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## **Financing Mechanisms to Support Sustainable Practices**

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This paper surveys financing mechanisms supporting sustainable practices, examining current practice and promising new practices under development. It divides the financing spectrum into the standard categories of equity and debt, plus policy-based practices and public/private partnerships. Each section includes a brief description of financing categories and practices; examples of each, i.e., what they are being used to accomplish and by whom; and provides estimates of the current scale of the markets, where available.

### Summary of Findings

Direct investment to support sustainable practices is conducted across the financing spectrum, at levels that measure in the hundreds of billions annually. Debt and equity financing for renewable energy, for instance, totaled \$333 billion in 2017.<sup>1</sup>

Environmental, social, governance (ESG) investing in the US, primarily in the form of equity investments in the secondary market, i.e., purchasing shares of public companies through stock exchanges, was \$12 trillion in 2018, up 38% from 2016.<sup>2</sup>

Despite its prevalence, investment to support sustainable practices is often considered an emerging or niche field of finance, and perhaps it is, relative to the magnitude of investment needed to fully address environmental sustainability challenges, which has been estimated at \$90 trillion by 2030.<sup>3</sup>

Reaching the level of investment needed to address climate change and other critical sustainability challenges will require public policy support.<sup>4</sup> In addition to providing guarantees and other credit supports, policy measures can help “internalize the externalities” – by placing a cost on pollution, for example, and a value on conserving air, water, habitat and bio-diversity resources – thereby triggering investment.

Without appropriate policy interventions, private investment is unlikely to be sufficient to meet sustainability goals, but regulation is not the only investment driver. Between the hurricanes, wildfires, coastal flooding and other disasters of the past several years, the risks of climate change are rapidly shifting from posited theory to on-the-ground fact.<sup>5</sup> As stated by MSCI, “Physical risk, not regulatory risk, is the exposure that companies may need to worry about.”<sup>6</sup>

Facts on the ground, in turn, drive preferences, choices and demand. Preferences, as expressed by investors, citizens and consumers, are the ultimate drivers of policy choices and corporate behavior. Preferences, of course, are not financing mechanisms, but financing mechanisms are simply tools, and they are useless in the absence of demand for the financing objective. Many indicators show that demand for sustainable

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<sup>1</sup> Ceres; In Sight of the Clean Trillion; May 2018

<sup>2</sup> Forum on Sustainable and Responsible Investing; Report on US Sustainable, Responsible and Impact Investing Trends 2018

<sup>3</sup> The New Climate Economy, Global Commission on the Economy & Climate; The Sustainable Infrastructure Imperative; Oct 2016; and cited in OECD; Progress Report on Approaches to Mobilising Institutional Investment for Green Infrastructure; September 2016

<sup>4</sup> e.g., ACTIAM, et al. The Paris Green Bonds Statement; December 2015

<sup>5</sup> Swiss Re; Preliminary Sigma Estimates for 2018; SwissRe.com; Dec 18, 2018

<sup>6</sup> Lee, Linda-Eling and Moscardi, Matt; 2017 ESG Trends To Watch; MSCI.com; Jan 2017

solutions is high and growing,<sup>7</sup> and this is manifest in the growth of green finance, as well as the mounting pressures that investors are placing on major corporations regarding their ESG performance.

## Equity

**Secondary market equity investment** – This category, otherwise known as purchasing shares through the stock market, measures in the trillions of dollars and is the largest area of sustainable finance by dollar volume. It can promote sustainability in at least two ways – shareholder activism and ESG-directed investment. Both are increasingly prevalent, reflecting investors’ desire to direct their investments towards companies supporting long-term sustainability. The two strategies are related, as ESG investment also gives the investors standing to engage with management.

- **Shareholder activism** by major institutional investors. One factor behind sustainability-related shareholder activism is that many institutional investors are retirement funds with long-term obligations, and they use their position as major shareholders to pressure companies to also adopt long-term thinking as reflected in the companies’ ESG policies. There can also be a political dimension here, with public pension funds directly or indirectly accountable to elected officials who choose both activism and ESG-directed investment as a means of reflecting policy preferences of their constituents.

Shareholder activism is on the rise,<sup>8</sup> with the number of targeted companies up 52% over 5 years by one measure.<sup>9</sup> And there have been notable successes:

- In 2017, holders of 62% of ExxonMobil’s shares, opposing management, voted in favor of a resolution calling for more climate information disclosure, including the impact on the firm of a transition to a low carbon economy. The resolution’s sponsors included the New York State and City public pension funds, and it drew the voting support of major private institutional investors, including BlackRock and Vanguard.<sup>10</sup>
- In 2018, Royal Dutch Shell pledged to set firm carbon limits, with executive pay linked to success in meeting those targets. Shell had been under pressure from the Church of England Pension Board and others, and its CEO attributed Shell’s action to “dialogue” with those major investors.<sup>11</sup>

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<sup>7</sup> As examples: Hamilton, L.C.; Millennials and Climate Change; University of New Hampshire, Carsey School of Public Policy; Mar 13, 2017. Muro, M. et al.; How the Geography of Climate Damage Could Make the Politics Less Polarizing; Brookings Institution; Jan 29, 2019. National Caucus of Environmental Legislators website; Public Opinion page. Pratico, E.; Investors, Consumers, and Markets Demand Climate Action: Four Trends for Your Business to Know; Business for Social Responsibility; Mar 22, 2017.

<sup>8</sup> Raval, A. & Mooney, A.; Money Managers: The New Warriors of Climate Change; Financial Times; Dec 26, 2018. Ernst & Young; 2018 Proxy Season Review

<sup>9</sup> Weingarten, M. et al.; The Activist Investing Annual Review 2019; Schulte Roth & Zabel

<sup>10</sup> Olson, B.; Exxon Shareholders Pressure Company on Climate Risks; Wall Street Journal; May 31, 2017; BlackRock Press Release; Supporting a Shareholder Proposal Following Extensive Management Engagement; BlackRock.com; May 31, 2017;

<sup>11</sup> Raval, A. et al.; Shell Yields to Investors by Setting Target on Carbon Footprint; Financial Times; Dec 2, 2018. Editorial; Shells’ Carbon Emissions Targets are a Clear Model for Others; Financial Times; Dec 8, 2018

- In 2019, Glencore, the world's largest mining company by revenues<sup>12</sup> and one of the largest coal producers, agreed to cap coal production at current levels. In a statement, Glencore recognized climate change science, supported the goals of the 2015 Paris Agreement, and pledged to "invest in assets that will be resilient to regulatory, physical and operational risks related to climate change." Glencore attributed its actions to "engagement with investor signatories of the Climate Action 100+ initiative."<sup>13</sup>

As described on its website, Climate Action 100+ is an investor initiative, launched in 2017, "to ensure the world's largest corporate greenhouse gas emitters take necessary action on climate change." Its membership currently includes over 300 investors with more than \$33 trillion in assets collectively under management. It is specifically engaging with 100 companies accounting for two-thirds of annual global industrial emissions, along with 60+ others with "significant opportunity to drive the clean energy transition." The initiative's goals are to improve governance, curb emissions and strengthen climate-related financial disclosures.<sup>14</sup>

Ernst & Young, in its 2019 proxy season preview, based on interviews with over 60 major private and public institutional investors, reported the top three areas these investors want corporate boards to focus:

- Board diversity, with 53% of investors citing a need for greater gender, race and ethnic diversity, up from 33% three years ago.
  - Environmental and social factors, cited by 49%, with 38% specifically citing climate change, up from 15% three years ago.
  - Human capital management, including workforce diversity and pay equity, cited by 39%, up from just 6% three years ago.<sup>15</sup>
- Growth of **ESG/SRI-directed investment funds**. This is a direct statement of investor demand for shares of ESG/SRI-positive companies. Holding other factors constant, this demand will raise the price of these companies' shares, and therefore the value of the companies. This, in turn, creates an incentive for management to maintain ESG/SRI-positive policies and for other companies to adopt these policies. It also gives investors standing, as noted above, to engage with management. That is sometimes in the form of confrontational activism, but where a company has already passed an ESG screen, the relationship is more likely to be one of a supportive or nudging partner.

