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# Scaling Finance for Clean Energy: Collaborative Solutions for a New Economy



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## About This Report

This report was written by Charlotte Bancelhon, Christoph Karge, Emilie Prattico, and Ran Tao. This report is part of a program of research BSR is leading with support from the Swiss Agency for Development and Cooperation and ClimateWorks to explore the role of the financial sector in unlocking trillions of dollars in favor of the clean energy transition. This research aims to identify collaborative pathways between financial-services companies and businesses working in other industries that are well-represented in BSR's extensive networks of more than 270 multinational companies.

The shift to a low-carbon economy constitutes an unprecedented opportunity for the private sector to take leadership and drive climate action at scale to build a thriving economy. According to the New Climate Economy report, “the pace of change needs to be accelerated to stimulate further and better quality growth as well as reduce climate risks.” This will be achieved through “cooperative, multi-stakeholder partnerships—not just between governments, but among businesses, investors, states and regions, cities, and communities.” The recommendations of the report, if implemented, not only provide an opportunity for sustainable economic growth, but also to achieve up to 96 percent of the emissions reductions needed by 2030 to remain on the 2-degree pathway (The New Climate Economy, 2015). Never has the time been riper for the private sector to develop innovative and deeply transformative solutions to lead this change.

In light of the findings of the 2015 New Climate Economy report, how do we turn the unprecedented diplomatic settlement at COP21 into catalytic action in the real economy? BSR holds that, in order to catalyze action, we must translate the vision of a climate-compatible future into actionable insights for the business industries with the highest potential impact—such as the financial services industry. Specifically, financial actors lie at the crux of the shift to a low-carbon and climate-resilient economy, since they will provide financing to those who will make the clean energy transition a reality. Hence we aim to understand how to bring together the actors that are key to this transition, starting with companies in the financial services industry, but also expanding to those in high-emitting industries, in a collaborative initiative aimed at designing just what is required of financial products and services to unlock the trillions of dollars needed to scale clean energy solutions.

The clean energy transition and the shift to a low-carbon economy have been the object of much research and activity since even before the signature of the historic Paris Agreement. Moreover, companies from all industries have ramped up the volume and ambition of climate action. Our contribution to this rich landscape of analysis is the perspective of collaboration. BSR has fostered and guided collaboration between stakeholders for more than 20 years and has gained insight on how collaboration can address systemic questions that actors cannot solve alone. BSR is currently spearheading 22 collaborative initiatives, including six dealing directly with climate.

This report examines the role of collaboration in scaling clean energy finance, understood as a structural shift in the energy system from fossil fuel-based to renewable and efficient energy production. This report is addressed to asset owners, asset managers, and banks (including commercial and investment banks) that are looking to support the transition to a 2-degree pathway. The report is more specifically addressed to teams in charge of defining and implementing these organizations' climate strategies.

The methodology for this report consists of three elements. Outlined in full detail in the Appendix A, they are: semi-structured interviews, a comprehensive literature review, and focus groups. This report also builds on research BSR conducted in 2015 with the support of BNY Mellon to examine how institutional investors and other stakeholders can help unlock capital for environmental and social progress, entitled “Conditions for Scaling Investment on Social Finance” (see Davis Pluess et al., 2015).

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## Executive Summary

The transition to a low-carbon economy is underway. The Paris Agreement cemented the foundations for the new climate economy in 2015.

Collectively, the 164 national climate plans included in the Agreement represent at least a US\$13.5 trillion market for the energy sector alone through 2030—and US\$90 trillion for the economy as a whole.<sup>1</sup>

For the first time, there is a clear policy signal for investors across all jurisdictions to make low-carbon investments, whether through financing projects or investing in new technologies. Investors have the opportunity to seize the extraordinary market shift into renewable energy supply, with the International Energy Agency (IEA) projecting global investment from national climate plans by 2030 to reach US\$3.9 trillion, including US\$1.3 trillion in wind, US\$1.1 trillion in solar, and US\$0.9 trillion in hydro. The economic opportunities from energy efficiency are also large: Looking out to 2030, the IEA projects that implementing national climate plans will require US\$5.4 trillion in energy efficiency investment.

There are many measures financial industry actors can take alone; indeed, many of these actors have already implemented important measures. Through BSR's research, we argue that, in addition to notable independent efforts, collaboration can help address three specific market barriers to scaling action within the financial industry in favor of the clean energy transition:

### **Assessing and managing risk are at the forefront of climate action and collaboration for the industry**

Collaboration can further support ambition by engaging diverse stakeholders, including corporate clients, in order to develop industry policies that help clients address risk as they ramp up climate action.

### **Industry-wide capacity building for climate expertise can drive systemic change**

Building climate capacity to encourage stakeholder engagement is key to ensuring that the financial industry will drive the clean energy transition to keep the world on a 2-degree trajectory.

### **Developing common metrics and methods to identify projects is key to seizing climate-related opportunities**

Banks in particular can develop common metrics that allow them to classify projects in their pipeline as contributing to the clean energy transition.

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<sup>1</sup> <http://newclimateeconomy.report/2016/>



## Introduction

The provisions of the Paris Agreement, including those related to the Nationally Determined Contributions (NDCs) from 164 countries, provide the foundation for a new climate economy, marking a historic turning point for global efforts to drive climate-compatible development.<sup>2</sup> The Paris Agreement has established the first-ever universal framework for climate regulation in which national governments undertake more ambitious emissions-reduction targets every five years, toward a global goal of net-zero emissions in the second half of this century. A recent report by the International Renewable Energy Agency (IRENA) and the IEA shows that renewable energy now accounts for 24 percent of global power generation and 16 percent of primary energy supply—and that to achieve decarbonization in line with the Paris Agreement, renewables will have to reach 80 percent of power generation and 65 percent of total primary energy supply by 2050 (IEA and IRENA 2017).

Implementing these plans will require trillions of dollars in low-carbon investment in order to reach the Paris Agreement goal of 2°C, and pursuing a 1.5°C target will require even more. China alone committed to source 20 percent of its energy from renewable sources by 2030 and is planning to spend at least US\$360 billion on renewables before 2020 (Forsythe, 2017). Bolstered by the Sustainable Development Goals, which also have a 2030 horizon, this shift is inevitable and must be anticipated and managed. In particular, goal 7—to ensure access to affordable, reliable, sustainable, and modern energy for all—and goal 13—to take urgent action to combat climate change and its impacts—need to be tackled in tandem in order to ensure that the energy transition meets the 2-degree pathway.

Developed countries have made a commitment to mobilize US\$100 billion per year of climate finance, with public money being used to leverage private-sector finance to the highest possible extent (Department of Foreign Affairs and Trade, Australia, 2016); pressure on governments to reduce or to remove fossil-fuel subsidies is increasing (Chestney, 2016); and carbon pricing is gaining momentum around the globe and in varied jurisdictions (World Bank et al., 2016).

Carbon reductions set out in the NDCs transform the energy mix in many economies. As the Financial Stability Board's Task Force on Climate-related Financial Disclosures reports, the energy transition presents revenue risks and opportunities as investments shift to low-carbon energy solutions, with ripple effects throughout the economy. Financial stability throughout the economy is at stake, according to the Task Force's findings. For individual companies, reputational risk is increasing as investors, governments, non-governmental organizations (NGOs), citizens, staff, and customers will be increasingly asking climate questions of financial institutions (FSB-TCFD, 2016a).

The We Mean Business coalition, of which BSR is a co-founding member, offers a unique window into the scale of the opportunity represented by the energy transition. As of March 2017, 512 companies representing more than US\$8.3 trillion have made commitments to align their practices, operations, and supply chains with climate-compatible growth. At the same time, 183 investors, controlling more than US\$20.7 trillion in assets, have pledged to align their investments with the same trajectory.<sup>3</sup> The top three publicly traded companies in the world by market capitalization—Apple, Google, and Microsoft—have all

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<sup>2</sup> The Paris Agreement is available at: [http://unfccc.int/files/essential\\_background/convention/application/pdf/english\\_paris\\_agreement.pdf](http://unfccc.int/files/essential_background/convention/application/pdf/english_paris_agreement.pdf)

<sup>3</sup> Initiative's website available at: [www.wemeanbusinesscoalition.org](http://www.wemeanbusinesscoalition.org)



committed to 100 percent renewable power. The largest private-sector employer in the world, Walmart, has made the same commitment, in addition to setting science-based emissions-reduction targets, aiming to reduce their absolute emissions from operations by 18 percent and Scope 3 emissions by 1 gigaton by 2025 from 2015 levels. These contributions to the energy transition will require finance and collaborative solutions in order to innovative ways to achieve scale.

The unprecedented opportunity of matching the ambition of corporations and investors spurred BSR's research and bolstered the belief that collaboration between these groups is necessary to drive the scale of change that the energy transition demands. The purpose of this report is to present the ways in which collaboration can support financial actors and their corporate clients in leading the clean energy transition.

BSR devised a framework, "Conditions for Scaling Investment on Social Finance," to examine how institutional investors and other stakeholders can help unlock capital for environmental and social progress (Davis Pluess et al., 2015). Recommendations for the investment community were structured around five pillars: accessibility, measurement, transparency, systemic change, and collaboration. Building on these pillars and adapting the recommendations to the context of the energy transition, this report further aims to show opportunities for collaboration between financial-industry actors, in particular banks, with other economic actors to catalyze the systemic change necessary for the shift to the new energy economy. The notions of accessibility, measurement, and transparency are particularly relevant to this research.

## THE ROLE OF COLLABORATION

In its previous research, BSR found that collaboration is a key condition needed for investors to bring sustainable finance to scale (Davis Pluess et al., 2015). The report recommended that investors cultivate partnerships among stakeholders to de-risk investments, accelerate product innovation and testing to boost demand, and provide guidance and technical assistance to strengthen the pipeline of investment opportunities for both investors and intermediaries.

This research found that collaboration between different actors can play a critical role in supporting the shift in the energy system by mobilizing capital in favor of clean energy. Notably, collaboration between asset owners, asset managers, banks, and corporations can support:

- » The assessment and mitigation of climate risk across asset portfolios as well as banks' products and services;
- » The identification of projects with the potential to contribute to the energy transition; and
- » Capacity-building of specific knowledge and skills for climate investments.

This report sets the context of clean energy investment before exploring existing practices areas across the industry. It then goes on to study collaborations in the clean-energy finance space, and identifies new areas where collaboration is needed to further enable the energy transition.

