#GSSFI





SUSTAINABLE FINANCE INNOVATION FORUM 2018

KEY TAKEAWAYS

OVERVIEW

Goldman Sachs (GS) hosted our second Sustainable Finance Innovation (SFI) Forum on November 13th 2018. The event convened more than 400 representatives from leading investors, corporates, non-governmental organizations (NGOs) and the public sector alongside GS representatives for a timely conversation on the latest developments and innovations in sustainable finance.

The SFI Forum was held against the backdrop of the US midterm elections, which saw an unprecedented diversity of candidates and a record number of elected women; the rise of the #MeToo movement and mandates for gender diversity, including most recently in California; the release of the Intergovernmental Panel on Climate Change (IPCC) report, which underscored the urgency of climate action; and the Nobel Prize in Economics being awarded to two economists for their work on climate change.

Even though making progress on climate policy continues to be challenging as evidenced by Washington State's rejection of carbon pricing and France's repeal of its fuel tax, many governments are moving ahead compelled not only by the need to manage risks but also the opportunity to drive sustainable economic growth. Accelerating market drivers and ongoing technology innovation are also making sustainability a strategic imperative that is reshaping industries and investments.

The day brought together leading experts to discuss these trends and the role of financial innovation and markets. Topics ranged from the industry transition across energy, mobility and infrastructure; Environmental, Social, Governance (ESG) integration across passive equity, fixed income, private impact investing, and hedge fund activism; to technology innovation and sustainability. In addition, business leaders shared their perspectives on why sustainability is a strategic agenda across the C-suite and the boardroom; NGO representatives discussed policy, politics and corporate partnerships; and investors shared their views on the role of investment in bridging the gender gap.

This white paper provides a summary of key takeaways.

EVENT AGENDA

CEO Fireside Chat

David Solomon, Chief Executive Officer, Goldman Sachs
Moderator: Kyung-Ah Park, Head of Environmental Markets Group, Goldman Sachs

Energy: The Low Carbon Transition

Thomas Brostrøm, President, Ørsted North America
Richard Kauffman, Chairman of Energy and Finance, State of New York
Mark Noyes, President and Chief Executive Officer, Con Edison Clean Energy Businesses
Georgios Papadimitriou, President and Chief Executive Officer, Enel Green Power North America
Moderator: Pooja Goyal, Head of Alternative Energy Investing, Special Situations Group, Goldman Sachs

Mobility: Disruption and Acceleration

Brooks Entwistle, Chief Business Officer, Uber International
Michael Ronen, Managing Partner, Softbank Investment Advisers
Julia Steyn, Vice President, Urban Mobility and Maven, General Motors
Moderator: Scott Lebovitz, Global Head of Energy and Natural Resources, Co-Head of Infrastructure Investment Group, Merchant Banking Division, Goldman Sachs

Mainstreaming ESG: Integration, Investment, and Impact

Rakhi Kumar, Senior Managing Director & Head of ESG Investments & Asset Stewardship, SSGA
Steve Liberatore, Managing Director and Responsible Fixed Income PM, TIAA Investments
Ken Mehlman, Global Head of Public Affairs, Co-Head of KKR Global Impact
Moderator: Eric Lane, Global Co-Head of Consumer and Investment Management Division, Goldman Sachs

Investor: Rise of the ESG Activist*

Jeffrey Ubben, Founder and Chief Executive Officer, ValueAct Capital
Moderator: Gregg Lemkau, Co-Head of Investment Banking Division, Goldman Sachs

NGOs: Policy, Politics and Partnerships

Fred Krupp, President, Environmental Defense Fund
Mindy S. Lubber, Chief Executive Officer and President, Ceres
Moderator: Steve Strongin, Head of Global Investment Research, Goldman Sachs

Bridging the Finance Divide: Gender

Jenny Abramson, Founder and Managing Partner, Rethink Impact
Linda Rottenberg, Co-Founder and Chief Executive Officer, Endeavor Global
Rachel Vogelstein, Douglas Dillon Senior Fellow; Director, Women & Foreign Policy Program, Council on Foreign Relations
Moderator: Dina Powell, Managing Director, Investment Banking Division, Goldman Sachs