As noted earlier, ESG investing in the US increased by 38% from 2016 to 2018 to \$12 trillion in professionally managed assets, primarily publicly traded shares. This represents about 26% of all US assets under professional management.<sup>16</sup> Global investment trends are similar, with European funds showing the most engagement with sustainability issues.<sup>17</sup> The growth in US investment is likely to continue with the

<sup>12</sup> Doherty, B.; Everything You Need to Know About Glencore, Dan Gertler and Their Interest in DRC; Financial Times; Nov 5, 2017

<sup>13</sup> Glencore Statement; Furthering Our Commitment to the Transition to a Low-Carbon Economy; Glencore website; Feb 20, 2019

<sup>14</sup> Climate Action 100+ website. With regard to climate-related financial disclosure, leading frameworks include those of the Sustainability Accounting Standards Board (SASB) and the Task Force on Climate-Related Financial Disclosures.

<sup>15</sup> Ernst & Young; EY Center for Board Matters; 2019 Proxy Season Preview

<sup>16</sup> Forum on Sustainable and Responsible Investing; Report on US Sustainable, Responsible and Impact Investing Trends 2018

<sup>17</sup> Global Sustainable Investment Alliance; 2016 Global Sustainable Investment Review

Dept. of Labor's 2015 finding that incorporation of ESG-related factors into investment decision-making can be compatible with fiduciary responsibility.<sup>18</sup> Indeed, some investors are beginning to believe that ignoring ESG factors is incompatible with fiduciary responsibility.

While the concept of ESG-oriented investment funds was pioneered by firms like Domini Social Investments, which launched in 1991 and currently has \$2.3 billion under management,<sup>19</sup> it has taken off in the past few years with the entrance of giants like BlackRock, the world's largest investment manager. In his 2018 annual letter to corporate CEOs, the BlackRock CEO stated, "To prosper over time, every company must not only deliver financial performance, but also show how it makes a positive contribution to society."<sup>20</sup> And he stated that BlackRock will put this concept into action as it chooses investments in its active portfolio (then at \$1.7 trillion) and as it engages with management of companies held in its portfolio of index funds, which exceeds \$4.0 trillion.<sup>21</sup>

How about divestment? Can selling fossil fuel stocks be considered a reverse financing mechanism to promote sustainability? Divestment has a number of angles. It is perhaps most commonly seen as a statement of personal or institutional values, but it is also a portfolio diversification and risk management strategy, as in the decision of the Norwegian sovereign fund (itself a product of Norway's oil profits) to eliminate oil and gas exploration companies from its portfolio.<sup>22</sup> And it might (or might not) enable an investor to purchase better-performing stocks.<sup>23</sup> But does it promote sustainability, meaning, in this context, reduced CO<sub>2</sub> emissions? Perhaps, but the evidence from prior divestment campaigns suggests it is more likely to succeed as a political strategy rather than from any financial pressure that may flow from the sale of stock shares. Studies to date do not show a negative impact, attributable to the divestment campaign, on share prices of fossil fuel companies, which is consistent with evidence from prior divestment campaigns.<sup>24</sup> And there can be a counterproductive aspect. Divestment means replacing one investor with another, with the likely result of the companies' shares becoming more concentrated over time in the hands of investors who are not interested in challenging management on sustainability issues.

The political side of a divestment campaign is another matter. Successful divestment campaigns result in heightened awareness of a problem, stigma towards those contributing to the problem, and support for alternatives<sup>25</sup> – which in this case would mean such things as greater demand for renewables, and perhaps support for carbon taxes, higher auto mileage standards, and other steps that drive down demand for fossil fuels.

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<sup>18</sup> US Department of Labor; Interpretive Bulletin Relating to the Fiduciary Standard Under ERISA in Considering Economically Targeted Investments; Oct 26, 2015

<sup>19</sup> Domini Social Investments website

<sup>20</sup> Fink, L.; Larry Fink's 2018 Letter to CEOs: A Sense of Purpose; BlackRock.com; 2018

<sup>21</sup> Massa, A.; BlackRock's Assets Fall Below \$6 Trillion on Market Turmoil; Bloomberg; Jan 16, 2019

<sup>22</sup> Milne, R.; Norway's Oil Fund Shake-up Raises Hackles; Financial Times; Mar 11, 2019

<sup>23</sup> Grantham, J.; The Mythical Peril of Divesting From Fossil Fuels; London School of Economics, Grantham Research Institute on Climate Change and the Environment; Jun 13, 2018

<sup>24</sup> Pollin, R. & Hansen, T.; Economics and Climate Justice Activism: Assessing the Fossil Fuel Divestment Movement; University of Massachusetts Amherst, Political Economy Research Institute; April 24, 2018.

Ansar, A. et al.; Stranded Assets and the Fossil Fuel Divestment Campaign: What Does Divestment Mean for the Valuation of Fossil Fuel Assets? University of Oxford, Smith School of Enterprises and the Environment; Oct 2013

<sup>25</sup> *ibid*

In the face of this, different funds are adopting different strategies. CalPERS (the California Public Employees Retirement System), with \$354 billion under management,<sup>26</sup> decided in 2015 to divest from coal companies.<sup>27</sup> In 2016, it voted to require the companies it invests in to have board members with expertise in the risks associated with climate change. Rather than divesting all fossil fuel stocks, CalPERS has chosen to engage, maintaining a voice with management rather than severing ties.<sup>28</sup> Similarly, the Norway fund, prior to its recent decision to divest oil and gas exploration companies, had decided in 2015 to divest coal company shares.<sup>29</sup> Many other funds, including the New York State and City pension funds, are considering their divestment strategies.<sup>30</sup>

**Private Equity & Venture Capital** refers to direct investment into firms that are not publicly listed. Both private equity and venture capital investors seek returns well above standard market levels.

Venture capital is early-stage investment, often into start-up companies controlled by an entrepreneur with a promising idea and vision. Control of the company generally remains with the founding entrepreneur, and venture firms profit by selling shares when the promising idea works out and turns into a revenue-generating product. Depending on the stage of a company's development, venture investment into a single company is generally in the low millions.

Private equity investment is generally at a later stage of corporate development, and the private equity firms typically purchase a controlling interest in a firm. As compared to institutional investors purchasing shares of publicly listed companies, therefore, private equity investors don't seek to engage with and attempt to influence management. They *direct* management. The firms they purchase are typically smaller than publicly listed firms, but they can, nonetheless, be quite large, with assets in the tens and even hundreds of millions.

Examples of private equity and venture capital investment for sustainable purposes include:

- In 2018, KKR launched a \$1 billion fund to invest in companies aligned with the UN Sustainable Development Goals (SDGs).<sup>31</sup> Its initial investments through the fund were a Singapore-based energy efficiency company and an Indian waste collection company, supporting the Indian government's "Clean India" campaign.<sup>32</sup> KKR has also, since 2008, teamed with the Environmental Defense Fund (EDF) to improve the environmental performance of companies in KKR's portfolio. EDF reports 27 million cubic meters of reduced water use and 6.3 million tons of reduced waste through this effort, which is now called the "Green Solutions Platform."<sup>33</sup>
- Circulate Capital is a new investment firm focused on reducing ocean plastics by investing in waste management and recycling firms. It has received funding

<sup>26</sup> CalPERS website; Investment & Pension Funding Facts for FY 2017-18

<sup>27</sup> Pollin, R. & Hansen, T.

<sup>28</sup> Farmer, L.; Pension Fund Takes Unprecedented Climate Change Action; *Governing.com*; Mar 17, 2016

<sup>29</sup> Carrington, D.; Norway Confirms \$900bn Sovereign Wealth Fund's Major Coal Divestment; *The Guardian*; Jun 5, 2015

<sup>30</sup> Steyer, R.; NYC Issues RFP for Help with Fossil Fuel Divestment: Pension & Investments; Dec 18, 2018.