## CLEAN ENERGY INVESTMENT: CURRENT LANDSCAPE AND TRENDS

In interviews for this report, insufficient returns were cited as the number one barrier to investment in renewable energy. While there are instances of actors working together to improve returns, such as those in the Catalytic Finance Initiative created by Bank of America, examples remain scarce. Competition in the industry for greater return is rife, making this a challenging aspect for collaboration.

While the investing world recognizes the macroeconomic pivot toward low-carbon development—take investors' commitment to climate action under We Mean Business as an example—returns across low-carbon investment opportunities are heterogeneous. Fossil fuel technologies such as those for oil, coal, and natural gas have enjoyed a long history of implementation, which means that costs for these technologies have fallen over a longer time horizon. By comparison, renewable energy technologies are relatively new to the market, and they have conventionally been more expensive. Climate and energy vehicles from green bonds to corporate power purchase agreements (PPAs) are creating new opportunities for investors to achieve the returns they need.

Historically, clean energy investment has, until recently, been unable to offer investors returns as strong as conventional instruments such as stocks and bonds, but falling renewable energy costs and improving operational efficiency have contributed to better performance in recent years with costs projected to fall further in the near to medium term. Indeed, innovation in the renewable energy technology space has led to sharp cost reductions. Solar photovoltaic module prices have dropped 80 to 85 percent and wind turbine costs have fallen by roughly 30 to 40 percent since 2009, and the cost of electricity generated by these technologies could fall another 59 percent by 2025, according to experts (Rowling, 2016; Lazard, 2016). As these technologies become more cost-effective, they will generate greater returns, which in turn will attract more investors. Policy stability has also been a major driver, with tax incentives and other supportive policies fueling clean-energy market growth.

## CLEAN ENERGY FINANCE TRENDS

In 2016, strong investment in clean energy continued with new investment totaling US\$287.5 billion. This was less than the previous year, when investment reached a record of US\$348.5 billion, but the slowdown was principally a reflection of falling costs. For example, solar capacity actually increased year over year. In addition, although overall investment fell, there were notable pockets of growth. Offshore wind experienced impressive growth as developers in Europe and China provided greater investment. Capital spending for wind hit US\$29.9 billion for the year, a jump of 40 percent from 2015. Mergers and acquisitions (M&A) was also another bright area with increased activity: M&A broke the US\$100 billion mark and totaled US\$117.6 billion, up from US\$97 billion in the previous year (Bloomberg New Energy Finance, 2016).

The growth for renewables is also supported by increasing demand from corporations. As of early 2017, more than 88 companies have committed to powering their operations with 100 percent renewable energy (RE100), including well-known companies such as Ikea, Nike, and Bloomberg.<sup>4</sup> Corporations have historically explored a variety of ways to increase renewable energy use, including installing solar panels on their rooftops or wind turbines on their land, but they are increasingly using renewable energy PPAs—long-term contracts for electricity produced by renewable technologies—in order to show their support for

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<sup>4</sup> Initiative's website available at: <http://there100.org/companies>

clean energy. Companies added nearly 1.6 gigawatts of such contracts in 2016, which represents a significant increase from only 0.8 gigawatts in 2010 (Business Renewables Center, 2017). Investors that finance projects, or developers that make these contracts possible, can usually achieve a return of between 8 to 12 percent (Cornerstone Capital, 2017). It's also worth noting that income from such projects tends to be predictable and stable, which creates less risk for investors.

While these trends are positive, investors are generally concerned with where they can achieve the greatest returns relative to all opportunities available in the market. If the opportunity cost for renewable energy is too high, investors will turn elsewhere. Therefore, it is important to assess the landscape of returns that investors can achieve in the market more broadly before turning our attention to clean energy specifically. Investment returns for traditional asset classes in the years following the financial crisis have been challenging, yet improving market conditions contributed to positive results in 2016. Indeed, stocks had a rocky start in 2016 but experienced a comeback by the end of the year, with the NASDAQ and Dow finishing up more than 7 and 13 percent, respectively (Domm et al., 2016). Bonds, on the other hand, did not fare as well: in the final quarter of last year, the average mutual fund focusing on the United States Treasury bond market lost about 7 percent (MarksJarvis, 2016).

Looking ahead, a critical question is whether renewable energy investment opportunities will be able to offer investors returns attractive enough to engender the amount of renewable energy experts say is needed to keep climate change in check. It's projected that around US\$45 trillion will be invested in energy infrastructure between 2015 and 2030 (The New Climate Economy, 2014). Indeed, the prospects for the value proposition of clean energy are bright. On the supply side, prices have fallen sharply in recent years, and they are likely to continue to fall. On the demand side, buyers, led by corporations, are more eager than ever to accelerate their uptake of renewable energy. Clearly, the investment community has a strong role to play in this endeavor.

## **RETURNS FOR CLEAN ENERGY INVESTMENT OPPORTUNITIES**

### **ENVIRONMENTAL EQUITIES**

When investors decide to invest in clean energy, they have the option of buying stocks in companies that produce renewable energy technologies. They can also purchase index funds that align with their clean energy philosophy, such as the S&P Global Clean Energy Index,<sup>5</sup> which includes 30 or so companies from around the world that focus on renewable and clean energy-production equipment. Sustainalytics, a leading provider of environmental, social and governance (ESG) data, screens the companies included in the index, which represents a broad range of sectors, including industrials, materials, and information technology, although utilities command the greatest share, composing over 60 percent of the breakdown (S&P, 2017). Stocks and their index derivatives can be attractive ways for investors seeking exposure to renewable energy holdings by offering diversification and high liquidity whereas other types of investments may be relatively concentrated and extend over longer time horizons. In 2016, the S&P Global Clean Energy Index achieved a 15 percent return.

### **GREEN BONDS**

Investors that want to limit their risk from the volatility of stocks can turn to bonds, although bonds tend to offer less return compared to equities. The market for environment-friendly bonds has been growing

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<sup>5</sup> For an overview, see: <https://us.spindices.com/indices/equity/sp-global-clean-energy-index>

rapidly, reaching new heights in 2016, with US\$81 billion in labeled green bonds added to the market, a significant jump from the US\$42.2 billion issued in 2015. Developing countries contributed the most to growth, with China and India adding the most first-time issuances. For example, Chinese institutions China Industrial Bank, the Bank of Qingdao, and Xinjiang Goldwind rank as some of the largest entrants into the market in 2016; corporations were also responsible for significant activity, with large issuances from Apple, Toyota, and Iberdrola (Mahapatra, 2017). Other notable highlights for the year included Poland becoming the first country to issue a green sovereign bond, and China's Bank of Communications issuing the largest green bond in history at US\$4.3 billion (Climate Bonds, 2017). Banks in China have issued such bonds for 2.95 percent annual interest on three-year terms (Bloomberg, 2016). Generally, green bond pricing has largely tracked that of conventional bonds, but investors get the added benefit of supporting green investments. These bonds align with the definitions of the Climate Bonds Initiative (CBI) and can cover investments in sectors such as clean energy, green building, and electric vehicles.

## CORPORATE POWER PURCHASE AGREEMENT (PPA)

Corporate PPAs are long-term contracts for electricity penned directly between a power producer and a corporation, and one of their main benefits is that they can stimulate additional financing for new renewable energy projects. Essentially, corporations promise to pay a producer a fixed price for electricity in a long-term contract, commonly 10 to 15 years, for all or part of the renewable energy that is generated by a project. Investor returns for corporate PPAs range from 8 to 12 percent, and growth in PPAs has been significant, with future prospects thought to be strong, especially in Asia (DLA Piper, 2016). The first corporate PPAs for renewable energy appeared on the market in 2008, and about 0.65 gigawatts were contracted between 2008 and 2012. Since then, contracts have grown tremendously, with most corporations attributing their adoption of PPAs to mainly economic reasons rather than simply environmental motivations (BakerMcKenzie, 2015). This past year, roughly 1.6 gigawatts of PPAs were added to the market, and the outlook continues to be favorable as the market expands.

In summary, investment options for renewable energy finance such as equities, bonds, and corporate PPAs, which create returns in the range of 3 to 15 percent, were comparable to the range of 7 to 13 percent returns that investors were able to achieve generally through the broader stock market in 2016. While these instruments delivered returns that were consistent with the overall market, they may still not be sufficient to ignite the renewable energy investments needed to mitigate climate change. In order to improve prospects, collaboration among financial industry players may help, but inveterate competition between financial institutions such as banks impede progress. Industry collaboration to date is certainly noteworthy, although many actors will also see benefits in pursuing these opportunities alone. The aim of what follows is to show that the opportunities for investment in clean energy are bolstered by collaboration in three important ways: managing risk, building project pipelines, and building capacity in financial institutions.

# Risk: Understanding and Mitigating Climate Risk

Banks' systematic consideration of climate risk in investment and lending decisions will shift capital away from carbon-intensive and toward low-carbon assets and clean energy. Flurries of thought leadership and collaboration have grown to address how investors can measure and mitigate climate risk.

## FOCUS

### Defining climate risk

Investor research from firms such as Mercer or Blackrock, as well as the recommendations of the Financial Stability Board's Task Force on Climate-related Financial Disclosures, identifies factors underlying climate risk (Mercer, 2015; Blackrock Investment Institute 2016; FSB-TCFD 2016). Although terminology and the number of factors differ, there is a consensus that physical, regulatory, technological, consumer, and reputational factors all contribute to climate risk. In the FSB's definition, all risks listed below—except for physical risk—are considered “transition risks,” or risks related to the adjustment to a low-carbon economy

- » **Physical risk:** Physical risk refers to the physical impact on assets by extreme weather events (e.g., storms, floods) as well as changes in weather patterns (e.g., droughts, changes in precipitation). Mercer argues that chronic weather patterns will affect resource availability and distribution, as with water and agriculture (Mercer, 2015). Our interviews revealed that physical risks are difficult to quantify: Risks highly depend on asset location and vulnerability, and some regions are more severely impacted by extreme weather events as well as changes in weather patterns. Our interviews also emphasized that climate models are difficult to translate in a way that investors can use.
- » **Regulatory risk:** Regulatory risk refers to the body of international, national, and local regulations limiting carbon emissions, which may also affect the operations and financial viability of assets. According to the 2016 Global Climate Legislation Study, there were 854 climate change laws and policies in October 2016, up from 54 in 1997 and 426 in 2009. These cover the electricity sector (25 percent), agriculture and forestry sector (24 percent), industry (21 percent), transportation sector (14 percent), and other sectors (10 percent) (Grantham Research Institute, 2016). Interviews pointed to lack of stability in regulatory frameworks as a key barrier to adopting green technologies.
- » **Technology risk:** Technology risk refers to technological advances and shifts that pose threats to the demand of fossil fuel-based business models and products. Low-carbon technologies including wind power, solar power, electric vehicles, and LED lighting are increasingly cost-competitive. According to a Goldman Sachs report, and in line with earlier insights on the decreasing costs for clean energy technologies, the cost of wind power before subsidies is now comparable to that of natural gas in parts of the United States (Goldman Sachs, 2016).