The Board Perspective: ESG

Ellen Kullman, Former Chairman and Chief Executive Officer, DuPont (Board of Directors of Amgen, Dell Technologies, Goldman Sachs, United Technologies)
Moderator: Heather Miner, Global Head of Investor Relations, Goldman Sachs

Infrastructure: Pathway to Sustainable Development

Leo Argiris, Chief Operating Officer, Arup Americas
Edwin Cass, Global Head of Real Assets, Canada Pension Plan Investment Board
Brian Sullivan, Senior Vice President and Treasurer, Veolia North America
Moderator: Rich Friedman, Global Head of Merchant Banking Division, Goldman Sachs

The CFO Perspective: Sustainable Finance*

Jon R. Moeller, Vice Chairman, Chief Operating Officer, and Chief Financial Officer, Procter & Gamble
Moderator: Alison Mass, Global Head of Financial and Strategic Investors Group, Investment Banking Division, Goldman Sachs

Tech & Innovation: The Next Frontier

Ewald Hesse, Chief Executive Officer, Grid Singularity
Nancy Pfund, Founder and Managing Partner, DBL Partners
James Rogers, Founder and Chief Executive Officer, Apeel Sciences
Moderator: Marty Chavez, Vice Chairman and Global Co-Head of Securities Division, Goldman Sachs

Industrial Revolution 4.0: Cleaner, Smarter, Better

Virtual & Augmented Reality: Heather Bellini, Managing Director, GS Global Investment Research
5G and IoT: Rod Hall, Managing Director, GS Global Investment Research
Ag Tech Revolution: Jerry Revich, Vice President, GS Global Investment Research
Moderator: Allison Nathan, Managing Director, GS Global Investment Research

*These sessions were off the record and are not summarized in this report

CEO FIRESIDE CHAT

From left to right: **David Solomon**, Chief Executive Officer, Goldman Sachs; **Kyung-Ah Park**, Head of Environmental Markets Group, Goldman Sachs

David Solomon, opened the event with a fireside chat that touched upon a range of topics – from his transition as the new CEO to perspectives on the recent US mid-term election and the overall market. On the latter, a key takeaway from clients is that there is confidence in the underlying US economy, but with greater market volatility and a more fragile geopolitical environment.

A key part of the discussion was on what sustainability means for Goldman Sachs and why it is core to the firm's strategy and to generating long-term sustainable returns. David said, "There aren't a lot of companies that make it to 150 years, let alone under the same name. So as CEO, I'm very focused on how to position our firm and ensure leadership for the next 150 years. You have to think about what matters not only in the short- and medium-term, but over the long-term -- certainly for our company and our clients, but also for our people, our community and our environment. Integrating sustainability across our businesses enables us, over the long-term, to deliver sustainable outstanding returns for our shareholders."

He underscored how Goldman Sachs is committed to leveraging its role as a global financial institution and to the formation of capital for clients to drive positive impact. The firm is mobilizing $150 billion in clean energy financing and investment by 2025 and currently manages $15 billion in dedicated ESG and impact investments and another $75 billion with an ESG overlay. In addition, he emphasized the importance of sustainability to our people, noting that 70% of the workforce is millennials, and a key part of attracting and retaining the best people includes creating a diverse and inclusive environment. Diversity, not only on gender but more broadly, is a strategic imperative that fosters creativity and innovation. Ultimately, sustainability is a strategic imperative and the firm is committed to leveraging our people, capital and ideas to more holistically serve our clients and stakeholders.

