

Climate-Related Financial Risks and Opportunities Primer

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Summary

Climate change is one of the most – if not the most – critical issues facing human civilization. Modern life as we know it is underpinned by the ability to generate cheap energy from fossil fuels. This comes at a significant cost to the physical environment and the longevity of the human race.

In order to maintain some semblance of life as we know it, humans need to create an entirely new economy based around clean, carbon neutral energy sources. This economic transformation will require tremendous amounts of financial investments and political will. Due to the varying needs and resources of communities around the globe, this transformation will not happen overnight.

For financial institutions, the political and technological advancements required to decarbonize the economy will have significant implications for labor markets and assets. Without proper planning communities and businesses may not be equipped to adapt to changes as they occur.

Despite the risks that lie ahead there are also tremendous opportunities for financial institutions to invest in building the low-carbon economy of the future. New technologies will create labor demands that didn't previously exist while new asset classes may emerge to diversify risk away from legacy assets. Capitalizing on new opportunities will be advantageous for the financial institution's stakeholders and the communities they serve.

Climate-related financial risks represent an entirely new field for the global financial sector. As a result, significant gaps exist in quantifying risk and measuring it across industries. Early voluntary action to begin disclosing risks will help fill gaps and develop the data and methodologies that will be needed for financial institutions to take more deliberate action down the road.

To facilitate voluntary disclosures, a number of frameworks have been released outlining the role financial institutions can play in mitigating climate-related financial risks. These frameworks serve as a starting point from which federal and state regulators will likely begin to take regulatory action. It thus behooves financial institutions to study the frameworks as they evolve to begin taking prompt action.

This paper outlines some of the major socioeconomic risks that may impact financial institutions and the communities those institutions serve. It also outlines a few opportunities that financial institutions can leverage to diversify risk and contribute to the overall greening of the economy.

Finally this paper concludes with several recommendations financial institutions can take to begin building the adaptive capacity to mitigate new and uncertain risks as they emerge.

What Climate Change Means for Financial Institutions

In the media climate change is depicted by melting ice caps and raging wildfires. While this is the most graphic representation of what climate change is doing, it is not an adequate representation of what climate change means for financial institutions.

Climate change is an overhaul of the economy marked by the transition or adaptation of new methods of production and consumption. In other words: it is a radical departure from business as usual.

With climate change will come the emergence of new industries – such as carbon capture – while legacy industries – such as oil extraction – will fall to the wayside. The transition to a low-carbon economy will change every facet of life as we know it from how we travel to what types of jobs we work in. As a result, this will change how banks operate and the services they provide.

This economic transformation will be amplified by a concurrent technological revolution. As new industries need to be created to mitigate and manage our new climate, so too will new technologies. The revolution in automation, artificial intelligence, blockchain, and machine learning should not be viewed distinctly from physical environment climate change but rather as an integrated component of the much larger economic transition underway.

Changing economic realities and the proliferation of new technologies will invariably change how banks do business. Automated decision making will change the current underwriting and lending processes while the evolving job market will change how consumers earn an income and use the bank's services to manage their wealth.

The emergence of new business models will also change the risk tolerance of banks. There will be a greater degree of uncertainty during the transition and as a result many banks will be reluctant to lend capital to unproven business models. This will create a paradox whereby large capital investments will be needed to fund the transition to a low-carbon economy while few lenders will be comfortable making those investments.

Climate change is a problem of the global commons impacting every institution regardless of size. This is not something that can be resolved with a fine or a penalty. As the transition begins questions will emerge about proportionate regulation and the veracity of data used to implement regulations. Firms without the capacity to meet anticipated data reporting obligations will be

most at risk in navigating the future regulatory landscape. This poses great risk to the firm's stakeholders in the short-term while casting doubt on its prospects for longevity into the future.

Climate-Related Financial Risks

Physical Risks

Physical risks are those that are most often attributed to climate change: more frequent and severe weather events such as hurricanes and gradual changes to the physical environment such as rising temperatures. Physical risks are split into two sub-categories: acute and chronic.

Acute

Acute physical risks are sudden extreme weather events that happen more frequently and with greater severity. These risks can manifest as extreme precipitation events in areas not accustomed to heavy rainfall or more frequent Category 4 and 5 hurricanes in the Atlantic. Due to the sudden and intense nature of these events, acute physical risks increase the likelihood of property damage and disruption to local businesses.

One of the predominant challenges with acute physical events is the underinsurance of properties that were not previously at risk for flood events but may be exposed to flooding as weather patterns change. While a home purchased today may not require flood insurance, at some point in the future that property may be exposed to flooding. Due to the long time horizon for evaluating climate risks it is likely property owners, underwriters, and insurers are not factoring in the likelihood that future flood risks may lead to asset depreciation or increased loan defaults.