» **Consumer and reputation risk:** Reputation risk refers to shifting consumer patterns and reputational damage linked to being associated with a controversial activity. The Fossil Fuel Divestment campaign in the United States has found 696 institutions and 58,000 individuals representing US\$5.4 trillion in assets have divested from fossil fuels (including partial divestments).<sup>6</sup>

For example, climate risk in the oil and gas sector may lead to stranded assets, as pointed out by Bank of England Governor Mark Carney (Clark, 2015). The stranded-asset theory argues that there is a limited “carbon budget” the world can afford to spend and still be able to achieve the 2-degree target, and this budget amounts to between one-fifth and one-third of the world’s proven reserves of oil, gas and coal.

A report from Boston Common also looks at how 61 global banks integrate climate considerations in their risk management. It found that 20 of those banks rebalance their portfolios in view of climate-related risks and opportunities. Only one bank, Bank of Nova Scotia, stated that it integrates climate-related risk into loan pricing (Boston Common, 2015).

## Defining and explaining barriers and failures

Our research points to two main barriers for integrating climate risk considerations: time horizon and lack of common frameworks.

### TIME HORIZON

Investor short-termism is recurrently cited as a challenge to considering climate change in investment and lending portfolios. Traditional risks such as market, inflation, or interest rate risks are measured on an annual time frame, while climate risk will need to be measured over the long term (more than three years). Risk factors mentioned above will unfold at different paces, creating risk in different time horizons. While regulation may create the largest short-term climate risks, technology change will have medium-term impacts and physical risk will reflect long-term impacts.

### LACK OF COMMON FRAMEWORKS

Lack of common frameworks is also cited as a barrier to considering climate risk in investor decisions and shifting investment and lending portfolios toward green assets. More specifically, interviewees pointed to a lack of common carbon-footprinting methodologies or common definitions on what constitutes a green investment or bond. Developing common frameworks, methodologies, and definitions will allow investors and lenders to measure their climate exposure and performance against established benchmarks and allow them to devise clear road maps and strategies toward a 2-degree pathway.

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<sup>6</sup> Initiative’s website available at: <https://gofossilfree.org/commitments/>



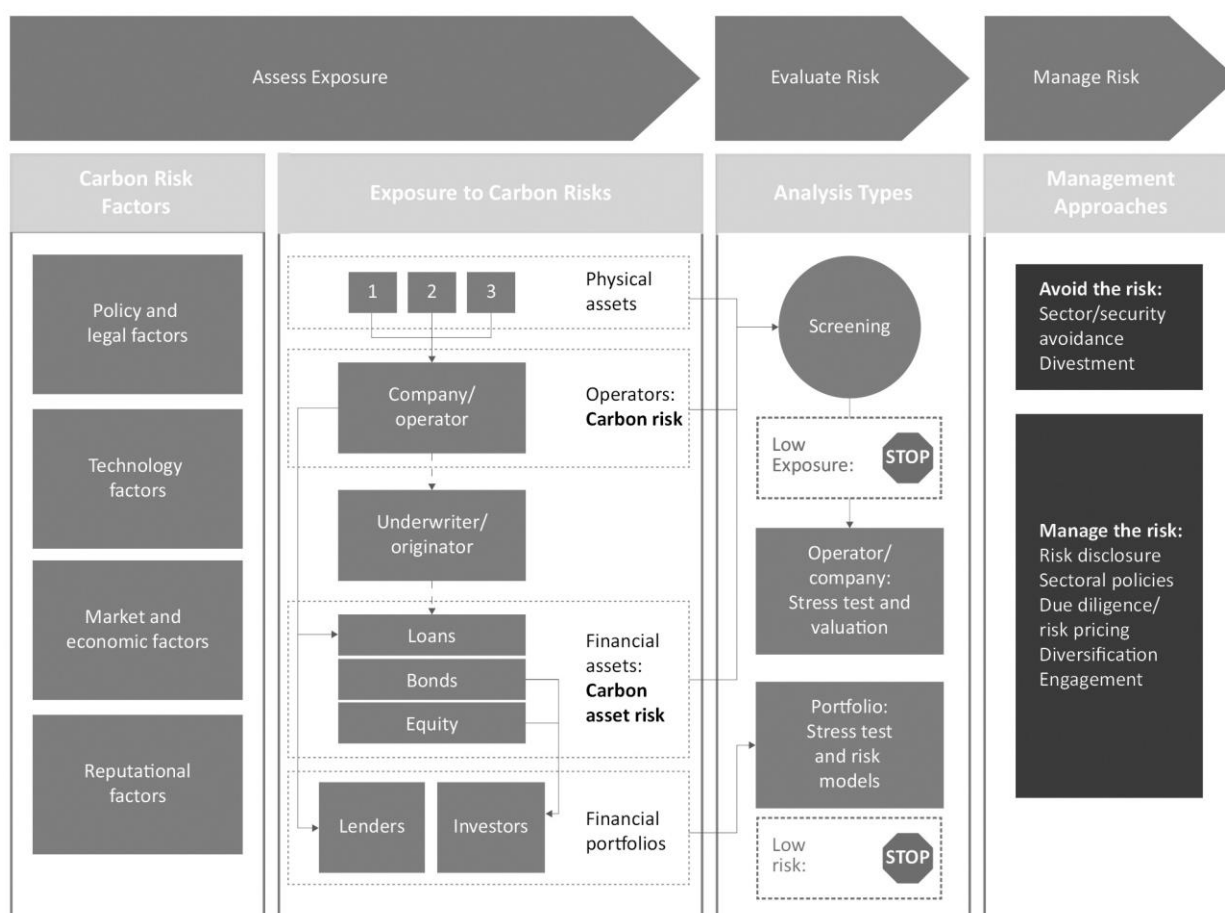
## Emerging Frameworks and Collaborations Around Climate Risk

Today, an important number of think tanks and projects are developing frameworks for investors to understand climate risk exposure and pathways to managing that risk.

### FRAMEWORK TO ASSESS AND MANAGE CARBON RISK

Under the Portfolio Carbon Initiative,<sup>7</sup> the WRI and the UNEP Finance Initiative (UNEP FI) developed a framework to help investors identify, assess, and manage carbon risk. The framework specifically looks at risks linked to regulation, technology, and reputation, and excludes physical climate risks. The framework identifies approaches to evaluating risk, including screening corporate climate strategies for carbon risk, and stress-testing exposure at both the corporate and portfolio levels.

Figure 1 - Framework to identify, assess, and manage carbon risk



Source: WRI and UNEP FI (2015)

The framework then points to options for managing carbon risk based on the type of investor across shareholders, bondholders, lenders, and underwriters. A shareholder, for example, can choose to engage company management or avoid investing or divesting from carbon intensive sectors. A lender can

<sup>7</sup> Initiative's website available at: [www.ghgprotocol.org/Portfolio\\_Carbon\\_Initiative](http://www.ghgprotocol.org/Portfolio_Carbon_Initiative)



integrate climate risk in loan pricing, implement policies seeking to conduct increased due diligence, or limit loans in certain carbon-intensive sectors such as coal.

Corporates, including banks, can also set an internal price on carbon. This allows companies to evaluate and account for the financial risks, cost, and market opportunities of climate change as well as prepare for the impact of future regulations. According to CDP, in 2015, 435 companies used an internal price on carbon, including banks such as BNY Mellon, Bank of America or Société Générale (CDP, 2015).

#### FOCUS

### Carbon Footprinting

Initiatives and regulations such as the Portfolio Decarbonization Coalition, the Montreal Protocol, and France's Energy Transition Law are driving investors to measure and disclose the carbon impacts of their portfolios. A 2015 Novethic survey stated that 94 investors had completed a carbon-footprint assessment (Novethic, 2015).

Current carbon-footprinting approaches have a number of shortfalls: Results are not fully comparable due to different methodologies; methodologies exist for equity portfolios but not for other asset classes, such as private equity, or fixed income; and methodologies do not capture avoided emissions from technology advancements, products, or other categories.

Investors are experimenting with different data sets. For example, some investors are complementing portfolio carbon footprinting with "green-brown" metrics, which calculate the proportion of a portfolio invested in green versus brown sectors. This allows investors to understand the balance between climate risks and opportunities. Green-brown metrics also allow for forward-looking estimates (Kepler Cheuvreux, 2015). Some think tanks, such as the 2 Degrees Investing Initiative, argue that investors should focus on physical asset-level data rather than annual reporting.<sup>8</sup>

Although far from perfect, corporate disclosure of carbon data is continuously improving. The CDP reported that 63 percent of the 1,305 companies targeted by its Carbon Action campaign responded to the CDP questionnaire in 2016, up from 42 percent in 2015. Most companies are using the GHG Protocol, a standard to measure and report corporate GHG emissions, where data is seen to be comparable (CDP, 2016).

Common definitions on what constitutes a green investment, however, are lacking. We can point to some efforts by the Climate Bond Initiative, but our research found that the main actors disagree on what is defined as a green investment. Developing common definitions of green investment will be critical to a credible expansion of the green bond market.

Based on the framework above, collaboration between actors can support the integration of climate risk in two areas: (1) the assessment of risk exposure and the evaluation of the risk and (2) the management and mitigation of climate risks.

<sup>8</sup> Initiative's website available at: [http://2degrees-investing.org/#!/page\\_Resources](http://2degrees-investing.org/#!/page_Resources)

## Building Capacity: Climate Change-Related Knowledge and Skills

While there has been an uptake in climate-related capacity-building activities in the financial sector and the banking sector in particular,<sup>9</sup> our research shows that building capacity—specific knowledge and skills for climate investments—is a necessary condition for the energy transition to take place at the pace and scale called for by the 2-degree trajectory.