SUSTAINABILITY MILESTONES AND TARGETS

$150Bn	Clean energy financing and investment target by 2025
$15Bn*	Dedicated ESG and Impact assets under supervision
$17Bn*	Weather-related catastrophe bonds
$7Bn*	Investments in underserved communities
$500Mn	Commitment to invest in women led businesses
100%	Renewable power for our global needs by 2020
Zero	Net carbon emissions for our global footprint since 2015
50%	Women representation in our incoming analyst class by 2021

* As of 2017 year-end, except ESG and Impact assets under supervision which is as of September 2018

ENERGY

The Low Carbon Transition

> *… just in the way that Edison thought the electricity system was going to be about lighting, but it turned out to be a lot more, the question is, are increasingly distributed energy solutions around us going to give rise to a whole new opportunity of value-added services for electrons… certainly electric transportation, but the question is are we going to be having home healthcare, is air-conditioning going to be a service, home automation… that's a kind of X factor and an accelerant for the new energy system.*
>
> **RICHARD KAUFFMAN, CHAIRMAN OF ENERGY AND FINANCE, STATE OF NEW YORK**

The energy sector is being disrupted at an unprecedented scale by technology innovation, changes in consumption patterns, supply dynamics and policy shifts. With continued cost declines, renewables have become the largest and fastest driver of growth in the energy sector. These cost declines and the resulting growth opportunities are driving companies to fundamentally reposition themselves - certainly in the utility sector but also among oil and gas companies. For example, incumbent oil and gas companies are increasing investments in renewable energy, some are acquiring electric utilities and many are exploring opportunities in EV infrastructure.

Given the pace of disruption, diversification is a big theme across business lines, technologies, and geographies. Through a standalone clean energy business, which is non-regulated, Con Edison is moving beyond its traditional service territory in New York by investing in markets across the US and diversifying regulatory regimes and technologies. Similarly, Enel is growing across geographies globally, not only in the US, but also in Latin America and other emerging markets. In the case of Ørsted, which has repositioned itself from an oil and gas producer to a leader in offshore wind, the company is both diversifying from an European to a more global footprint and looking at a more diversified technology portfolio of solar, battery storage and land-based wind as per their recent acquisition of US onshore wind developer, Lincoln Clean Energy.

Diversification is also a theme across financing as companies innovate and tap into a variety of efficient capital sources. Developers are financing renewable projects through balance sheet capital and some leverage, but once projects are built, they are recycling capital by bringing in infrastructure and other financial investors. In addition, companies are tapping into green bonds at the corporate and project level. The role of strategic venture capital is also becoming important as large firms like Enel have established internal innovation arms to invest in niche but potentially large disruptive growth technologies that align with the market shift to customer-oriented decentralization. As the market moves towards a decentralized and diverse set of solutions, financing can become more challenging as there are multiple revenue streams from different markets, thus different rates and credits, and different technologies. That's where specialized public finance entities such as the NY Green Bank can play a meaningful role in providing credit support. The bank has deployed over $520 million of credit to date and serves as a financial incubator for projects until private capital can step in.

Policy innovation continues to be important beyond its role in attracting financing. In the US, state policies have a significant influence and many states are moving up their renewable

From left to right: *Moderator:* **Pooja Goyal**, Head of Alternative Energy Investing, Special Situations Group, Goldman Sachs; **Georgios Papadimitriou**, President & Chief Executive Officer, Enel Green Power NA; **Thomas Brostrøm**, President, Ørsted North America; **Mark Noyes**, President & Chief Executive Officer, Con Edison Clean Energy Businesses; **Richard Kauffman**, Chairman of Energy and Finance, State of New York

NEW YORK REFORMING THE ENERGY VISION

Reforming the Energy Vision (REV) is a comprehensive energy strategy for New York to ensure a clean, more resilient and affordable energy system. An example of a program under REV is Con Edison's 'Brooklyn Queens Demand Management Program' where Con Ed met rising demand in the area by deploying customer- and utility-side demand response as well the deployment of storage, solar and energy efficiency solutions instead of building additional power substations.

Source: rev.ny.gov

portfolio standards (e.g., NY 50% by 2030). However, policy needs to take a market-based approach that doesn't simply bolt renewables on to the existing grid. The current electric system in the US is not only energy inefficient but is also financially inefficient with capacity utilization of ~50%. A more integrated approach is necessary, one that accommodates not only renewables but also storage, electrification of transportation and heating, while being resilient, affordable, and responsive to shifting customer preferences. Storage is particularly critical for stability and reliability. Another example of policy innovation that creates a market is in offshore wind, where states like New York are providing a larger economic prize (2.4GW by 2030) rather than taking a singular project approach.