This poses a challenge to underwriters, insurers, and property owners who may be risk averse to changing flood zones. Insurers may deem some areas too risky to insure, increasing premiums or withdrawing from those markets altogether. Property owners with insufficient insurance may find themselves in a situation where they are unable to repair damage caused by an extreme weather event, decreasing the value of their property. With increasing costs to insure and/or repair properties lenders may find an increase in loan defaults on their books.

Low and moderate income communities, as well as historically marginalized communities, will face the most adverse effects of extreme weather events. These communities already face a shortage of capital and do not have the resources to protect their properties. Extreme weather events that lead to a disruption in business may lead to permanent, unrecoverable economic damage that will impact the entire community long into the future.¹

¹ The 1972 flood in Elmira and Corning should serve as a good historical reference point to demonstrate the long-term economic implications of extreme weather events. While the flood was not the singular cause for economic decline in Elmira, it likely amplified the existing exodus of manufacturing jobs and retail stores from the city. While the neighboring city of Corning was able to recover from the flood, Elmira

Chronic

Chronic risks are gradual changes to the physical environment that happen over a longer time horizon. Unlike acute physical risks which are characterized by sudden weather events, chronic risks steadily degrade labor productivity and reduce agricultural output over time.

The greatest chronic risk comes from increasing temperatures in both the oceans and in the atmosphere, leading to droughts, food shortages, and the emergence of new viruses². Areas exposed to higher average temperatures will see changes in their agricultural capacity as heat and drought reduce crop yields. Changes to the physical environment will adversely impact livestock and deplete fisheries. Over the long-term, chronic climate events will change the food supply chain increasing the risk for disruptions and shortages.

Chronic climate events will lead to a greater risk for socioeconomic upheaval as areas become intolerable or uninhabitable. Human migration stemming from climate change will put new demands on already strained resources.³ Physical changes to the environment will change the distribution of labor making it more difficult to provide employment for the population. Inequitable distribution of limited resources will inevitably lead to tension that will only grow as conditions worsen.

Physical risks will have significant implications for the economy as communities grapple with increasingly severe weather events and the deterioration of the economy's productive capacity over time. While the primary risk facing financial institutions is damage attributed to flooding and extreme weather events, changing socioeconomic conditions in areas where those financial institutions operate will impact their operational capacity and the longevity of their business model over the long-term.

Transition Risks

Transition risks can be described as the structural economic changes that will happen as a result of transitioning to a low-carbon economy. These changes will result from sector obsolescence, new technological innovations, and changing consumer preferences. For

was not. This event demonstrates why localized resiliency – not just institutional resiliency – is important to mitigate against climate-related risks.

² It is beyond the scope of this primer to discuss indirect risks, such as the proliferation of new pathogens, but in hindsight of COVID-19 Pandemic the health risks that will emerge from climate change should not be taken lightly. Whether it is the emergence of novel viruses, such as COVID-19, or the spread of existing diseases to new areas, such as malaria, it is important to acknowledge that changing health patterns will amplify the socioeconomic risks posed by climate change.

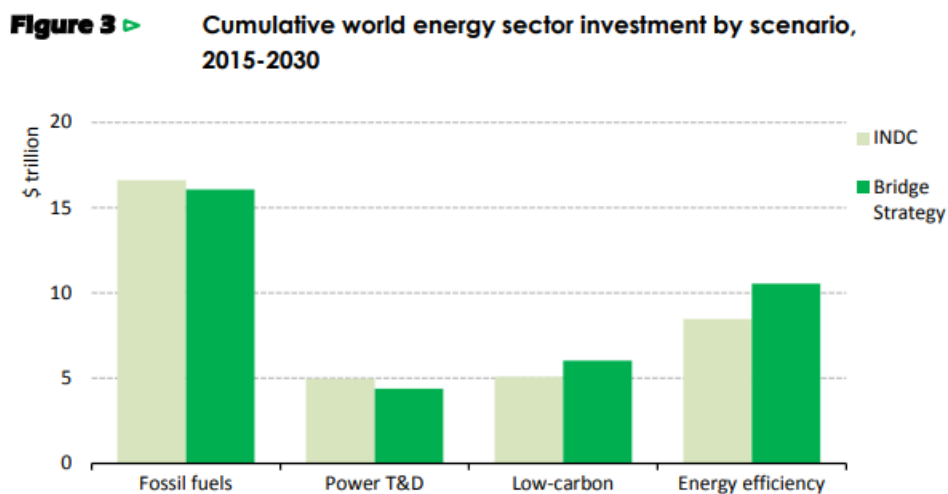
³ The civil war in Syria is a great example of this happening in recent history. Prior to war breaking out in 2011, a severe drought led to extensive crop failures, driving farmers to leave their farms for urban cities. Poor governance combined with internal migration strained already limited resources, leading to political unrest. For more information read: [“Climate change in the Fertile Crescent and implications of the recent Syrian drought.”](#)

transition risks to begin to manifest significant political and financial capital will need to be invested. Due to the reliance on external forces to initiate the shift, transition risks are categorized two ways: orderly and disorderly.