Muio, D.; Divesting from Big Oil a Tough Sell — Even in the Bluest Cities and States; *Politico*; Mar 7, 2018

<sup>31</sup> Bank, D.; What We Know About KKR's \$1 Billion Global Impact Fund; *Impact Alpha*; Apr 30, 2018

<sup>32</sup> Chasan, E.; KKR Turns to Impact Fund Co-Investing With \$510 Million Deal; *Bloomberg*;

Feb 10, 2019

<sup>33</sup> KKR and EDF websites

commitments from investors totaling \$90 million and intends to focus its efforts in five countries in south and southeast Asia that are the source of 45% of ocean plastics.<sup>34</sup>

- Congruent Ventures is a \$92 million fund with interests including clean energy and industrial supply-chain innovation. Its initial investments include a materials science company developing a product that can reduce energy and materials use in manufacturing and a company that monitors and helps improve performance of rooftop solar installations.<sup>35</sup>

**Initial Public Offerings (IPOs)** – IPOs for green companies, sometimes called green IPOs, is not a precise category, as there is no precise definition of a green company, but it could include renewable and energy efficiency companies, recycling and waste management companies and clean transport, such as Tesla, which went public in 2010.<sup>36</sup>

Yieldcos were a highly visible green IPO for several years, but went through a boom and bust cycle.<sup>37</sup> Although available for any number of uses, the yieldco structure has been particularly associated with wind and solar projects. The first yieldco IPO was in 2013,<sup>38</sup> and by mid-2015, the yieldco market had raised \$16 billion through nine IPOs and secondary capital offerings. By 2016, two aggressively expanding companies in the field had declared bankruptcy,<sup>39</sup> and there has been little new activity since.

The yieldco structure is akin to an equity version of asset-backed securities (ABS) and comparable to real estate investment trusts (REITs), in which performing assets, such as solar fields with long-term power purchase agreements (PPAs) in place, are transferred from a parent company into a spin-off entity with predictable cash flow based on the PPAs. Investors purchase shares in the company (the yieldco), which typically makes quarterly dividend payments. The funds raised through the equity sale (the IPO) can then be used by the parent to develop the next set of projects, which, when completed and with PPAs in place, can be spun-off into the same or another yieldco.

Yieldcos, as companies and unlike ABS, are designed to be perpetual. To maintain share value, they depend on a continually renewing stream of projects and PPAs, but the yieldco model can be financially vulnerable under some fairly common circumstances -- most particularly, rising interest rate environments. Because yieldcos are, as the name implies, designed for yield, they are most attractive to investors when their regular dividend payments are attractive as compared to alternative investments. When interest rates rise, then yieldcos tend to lose value.<sup>40</sup> Similarly, as a way to raise capital, yieldco IPOs only make sense when the cost of equity capital is lower than debt. In many market environments, large utility companies can borrow at lower rates and thereby become a lower cost source of capital for renewable resources as compared to

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<sup>34</sup> Circulate Capital website

<sup>35</sup> Spector, J.; Congruent Ventures Wants to Prove That Early-Stage Cleantech VCs Can Make Money; Greentech Media; Apr 4, 2018. Deign, Jason; Omnidian Raises \$5.1 Million for Residential PV Performance Offering; Greentech Media; Nov 15, 2017

<sup>36</sup> Kiersz, A.; Tesla's IPO Was 8 Years Ago; Business Insider; Jun 29, 2018

<sup>37</sup> Konrad, T.; The YieldCo Boom and Bust: The Consequences of Greed and a Return to Normalcy; GreenTech Media; May 13, 2016

<sup>38</sup> Kinrade, T.; A Sixth YieldCo Goes Public as the Asset Class Has its First Anniversary; Solsystems.com; Jul 18, 2014

<sup>39</sup> Hals, T. & Groom, N.; Solar Developer SunEdison in Bankruptcy as Aggressive Growth Plan Unravels; Reuters; Apr 21, 2016; Fitzgerald, P.; Spain's Abengoa Files for Chapter 15 Bankruptcy in U.S.; Wall Street Journal; Mar 29, 2016

<sup>40</sup> Sweet, C.; IPOs Bring Fresh Wind for Green Investing; Wall Street Journal; May 5, 2015

a yieldco.<sup>41</sup>

### **Debt Financing – labeled green and otherwise**

Debt financing to support sustainable activities includes bonds and loans.

The bond category is dominated by green bonds, but now also includes labeled social and sustainability bonds. As financial instruments, sustainable activity bonds do not differ from other bond financings, but the uses of proceeds are limited to green and/or social uses, and the labels help investors to target their investments to these uses.

Sustainable debt financing has recently expanded into commercial loans, with major banks making investment commitments towards activities that support the UN's Sustainable Development Goals (SDGs).<sup>42</sup> In a new development, lenders are making loans with interest rates tied to sustainability measures (discussed in the full recourse debt section below).

For bond financings, the International Capital Market Association (ICMA) has published Green, Social, and Sustainability Bond Principles,<sup>43</sup> and these frameworks form the basis of the market:

- Green bonds are designed to have an environmental benefit.
- Social bonds intend to achieve a positive social outcome, typically for a lower-income or otherwise underserved population, and uses include affordable housing and access to essential services such as healthcare and education.
- Labeled sustainability bonds combine both environmental and social uses.

The Principles set out transparency processes to enable bond purchasers to understand the purposes of the issue and to govern the uses of bond proceeds, which may be verified by a third party.<sup>44</sup>

In the United States, many sustainability bond uses fall within the longstanding domain of the municipal bond market, including environmental bonds for clean water and affordable housing bonds. This means that last year's housing bond might be this year's social bond. In addition, there is no mandate to use the labels, so many bonds for qualified activities do not carry a sustainability label. Accordingly, the size of the sustainable bond market does not equate to the size of the underlying sustainable activities, and growth in the sustainable bond market does not necessarily mean growth in the underlying activities. As a result, there is some discussion as to how meaningful the labels are. There are a couple of factors that suggest the labels are meaningful and useful:

- Many countries, particularly those with emerging markets, are newly able, with economic growth, to address sustainability matters at scale. Sustainable bond issuance in those countries therefore more closely tracks growth in sustainable activities. China, for instance, with its recent focus on environmental quality, is a

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<sup>41</sup> Hoium, T.; Why Utilities (Not Yieldcos) Are Dominating Renewable Energy Finance; The Motley Fool; Mar 16, 2018

<sup>42</sup> As examples: McHale, B.; Banking on 2030: Citi & the Sustainable Development Goals; Citigroup.com; Sept 19, 2017. Bank of America website; Our Commitment to Environmental Sustainability

<sup>43</sup> International Capital Market Association (ICMA) website; Green, Social, and Sustainability Bond Principles

<sup>44</sup> Financial market regulators in some countries, including China and India, have established their own frameworks, which largely track the ICMA principles, although with some divergence.



leader in sustainable bond issuance.

- Bond purchasers appear to find the labels quite useful, and sustainable bond issues regularly attract more buyers than other bonds. Some analyses show this resulting in lower interest rates for sustainable bond issuers, reducing the costs of sustainable activities<sup>45</sup> -- e.g., lowering costs for water systems, affordable housing and social service providers.

In 2018, labeled sustainable debt financing totaled \$226 billion globally, a 13% increase over 2017.<sup>46</sup> As recently as 2012, this market, which dates to 2007, stood at \$5 billion. Green bonds, at \$167 billion, are the core of the market, but almost all of the growth in 2018 came from social and sustainability bonds.

The Climate Bond Initiative (CBI) puts total outstanding climate-aligned bonds, labeled and otherwise, at \$1.45 trillion. Of that figure, \$389 billion is labeled green. CBI puts US climate-aligned municipal outstanding issuance at \$264 billion, of which only \$14 billion specifically carries a sustainability label.<sup>47</sup> If the preferential pricing seen in some studies holds, we can expect the portion of labeled bonds to increase markedly.<sup>48</sup>

Categories of debt financing used for sustainable finance include corporate and municipal full recourse debt, securitizations (asset-backed and mortgage-backed securities) and project finance. Each of these is described below, with examples of uses for sustainable purposes.

**Full Recourse Debt** is repaid by any and all assets of the borrower. Most debt is full recourse, issued with the expectation that it will be repaid from the operating cash flow of the borrowing entity. In the context of this discussion, full recourse debt includes corporate bonds and the bonds sold by Multilateral Development Banks (MDBs), as well as municipal bonds, including general obligation debt of states and municipalities and 501c3 bonds sold on behalf of nonprofit institutions.

Full recourse debt can also include commercial loans, as in the Danone and EDF examples below. The Danone and EDF green credit facilities are particularly interesting in that they carry interest rates that vary based on the borrowers' achievement of sustainability measures. This means that the lenders are viewing ESG as a matter of credit and risk, with the borrowers' financial prospects expected to improve with positive ESG performance. This view is consistent with that of the equity investors discussed above, but it is highly unusual to incorporate it directly into loan terms.