States can also help lower soft costs by reducing customer acquisition costs and permitting. Ultimately, it will take a holistic systems approach to ensure that all the key actors in the energy industry – developers, regulators, customers – are well positioned for the clean energy transition.

MOBILITY

Disruption and Acceleration

> *We do believe that there's now an irreversible trend towards electrification of cars.*
>
> **MICHAEL RONEN, MANAGING PARTNER, SOFTBANK INVESTMENT ADVISERS**

Transportation is another sector that is seeing massive transformation. The industry is no longer simply about moving from point-to-point and ownership of vehicles, but increasingly an integrated smart mobility system that provides Mobility as a Service (MaaS). While uncertainty abounds on regulation and potential societal spillovers, such as impacts to jobs and traffic congestion, what is clear is that the disruption is creating a large market opportunity, establishing new ecosystems, and catalyzing new investment verticals.

Disruption in the transportation market is reaching a level of maturity akin to the communications sector two decades ago, but the addressable market size in transportation is even larger. The combination of rapid growth in ridesharing, electrification of vehicles, and ultimately, autonomous vehicles is providing tech-growth investors like SoftBank's Vision Fund with a sizeable investment thesis. Meanwhile, traditional OEMs such as General Motors (GM) are disrupting from within. For example, GM is fundamentally rethinking the idea of ownership through specialized businesses like Maven, which focus on peer-to-peer car sharing and urban mobility solutions. Maven has built a mobile-first software platform that connects the two sides of the marketplace, providing access to vehicles for people who don't want ownership and supplying these vehicles either through Maven or through people who own GM vehicles. These opportunities are internally redefining the value proposition for a century-old incumbent like GM. In a short period of time, ride sharing companies like Uber have gone from providing passenger mobility, to creating an entire platform for moving people, food and goods, covering a range of services from healthcare transport to food delivery. To make this work, operational excellence, technology, and scale are key. The geographic opportunities are also expanding with high growth markets across Asia, Latin America and EMEA.

Each of these markets requires different local approaches, for example Uber is partnering with companies across the world and across its business platforms – the collaboration with Tokyo taxi companies being one example. Such firms have benefited from cross-fertilization of learning across markets, whether it is on partnership models or safety practices.

Given the scale of disruption and uncertainty of how the transition will ultimately play out, both incumbents and new entrants are establishing an interconnected and complex ecosystem. Companies like GM are not only building solutions organically, but also making strategic acquisitions such as Cruise, which accelerated its autonomous vehicle strategy. Some investors, like SoftBank, are deploying funds across the entire ecosystem as the end market is growing exponentially. They are looking to capture the value early by taking risks upfront and investing heavily in transformative technologies. Due to the intertwined web of relationships, this often means working in collaboration with other market participants. For example, SoftBank is an investor in several ridesharing companies (such as Uber, Ola and Grab) as well as GM's Cruise. GM is working with Uber and other gig economy rider platforms to help solve the ownership problem. For such investors, this means supporting working relationships between portfolio companies and enabling greater access to markets in a shorter timeframe. For companies like Uber, developing relationships with local and national governments, as well as with individual drivers is a must.

With many new models emerging in the mobility ecosystem, there are growth opportunities across expansive verticals. Electrification creates broader opportunities in fast charging infrastructure and battery technologies. Much like what Amazon brought to the retail marketplace,

From left to right: *Moderator:* **Scott Lebovitz**, Global Head of Energy and Natural Resources, Co-Head of Infrastructure Investment Group, Merchant Banking Division, Goldman Sachs; **Michael Ronen**, Managing Partner, Softbank Investment Advisers; **Julia Steyn**, Vice President, Urban Mobility and Maven, General Motors; **Brooks Entwistle**, Chief Business Officer, Uber International

DID YOU KNOW?