Orderly

An orderly transition is one that is planned out and happens over time. This type of transition gives institutions and communities the ability to absorb changes to the economy in a manner that does not eliminate all risks, but diminishes the impact of climate change and reduces the severity of adverse physical climate events.

The primary objective of an orderly transition is to decarbonize the energy supply over a period of time to reduce shocks to the economy. It is estimated that the transition to a low-carbon economy will require around \$13.5 trillion in investments from 2015 - 2030.⁴ This is just a fraction of the total investment required to build infrastructure that aligns with a low-carbon future:



Note: Fossil fuels includes investment in fossil-fuel supply and in fossil-fuel based power generation. T&D is transmission and distribution. Low-carbon includes power supply and transport fuels. Energy efficiency covers end-use energy sectors.

An orderly transition relies on adequate policy shifts, the advancement of carbon capture technology, and the deployment of capital investments to meet the requirements of the transition. Due to the reliance on competing and insufficient political, technological, and financial variables, it may be unlikely that the orderly transition will happen in time.

⁴ International Energy Agency, *World Energy Outlook Special Briefing for COP21, 2015, 4.*

Disorderly

A disorderly transition is an abrupt shift to a low-carbon economy due to late policy action or sudden technological advancements. Due to the immediacy of action in a disorderly transition, the economy will not have time to absorb shocks, leaving some communities more vulnerable to risks than others.

The greatest risk of a disorderly transition is assets suddenly depreciating or becoming stranded altogether. This is true for industries involved in extracting, processing, and consuming fossil fuels, as well as other high-carbon manufacturing industries. This transition may manifest in a sudden policy shift that imposes a tax or cap on carbon emissions that requires firms to radically change their methods of production. These changes can suddenly disrupt the labor market leaving workers in high-carbon industries particularly exposed.

With insufficient capital investments, technological advancements, and policy action at present, a disorderly transition is likely.⁵ The uncertainty of whether or not an orderly transition will happen increases the risks facing financial institutions who may, as a result, receive insufficient or divergent guidance on how to quantify their own risks.

Regulatory Risks

Despite the ability to scientifically quantify many of the physical risks that lie ahead, there is substantial uncertainty around how and when a transition to a low-carbon economy will occur. As a result, regulators will have to craft guidance around incomplete information that may change as the transition unfolds. The type and scope of transition and physical risks will largely depend on the political will to implement change and the ability of regulators to hold firms proportionately responsible for their impact.

New York State's Department of Financial Services (DFS) is cognizant of variances in scope of risk and exposure based on size, location, and lines of business. DFS also recognizes that financial institutions are at different phases in the disclosure process, with some having more resources than others. That being said, there is still a general expectation, regardless of size, that each regulated institution take a "proportionate approach" based on their unique risk exposure. Given the complexity of regulating climate-related financial disclosures, it is unclear what exactly a proportionate approach should look like or how it will be implemented.

While regulators are developing a strategy for managing climate-related financial risks, the more time it takes to do so the greater the economic repercussions will likely be. Ambiguity will increase the likelihood of a disorderly transition while delayed action will increase exposure to more frequent and severe physical risks.

⁵ The alternative to a disorderly transition would be no transition. Should this happen the primary risk exposure will come from acute and chronic physical risks.

Meanwhile, given that the U.S. is lagging behind our European counterparts, it is increasingly likely that European regulators will dictate the terms of the transition and the expectations of reporting disclosures. While the U.S. is close to Europe there are nonetheless cultural differences that may make certain expectations unpalatable in the United States.⁶ Disagreements on the international stage – which are inevitable – will increase the likelihood of an abrupt, disorderly transition.

The most fundamental question surrounding regulation is who will be responsible for what. While one could argue some industries contribute greater emissions than others, it may not be possible to adequately quantify and standardize historic, present, and future emissions across firms. The high level of uncertainty around regulation puts financial institutions at risk because there is little to no guidance as to what those institutions will be responsible for. Will lenders be held liable for their direct operational emissions or will they be held liable for the emissions created as a result of their lending and investment activities?