Examples of full recourse debt include:

- The World Bank issued the first labeled green bond in 2008 and has issued over \$12 billion in green bonds through over 150 transactions supporting projects designed to mitigate climate change or help affected people adapt to it.<sup>49</sup>
- Apple raised \$2.5 billion through two green bond issues in 2016 and 2017 to fund the

<sup>45</sup> Climate Bond Initiative (CBI) and International Finance Corporation; Green Bond Pricing In The Primary Market: January - June 2018. Schuele, Finn and Wessel, David; Municipalities Could Benefit From Issuing More Green Bonds; Brookings; Jul 16, 2018

<sup>46</sup> CBI; 2018 Green Bond Market Summary; Jan 2019. In addition to CBI, Bloomberg NEF and Environmental Finance also track sustainable bond market activity. Each has slightly different numbers due to some technical differences in categorizations and exclusions.

<sup>47</sup> CBI; Bonds and Climate Change: The State of the Market 2018

<sup>48</sup> Schuele, F. and Wessel, D.

<sup>49</sup> World Bank website; World Bank Marks 10-Year Green Bond Anniversary; Nov 13, 2018

company's conversion to 100% renewable energy, plus energy efficiency conversions throughout its global operations and an increase in the company's use of biodegradable materials. Apple's second green bond was issued less than two weeks after the US President announced his intention to withdraw the US from the Paris climate agreement. "Leadership from the business community is essential to address the threat of climate change," said Apple, in a statement.<sup>50</sup>

- The City of Los Angeles issued \$276 million in general obligation bonds in 2018, labeled social bonds, to fund programs, including housing construction, for homeless people.<sup>51</sup> In 2016, Los Angeles voters approved a property tax increase designed to support \$1.2 billion in bonds to enable the city to expand services and construct 10,000 housing units for homeless residents.<sup>52</sup>
- Columbia University issued \$50 million in green bonds in April 2016 for a new LEED-certified science center, joining such other universities as MIT, Virginia, Texas and Arizona State in using green bonds for LEED-certified development.<sup>53</sup>
- The Republic of France issued sovereign green bonds totaling \$6.0 billion in 2018. France was one of at least seven countries to issue sovereign green bonds in 2018, backed by the full faith and credit of the country. Sovereign issues are an important leadership statement, demonstrating a country's commitment to climate change mitigation.<sup>54</sup>
- Loans with interest rates indexed to sustainability criteria include a €2 billion credit facility for Danone and a €4 billion revolving facility for EDF, the French electric utility. For EDF, the interest rate is tied to its CO<sub>2</sub> emissions, conversion to an electrified vehicle fleet, and its customers' use of online consumption monitoring tools. For Danone, the measures include growth in sales by Danone's B Corp subsidiaries, as Danone itself works towards becoming a certified B Corp.

These loans mark an important development that bears watching. The lenders involved include BNP Paribas and Crédite Agricole as leads, working in syndication with JP Morgan, HSBC, Citibank and other major banks. In other words, this is already in use by the most mainstream lenders. But we will need to see if it becomes widely adopted.<sup>55</sup>

**Securitizations** (Asset-Backed Securities and Mortgage-Backed Securities) – The SEC defines asset-backed securities (ABS) as securities backed by a discrete pool of self-liquidating financial assets, and asset-backed securitization as a financing technique in which financial assets, in many cases themselves less liquid, are pooled and converted into instruments that may be offered and sold in the capital markets.<sup>56</sup> The pooled

<sup>50</sup> Webb, A.; Apple Issues a Second Green Bond to Finance Clean Energy; Bloomberg; Jun 13, 2017

<sup>51</sup> Ghori, I.; With Proceeds Tackling Homelessness, Los Angeles Brings Social Bonds; The Bond Buyer; Jun 26, 2018

<sup>52</sup> Macias, M., Jr.; LA City Council Approves \$300M for Homeless Housing; Courthouse News Service; Jun 6, 2018

<sup>53</sup> Columbia University website (2016)

<sup>54</sup> CBI; 2018 Green Bond Market Summary

<sup>55</sup> Avery, H.; The Growth of Green Credit; Euromoney; Apr 09, 2018. Gilbert, J.C.; Every CFO Should Know This: 'The Future Of Banking' Ties Verified ESG Performance To Cheaper Capital; Forbes; Feb 20, 2018. EDF press release; EDF Announces the Successful Syndication of an Innovative ESG-Indexed Revolving Credit Facility; Nov 27, 2018

<sup>56</sup> Securities and Exchange Commission; 17 CFR Parts 210, 228, 229, 230, 232, 239, 240, 242, 245 and 249. [https://www.sec.gov/rules/final/33-8518.htm#P174\\_14586](https://www.sec.gov/rules/final/33-8518.htm#P174_14586); March 8, 2005

financial assets can include leases, loans, contracts, receivables or other non-real estate financial assets. Mortgage-backed securities (MBS) are essentially exactly like ABS, with payments flowing from pools of real estate mortgage loans. ABS and MBS succeed or fail based on the strength and quality of the assets backing the securities.

The securitization examples below include pools of car loans, solar leases, and energy efficiency projects. Buildings account for roughly 40% of US energy consumption, split roughly evenly between commercial and residential uses,<sup>57</sup> creating a large market for energy efficiency retrofits leading to the triple benefits of reduced carbon emissions and water use, lower utility bills, and more clean energy jobs. Green securitizations include:

- Hannon Armstrong, a financing firm specializing in renewable energy and energy efficiency projects, issued the first labeled green ABS in December 2013. The \$100 million private placement was backed by wind, solar and energy efficiency projects at 20 properties.<sup>58</sup> Hannon Armstrong now manages \$4.9 billion in energy efficiency and renewable projects and estimates that its investments result in 2.3 million tons of reduced CO<sub>2</sub> emissions annually.<sup>59</sup>
- Fannie Mae, the US mortgage financing agency, has been the world's most prolific green bond issuer the past two years, with MBS issues totaling \$46.5 billion. The proceeds have funded energy efficiency projects in residential buildings.<sup>60</sup>
- In November 2018, SunPower, in partnership with Hannon Armstrong, issued \$440 million in securities backed by some 37,500 residential rooftop solar leases. 83% of the residential customers had FICO scores of 753 or better, and the issue was rated single-A.<sup>61</sup> This was one of seven solar ABS totaling \$2.2 billion issued in 2018. Solar ABS can be backed by leases, Power Purchase Agreements (PPAs) and/or loans, and there have been 22 issues totaling \$4.4 billion since the first one in 2013.<sup>62</sup>
- Toyota has issued three ABS, each over \$1 billion, through which it funds finance and lease contracts for Prius and other hybrid and low-emission vehicles.<sup>63</sup>

It is worth noting that the PPAs that are the building blocks of many green ABS are attractive for power purchasers because they can be used to lock in power prices at a reasonable level (often at a discount to prevailing utility rates) over a long time period. In that way, PPAs can provide a hedge against volatile and rising energy costs.

**Revenue bonds** are municipal bonds often issued by a state or local authority and backed by a dedicated tax, user fee or other specific revenue. Examples include:

- Central Puget Sound Regional Transit Authority - \$923 million in 2015 to expand the

<sup>57</sup> US Department of Energy; 2011 Buildings Energy Data Book; March 2012

<sup>58</sup> Trabish, H.; The \$100 Million Green Bond From Hannon Armstrong. GreenTech Media Dec 26, 2013

<sup>59</sup> Hannon Armstrong website

<sup>60</sup> CBI; 2018 Green Bond Market Summary. CBI; Bonds and Climate Change.

<sup>61</sup> Adams, M.; Hannon Armstrong Readies \$440M Solar Lease ABS; Global Capital; Nov 5, 2018  
SunStrong Capital Holdings LLC Successfully Completes 400 Million Asset-Backed Securitization;  
Sunpower.com; Nov 28, 2018

<sup>62</sup> Mendelsohn, M.; Raising Capital in Very Large Chunks: The Rise of Solar Securitization  
PV Magazine; Nov 16, 2018. The totals quoted do not include private placements. That information is not publicly available, but is likely a small portion of the total solar ABS market.