### Defining and explaining barriers and failures

In previous research, BSR already found that a precondition for enabling greater social finance—including climate finance—is to improve “the knowledge and skills of investors, managers, and advisors who play critical roles in translating” the complexities of climate finance into language investors can understand (Davis Pluess et al., 2015).

The level of maturity in corporate and financial institutions’ approaches to climate change varies greatly: While a good number of especially large corporations, banks, and funds have advanced on those topics, some companies are only just starting to shift and still others need to adapt to more climate-sustainable business practices. The energy transition, and with it the changing investment and financing patterns in renewable energy, has large repercussions for companies’ business models, especially those in power generation. And many companies lack sufficient internal awareness, knowledge, skills, and experience to successfully confront and overcome climate change challenges.

The Association of Climate Change Officers (ACCO), a membership organization founded to advance enterprise knowledge, capacity, and leadership on climate change risks and opportunities, outlines three business competencies that managers working on climate change topics need to develop. According to the ACCO, these three specific competencies can be further defined by 15 distinctive skills, as summarized in Table 1.

**Table 1 - Distinctive business competencies on climate change**

Main competency	Characteristic climate change skill
<b>Foundational Knowledge and Skills</b>	Science Literacy Environmental and Economic Literacy Understanding of the Policy Landscape Management Acumen
<b>Organizational Knowledge and Experience</b>	Strategic Planning Decision Making Compliance and Enterprise Risk Management Asset Management Value and Supply Chains Communications and Corporate Social Responsibility

<sup>9</sup> According to Boston Common Assets, 70 percent of banks that responded to their survey are undertaking carbon footprints and environmental stress tests, and 80 percent have adopted oversight of climate risk at board level (Boston Common, 2016).

	Governance
<b>Strategic Execution</b>	Enterprise Risk Mitigation Supporting Change Within the Organization Stakeholder Engagement Reaching Beyond the Organization

Source: [www.accoonline.org/competencies.html](http://www.accoonline.org/competencies.html)

While companies show strong performance on more traditional skills and knowledge, such as competencies in “Organizational Knowledge & Experience,” skills more directly associated with sustainability in general and climate change in specific, here called “Foundational Knowledge and Skills” and “Strategic Execution,” are significantly less developed as part of companies’ human capital.

“The technology is there, what’s really lacking is more skilled people.”

Companies need to “invest in education and skill development for the next generation of talent” to address climate challenges and to stay competitive (Davis Pluess et al., 2015). Our consultation and research process revealed that a number of these underdeveloped competencies might hinder the growth of climate finance. We have observed that the lack of climate finance can be traced to varying degrees of skills and knowledge, especially around:

- » Environmental and science literacy
- » Supporting change within the organization
- » Reaching beyond the organization and stakeholder engagement

## LACK OF ENVIRONMENTAL AND SCIENCE LITERACY

To guide capital allocation decisions in a more concrete way, the Task Force on Climate-related Financial Disclosures found that companies need to develop necessary organizational skills and capabilities for assessing their climate-related risks and opportunities, for example with the aim to create climate scenario analyses helping them to understand:

- » The robustness of an organization’s strategy and financial plans under different plausible future states of the world;
- » How an organization positions itself to take advantage of opportunities and plans to mitigate or adapt to climate-related risks; and
- » How an organization challenges itself to think strategically about longer-term climate-related risks and opportunities (FSB-TCFD, 2016).

While environmental and science literacy is “the capacity to understand and participate in evidence-based discussions of socio-ecological systems” business managers do not need to be scientists to grasp core

concepts such as environmental systems thinking<sup>10</sup> in order to cope with uncertainty and improve corporate decision making (Michigan State University, 2010; Szymanski, 2014).

Our consultation made clear that companies generally do not lack information helping them with their climate investments. Over time, data and information on climate issues have improved dramatically, such as with efforts to produce voluntary or mandatory GHG emission reports or insurers' data on risks of extreme events (ClimateWise, 2016). While insurers have made good progress on integrating this data in their risk models, other financial actors are still struggling to understand how to make sense of this wealth of information for their business and integrate it into their decision making.

## **SUPPORT FOR CHANGE WITHIN ORGANIZATIONS**

One of the most significant barriers to unlocking climate finance is the deeply entwined cultural, governance, and behavioral factors that influence investors' decision making (Davis Pluess et al., 2015). Organizing cultural change within companies is often difficult, as organizations tend to pursue traditional ways of doing business through employing long-established models and processes.

A number of stakeholders in our consultation process detailed the difficulty in achieving cross-fertilization between sustainability teams possessing specific climate and energy knowledge and, for instance, corporate finance departments. A critical aspect for those cross-team discussions is introducing sustainability considerations into the return on investment (ROI) equation as well as risk-assessment tools, leveraging understanding about policy changes to determine the long-term investment environment (as in the case with stranded assets), or adapting analysis to regional and local climate change risks.

The underlying pattern we observed is the lack of individual and organizational incentives for long-term impact or measurement of climate performance. Incentive structures and benchmarks that, for instance, asset owners use to evaluate asset managers are heavily weighted toward short-term and quarterly performance. This reality fails to consider environmental impacts, which do not abide by institutional time horizons. Additionally, conflicting and unclear interpretations of the role of ESG factors in fiduciary duty are preventing some private investors and corporates from investing in climate-resilient strategies (Davis Pluess et al., 2015).

Although incentives and compensation are increasingly linked to ESG factors, with 50 percent of banks explicitly linking climate-strategy goals to executive compensation, it is usually companies' operational environmental performance, such as GHG emissions, that are taken into account rather than forward-looking "financing specific or broader climate strategy-related objectives" (Boston Common, 2017).

## **REACHING BEYOND THE ORGANIZATION AND STAKEHOLDER ENGAGEMENT**

For project developers, our stakeholder consultations confirmed that there remains a shortage of experienced project developers able to provide skills and capacity around local stakeholder engagement to successfully take a project forward. Specifically, research on this topic underlines project developers' lack of local knowledge and insufficient stakeholder management due to non-awareness of policy risks and local political sensitivities, which can result in local struggles or community unrest (Bielenberg et al.,

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<sup>10</sup> Systems thinking is the process of understanding how things influence one another within a whole. In nature, systems thinking examples include ecosystems in which various elements such as air, water, movement, plants, and animals work together to survive or perish (Environment and Ecology, n.d.).

2016). Even for California and Germany, where the population tends to be largely in favor of renewable energy, research found that extensive and early local engagement is key to successful project development, while the absence of community consultation can cause local protests and resistance (Schreuers et al., 2015).

For project investors, our research and others have found that international institutional investors were especially willing to directly take a stake in climate projects (Bielenberg et al., 2016). The skills at play here go beyond broad climate-related skills to include specific technical skills and management experience regarding, for example, due diligence of large-scale sustainable infrastructure projects and their related timeframe- and risk-management practices.

# Project Pipeline: Identifying Projects That Favor the Energy Transition

## Defining and explaining barriers and failures

Projects that support the energy transition cover a large array of industries—energy production and distribution, transportation, construction, agriculture, infrastructure, and all heavy manufacturing industries—as well as evolving and emerging technologies—energy efficiency, energy storage, smart grids and connected objects, and mitigation technologies.

Banks recognize that these projects are growth areas and genuine business opportunities, and that there is a risk associated with not seizing these opportunities. They recognize at the same time the gaps in methodologies and standards that, if addressed, would help them identify projects with the potential to contribute to the energy transition and also assess the scale of that contribution. While disclosure on climate impacts has increased and data on project performance is also increasingly available, frameworks to identify projects early in their lifecycle—before they are even identified as viable climate projects—are seen as lacking. Although banks are keen to find ways to identify opportunities related to the energy transition, there are currently no methodologies for breaking down how the trillions of dollars of investment needed for the energy transition fit into a given bank's pipeline.

The momentum for opportunities stemming from the energy transition has not waned. Investment in renewable energy technologies has increased, and investments in energy technologies are expected to drive down the cost of renewable energy even further. Opportunities abound and banks are increasingly taking measures to seize them. At this stage, banks have successfully implemented organizational features to favor climate-compatible activities. Barclays, for instance, has linked senior executive compensation to overall performance on climate strategy-related goals; at HSBC, the chairman holds organization-wide accountability for climate change (Boston Common, 2017).

While the sector is seeing a growth in appetite for capturing these opportunities, projects with positive climate impacts do not always appear in the project pipeline as opportunities. Lacking metrics, not only do banks have a reduced ability to identify opportunities, but they also have limited ways to disclose quantitative information about projects and investments that contribute to the energy transition, such as energy efficiency or renewable energy. While some banks noted internal efforts to track and report—or to develop way to track and report—this kind of data, it appears that few banks had integrated institution-wide reporting protocols. Not only did banks not have the need for such metrics internally, but they also noted the need for industry-wide alignment, if not consensus, on what those metrics should be.

According to our benchmarking of collaborative programs setting project-identification standards, the CBI and the UNEP FI are the two leading initiatives. These initiatives are significant not only in their impact but in the signal they are sending to the market that there is strong support and demand for more metrics that could be applied across industries and for different classes of assets or types of projects that favor the energy transition.

CBI focuses on building strong markets for climate bonds and green bonds to support assets and projects that will accelerate the energy transition. Its three working groups comprise a scientific board, a technical

board, and an industry board made up of 18 financial-services actors from responsible mutual funds (Calvert), asset managers (Aviva Investors), ratings agencies (S&P), or retail and commercial banks (Lloyd's).<sup>11</sup>

The Climate Change Advisory Group of UNEP FI also focuses on developing common metrics for climate projects and assets, notably by investing in research and development.<sup>12</sup> The group elects a maximum of 10 participants to the governance structure representing insurance (Swiss Re, Allianz), banking (Bank of America, First Rand), and investment (Hermes), and includes the UNEP.

Complementary to these activities and approaches, our research suggests that banks remain keen to further develop common standards for such assets and projects. Several hypotheses explain the hindrances to identifying projects and instituting metrics that favor the energy transition and associated growth opportunities:

- » Some metrics are not sufficiently precise as to the climate benefits of a project or investment.
- » Some metrics are precise as to the climate benefits of a project or investment, but they do not integrate well with other metrics that banks use to assess decisions.
- » Banks have observed a proliferation of metrics and standards that create a situation where, although a lot of data are available, it is unclear how to tie them to identifying genuine growth opportunities in assets and projects that contribute to the energy transition.
- » In some industries, massive changes are expected in 10 to 15 years (such as automotive), and banks do not have appropriate methodologies to envision long-term challenges that can translate into current opportunities.