Financial Risks

Financial institutions are exposed to varying degrees of climate-related risks determined by their portfolios, assets under management, and general market conditions. The risks financial institutions face will be compounded by assets becoming stranded and devalued. This means prudent decisions based on sound financial assessments today may inadvertently lead to adverse outcomes in the long-term.

A major risk factor for financial institutions is portfolio exposure. Institutions that hold securities on their balance sheet or in actively managed client portfolios will need to better understand how exposed their portfolios are to climate-related risks. While investors can mitigate risk by diversifying away from fossil fuel intensive assets, it will be a lot more difficult to plan risks around future regulatory or policy shifts. This will create a great degree of uncertainty which will reverberate across the entire stock market.

Another risk area for financial institutions to address are assets under management. While financial institutions can anticipate and plan for assets that may become stranded or devalued under a low-carbon economic transition, it will be much more difficult to assess the value at risk over a longer time horizon. Assets may produce weaker growth or lower returns due to abrupt policy shifts and unforeseen changes in consumer preferences.

Finally financial institutions need to address how concentrations of risk may impact asset values and day-to-day financial operations. Extreme weather events will disproportionately impact certain geographies over others putting assets in those communities at risk. An example of this

⁶ An area of potential conflict is around the idea of taxing carbon. This will likely be a political nonstarter for the United States and due to diverging ideologies around the role of taxes in society, it is possible this could stall transition efforts.

is the concentration of internet data flowing through data centers based in Northern Virginia. Approximately 70 percent of internet data passes through Ashburn, VA whose energy is provided by Dominion Energy. While electricity production in Virginia is not a direct concern for bank operations in New York, any disruption to Dominion Energy – be it from an extreme weather event or an abrupt policy change – will impact the digital infrastructure underpinning most banking transactions.⁷ Financial institutions need to be aware of risk concentrations that may impact asset values and operations to be able to disclose those risks to stakeholders while developing appropriate plans to ensure continuity of operations.

Climate-Related Financial Opportunities

Despite the great risks and tremendous uncertainty that lies ahead, there will also be new opportunities as the economy decarbonizes. These opportunities lie in the emergence of new industries through technological innovation that will require tremendous injections of capital.

Financial institutions are uniquely positioned to finance these innovations bringing new economic opportunities to their communities. The diversification of risk across existing economic conditions and new economic opportunities is a mitigation strategy financial institutions can employ to reduce their own exposure while building resiliency within the communities they serve.

Green Lending

From a retail product perspective, financial institutions can offer consumer and commercial lending products that lead to the greening of the economy. These products can be vehicle loans designated for electric vehicles, home improvement projects to install solar panels, and the installation of electric vehicle charging stations at commercial facilities.

One benefit of offering green lending products is hedging risk against future regulation that might change the longevity of traditional lending products. Vehicle loans are a great example of this. In September 2020 the governor of California issued an executive order banning the sale of internal combustion engine vehicles in the state by 2035. While the ban does not prohibit the use or resale of non-electric vehicles at this time, a disorderly transition could modify this law to include the use of fossil fuel driven cars in the future. Incorporating green lending into retail product offerings, such as electric vehicle car loans, allows financial institutions to mitigate the

⁷ A recent example of this happening is the extreme cold weather that led to a major energy crisis and near collapse of the grid in the state of Texas in February 2021. Electricity is managed by the Electric Reliability Council of Texas (ERCOT) which is independent from national grid infrastructure. The extreme cold weather event of 2021 placed too much pressure on the grid and without any external suppliers to alleviate the pressure, the entire Texas grid came within minutes of collapsing. Texas-based assets or vendors providing critical services to financial services outside of Texas would have been adversely impacted by this concentration of risk.

risk of these kinds of bans while simultaneously providing the credit needed to facilitate the transition to a low-carbon economy.

Another benefit of green lending is the opportunity to invest in commercial improvement projects that can increase the value of businesses in the community. Commercial properties have the most to gain from green lending opportunities as they can invest in projects – such as installing solar panels – that decrease their operating costs while simultaneously allowing them to sell excess energy back to the grid. Due to the fact that green capital improvement projects can immediately generate revenue, green lending products may reduce the overall risk of a financial institution's loan portfolio. By working with commercial businesses now to green their properties rather than relying on government intervention down the road, financial institutions can play an important role in building the infrastructure necessary for an orderly transition to occur.

Digitization of the Economy

The economic transition underway will be a function of climate change but it won't happen in a vacuum. Other complimentary changes in the economy, such as automation, will happen alongside efforts to decarbonize the economy. Financial institutions will operate in a new economic landscape that will also become increasingly digital. As a result, this will likely change how consumers interact with financial institutions and manage their money.

