State Street
8. Wells Fargo

## **Asset managers**

No U.S. regulatory list is available

Large U.S. headquartered asset managers  
in scope based on value of their AUM

1. Bank of New York Mellon Investment  
Management
2. BlackRock
3. Capital Group
4. Fidelity Investments
5. Goldman Sachs Asset Management
6. JP Morgan Asset Management
7. Morgan Stanley Investment Management
8. PIMCO
9. State Street Global Advisors
10. The Vanguard Group

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