<sup>63</sup> Toyota website; Toyota Financial Services Supports Environmental Sustainability by Expanding Green Bond Program; May 13, 2016

regional light rail system. The bonds will be repaid from sales tax revenue.<sup>64</sup>

- DC Water - \$350 million green century bond issued in 2014 and to be repaid from user fees. DC Water, like most water districts, has a monopoly on supply plus the authority to set rates at levels required to cover costs, including debt service costs.<sup>65</sup>
- New York Metropolitan Transportation Authority (MTA) – nine green revenue bond issues totaling \$5.5 billion from since 2016 for various projects in the public transit agency's capital plan.<sup>66</sup>

**Project Finance** is debt issued to create a specific project, with repayment of the debt generated solely from the cash flow of the financed project. Project finance is typically used for proven models, where the projected cash flow is considered predictable over the term of the financing, and it is a major form of financing for large-scale wind and solar projects. A Moody's study found that projects with green uses had lower default rates than non-green projects.<sup>67</sup> The Frankfurt School of Finance & Management estimated worldwide project finance investment in renewables at \$91 billion in 2017, down slightly from the 2016 level.<sup>68</sup>

Examples:

- A renewable natural gas project in Arizona, where methane from cow manure is captured, processed, piped and sold, was financed in 2018 with \$61 million of tax-exempt industrial development bonds underwritten by Equilibrium Capital.<sup>69</sup>
- A series of Chinese projects in 2015, including an \$856 million off-shore wind farm, a \$420 million on-shore wind farm, and a \$480 million solar project. China has been the leading location for renewables finance for the past several years.<sup>70</sup>
- A solar power plant in Chile, called the largest in Latin America, financed in 2014 by \$47.3 million in project bonds underwritten by Bank of America Merrill Lynch and guaranteed by OPIC.<sup>71</sup>

## **Policy-Based Practices**

This category is for investment mechanisms specifically created by public policy. In addition to traditional command and control environmental regulation ("you must do this; you may not do that"), accompanied by public spending, governments at all levels have increasingly experimented with market-based and incentive-oriented solutions. Broadly speaking, the policies are designed to create financial value for desired activities and costs for undesirable activities.

The strategies include traditional policy-based incentive programs such tax credits for

<sup>64</sup> Deshais, N.; Seattle Transit Joins Spokane with Green Bonds; The Spokesman-Review; Aug 11, 2015

<sup>65</sup> DC Water; DC Water Announces Successful Sale of \$350 Million Green Century Bonds; Jul 10, 2014

<sup>66</sup> Metropolitan Transportation Authority website

<sup>67</sup> Moody's: Project Finance Bank Loans for Green Use-Of-Proceeds Projects Demonstrate Lower Default Risk; Moody's Investors Service; Sept 18, 2018

<sup>68</sup> Frankfurt School of Finance & Management; Global Trends in Renewable Energy Investment 2018.

Frankfurt School – UNEP/Bloomberg New Energy Finance

<sup>69</sup> Equilibrium Capital; Turning Livestock Waste into Renewable Fuel: Green Bond Case Study; presentation at Conservation Finance Investor Conference; Jan 9, 2019

<sup>70</sup> ibid

<sup>71</sup> Kidney, S.; Now Here's Something to Like; Climate Bonds Initiative website; Sept 25, 2014

preferred activities, which is just a step away from direct public expenditures, as well as taxes on undesirable activities, plus the much newer and more innovative cap and trade programs. It is important to note, as well, that command and control environmental regulation, although it is not a financing mechanism, triggers a great deal of investment and economic activity. The whole industry of environmental services, for instance, is based on meeting environmental regulations.

**Carbon Pricing Initiatives** include cap and trade programs as well as direct pricing systems, such as carbon taxes. The World Bank estimates that governments worldwide raised about \$33 billion from carbon pricing initiatives in 2017, a 50% increase from 2016. This figure includes revenues from both emissions trading systems and from carbon taxes, but appears to be largely from trading systems. 46 countries and 24 subnational jurisdictions have emissions trading or carbon taxes in place or fully approved and scheduled to be put in place. The majority of these are trading systems, and they collectively cover an estimated 20% of global GHG emissions.<sup>72</sup>

Despite the growth of these pricing initiatives, they tend to share a certain level of timidity. While most nations and jurisdictions recognize the environmental value (88 countries include carbon pricing as an element of their Paris Accord NDCs),<sup>73</sup> they are reluctant to disrupt existing energy markets and jeopardize existing jobs. And they do not want to put themselves at an economic disadvantage relative to others who do not place a price on carbon. A Commission on Carbon Prices, convened by the World Bank, concluded that achieving the Paris temperature target requires carbon prices of US\$40 to \$80 per ton of CO<sub>2</sub> by 2020 and \$50 to \$100 by 2030.<sup>74</sup> In contrast, 80% of emissions are not currently covered by any price, and nearly 75% of covered emissions are priced below \$10 per ton.<sup>75</sup> And, with such recent examples as the Yellow Vest protesters in France and the voters of eco-friendly Washington State, who have now twice voted down a carbon tax, it is clear that there are very serious political hurdles to implementing higher levels of carbon pricing.

Following is a high-level summary of cap & trade and direct pricing systems:

- **Cap & Trade** is a pollution control system that combines command and control regulation with market forces. Under cap and trade, a governmental jurisdiction places an absolute cap, declining over time, on a particular pollutant, and then divides that cap, via permit, among all companies emitting the pollutant. As the cap ratchets down, companies can meet their new, reduced cap by either reducing their emissions or purchasing emissions allowance from another firm. The firm that sells (i.e., trades) pollution allowance under its permit cannot exceed its now-reduced cap, but it has been able to turn its reduced emissions into a source of earned revenues.<sup>76</sup>

In recent years, most public attention to cap & trade in the US has focused on Congressional refusal to approve its use to control CO<sub>2</sub> and other green house gases (GHG). It is perhaps forgotten by much of the public that a very successful federally-approved cap & trade program has been in place since 1990 to control sulfur dioxide emissions – the gases responsible for acid rain.<sup>77</sup>

<sup>72</sup> World Bank; Carbon Pricing Dashboard; Worldbank.org

<sup>73</sup> World Bank & Ecofys; State and Trends of Carbon Pricing 2018

<sup>74</sup> World Bank; Report of the High-Level Commission on Carbon Prices; 2017

<sup>75</sup> World Bank; Carbon Pricing Dashboard; Worldbank.org

<sup>76</sup> Environmental Defense Fund website

<sup>77</sup> Conniff, R.; The Political History of Cap and Trade; Smithsonian Magazine; Aug 2009

Examples of cap and trade in place include:

- Regional Greenhouse Gas Initiative (RGGI) -- a cap and trade program jointly administered by nine states in the Northeast US (with two more states in the process of joining) under which CO<sub>2</sub> pollution permits are auctioned to power producers, who may trade them with other power producers within the participating states. States have used the auction proceeds to support energy efficiency and related policy objectives.<sup>78</sup> Connecticut, for instance, uses a portion of its RGGI auction proceeds to capitalize the Connecticut Green Bank.<sup>79</sup>

RGGI is the first mandatory GHG reduction program in the US, with its cap in place as of 2009. The years since RGGI's introduction have coincided with a rapid shift from high-carbon fuel sources (coal and petroleum) to lower cost and lower-carbon natural gas, with the result that emissions have fallen below the cap and may well have reached their current level without RGGI. As a result, the Congressional Research Service notes, the auctions have functioned more like a carbon tax. More recently, the states recalibrated the cap, starting from current actual levels, and they expect the program will function more closely as initially intended.<sup>80</sup> Since the program began, power sector emissions have fallen by about 50% while the regional GDP has grown.<sup>81</sup>

- The European Union and China have the largest cap and trade initiatives. The EU system dates to 2005, and China, which now has eight regional systems, is working towards a nationwide system by 2020. China's system will be limited to the power sector, covering 25-30% of the country's GHG emissions. The EU system covers an estimated 45% of emissions.<sup>82</sup> As with other cap and trade systems, the EU system has often acted more like a tax, with excessive permits and allowances rarely forcing companies against hard caps.<sup>83</sup>

Other prominent cap and trade systems include those of California and several Canadian provinces. Canada is scheduled to implement a nationwide carbon pricing system in 2019,<sup>84</sup> although the plan faces continued legal and political challenges.<sup>85</sup> Beyond the political challenges, these systems have sometimes been gamed as energy traders have taken advantage of lax enforcement and inexact measurement systems.<sup>86</sup>

- **Direct Pricing Systems** – This category includes, most prominently, carbon taxes and other carbon pricing schemes that do not involve a swap. Ideally, the price reflects all external costs – to the environment, to health, etc. – flowing from the use of carbon-based fuels and resources.