A major benefit of this is access to new forms of collateral that financial institutions can use to secure loans. In the current banking system financial institutions use physical or financial assets to back loans. These assets range from homes to equity in companies. The digitization of the economy will create new digital asset classes, such as cryptocurrencies and non-fungible tokens, that financial institutions can use to secure loans. This will drastically reduce the risk of loan defaults as the ledger-based blockchain will facilitate easier resource recovery processes. While it is still very early to tell where this might go, signals from major banks like JP Morgan⁸ suggest that part or all of the financial system will become digitized⁹, with climate related-risks being an important driver behind that transition.

Another benefit of an increasingly digital economy is the scalability of financial operations across geographic locations. This will allow smaller banks to provide a better customer experience that can compete with larger institutions. The current business model relies on brick-and-mortar properties that are expensive to maintain, limited in their reach, and a burden for customers to access services. New digital infrastructure will allow financial institutions to better serve their communities by providing products and services that are location independent.

⁸ In 2019 JP Morgan tested its own blockchain-based coin. JP Morgan maintains its own Blockchain Center of Excellence where they discuss the integration of digital money with the current financial system: <https://www.jpmorgan.com/insights/technology/blockchain>.

⁹ There are also significant risks, especially as it pertains to cyber security, that follow the digitization of the economy. While it is outside of the scope of this paper to cover those risks they should be considered as financial institutions look to capitalize on the economic digitization that is underway.

This will allow community banks to scale their operations within their communities allowing them to be more competitive with larger national banks.

Population Migration

Internal migration is a significant byproduct of climate change that is already underway. The COVID-19 pandemic led many people to leave high cost of living cities like New York and San Francisco for greener pastures. As the risk of droughts, wildfires, and floods increases, it is likely these migration patterns will continue.

Migration is a great opportunity for low- to moderate-income communities to attract new talent who may bring higher salaries with them. COVID-19 expanded the availability of remote work which will likely continue to increase as firms look for ways to mitigate their own carbon footprints. Attracting high-income talent to the low- and moderate-income areas is an opportunity to mitigate future climate risks as it will lead to a more diversified customer base to whom a financial institution can offer services to. Concentration of risk is often looked at from an asset perspective but in light of climate change it should also be looked at from a human capital perspective. As this paper demonstrates most people will feel the effects of climate change at an economic level rather than an environmental level. It is in the interest of financial institutions to mitigate concentration of risk by attracting a new pool of customers who can provide diversified income and employment streams.

Another benefit of migration is the opportunity to elevate property values in the community. Interest-bearing loans provide a significant revenue stream for financial institutions however that is predicated on the property values within the communities they serve. In low- to moderate-income communities with below average property values financial institutions will have to continuously increase the volume of their loan portfolios, increasing their exposure to physical climate risks. As demonstrated by the 2007 financial crisis this increases the concentration of risk and can amplify adverse conditions across the economy.¹⁰ Attracting new property owners who can increase the market value of all the properties in the community¹¹ can mitigate property depreciation that may result from extreme weather events in the future.

¹⁰ Chairman Ben Bernanke eluded to this in a 2010 congressional testimony where he conveyed that “poor management of concentration risk” was one of several factors that created vulnerabilities within the financial system. Structural vulnerabilities amplified the shocks of the collapse of the subprime mortgage market. To read more: <https://www.federalreserve.gov/newsevents/testimony/bernanke20100902a.htm>.

¹¹ A great anecdote of this comes from Syracuse, NY. [This profile](#) covered on Syracuse.com demonstrates how high-income earners are leaving high cost of living cities for areas where they can have an impact while reducing their own living expenses. This will have a ripple effect across the local economy.

Frameworks for Disclosing Risk

While no singular guidance has been released regarding climate-related risks to date, a number of international organizations are leading the way by establishing guiding frameworks to help financial institutions assess their risks and capture the opportunities that lie ahead. These frameworks will likely form the basis of regulatory actions taken by regulators here in the United States.