Electric vehicles are taking off

55%
New light vehicle sales by 2040 (vs. less than 2% today)

33%
Global fleet by 2040

Source: Goldman Sachs Global Investment Research

ride sharing is creating thematic investment opportunities in transportation platforms that enable last mile delivery. Automation will eventually become the reality, creating another big investment opportunity. In addition, opportunities also include integrating existing transit infrastructure to work cohesively with communication services like 5G and big data.

It's difficult to predict the pace of change and the transition curves, but as these technologies mature, there will be an evolution from venture investing to more traditional private equity growth and infrastructure investors perhaps within the next decade.

MAINSTREAMING ESG

Integration, Investment and Impact

> *If you view ESG the right way, which is the way to create double bottom-line value or reduced risk using the materiality lens, our experience is there's tremendous financial benefit and investors absolutely want to see that.*
>
> **KEN MEHLMAN, GLOBAL HEAD OF PUBLIC AFFAIRS, CO-HEAD OF KKR GLOBAL IMPACT**

Globally, more than $23 trillion[1] of professionally managed assets are integrating ESG, one of the fastest growing investment trends. Reflective of this, not only large asset managers with public equity and fixed income strategies, but also increasingly alternative investors such as private equity and hedge funds are employing ESG investment strategies. In addition to integration, there has been a significant rise in investor engagement as well as shareholder proposals and proxy voting on environmental and social (E&S) issues. Though overall approaches are diverse, there is growing consensus that integrating material ESG factors correlates to long-term financial returns and can help generate alpha.

ESG integration varies across different investor types. For passive public equity investors, whose strategies track indices, ESG factors are viewed as "low probability, but high impact factors" which influence long-term financial return. Passive investors are integrating ESG as part of their fiduciary responsibility and ensuring that these factors are incorporated into the long-term strategy. Some of these investors are also actively engaging with companies and influencing positive change. For example, State Street Global Advisors (SSGA) is calling on companies in five markets to add at least one woman to their boards given the research that diverse boards have better performance outcomes. As a result of the engagement, over the course of a year, there's been an 8% reduction in the number of companies in the Russell 3000 that do not have women on their boards. SSGA views stewardship as helping drive material ESG issues into the core strategy of companies in a systematic manner.

In the private equity market, investors are seeking opportunities for enhanced return by addressing E&S themes that have secular tailwinds both into how they invest and create value from their investments. KKR for the past decade has invested $4.8 billion in companies where the core products and services address critical societal challenges. This includes companies focused on food safety, education, workforce development and clean water in countries like China, where the rising middle class are increasingly environmental and health focused. These investments provide private equity type returns, but tend to be smaller in size. As such, a dedicated global impact fund that is focused on lower middle market investments provides a more focused strategy to invest in these themes. Using ESG as a lens helps address material operational issues that either mitigate risk or create a double bottom line. For example, KKR's partnership with the Environmental Defense Fund to optimize portfolio companies' environmental footprint has identified $1.25 billion of value across an initial set of 25 companies, and today that effort is at 58 companies.

Fixed income investors are embracing ESG as a way to better manage risk, which can impact long-term credit performance, and to facilitate the allocation of debt capital toward sustainable investments. For example, TIAA, in its Responsible Fixed Income strategies looks to deliver the double bottom line of positive total return and measureable E&S impact across a portfolio that includes investing in both leading ESG issuers and direct impact investments. TIAA invested in the first blue bond for The Seychelles that was directed

1 Global Sustainable Investment Review, US SIF 2016

From left to right: *Moderator:* **Eric Lane**, Global Co-Head of Consumer and Investment Management Division, Goldman Sachs; **Rakhi Kumar**, Senior Managing Director & Head of ESG Investments & Asset Stewardship, SSGA; **Ken Mehlman**, Global Head of Public Affairs, Co-Head of KKR Global Impact; **Steve Liberatore**, Managing Director and Responsible Fixed Income PM, TIAA Investments

RISE OF ESG ENGAGEMENT

The top three asset management firms, who collectively account for almost 70% of passive investing, have increased their shareholder engagement on environmental and social issues by more than 35% in the past year.