<sup>78</sup> Regional Greenhouse Gas Initiative website

<sup>79</sup> Connecticut Dept. of Energy & Environmental Protection; Regional Greenhouse Gas Initiative; Nov 2018

<sup>80</sup> Ramseur, J.; The Regional Greenhouse Gas Initiative: Lessons Learned and Issues for Congress.

Congressional Research Service; Apr 27, 2016

<sup>81</sup> Regional Greenhouse Gas Initiative website

<sup>82</sup> World Bank; Carbon Pricing Dashboard

<sup>83</sup> The Economist; Low-Carb Diet: Companies are Moving Faster than Many Governments on Carbon

Pricing; Jan 11, 2018

<sup>84</sup> World Bank; Carbon Pricing Dashboard

<sup>85</sup> Austen, I.; Justin Trudeau's Carbon Tax Push Finds Critics on All Sides; NY Times; Dec. 7, 2018

<sup>86</sup> Chan, M.; Ten Ways to Game the Carbon Markets; Friends of the Earth; 2010; Fialka, J.; China Will Start the World's Largest Carbon Trading Market; Scientific American; May 16, 2016; Van Benthem, A. & Martin, R.; Europe's Carbon-Trading System is Better than Thought, and Could be Better Still. The Economist; Dec 11, 2015

Carbon taxes and pricing schemes are not necessarily, in and of themselves, sustainable financing mechanisms in that the funds raised can be used for any purpose. In the US, for instance, perhaps the most commonly proposed use of proceeds from a federal carbon tax is a direct repayment to individuals, a “carbon dividend.” Nonetheless, by raising the price of carbon-based resources to levels that more accurately reflect their full costs, these tax and pricing systems can trigger substantial private investment in renewable and other reduced-carbon resources. As of 2017, 24 countries and two subnational jurisdictions have a carbon tax in place or approved and scheduled for implementation. All but 8 of these also have trading systems.<sup>87</sup>

Japan, as one example of a country with a carbon tax, introduced the tax in 2012. It is placed on fossil fuels in proportion to the levels of CO<sub>2</sub> emissions, and Japan is using its carbon tax revenue for efforts to mitigate climate change, including subsidies for energy conservation projects. The tax is set at approximately \$3 per ton of CO<sub>2</sub>.<sup>88</sup>

Carbon taxes are, of course, public levies, but there are also many private carbon pricing systems in place. CDP reports that 607 companies had internal carbon prices in place in 2017, four times the number from 2014, with 700 additional companies planning on having pricing systems in place within two years. These include many of the world’s largest companies.<sup>89</sup>

Companies cite forward-looking reasons for voluntarily creating internal carbon prices, including:

- Managing risk – companies learn where their vulnerabilities would be in the event of an externally mandated carbon price.
- Discovering opportunities – the transition to a lower carbon economy will create many business opportunities, and companies can use internal pricing to help determine where it may have advantages and to begin developing and rolling out those strategies.
- Driving efficiencies – many companies use a carbon price to incentivize energy efficiencies and other savings strategies.<sup>90</sup>

Companies with internal carbon pricing come from a wide range of industrial sectors, include consumer-facing companies such as General Motors, Disney, Kellogg, Microsoft and Colgate-Palmolive, as well as financial services companies, utilities and industrials.<sup>91</sup>

**Tax credits** – The US federal government provides tax credits for solar and wind renewable energy installations. The credits were renewed at the end of 2015, with the solar credit set at 30% of the cost of a solar installation through 2019, and then stepping down to 10% in 2022 and thereafter. The wind credit is 2.3 cents per kilowatt-hour of generated electricity in 2016 and ramps down through 2020, when it expires. The credits apply to home installations as well as major commercial farms, and the Joint Committee on Taxation estimates that the solar tax credits will reduce federal revenues by

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<sup>87</sup> World Bank & Ecofys; State and Trends of Carbon Pricing 2018

<sup>88</sup> Japan For Sustainability website; Japan Introduces New Tax on Carbon Emissions; 2013. Timperley, J.; The Carbon Brief Profile: Japan; carbonbrief.org; Jun 25, 2018. World Bank; Carbon Pricing Dashboard

<sup>89</sup> CDP; Putting a Price on Carbon: Integrating Climate Risk into Business Planning; Oct 2017

<sup>90</sup> ibid

<sup>91</sup> ibid

approximately \$9.3 billion and the wind credit will cost \$14.5 billion in lost revenues.<sup>92</sup>

Industry sources estimate that the credits will boost solar energy production by more than 50%, to 72,000 megawatts, enough power for 12 million homes.<sup>93</sup> US solar industry employment stood at 242,000 in 2018, up from 93,000 in 2010, but down somewhat from a 2016 peak despite a near doubling in solar power generation from 2016 to 2018.<sup>94</sup> Bloomberg New Energy Finance estimates that the tax credit extensions will generate \$73 billion in wind and solar investment over five years.<sup>95</sup>

**Guarantees & Loan Programs** – The U.S. Department of Energy (DOE) has large-scale loan and loan guarantee programs, with a \$30 billion portfolio and \$40 billion in remaining authority.<sup>96</sup> The DOE reports that the existing portfolio has generated more than \$50 billion in total investment in clean energy projects.<sup>97</sup> The guarantee program may have become most widely known through a controversial \$500+ million loss when it guaranteed a loan to Solyndra, a solar power firm that shuttered in 2011. Despite that loss, and others, the DOE reported the program was generating surpluses by 2014.<sup>98</sup> The current administration had announced its intention to eliminate the DOE financing programs, but they have been maintained at full funding by Congress.<sup>99</sup>

A number of states have created Green Banks for investment in clean energy and similar projects. Green Banks often follow a public/private model, with public funds used to leverage larger amounts of private investment.<sup>100</sup> New York's Green Bank reports over \$600 million in clean energy investments.<sup>101</sup>

**Water Quality and Habitat Preservation Trading Systems** -- Regulatory structures can create markets by placing limits on pollutants and environmental damage while allowing flexibility on ways to meet the limits. Cap and trade is the most prominent example of this, but the model has variants.

In each example, one party purchases credits conferring a right or license to pollute or degrade an environment within limits, with the purchase price going to a second party who uses the funds to create an offsetting environmental benefit and receive a return. Each program intends to create either no net environmental loss or net benefits while creating economic benefits for participants. The business surrounding these activities is referred to as ecosystem services.

Examples include:

- **Mitigation banking and conservation banking** – These programs are designed to restore, create and/or preserve habitat, with mitigation banking focused on wetlands and aquatic resources and conservation banking focused on habitat needs of endangered species. In each case, the “bank” refers to physical property protected

<sup>92</sup> Sweet, C.; Wind, Solar Companies Get Boost From Tax-Credit Extension; Wall St Journal; Dec. 16, 2015

<sup>93</sup> ibid

<sup>94</sup> Solar Foundation; National Solar Jobs Census, 2018; thesolarfoundation.org

<sup>95</sup> Bloomberg New Energy Finance; Impact Of Tax Credit Extensions For Wind And Solar; Dec 17, 2015

<sup>96</sup> US Department of Energy Loan Programs Office website

<sup>97</sup> ibid.