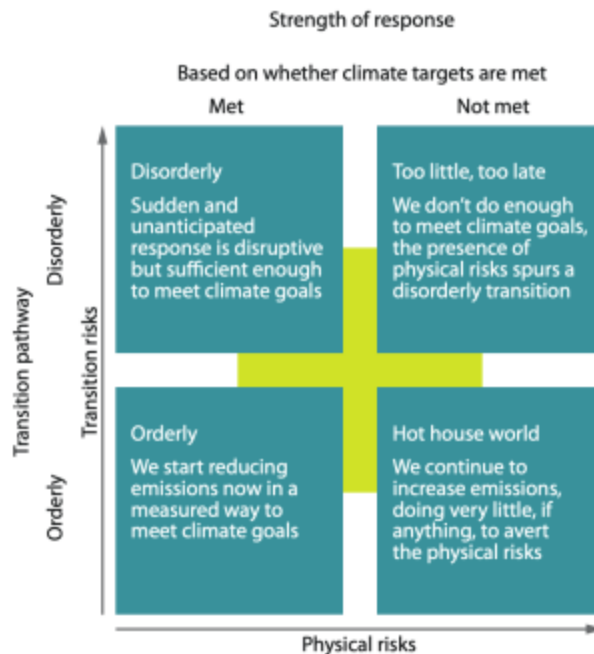
It is important to note that these frameworks are still new and under development. That means the expertise required to implement many of the suggested recommendations does not yet exist at the regulatory level. This is why individual action on the part of financial institutions is paramount. It is only through action in the short-term that the necessary expertise and knowledge will be acquired to take the steps needed to mitigate climate-related financial risks in the long-term.

Network of Central Banks and Supervisors for Greening the Financial System (NGFS)

The NGFS released several climate scenarios in June 2020 to provide central banks and supervisors with a framework to begin addressing the risks posed by different climate pathways. The objective of these scenarios is to provide different members of the international financial system with a common reference point.

The scenarios put out by the NGFS integrate the two different economic transition pathways with physical risks posed by climate change. They are depicted as follows:

NGFS Climate Scenarios Framework



Source: NGFS (2019a).

U.S.-based regulators – including New York State’s Department of Financial Services – are members of the NGFS. It is likely these scenarios and the risks ascribed to them in detail in the framework document will underscore regulatory measures taken domestically in the United States.

Task Force on Climate-related Financial Disclosures (TCFD)

The TCFD released its final report on the *Recommendations of the Task Force on Climate-related Financial Disclosures* in June 2017. The report discusses the financial implications of climate change as they relate to adequately disclosing risks to shareholders and key stakeholders.

The task force is developing an industry-wide approach that produces consistent – albeit voluntary – disclosures that help investors, lenders, and insurance underwriters evaluate the material risks stemming from climate change. The following framework was established around four disclosure components to address the risks:

Core Elements of Recommended Climate-Related Financial Disclosures



A key theme present in the TCFD framework as well as other frameworks is the full integration of climate-related risks within existing risk management and oversight bodies. These include placing climate-related disclosures in existing financial documents and layering climate-related risks onto existing assessments. This is to help facilitate widespread, standardized adoption of the task force's recommendations as soon as possible to help inform key stakeholders of the risks and opportunities that lie ahead.

Financial Stability Oversight Council (FSOC)

In 2021 FSOC released its *Report on Climate-Related Financial Risk*. The report highlights the key regulators and agencies that will be tasked with enforcing climate policy and the disclosure expectations of financial institutions.

The Council recommends that financial institutions should take the following actions immediately:

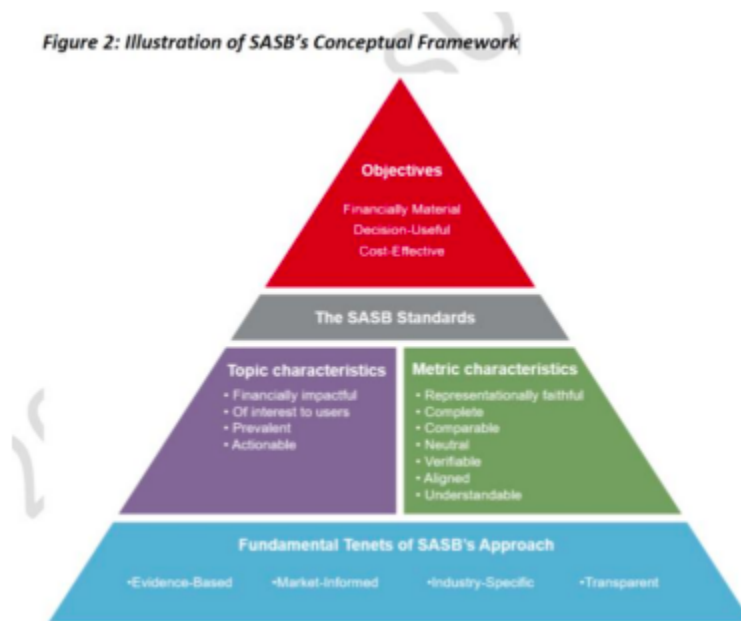
- Build capacity and expand efforts to address climate-related financial risks
- Fill in climate-related data and methodological gaps
- Enhance public climate-related disclosures
- Assess and mitigate risks to financial stability

The Council argues that it is the responsibility of all members of the financial system to take appropriate action to ensure system-wide resiliency in the face of climate-related physical and transitory economic risks. These recommendations are echoed by other federal and state regulators who recommend that financial institutions begin assessing their risk exposure and developing the capacity to mitigate those risks.