The benefits of ensuring that appropriate governance structures, metrics, and targets are in place include the ability to deliver a coherent strategy and knowledge flow between corporate business units that are exposed positively and negatively to the energy transition. In particular, in the context of banks dealing with corporate clients who are making commitments to advance the energy transition at a significant pace (see Appendix D), the ability to assess the strength of these projects will determine the overall success of a bank's climate strategy on the one hand, and its ability to seize business opportunities on the other. In addition, such standards—including if they were instituted industry-wide—would introduce the ability to assess progress against goals, possibly against peers, and, crucially, against the economy at large.

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<sup>11</sup> Initiative's website available at: [www.climatebonds.net/standards/about/governance/industry-working-group](http://www.climatebonds.net/standards/about/governance/industry-working-group)

<sup>12</sup> Initiative's website available at: [www.unepfi.org/climate-change/climate-change-advisory-group/](http://www.unepfi.org/climate-change/climate-change-advisory-group/)



## The Role of Collaboration

Our review of current collaborative practices in scaling clean energy finance has identified white spaces for further exploration. These correspond to collaborations addressing systemic barriers to capacity building, building a project pipeline, and risk management that brings together corporations as well as financial institutions.

### WHAT COLLABORATIVE APPROACHES ALREADY EXIST?

Our review of the collaborative initiatives around climate and finance shows that the great majority of these alliances and working groups have measures in place addressing to some extent the three barriers we identified (see Table 2 below). Based on our expert interviews, research, and review of existing collaborative approaches, there remain white spaces that are not fully addressed by those initiatives.

**Table 2 - Selected examples of collaborative initiatives with capacity building, project pipeline, or risk component**

Collaborative initiative	Description and Approach	Capacity Building	Project Pipeline	Risk	Members
<a href="#">Asset Owners Disclosure Project</a>	<ul style="list-style-type: none"> <li>Climate Risk Rating</li> <li>Working group/stakeholder engagement</li> <li>Training</li> <li>Campaigning/advocacy</li> <li>Research/data collection/market analysis</li> <li>Shareholder activism</li> </ul>	√		√	6 members: • (Corporate) Foundations
<a href="#">Banking Environment Initiative</a>	<ul style="list-style-type: none"> <li>Formal commitment</li> <li>Research/data collection/market analysis</li> <li>Working group/stakeholder engagement</li> </ul>	√			11 members • Banks
<a href="#">Carbon Pricing Leadership Coalition</a>	<ul style="list-style-type: none"> <li>Research/data collection/market analysis</li> </ul>			√	>150 members: • Corporates • Banks • Public institutions
<a href="#">Carbon Tracker Initiative</a>	<ul style="list-style-type: none"> <li>Research/data collection/market analysis</li> <li>Investment guides</li> <li>Campaigning/advocacy</li> </ul>	√		√	It is an NGO founded by corporate foundations. Partner of We Mean Business.
<a href="#">Catalytic Finance Initiative</a>	<ul style="list-style-type: none"> <li>Formal commitment to invest</li> <li>Designing/testing financial instruments</li> </ul>		√	√	10 members: • Banks • Public institutions (e.g., IFC)
<a href="#">Climate Bonds Initiative</a>	<ul style="list-style-type: none"> <li>Standard-setting and certification (bonds)</li> <li>Research/data collection/market analysis</li> </ul>	√	√		35 members: • Banks • Asset owners • Asset managers • Public institutions
<a href="#">ET Risk</a>	<ul style="list-style-type: none"> <li>Research/data collection/market analysis</li> <li>Working group/stakeholder engagement</li> </ul>			√	31 members: • Asset owners • Asset managers • Banks • Collaborative initiatives • Public institutions
<a href="#">Finance for Resilience (FiRe)</a>	<ul style="list-style-type: none"> <li>Designing/testing financial instruments</li> </ul>		√	√	43 members: • Banks

					<ul style="list-style-type: none"> <li>Public institutions (e.g., EBRD)</li> <li>Researchers</li> <li>Financial consultants</li> <li>Collaborative initiatives</li> </ul>
<a href="#">Global Innovation Lab for Climate Finance</a>	<ul style="list-style-type: none"> <li>Working group/stakeholder engagement</li> <li>Designing/testing financial instruments</li> </ul>	√	√	√	22 members: <ul style="list-style-type: none"> <li>Asset owners</li> <li>Asset managers</li> </ul>
<a href="#">Institutional Investors Group on Climate Change (IIGCC)</a>	<ul style="list-style-type: none"> <li>Working group/stakeholder engagement</li> <li>Communication on aggregated investor positions</li> </ul>	√		√	120 members: <ul style="list-style-type: none"> <li>Asset owners</li> <li>Asset managers</li> </ul>
<a href="#">Investor Network on Climate Risk (INCR) / Ceres</a>	<ul style="list-style-type: none"> <li>Working group/stakeholder engagement</li> </ul>	√		√	Around 120 members: <ul style="list-style-type: none"> <li>Asset owners</li> <li>Asset managers</li> </ul>
<a href="#">Montréal Carbon Pledge</a>	<ul style="list-style-type: none"> <li>Formal commitment</li> </ul>	√		√	120 members: <ul style="list-style-type: none"> <li>Asset owners</li> <li>Asset managers</li> <li>Public institutions (UN)</li> </ul>
<a href="#">Portfolio Carbon Initiative</a>	<ul style="list-style-type: none"> <li>Standard-setting</li> <li>Research/data collection/market analysis</li> </ul>			√	<ul style="list-style-type: none"> <li>Collaborative initiatives</li> <li>Researchers</li> </ul>
<a href="#">Portfolio Decarbonization Coalition / UNEPFI</a>	<ul style="list-style-type: none"> <li>Formal commitment</li> </ul>	√		√	26 members: <ul style="list-style-type: none"> <li>Asset owners</li> <li>Asset managers</li> <li>Public institutions (UN)</li> </ul>
<a href="#">SEI Metrics</a>	<ul style="list-style-type: none"> <li>Research/data collection/market analysis</li> </ul>			√	8 members: <ul style="list-style-type: none"> <li>Collaborative initiatives</li> <li>Researchers</li> <li>Financial consultants</li> </ul>
<a href="#">UNEP FI</a>	<ul style="list-style-type: none"> <li>Formal commitment</li> <li>Working group/stakeholder engagement</li> <li>Research/data collection/market analysis</li> <li>Standard-setting</li> </ul>	√			>200 members: <ul style="list-style-type: none"> <li>Banks</li> <li>Asset owners</li> <li>Asset managers</li> <li>Public institutions (UN)</li> </ul>
<a href="#">2 Degrees Investing Initiative</a>	<ul style="list-style-type: none"> <li>Campaigning/advocacy</li> <li>Research/data collection/market analysis</li> <li>Awards</li> </ul>			√	30 members: <ul style="list-style-type: none"> <li>Banks</li> <li>Asset managers</li> <li>Collaborative initiatives</li> </ul>

Source: BSR Analysis using the initiatives' public resources. For a complete overview of reviewed initiatives, see Appendix B.

## UNDERSTANDING AND MITIGATING RISK

Collaboration between actors can support the integration of climate risk in two areas: (1) the assessment of risk exposure or the evaluation of risk, and (2) the management or mitigation of risks.

Collaboration can support the development of common accounting frameworks, definitions, datasets, and tools to understand portfolio exposure to carbon risk. Aligning definitions of what are considered green investments or building common carbon-footprinting tools would allow corporations, asset owners, investors, and banks to compare their performance and clarify their journey toward a 2-degree path. Collaborations such as SEI Metrics<sup>13</sup> and ET Risk<sup>14</sup> (see Table 2) focus on building datasets for carbon asset risk or developing common tools for carbon footprinting.

<sup>13</sup> Initiative's website available at: [http://2degrees-investing.org/IMG/pdf/sei\\_metrics\\_summary-3.pdf](http://2degrees-investing.org/IMG/pdf/sei_metrics_summary-3.pdf)

<sup>14</sup> Initiative's website available at: [http://2degrees-investing.org/IMG/pdf/et\\_risk\\_summary-3.pdf](http://2degrees-investing.org/IMG/pdf/et_risk_summary-3.pdf)

Collaboration can support investor climate risk management strategies, such as carbon pricing, decarbonization, or investor corporate engagement. Existing collaborations focus on supporting investor commitments to decarbonization, such as the Portfolio Decarbonization Coalition, or bringing investors together to engage corporations on climate, such as the Investor Network on Climate Risk (INCR).

## IDENTIFYING PROJECTS

There is a need for unilateral and collective metrics for identifying opportunities to finance or invest in projects that contribute to the energy transition.

On the demand side, banks can act to ensure that their pipelines are populated with projects that are suited to their processes, in particular by helping small players get to the right level.

On the supply side, in addition to identifying unilateral solutions to capitalize on opportunities, banks can drive change by creating uniform metrics for projects across the industry that do not duplicate or unnecessarily increase the number of standards that banks must currently report on. They can further drive change by improving current metrics for projects or by finding ways to integrate them to suit new goals and strategies, thus perhaps avoiding the proliferation of new standards.