<sup>98</sup> Doom, J.; U.S. Expects \$5 Billion From Program That Funded Solyndra; Bloomberg; Nov 12, 2014

<sup>99</sup> McDonald; T. R.; Omnibus Saves Department of Energy Loan Program and Adds New Direction; Holland & Knight, Government Energy & Finance Blog; March 27, 2018

National Renewable Energy Laboratory; Green Banks; nrel.gov. Coalition for Green Capital website

<sup>100</sup> National Renewable Energy Laboratory; Green Banks; nrel.gov. Coalition for Green Capital website

<sup>101</sup> New York Green Bank website



from development and managed to preserve the intended environmental benefit. In return, the owner of the property receives credits which he or she can sell to a second party developing property elsewhere that has triggered a need for mitigation. The programs, therefore, create financial incentives for owners of substantial and environmentally significant properties to keep those properties intact.<sup>102</sup> The US Fish and Wildlife Service (FWS), which administers conservation banking credits, reports the establishment of more than 130 conservation banks conserving 142,000 acres of habitat protecting over 70 threatened or endangered species.<sup>103</sup>

As compared to emissions cap and trade systems, which can scale essentially immediately, with known parties and directly measurable emissions, mitigation and conservation banking have a series of impediments to scale, including a lack of publicly available market data, variable levels of demand for credits and the inherent lack of certainty with regard to the scale of mitigation required. These create uncertainties with the timing of approval processes on both the development and mitigation sides of the transaction.<sup>104</sup>

- **Stormwater credits** – To reduce pollution of local rivers and streams and to protect the Chesapeake Bay Watershed, the District of Columbia (DC) in 2013 established a rule in which real estate development or redevelopment in excess of 5,000 square feet triggers stormwater retention requirements, at least 50% of which must be provided on-site. Owners can meet the remaining requirement by purchasing privately-traded Stormwater Retention Credits from other sites or paying a fee to the District Department of the Environment. The District places the fees into a special fund used to build green infrastructure to retain runoff.<sup>105</sup>

To fuel the market for a Stormwater Retention Credit Trading Program, the Nature Conservancy (TNC), Encourage Capital and Prudential Financial created a \$1.7 million fund to build green infrastructure to create credits that can then be sold to developers of sites that need credits to meet retention requirements.<sup>106</sup> The fund was announced in March 2016.

Though modest in size, this program appears readily replicable in the growing number of jurisdictions creating stormwater retention programs as a strategy to clean local waterways and maintain clean water supplies.<sup>107</sup> TNC identifies stormwater runoff as the world's fastest growing source of water pollution.<sup>108</sup>

The model is also applicable to other types of pollution and demonstrates the kind of private market that can be created once a governing jurisdiction places a limit on a particular source or type of pollution. It can also be seen as a combination of cap & trade plus a pollution-related tax.

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<sup>102</sup> US Fish & Wildlife Service website, Conservation Banking; US Environmental Protection Agency website, Mitigation Banking Factsheet

<sup>103</sup> US Fish & Wildlife Service website, Endangered Species

<sup>104</sup> Hook, P. & Shadle, S.; Navigating Wetland Mitigation Markets: A Study Of Risks Facing Entrepreneurs And Regulators; Convention on Biological Diversity website; Dec 2013

<sup>105</sup> Branosky, E.; From Grey to Green: Stormwater Trading in Washington D.C. River Voices; The River Network; July 2015

<sup>106</sup> The Nature Conservancy; New Investment Model for Green Infrastructure to Help Protect Chesapeake Bay; Mar 7, 2016

<sup>107</sup> Friedrich, K.; Stormwater Credits in D.C. Could Provide a Blueprint for Other Cities; Conservation Finance Network; Jun 6, 2016

<sup>108</sup> The Nature Conservancy; March 7, 2016

**PACE** - Property-assessed clean energy (PACE) programs provide home improvement financings, with the improvements conserving energy and water. PACE financings, which require enabling state and/or local legislation, are secured by the property and repaid via an assessment added to the property tax bill. In the event of a sale, the assessment stays with the property. Residential PACE programs are currently available in California, Florida and Missouri, with PACE for commercial buildings available in 17 additional states. Enabling legislation to expand the practice is pending in other states.<sup>109</sup>

One barrier to energy efficiency investment is that owners do not know if they will own a property long enough to recoup the costs of the efficiency installation. PACE programs are designed to overcome that barrier. That is, energy cost savings should exceed the PACE-related property tax increment, and property owners should therefore realize immediate monthly savings. The full costs of the energy efficiency project, however, take some years to fully recoup. If the owner sells the property, any remaining project costs are transferred to the new owner. In this way, the new owner picks up right where the previous owner left off, benefiting from the continued energy cost savings, but shouldering the remaining project costs.

It is important to note that the level of energy cost savings from efficiency installations is highly dependent on the quality of the installation. Homeowners seldom have experience with this kind of project and are sometimes victims of shoddy work, leaving them saddled with the cost of the project but inadequate energy savings to cover the cost. There have been enough problems with residential PACE installations that the federal Consumer Financial Protection Board is looking at new protections for homeowners.<sup>110</sup>

The PACE trade association reports over \$6 billion in efficiency investments in 220,000 homes and 1,800 commercial properties.<sup>111</sup>

### **Public/Private Partnerships**

Public policy frames, in some respect, virtually all the financing activities described above. Regulations and limits are set, and private activity flows within the established framework. There are a number of areas, however, where the public and private sectors work much more directly in partnership to craft program initiatives that drive individual transactions.<sup>112</sup>

In these situations, the partnership typically includes the public sector working with the private non-profit and the private for-profit sectors. Often, the goal is to test and prove a model or framework that can be spun off and replicated at scale, with a reduced public sector role. Sometimes the nature of the problem is such that, even within a framework, the public sector retains a central role in each transaction.

The financing model generally places the public sector in the role of grantor or guarantor, taking the highest level of financial risk. The non-profit, which is often the advocating force behind the transaction, might provide a middle tier of funding, which could be on concessionary or market terms, and the private sector provides market rate financing in amounts appropriate to the carrying level of the project.

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<sup>109</sup> Website of PACE Nation, the PACE trade association

<sup>110</sup> Lane, Ben; CFPB Plans to Issue Rules on PACE Loans; Housing Wire; Mar 4, 2019. Berry, K.; CFPB Moves One Step Closer to Regulating Clean Energy Loans; American Banker; Mar 4, 2019

<sup>111</sup> PACE Nation website; PACE Market Data

<sup>112</sup> In contrast to public loan programs, where the public and private entities are on opposite sides of each transaction, in partnerships they are typically working together on the same side.

Examples of public/private partnerships include:

- **Debt for Nature Swaps** – Pursuant to the Tropical Forest Conservation Act (TFCA) of 1998, the US is able to forgive public debt, such as from the USAID, in exchange for conservation activities. Through mid-2013, when funding for the program ended, the US had concluded 20 agreements with 14 countries.<sup>113</sup> Swaps can also be negotiated with the World Bank and other multilateral development banks, as well as with private lenders. An NGO is typically involved, often raising additional funds for the forest conservation efforts, and assisting in establishing the governance and monitoring protocols for the conservancy area. The TFCA program could resume should the Congress appropriate new funding.<sup>114</sup>

The Nature Conservancy has negotiated a series of such swaps, and has recently built on the model using funds from impact investors, enabling more conservation activities. It has raised \$15 million in impact capital loans plus \$5 million in grants to retire Seychelles government debt. Seychelles is using the savings from its more manageable debt to protect marine areas from commercial fishing and oil exploration. The first Seychelles sanctuary is about 81,000 square miles (roughly the size of Kansas), with additional areas to be designated.<sup>115</sup>

- **Pay for Success Financing** -- This is a type of performance-based contracting in which an investor funds an intervention to solve a costly problem, with return on the investment based on the degree of success (and cost reduction) achieved by the intervention. Pay for Success (PFS) financing is also referred to as Social Impact Bond (SIB) financing. Despite that name, this structure is not typically an actual “bond financing” as the term is understood in the financial sector.

PFS is designed for situations where an entity, typically a public agency, is stuck in a cycle where it is obligated to direct substantial resources to pay for the high costs of some type of problem and may not have adequate resources for solutions. Often, as an agency or jurisdiction is allocating budget resources, which are always constrained, it is guided by the certainty of its obligation to pay for the consequences of the problem and the certainty of the costs of interventions versus the uncertainty as to when and to what degree a preventive intervention may be effective.