Sustainability Accounting Standards Board (SASB)

In February 2017 SASB released its *Conceptual Framework* to begin establishing standards for sustainability accounting. The purpose of this framework is to identify a way for firms to begin accounting for the environmental costs of the goods and services they produce while also accounting for social and human capital inputs that ultimately drive long-term value.

The SASB framework is depicted as follows:



This framework was open to public comment in 2020 and is currently under revision. The final standards put out by SASB will likely establish what constitutes materiality and thus provide a basis for regulators to begin enforcing disclosure requirements.

Recommended Next Steps

Climate change is an issue that has to be prepared for in advance as changes unfold. In Linda Lacewell's October 2020 letter from the New York State Department of Financial Services to the financial industry, she states: "Preparation is key to addressing systemic risks. By the time a crisis occurs, it is simply too late."

Financial institutions cannot adopt a wait and see approach, reacting to changes when they are met with them. Waiting not only poses an immediate threat to assets on a financial institution's balance sheet, it also reduces the opportunity to build institutional knowledge and expertise around climate-related financial risks, imperiling the entire international financial system.

Institutions need to build their individual capacities now to mitigate the inevitable risks that will befall their stakeholders. In doing so, they can provide those same stakeholders with opportunities to leverage the economic gains that will simultaneously come from the economic shift underway.

Perform an Internal Assessment to Determine Risk Exposure

The biggest risk facing financial institutions right now is lack of knowledge and understanding of climate-related risks and the impact it will have on the economy. While most institutions are aware, to some degree, that climate change is a threat on a macro level, many boards of directors and senior leadership teams do not have access to quantifiable data to understand how that threat impacts their own institutions and the communities they serve.

The first action any financial institution should take is conducting an internal assessment to better understand its risk exposure. This assessment should consist of both qualitative and quantitative methods of analyses. From a qualitative perspective, institutions should evaluate their capacity to mitigate risks and leverage opportunities to respond to climate change. This means evaluating governance and management bodies for knowledge gaps and developing a strategy for acquiring the knowledge the institution is deficit in.

Quantitatively, financial institutions need to evaluate their own soundness from a climate lens. This means understanding how to use the climate scenarios put forth by the NGFS to learn how physical and transition risks may impact an institution's assets under management, revenue streams, and overall balance sheet. Once this process is completed an institution can pursue a course of action that preserves the longevity of the institution and meets the needs of the communities they serve.

From a regulatory perspective, an initial internal assessment creates a baseline from which future action can be measured against. Due to the uncertain nature of how climate-related regulations will manifest, a baseline assessment and process for tracking improvements will demonstrate a good faith effort that may hedge against future unknown reporting requirements.

Create an Integrated ESG Stakeholder Strategy

Following the insights developed by an internal assessment, financial institutions need to develop an ESG stakeholder strategy that fully integrates with existing strategic plans.

While ESG is commonly thought of as a portfolio strategy to invest in “sustainable” companies it is much more likely that ESG will evolve into a scoring system that measures corporate resiliency. This scoring system will not only be used to measure access to financial capital, it will also be used to measure how well firms leverage human, social, and relational capital as well.

A comprehensive ESG strategy is required to better understand the role each stakeholder plays in the financial system – not just the benefit passed on to shareholders. Understanding where a financial institution can leverage non-financial capital will help it mitigate and diversify risk as the economy changes.

Develop Robust Data Capabilities

As acknowledged by all of the prominent regulatory frameworks, data is going to play a significant role in enforcing climate mitigation efforts. Data will inform narrative financial disclosures and may eventually be the basis for assessing emissions-based pricing in the future.

The only viable way to enforce climate policies will be through quantitative measures that can be standardized across firms, industries, and geographic locations. It is thus in the interest of financial institutions to begin developing robust data capabilities now anticipating that quantitative measures of emissions contributions and asset risks will be requested by stakeholders in the near term and eventually mandated by regulators in the long-term.

Building strong internal data capabilities will be critical to addressing knowledge deficits. Boards of directors and senior management can only make well-informed decisions with the information they have access to. Data deficits can obfuscate risk making it difficult for leadership to develop strategic plans in an increasingly complex and uncertain economic environment.

Develop ESG Matrixed Teams

In order to make use of an ESG strategy or leverage data-driven insights financial institutions need to have well-equipped teams facilitating day-to-day operations. This can be done by matrixing existing departments and internal organizations with climate and ESG expertise.