## CAPACITY BUILDING

Helping to overcome the knowledge and skill gaps outlined above, our research has identified the following mediating factors and solutions, which could be brought forward through collaboration:

- » **Strengthening the business case:** Over the past years, energy efficiency and renewable energy have proved to be good for business; however, clearly spelling out the underlying business case—such as with operational efficiency, cost reduction, or security of supply—will help to make them gain even more legitimacy within companies. The experts consulted for this paper also mentioned the need to “put a money value on the loss to society” when conventional projects are pursued instead of sustainable ones, the need for internal carbon pricing, and the need to internally communicate success to employees to “grow accustomed to the fact that [sustainable] projects might actually work.”
- » **Developing incentives for long-term ROI:** Incentive systems will need to be refocused on long-term profit maximization, emphasizing the real and perceived risks and opportunities presented by social and environmental trends. Asset owners and managers can help shift mindsets and priorities by changing incentive structures and advocating for better regulatory and policy frameworks. This requires strong support from many other actors, particularly policymakers (Davis Pluess et al., 2015). A good example is the Focusing Capital on the Long Term initiative (FCLT), which brings together about 20 institutional investment organizations with aggregate assets of US\$6 trillion to work on tools and approaches that encourage long-term behaviors in business and investment decision making (FCLT, 2015).
- » **Sharing good practices on the integration of climate finance into portfolios:** Information-sharing throughout the investment community is an important way to identify best practices and help investors make informed decisions about climate finance within their portfolios. Asset owners and managers can support transparency by sharing lessons learned and using their convening power, research capabilities, and leverage with managers and advisors. Based on this,

developing standard frameworks to evaluate investment opportunities seems paramount for enabling scaling climate finance (BSR interviews, Davis Pluess et al., 2015). Founded in 2003, the INCR is a coalition of more than 100 institutional investors representing about US\$13 trillion in assets. The group is dedicated to mitigating climate risks and capitalizing on low-carbon investment opportunities.

- » **Taking community engagement seriously:** Especially for large-scale renewable energy projects, an assessment of local political risks, coupled with early community engagement, are essential to organize stakeholder buy-in. Also worth considering are approaches to better distribute the value created through such projects on a local level. For example, South Africa's renewable energy legislation foresees a 5 percent ownership stake for the local population in any new project (Odolo et al., 2014). A failure to engage with communities and decision makers might ultimately result in a project being put on hold or abandoned due to unexpected or persistent local resistance—depending on the project phase, this can come with considerable sunk investments (For an overview of such cases in Germany, see Schulz, 2013).

## Opportunities for Future Collaboration

We have identified the following four areas where for-profit, nonprofit, and public-sector financial actors can collaborate in order to speed the clean energy transition:

- » **Banks' management of climate risk through developing common sector policies:** Financial institutions take a sector approach to mitigating risk by developing sector policies and minimum standards for investments for high-risk sectors (e.g., coal, oil sands, etc.). Collaboration to develop common frameworks around risk-mitigation requirements for high-risk sectors would help clarify the financial-services sector's signals toward a shift to a low-carbon economy.
- » **Banks' engagement with corporations on climate management:** Although many collaborative initiatives exist to bring together asset owners and managers to engage corporations, there is no equivalent initiative bringing banks together with corporations to discuss how banks can support their corporate clients in the energy transition.
- » **Building capacity and linking incentives to contributions to the energy transition:** Collaboration between investment managers and asset owners could result in integrating long-term return concepts with strategy and business decision making. This would ultimately impact the portfolio companies, which, over the medium term, would be also able to adapt a more long-term view to their operations and investments.

Focusing on long-term ROI would support advanced environment and climate-science approaches, such as scenario planning, which would help to substantiate ROI estimates. The competitive advantage of such a program could be in bringing together investors and operational companies to discuss and work on common ROI strategies across the value chain while building up internal climate capacity.

- » **Local stakeholder engagement:** Focusing on utility and infrastructure companies, as well as project developers, in approaches to assessing local political risks, organizing early community

engagement, and gaining buy-in for large-scale renewable energy projects can help to avoid significant cost and lost time from local resistance. Institutional investors who decide to directly acquire projects can benefit from such insights to set expectations and refine their management regarding the planning, timing, and risk management of investing in large-scale renewables projects.

# Appendices

## Appendix A: Research methodology and list of interviewees, focus groups, and review panel

The **methodology** for this paper consisted of three elements:

**Comprehensive literature review.** This work has been informed by the best available research conducted on the financial sector and climate change. This includes a comprehensive review of the natural science as compiled by the Intergovernmental Panel on Climate Change (IPCC). The IPCC compiles the most thorough and definitive assessment of the scientific, technical, and socio-economic information basis for understanding of the risk of human-induced climate change. We have used the findings of the Fifth Assessment Report, published in 2013-2014, as the evidence base for this research.

We have further drawn upon research conducted by banks, multilateral banks, institutional investors, international development agencies, governments, global nonprofits, research institutes, and universities.

We have also followed closely the development of recommendations of the FSB Taskforce on Climate-related Financial Disclosures until their publication in December 2016. We have made sure to integrate their findings and frameworks, especially as they relate to climate risk.

Full citations of all literature consulted for this research are found in the **References**.

**Semi-structured interviews.** Semi-structured interviews with leading thinkers in the field of finance and climate, as well as representatives from a cross-section of private enterprise, were conducted between July 2016 and January 2017. The insights harvested from these discussions have informed our understanding of climate risk as it applies to the financial sector, the handling of the energy transition by corporates as well as banks, the complexities of organizational change on issues such as climate, the essential building blocks of successful collaboration, and the best way to align peers for systemic change on the issues.

Representatives from the following organizations participated in the semi-structured interviews: Azabu Management Services, Barclays, BNP CIB, CDP, Danish Investment Fund for Developing Countries, Engie, Goldman Sachs, KKR, Novo Nordisk, Ontario Teachers' Pension Plan Board, SAP, Société Générale, Vestas, Warburg Pincus, World Bank/IFC, and WWF. For the detailed list, see Table 3 below.

**Focus groups.** We convened one focus group in New York in November 2016 as part of BSR's annual Conference. At this focus group, we presented initial research findings to a diverse set of stakeholders and solicited their further input. Participants came from the following organizations: BNP Paribas, Climate Policy Initiative, Enel, and Morgan Stanley. To further harvest ideas from a field of expert practitioners,

BSR attended Goldman Sachs' Low Carbon Economy Global Forum 2016. For the detailed list, see Table 4 below.

**Table 3: Interviewees for primary research**

Interviewee	Position	Organization
Anne Gadegaard Larsen	Senior Global Advisor, Sustainability Management & Reporting	Novo Nordisk
Birgitte Bang Nielsen	Climate Investments Sustainability Director	Danish Investment Fund for Developing Countries
Elizabeth Seeger	Director	KKR
Emmanuel Martinez	Environmental Director	Société Générale
Jacob Klingemann	Vice President	Danish Investment Fund for Developing Countries
Lance Pierce	President and Member of the Board, North America	CDP
Jeanne Stampe	Head, Asia Finance and Commodities	WWF
Joy Williams	Principal, Climate Change Risk	Ontario Teachers' Pension Plan Board
Katie Hyson	AVP, Thought Leadership, Learning & Innovation Group	Barclays
Kevin Smith	Vice President, Environmental Markets Group	Goldman Sachs
Kristian Heydenreich	Corporate CSR Manager	Vestas
Marcus Wagner	Project Director Sustainability	SAP
Mark Devadason	CEO & BSR Senior External Advisor	BSR & Azabu Management Services
Nathalie Borgeaud	Project Director, CSR Analysis & Advisory	BNP Paribas CIB
Peer Stein	Global Director, Financial Institutions Group	World Bank/IFC
Vedant Walia	Associate Director, Sustainability	Barclays

**Table 4: Focus-group participants**

Event	Participant / speaker	Position	Organization
COP22, panel discussion, Emilie Pratico attended	Anthony Holey	CEO	Carbon Tracker Initiative
	Erick Decker	Chief Investment Officer	AXA Mediterranean & LATAM, AXA Group
	Michael Eckhart	Managing Director, Global Head of Environmental Finance and Sustainability	Citigroup
	Michael Lewis	Head of Sustainable Finance Research	Deutsche Bank
	Pete Grannis	First Deputy Comptroller	New York State Comptroller's Office



Event	Participant / speaker	Position	Organization
Goldman Sachs' <b>Low Carbon Economy Global Forum 2016</b> , Charlotte Bancelhon & Emilie Pratico attended	<i>Selection:</i> Adnan Amin	Director General	International Renewable Energy Agency (IRENA)
	David Blood	Co-founder and Senior Partner	Generation Investment Management
	Hans Fahlén	Chief Investment Officer	AP2 Fund
	Jim Barry	Global Head of BlackRock Infrastructure Investment Group	BlackRock Investment Management
	Toby Kraus	Director, Corporate Finance & Business Strategy	Proterra
<b>BSR Conference 2016</b> , Emilie Pratico organized and moderated the panel	Andrea Valcalda	Head of Sustainability	Enel
	Gireesh Shrimali	Director, Climate Finance	Climate Policy Initiative
	Hilary Irby	Managing Director and Head of Investing with Impact	Morgan Stanley
	Laurence Pessez	Head of Corporate Social Responsibility	BNP Paribas

**Table 5: Report review panel**

Reviewer	Position	Organization
<i>External Reviewers</i>		
Nathalie Borgeaud	Project Director, CSR Analysis & Advisory	BNP Paribas CIB
Mark Devadason	CEO & BSR Senior External Advisor	Azabu Management Services
<i>Internal Reviewers</i>		
Edward Cameron	Managing Director	BSR
Sandy Eapen	Manager	BSR
Samantha Harris	Manager	BSR
John Hodges	Managing Director	BSR
David Korngold	Associate Director	BSR

## Appendix B: Collaborative Initiatives' Benchmark

Initiative's name	Approach	Capacity: Climate Change-Related Knowledge And Skills	Return On Investment / Economic Viability	Building A Pipeline / Visibility Of Pipeline	Risk Mitigation	# Members
<a href="#">Aiming for A</a>	- Shareholder activism	YES  Filing supportive shareholder resolutions  CDP's Carbon Performance Leadership Index (CPLI)				7
<a href="#">Investor Network on Climate Risk (INCR) (Ceres)</a>	- Working group/Stakeholder engagement	YES  Working Groups offer investors the opportunity to engage with their peers to share updates on key research, develop strategies, share best practices			YES  Carbon Asset Risk Working Group aims to prevent fossil fuel companies from wasting investor capital by showing how carbon risk poses a threat to their business	around 120
<a href="#">The Clean Trillion (Ceres)</a>	- Campaign (blog)/advocacy	YES  Working with corporates on: - Corporate governance - Stakeholder Engagement - Corporate disclosure - Sustainability performance			YES  Investors' Climate Risks: Investor Network on Climate Risk (INCR)	around 120
<a href="#">Climate Bonds Initiative</a>	- Standard-setting and certification (bonds) - Research/data collection/market analysis	(YES)  Defined common definitions/standards for global bond markets	YES  Investor perspective: science-based guidelines about qualifying investment helps investors make decisions about environmental credentials of bonds.	YES  Publishing market data, bonds issuing		35
<a href="#">Institutional Investors Group on Climate Change (IIGCC)</a>	- Working group/Stakeholder engagement - Communication on aggregated investor positions	YES  Collaborative platform for investors, best-practice sharing, development of "Investor Expectations" guides for annual shareholder meetings			(YES)  Risk Management Guide, Corporate Expectations	120