PFS tries to break this cycle by bringing in private investors to fund the intervention. To the extent that the intervention is successful and yields savings, the agency pays the investor for the cost of the intervention plus a return on the investment. Initial PFS contracts were clustered in social services, such as funding interventions to reduce criminal recidivism and early childhood supports to reduce the need for special education,<sup>116</sup> but the model is also now being tested for sustainability-related transactions:

- The District of Columbia in 2016 issued a \$25 million Environmental Impact Bond (EIB), with a PFS design, to fund the construction of green infrastructure to reduce combined sewer overflows into Rock Creek. The District is mandated to substantially reduce the roughly two billion gallons of untreated overflows that

<sup>113</sup> USAID website. Financing Forest Conservation: An Overview of the Tropical Forest Conservation Act

<sup>114</sup> Sheikh, Pervaze A.; Debt-for-Nature Initiatives and the Tropical Forest Conservation Act (TFCA): Status and Implementation; Congressional Research Service; Jul 24, 2018

<sup>115</sup> NatureVest website. Thande, George; Seychelles Preserves Swathes of Marie Territory in Debt-for-Nature Deal; Reuters; Feb 22, 2018. Williams, Tate; Why Conservation Donors Get Behind Debt-For-Nature Deals; Inside Philanthropy; Feb 26, 2018

<sup>116</sup> Archer-Rosenthal, D.; Pay for Success: the First Generation; Nonprofit Finance Fund; Apr 2016

- currently go into DC waterways annually, and a successful green infrastructure program will enable the DC Water Authority to reduce the scope and cost of grey infrastructure tunneling and storage projects currently estimated at \$2.6 billion.<sup>117</sup> Return to investors will depend on the degree to which the green infrastructure successfully meets design expectations and captures rainwater, thereby reducing runoff that is the main source of sewage overflows.<sup>118</sup>
- In 2019, the Atlanta Department of Watershed Management issued a similarly structured \$14 million EIB, funding the construction green infrastructure to reduce storm water runoff and protect water quality.<sup>119</sup>
  - A second sustainability-related PFS structure, called a Forest Resilience Bond (FRB), is related to an agency that is too busy putting out fires, literally, to work on prevention – the US Forest Service, which is “trapped in a vicious cycle of paying for today’s fires by borrowing funds intended to prevent tomorrow’s.”<sup>120</sup> The first FRB, for \$4.6 million, closed in 2018. It is funding forest management services over 15,000 acres in the North Yuba River watershed in Tahoe National Forest designed to reduce burn severity and increase rainwater capture for local water districts. The return to investors is intended to come from savings from reduced fire-fighting costs and from increased revenues from water districts. Initial investors include an insurance company, along with NGOs and foundations. Repayment will come from the Yuba Water Agency and the California Department of Forestry and Fire Protection.<sup>121</sup>

**Conservation Finance** -- Whereas regulatory schemes are typically designed to put a price on pollution, the flip side is creating systems to recognize the economic value of healthy ecosystems in the first place.

Conservation finance is defined as a set of mechanisms for investing in ecosystems to conserve the ecosystems for the long-term.<sup>122</sup> In many instances, this is done within the context of a public/private partnership. The World Wildlife Fund (WWF) has catalogued a series of such mechanisms,<sup>123</sup> including:

- Payments for watershed services, with payments for water use used to maintain and restore water quality and watershed habitat. A locally prominent example is the substantial investments the City of New York, often working with private landowners, has made to maintain clean watersheds for its reservoirs and avoid far larger costs associated with after-the-fact clean up.
- Revenue from tourism and recreation, such as park entry fees and hunting licenses (eco-tourism).

<sup>117</sup> Lisle, J.; DC Water Awarded Grant from Harvard University to Develop Innovative Green Infrastructure Financing Model; DC Water and Sewer Authority website; Mar 12, 2015

<sup>118</sup> Glazier, K.; D.C.'s Social Impact Bond Deal Will Fund Infrastructure; The Bond Buyer; Sept 2, 2016.

Goldman Sachs, DC Water, Calvert Foundation; Fact Sheet: DC Water Environmental Impact Bond; 2016

<sup>119</sup> WFM Staff; Atlanta DWM completes first publicly-issued Environmental Impact Bond; Water Finance & Management; Mar 4, 2019. Please note that, unlike most SIBs, the DC and Atlanta EIB transactions are bond financings as the term is used in the financial sector.

<sup>120</sup> Madsbjerg, S.; Connaker, A.; Fighting Wildfire With Finance; The Rockefeller Foundation website; Oct 15, 2015

<sup>121</sup> Blue Forest Capital & World Resources Institute; Forest Resilience Bond to Help Fund \$4.6 Million Restoration Project to Mitigate Wildfire Risk in Tahoe National Forest; Nov 1, 2018

<sup>122</sup> Huwylar, F. et al.; Making Conservation Finance Investable; Stanford Social Innovation Review; Jan 21, 2014

<sup>123</sup> World Wildlife Fund; Guide to Conservation Finance; 2009

- Bio-prospecting, where a corporation, such as a pharmaceutical company, make payments to be able to search for and extract compounds from the flora of a given region. The payments are used to preserve the biodiversity of the region.
- Micro-finance, where WWF cites informal Village Savings and Loan Associations in Kenya and Tanzania, where members make loans to each other for projects promoting health, education and environmental sustainability.

REDD+ (Reducing Emissions from Deforestation and Forest Degradation) is a prominent framework created under the UN in 2005 and designed to place a monetary value on carbon stored in forests and thereby create incentives for developing countries to protect forest systems. Countries and companies can purchase REDD credits to offset their carbon emissions, with the purchase price going towards forest conservation. To date, most purchases have been essentially grants.<sup>124</sup>

WWF, Credit Suisse and McKinsey have collaborated to create a framework to mobilize private capital to conserve healthy ecosystems and sustainably conserve clean air, fresh water and species diversity.<sup>125</sup>

They estimate an investment need of \$200 to \$300 billion per year over current levels to sustainably conserve the earth's natural capital. Attracting this level of capital – an investor-driven approach to conservation – will require projects that produce long-term cash flows to support both the conservation strategy and a return to investors.

Current conservation finance investment is about \$52 billion per year, 80% of which is from public sources.<sup>126</sup> The roughly \$10 billion per year in private investment is via green commodities, such as sustainable forestry and fisheries, ecotourism, and such mechanisms as carbon offsets and ecosystem fees.

There is investment appetite to meet the need, but the limiting constraint is a lack of investable projects with both conservation benefits and clear risk-return profiles.<sup>127</sup>

Obstacles to the development of conservation business opportunities include:

- No monetary value is placed on the clean air and water produced and bio-diversity supported by undeveloped lands;
- The significant short-term advantages of exploiting natural resources, such as clearing bio-diverse rain forests for the lumber and/or for monoculture agricultural purposes, such as palm oil plantations; and
- The investable opportunities that do exist tend to be small-scale.

WWF et al. identify policy leadership as the key to unlocking conservation finance markets by using regulation to create value in otherwise “non-marketable” conservation benefits (as seen in cap and trade and posited for stormwater credits). “If both conservation and financial benefits are clear and cost-effectively measurable, the associated cash flows have the potential to be scaled up. With scale ... risk can be

<sup>124</sup> NatureVest; EKO; Investing in Conservation; 2014

<sup>125</sup> The paragraphs that follow are a synopsis from Huwyler, et al. (Jan 21, 2014) and Huwyler, et al. (2016)

<sup>126</sup> Since conservation finance is more of a concept than an exact category, there are other well-researched estimates of investment totals that are substantially at variance from the numbers reported by Huwyler, et al. Ecosystem Marketplace, in a study conducted in cooperation with JP Morgan Chase and The Nature Conservancy, reports \$8.2 billion in private investment from 2004 to 2015, plus \$31.7 billion in public investment from 2009 to 2015. Source: Hamrick, K.; State of Private Investment in Conservation 2016: A Landscape Assessment of an Emerging Market; Ecosystem Marketplace; Dec 2016

<sup>127</sup> This point was made repeatedly in #EcoFinanceChat reported in Grady, B. (May 16, 2016)

pooled in a portfolio of projects across countries or across asset types.”<sup>128</sup>

The authors identify three categories of investment:

- Land purchases to conserve ecosystems and preserve capital. The land can presumably be sold at a later date to liquefy the investment, and may well have appreciated in value, creating a positive return.
- Investments in the infrastructure and management of ecosystems to achieve financial returns, which might include lodges for ecotourism; as well as investments in sustainable forestry, agriculture and aquaculture. It could include watershed protection, where the financial return could be payments from the water district whose filtration and purification costs are reduced (as in the NYC example above).
- Investments in ecosystem market and regulatory systems. This, in the first instance, is an investment of political capital to support the creation of regulatory systems, such as cap and trade and offset programs.

The framework cites a continuing need for public and philanthropic investment, particularly as credit enhancement to induce private investment until the risks of this class of investment are better understood.

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