It is recommended to build human capital through matrixed teams along the following lines of operation:

- **Accounting:** add greenhouse gas emissions tracking capabilities in anticipation of future reporting requirements and emissions pricing
- **Audit/Compliance:** add knowledge management tracking capabilities to improve record keeping and develop auditable data trails
- **Marketing:** add ESG capability to facilitate communications with external stakeholders and public relations capability to build relational capital with other key leaders in the community
- **Wealth Management:** add ESG investing expertise to help clients make investing decisions that mitigate adverse impacts of future transition or physical risks

Developing ESG matrixed teams is an important action step to build the human capital required to navigate the changing physical and economic landscape that lies ahead. Operating under a “business as usual” approach will undermine an institution's ability to adapt to the changes underway and make it increasingly untenable for that institution to maintain its operational capacity in the long-term.

Develop an Approach to Climate-Related Financial Risk Disclosures

Climate-related disclosures are essential for providing shareholders and non-shareholding stakeholders with insights into what a financial institution is doing to handle the changes underway. These disclosures can be used to communicate risk exposure while demonstrating how financial institutions are leaning into new opportunities.

The COVID-19 pandemic is an excellent example of how climate-related financial risks can be integrated into existing financial reporting documents. Attributing losses to COVID-19 allowed financial institutions to explain anomalies in their financial reporting while the Paycheck Protection Program enabled those same institutions to capture unexpected gains, reporting growth.

Financial institutions did not wait for regulators to mandate COVID-19 reporting in the narrative portions of their financial disclosures. They should not wait for climate-related regulation either. Modeling after the COVID-19 pandemic, financial institutions should begin incorporating climate-related risks into financial documents now. This demonstrates a good faith effort to regulators while creating verifiable documentation in anticipation of future regulation.

Conclusion

To adequately mitigate the future risks posed by the climate crisis, financial institutions and the communities they serve need to start building adaptive capabilities sooner rather than later. Through adaptability, institutions and communities will find resiliency to grow in the new low-carbon economy as it evolves.

Climate change is a problem of the global commons meaning every institution will be impacted regardless of size. While institutions cannot stop changes that will inevitably happen to the physical environment and economic landscape, financial institutions do have the means to determine its degree of impact. This ultimately boils down to how well institutions prepare for and develop the capacity to anticipate, mitigate, and adapt to a variety of known and unknown changes that they may face.

It is this principle of preparation in anticipation of future risks that will ultimately leave the most vulnerable populations exposed to climate change. Low- and moderate-income communities will face the greatest challenge adapting to climate change, not because they are incapable of doing so, but because they lack the resources and access to expertise that would enable them to do so.

Community banks play an important role in helping vulnerable communities build resilient capabilities by extending much needed capital investments to facilitate a transition to a low-carbon economy. While these communities will certainly be impacted by extreme weather events, the greater risk lies in the economic transition that is underway. An unmitigated disorderly transition will threaten carbon-intensive labor markets which could radically alter a financial institution's operating environment.¹² This will impact the local labor market and thus a financial institution's ability to conduct business in the area. Adverse impacts felt by the local population will inevitably trickle up, making it untenable for businesses to thrive in the long term.

¹² To better understand what this impact might look like in the future it is worth studying similar recent historic events: the aftermath of Hurricane Katrina on the city of New Orleans and the gradual transition away from a manufacturing economy during the 1990s and 2000s. Hurricane Katrina is an example of an extreme weather event that had immediate impacts on the local economy in New Orleans, resulting in immediate job losses and thus lost wages. The people who could leave New Orleans did so, spurring a domestic mass migration event that depleted New Orleans of an important human capital pool it could have leveraged to rebuild sooner. From a transition risk perspective, the decline of Rust Belt cities across the northeast should also be looked at in the context of transitioning to a low-carbon economy. In Elmira, for example, the decline in the manufacturing sector led to steep, sustained population decline over several decades. Gradual migration has led to continued economic stagnation over time, resulting in Elmira's inability to recover from the 2008 Recession. Any local economy that is exposed to climate-related structural economic changes may find recovery difficult just as Rust Belt cities have experienced with respect to manufacturing over the past several decades.

It is imperative that financial institutions build their own capacity to mitigate climate-related risks and capitalize on climate-related opportunities sooner rather than later. Regulation will likely be used to enforce efforts to mitigate macro-level climate risks while also serving as a basis to score institutions against each other. The process of standardizing comparative quantitative data will thus determine how and where capital resources flow. By building internal capacity to manage climate-related risks now financial institutions ensure their stakeholders and communities have continued access to capital markets as the transition to a low-carbon economy gets underway.