Initiative's name	Approach	Capacity: Climate Change-Related Knowledge And Skills	Return On Investment / Economic Viability	Building A Pipeline / Visibility Of Pipeline	Risk Mitigation	# Members
<a href="#">Global Investor Coalition on Climate Change</a>	- Formal commitment - Investment Solutions guide - Research/data collection/market analysis	(YES)  - Investment Solutions guide - Research/data collection/market analysis				400+ (indirectly) 4 directly
<a href="#">Principles for Responsible Investment (PRI)</a>	- Formal commitment - Working group/Stakeholder engagement - Research/data collection/market analysis - Investment guides	YES  PRI's 6 Principles				1,515
<a href="#">Montréal Pledge</a>	- Formal commitment	YES  Investors commit to measure and disclose carbon footprint. Methodology to measure CO <sub>2</sub> developed.				120
<a href="#">Portfolio Decarbonization Coalition / UNEP FI</a>	- Formal commitment	YES  Targeted engagement with portfolio companies.			(YES)  Divestment	26
<a href="#">Global Innovation Lab for Climate Finance</a>	- Working group/Stakeholder engagement - Designing/testing financial instruments	YES  Developing financial instruments, working groups	YES  Developing financial instruments	YES  Aims to create financial markets and instruments in developing world. Not necessarily concrete projects but investment opportunities	(YES)  Some focus on adaptation and insurance	22
<a href="#">UNEP FI</a>	- Formal commitment - Working group/Stakeholder engagement - Research/data collection/market analysis - Standard-setting	YES  Capacity building, best practices, research and tool development, setting standards, engaging stakeholders				>200
<a href="#">Green Growth Action Alliance</a>	- Working group/Stakeholder engagement - Designing/testing financial instruments	YES  Best-practice sharing, etc.; however, nothing concrete				50

Initiative's name	Approach	Capacity: Climate Change-Related Knowledge And Skills	Return On Investment / Economic Viability	Building A Pipeline / Visibility Of Pipeline	Risk Mitigation	# Members
	- Research/data collection/market analysis					
<a href="#">UK Sustainable Investment &amp; Finance (UKSIF)</a>	- Working group/Stakeholder engagement - Training - Campaigning/advocacy	YES  Industry interest group, sharing industry insight and collaboration				
<a href="#">Carbon Tracker Initiative</a>	- Research/data collection/market analysis - Investment guides - Campaigning/advocacy	YES  - Research/data collection/market analysis - Investment guides - Campaigning/advocacy	YES  Provide the financial and regulatory analysis to ensure that the risk premium associated with fossil fuels is correctly priced.		YES  Work with financial regulators to bring transparency on climate and stranded-asset risk and the fossil-fuel risk premium.	It's an NGO founded by foundations close to corporates and financial institutions. Partner of We Mean Business.
<a href="#">Forum Nachhaltige Geldanlagen</a>	- Formal commitment (optional) - Certification (optional, fund transparency) - Campaigning/advocacy, - Communicate aggregated positions - Working group/stakeholder engagement/networking - Training	YES  - Research/data collection/market analysis - Award recognition				150
<a href="#">Catalytic Finance Initiative</a>	- Formal commitment to invest - Designing/testing financial instruments			YES  Sharing information on projects, combined investments	YES  Pooling money to de-risk deals for banks, e.g., foreign exchange risks or junior debt	10
<a href="#">Finance for Resilience (FiRe)</a>	- Designing/testing financial instruments		YES  Developing financial instruments	YES  Aims to create financial markets and instruments	(YES)  Selected some projects to de-risk investments, e.g., pay-as-you-go projects	43
<a href="#">Asset Owners Disclosure Project</a>	- Climate Risk Rating  - Working group/Stakeholder engagement - Training - Campaigning/advocacy - Research/data	YES  - Working group/Stakeholder engagement - Training - Campaigning/advocacy - Research/data			YES  Assessing the asset owner's capability in managing portfolio climate risk	6

Initiative's name	Approach	Capacity: Climate Change-Related Knowledge And Skills	Return On Investment / Economic Viability	Building A Pipeline / Visibility Of Pipeline	Risk Mitigation	# Members
	collection/market analysis - Shareholder activism	collection/market analysis - Shareholder activism				
<a href="#">2 Degrees Investing Initiative</a>	- Campaigning/advocacy - Research/data collection/market analysis - Awards (International Award on Investor Climate-related Disclosures (2°Invest Award))				YES  Anticipating changes in demand of capital: change risk-adjusted returns of financial assets, creating financial risk & opportunity.	30

## Appendix C: We Mean Business Commitments

WMB Commitments	Number of companies / investors committed to action (as of 4/10/2017)
Company commitments	
Adopt a science-based emissions-reduction target	230
Put a price on carbon	78
100 percent renewable power	89
Responsible corporate engagement in climate policy	128
Report climate change information in mainstream reports as a fiduciary duty	192 ( <i>companies &amp; investors</i> )
Remove commodity-driven deforestation from all supply chains by 2020	54
Reduce short-lived climate pollutant emissions	22
Improve energy productivity	10
Improve water security	36
Grow the market for the world's most sustainable fuels	21
Investor commitments	
Montréal Carbon Pledge	117
Portfolio Decarbonization Coalition	25

Low-Carbon Investment	54
Report climate change information in mainstream reports as a fiduciary duty	192 <i>(companies &amp; investors)</i>
Other actions	
Low-Carbon Technology Partnerships Initiative	97

Source: [www.wemeanbusinesscoalition.org/take-action](http://www.wemeanbusinesscoalition.org/take-action)

## References

- BakerMcKenzie. 2015. "The rise of corporate PPAs: A new driver for renewables." [www.bakermckenzie.com/-/media/files/insight/publications/2015/12/the-rise-of-corporate-ppas/rise-corporate-ppas.pdf?la=en](http://www.bakermckenzie.com/-/media/files/insight/publications/2015/12/the-rise-of-corporate-ppas/rise-corporate-ppas.pdf?la=en).
- Bank of America. 2014. "Bank of America Announces \$10 Billion Catalytic Finance Initiative to Accelerate Clean Energy Investments That Reduce Carbon Emissions." <http://newsroom.bankofamerica.com/press-releases/corporate-and-investment-banking-sales-and-trading-treasury-services/bank-america-ann>.
- Bielenberg, Aaron, Mike Kerlin, Jeremy Oppenheim, and Melissa Roberts. 2016. "The next generation of infrastructure." McKinsey. [www.mckinsey.com/industries/capital-projects-and-infrastructure/our-insights/next-generation-of-infrastructure](http://www.mckinsey.com/industries/capital-projects-and-infrastructure/our-insights/next-generation-of-infrastructure).
- Blackrock Investment Institute. 2016. "Adapting portfolios to climate change." [www.blackrock.com/investing/insights/blackrock-investment-institute/climate-change](http://www.blackrock.com/investing/insights/blackrock-investment-institute/climate-change).
- Bloomberg. 2016. "China's \$230 Billion Green Bond Thirst to Supercharge Market." [www.bloomberg.com/news/articles/2016-02-04/china-s-230-billion-green-bond-thirst-to-supercharge-market](http://www.bloomberg.com/news/articles/2016-02-04/china-s-230-billion-green-bond-thirst-to-supercharge-market).
- Bloomberg New Energy Finance. 2016. "Clean Energy Investment End of Year 2016." Accessed April 17, 2017. <https://about.bnef.com/clean-energy-investment/>.
- Boston Common. 2017. "On borrowed time: Banks & climate change." Update Report 2017. <http://news.bostoncommonasset.com/wp-content/uploads/2017/01/Update-Report-On-Borrowed-Time-Banks-Climate-Change.pdf>.
- Boston Common. 2015. "Are Banks Prepared for Climate Change?" Impact Report 2015. <http://news.bostoncommonasset.com/wp-content/uploads/2017/01/Update-Report-On-Borrowed-Time-Banks-Climate-Change.pdf>.
- Business Renewables Center. 2017. "Business Renewables Center Deal Tracker." Accessed April 17, 2017. [www.businessrenewables.org/corporate-transactions/](http://www.businessrenewables.org/corporate-transactions/).
- Carbon Tracker. 2017. "Expect the Unexpected: The Disruptive Power of Low-carbon Technology." Grantham Institute. [www.carbontracker.org/wp-content/uploads/2017/02/Expect-the-Unexpected\\_CTI\\_Imperial.pdf](http://www.carbontracker.org/wp-content/uploads/2017/02/Expect-the-Unexpected_CTI_Imperial.pdf).
- CDP. 2015. "Putting a price on risk: Carbon pricing in the corporate world." [www.oceanfdn.org/sites/default/files/CDP%20Carbon%20Pricing%20in%20the%20corporate%20world.compressed.pdf](http://www.oceanfdn.org/sites/default/files/CDP%20Carbon%20Pricing%20in%20the%20corporate%20world.compressed.pdf).
- CDP. 2016. "Carbon Action" infographic. [www.cdp.net/en/reports/downloads/1384](http://www.cdp.net/en/reports/downloads/1384). Accessed April 17, 2017.
- Chestney, Nina. 2016. "Solar, wind costs could fall up to 59 percent by 2025, study says." Reuters, June 15, 2016. [www.reuters.com/article/us-renewables-cost-idUSKCN0Z10QD](http://www.reuters.com/article/us-renewables-cost-idUSKCN0Z10QD).
- Clark, Pilita. 2016. "Mark Carney warns investors face 'huge' climate change losses." *Financial Times*, September 29, 2015. [www.ft.com/content/622de3da-66e6-11e5-97d0-1456a776a4f5](http://www.ft.com/content/622de3da-66e6-11e5-97d0-1456a776a4f5).



Climate Bonds. 2017. "Climate Bonds 2016 Highlights: The big issuers: The big numbers: The trends that count and a 2017 forecast." [www.climatebonds.net/2017/01/climate-bonds-2016-highlights-big-issuers-big-numbers-trends-count-and-2017-forecast](http://www.climatebonds.net/2017/01/climate-bonds-2016-highlights-big-issuers-big-numbers-trends-count-and-2017-forecast).

ClimateWise. 2016. "Closing the protection gap: ClimateWise Principles Independent Review 2016." University of Cambridge Institute for Sustainability Leadership and PwC. [www.cisl.cam.ac.uk/publications/publication-pdfs/Closing-the-protection-gap-ClimateWise-Principles-Independent-Review-2016.pdf](http://www.cisl.cam.ac.uk/publications/publication-pdfs/Closing-the-protection-gap-ClimateWise-Principles-Independent-Review-2016.pdf).

Cornerstone Capital. 2017. "Climate Investing in 2017: Commentary: Climate Change, Global Thematic Research." <http://cornerstonecapinc.com/wp-content/uploads/2017/01/Climate-Investing-in-2017.pdf>.

Davis Pluess, Jessica, Smruti Govan, and Paula Pelaez. 2015. "Conditions for Scaling Investment in Social Finance", BSR Report, BSR. [www.bsr.org/reports/BSR\\_Conditions\\_for\\_Scaling\\_Social\\_Finance\\_2015.pdf](http://www.bsr.org/reports/BSR_Conditions_for_Scaling_Social_Finance_2015.pdf).

Dechert, Sandy. 2015. "IEA: \$13.5 Trillion Climate Investment Needed By 2030." CleanTechnica, October 22, 2015. <https://cleantechnica.com/2015/10/22/iea-13-5-trillion-climate-investment-needed-2030/>.

Department of Foreign Affairs and Trade, Australia. 2016. "Roadmap to US\$100 Billion." <http://dfat.gov.au/international-relations/themes/climate-change/Documents/climate-finance-roadmap-to-us100-billion.pdf>.

DLA Piper. 2016. "Corporate Power Purchase Agreements (PPAs): What are they?" [www.dlapiper.com/en/uk/insights/publications/2016/06/renewable-energy-global-paper/what-are-corporate-power-purchase-agreements-ppa/](http://www.dlapiper.com/en/uk/insights/publications/2016/06/renewable-energy-global-paper/what-are-corporate-power-purchase-agreements-ppa/).

Domm, Patti, and Antonio José Vielma. "Stocks close out 2016 with double-digit gains after third day of losses." CNBC, December 30 2016. [www.cnbc.com/2016/12/30/the-dow-could-ring-out-2016-with-a-near-14-percent-gain.html](http://www.cnbc.com/2016/12/30/the-dow-could-ring-out-2016-with-a-near-14-percent-gain.html).

Environment and Ecology. n.d. "Systems Thinking." Accessed April 17, 2017. <http://environment-ecology.com/general-systems-theory/379-systems-thinking.html>.

FCLT. 2015. "Investing for the future: How institutional investors can reorient their portfolio strategies and investment management to focus capital on the long term." Focusing Capital on the Long Term. [www.fcltglobal.org/docs/default-source/default-document-library/fclt\\_investing-for-the-future---short.pdf?sfvrsn=2](http://www.fcltglobal.org/docs/default-source/default-document-library/fclt_investing-for-the-future---short.pdf?sfvrsn=2).

Forsythe, Michael. 2017. "China Aims to Spend at Least \$360 Billion on Renewable Energy by 2020." *New York Times*, January 5 2017. [www.nytimes.com/2017/01/05/world/asia/china-renewable-energy-investment.html](http://www.nytimes.com/2017/01/05/world/asia/china-renewable-energy-investment.html).

FSB-TCFD. 2016. "Recommendations of the Task Force on Climate-related Financial Disclosures." [www.fsb-tcfd.org/wp-content/uploads/2016/12/TCFD-Recommendations-Report-A4-14-Dec-2016.pdf](http://www.fsb-tcfd.org/wp-content/uploads/2016/12/TCFD-Recommendations-Report-A4-14-Dec-2016.pdf).

FSB-TCFD. 2016a. "Overview of Report and Implementation Guidance." [www.fsb-tcfd.org/wp-content/uploads/2016/12/TCFD-Report-Overview-Dec.-2016.pdf](http://www.fsb-tcfd.org/wp-content/uploads/2016/12/TCFD-Report-Overview-Dec.-2016.pdf).

Goldman Sachs. 2016. "The low carbon economy: Technology in the driver's seat." [www.goldmansachs.com/our-thinking/pages/new-energy-landscape-folder/report-the-low-carbon-economy/report-2016.pdf](http://www.goldmansachs.com/our-thinking/pages/new-energy-landscape-folder/report-the-low-carbon-economy/report-2016.pdf).

- Grantham Research Institute. 2016. "The Global Climate Legislation Study: Summary of key trends 2016." [www.lse.ac.uk/GranthamInstitute/wp-content/uploads/2016/11/The-Global-Climate-Legislation-Study\\_2016-update.pdf](http://www.lse.ac.uk/GranthamInstitute/wp-content/uploads/2016/11/The-Global-Climate-Legislation-Study_2016-update.pdf).
- IEA and IREA. 2017. "Perspectives For The Energy Transition." [www.irena.org/DocumentDownloads/Publications/Perspectives\\_for\\_the\\_Energy\\_Transition\\_2017.pdf](http://www.irena.org/DocumentDownloads/Publications/Perspectives_for_the_Energy_Transition_2017.pdf).
- Kepler Cheuvreux. 2015. "Carbon Compass." IIGCC, 2 Degrees Investing, and Deloitte. [www.iigcc.org/files/publication-files/Carbon\\_Compass\\_final.pdf](http://www.iigcc.org/files/publication-files/Carbon_Compass_final.pdf).
- Lazard. 2016. "Lazard's Levelized Cost of Energy Comparison." [www.lazard.com/media/438038/levelized-cost-of-energy-v100.pdf](http://www.lazard.com/media/438038/levelized-cost-of-energy-v100.pdf).
- Mahapatra, Saurabh. 2017. "Labeled Green Bonds Issuance Doubled To \$81 Billion In 2016." CleanTechnica, January 16, 2017. <https://cleantechnica.com/2017/01/16/labeled-green-bonds-issuance-doubled-81-billion-2016/>.
- MarksJarvis, Gail. "In 2016 stocks were hot, but bonds were not." *Chicago Tribune*. December 30, 2016. [www.chicagotribune.com/business/columnists/ct-2017-stock-bond-market-outlook-0101-20161230-column.html](http://www.chicagotribune.com/business/columnists/ct-2017-stock-bond-market-outlook-0101-20161230-column.html).
- Mercer. 2015. "Investing in a time of climate change." [www.mercer.com/content/dam/mercer/attachments/global/investments/mercer-climate-change-report-2015.pdf](http://www.mercer.com/content/dam/mercer/attachments/global/investments/mercer-climate-change-report-2015.pdf).
- Michigan State University. 2010. "Environmental Literacy: About Us." Accessed April 17, 2017. <http://envlit.educ.msu.edu/>.
- Noonan, Laura. "Banks and investors commit \$8bn to low carbon initiative." *Financial Times*, April 6, 2016. <http://www.ft.com/content/d5b05a66-fb44-11e5-8f41-df5bda8beb40>.
- Novethic. 2015. "Climate: Investors Take Action." [www.novethic.com/fileadmin/user\\_upload/tx\\_ausynovethicetudes/pdf\\_complets/2015\\_update\\_sept\\_climate\\_report.pdf](http://www.novethic.com/fileadmin/user_upload/tx_ausynovethicetudes/pdf_complets/2015_update_sept_climate_report.pdf).
- Odolo, Ntombentsha, and Malibuye Cossie. 2014. "Renewable energy projects: community related protests." Financial Institutions Legal Snapshot, September 2, 2014. [www.financialinstitutionslegalsnapshot.com/2014/09/renewable-energy-projects-community-related-protests/](http://www.financialinstitutionslegalsnapshot.com/2014/09/renewable-energy-projects-community-related-protests/).
- Rowling, Megan. 2016. "Pressure for G20 deadline on fossil fuel subsidies shifts to Germany." Reuters, September 6, 2016. [www.reuters.com/article/us-g20-climatechange-fossilfuels-subsidi-idUSKCN11C259](http://www.reuters.com/article/us-g20-climatechange-fossilfuels-subsidi-idUSKCN11C259).
- Schreuers, Miranda, and Dörte Ohlhorst. 2015. "NIMBY and YIMBY: Movements For and Against Renewable Energy in Germany and the United States." In: *NIMBY is beautiful*, edited by: Carol Hager and Mary Alice Haddad. New York: Berghahn Books, 2015.
- Schulz, Matthias. 2013. "Mutiny in the Land of Wind Turbines." *Der Spiegel*, July 12, 2013. [www.spiegel.de/international/germany/wind-energy-encounters-problems-and-resistance-in-germany-a-910816.html](http://www.spiegel.de/international/germany/wind-energy-encounters-problems-and-resistance-in-germany-a-910816.html).
- S&P. 2017. "Monthly Factsheet: S&P/TSX Renewable Energy and Clean Technology Index." <http://ca.spindices.com/indices/equity/sp-tsx-renewable-energy-and-clean-technology-index>.

Szymanski, David. 2014. "The Business Case for Science Literacy." Bentley Magazine. Accessed April 17, 2017. [www.bentley.edu/observer/faculty/business-case-science-literacy](http://www.bentley.edu/observer/faculty/business-case-science-literacy).

The New Climate Economy. 2014. "Better Growth, Better Climate." <http://newclimateeconomy.report/2014/>.

The New Climate Economy. 2015. "Seizing the Global Opportunity." <http://newclimateeconomy.report/2015/>.

University of Cambridge Institute for Sustainable Leadership. 2016. "The Paris Climate Agreement: Implications for banks, institutional investors, private equity and insurers." [www.cisl.cam.ac.uk/publications/publication-pdfs/paris-climate-agreement-implications-for-international-banks.pdf](http://www.cisl.cam.ac.uk/publications/publication-pdfs/paris-climate-agreement-implications-for-international-banks.pdf).

World Bank, Ecofys, Vivid Economics. 2016. "State and Trends of Carbon Pricing 2016." <https://openknowledge.worldbank.org/handle/10986/25160>.

WRI and UNEP FI. 2015. "Carbon Asset Risk: Discussion Framework." [www.unepfi.org/fileadmin/documents/carbon\\_asset\\_risk.pdf](http://www.unepfi.org/fileadmin/documents/carbon_asset_risk.pdf).

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