Source: Company-specific proxy statements and reports

toward ocean conservation and revitalization of the marine based economy. Given most issuers tap into the fixed income market more often than the equity market, and issuers can range from not only corporates but also their subsidiaries, governments, and municipalities, there is a much broader set of investment opportunities.

Despite progress on ESG data, quality needs to be improved as there is currently little consistency between data providers. Investors are working to provide some consistency and transparency around the data. SSGA and KKR both leverage the Sustainable Accounting Standards Board (SASB) framework. KKR also uses the UN Sustainable Development Goals (SDGs) as a framework for its Impact Fund as well as greenhouse gas emissions measurements. For fixed income providers who invest in thematic bonds, the ability to directly tie proceeds to specific outcomes is easier. In the case of TIAA, impact measurement is focused on four key areas - affordable housing, community and economic development, renewable energy and climate change, and natural resources - and is shared with investors through an annual Impact Report.

Though there are different approaches to ESG data and investment strategies, it is clear that the financial case for ESG integration is compelling. The more investors can demonstrate the financial case for ESG investing, the more capital can be deployed to ESG leaders and sustainable impact opportunities, thus creating a virtuous cycle.

NGOs

Policy, Politics and Partnerships

> *We represent 160 institutional investors with $25 trillion in assets under management, and they are saying that through shareholder advocacy, through engagement, they want to see sustainability integrated from the boardroom to the global supply chain.*
>
> **MINDY LUBBER, CHIEF EXECUTIVE OFFICER AND PRESIDENT, CERES**

The United Nations Intergovernmental Panel on Climate Change report, released in October 2018, underscored the urgency of climate action. According to the report, there is a small window of opportunity to take unprecedented action to limit global warming to 1.5 degree Celsius and avoid the catastrophic consequences of climate change. In order to do this, participation from a broad set of representatives across society is needed, and environmental organizations are increasingly partnering with companies and investors to effect change. Large companies are integrating sustainability and establishing more ambitious climate and clean energy goals. Pressure from investors and the non-profit community, changing preferences from employees and consumers, and greater transparency from social media is increasing risk. Businesses in nearly every sector are starting to recognize climate risk as material and integrating sustainability across their business strategy, operations and global supply chain – from the boardroom to the CFO's office, and in some cases, starting to tie ESG performance to executive compensation.

With the help of sustainability organizations like Ceres, investors are stepping up their engagement with companies and increasingly evaluating climate risk in the context of their portfolios. For example, some 315 investors with $32 trillion of assets under management are engaging with the world's largest corporate greenhouse gas emitters through the Climate Action 100+.

As part of this engagement, investors are calling on companies to reduce emissions, improve governance, and strengthen their climate-related financial disclosure. Fundamentally, sustainability issues are relevant across all industries and can present material financial risks and opportunities that need to be addressed across the market and investment portfolios.

Measurement and transparency are pre-requisites for raising awareness, advocacy, and action. For example, the Environmental Defense Fund (EDF) is measuring ground level air pollution that is making people sick, thereby driving demand for clean energy. Technology is enabling the creation of high resolution air quality maps, and organizations are partnering with companies on data science to build new technological platforms. EDF is preparing to launch a new satellite to map and measure methane emissions across all major oil and gas regions. Methane causes more than a quarter of the global warming while being relatively cost effective to mitigate. EDF estimates that a 75 percent reduction from the oil and gas industry will be equivalent to closing down more than half of the world's coal-fired power plants in the next 20 years in terms of the impact on temperature rise.

On the policy front, the current US political landscape has made environmental issues and particularly climate change, highly partisan. Changing the narrative to local impacts, such as

From left to right: *Moderator:* **Steve Strongin**, Head of Global Investment Research, Goldman Sachs; **Fred Krupp**, President, Environmental Defense Fund; **Mindy Lubber**, Chief Executive Officer and President, Ceres

> *What I saw in the (US) midterms is more politicians putting more money into environmental messages and climate messages than I've ever seen.*
>
> **FRED KRUPP, PRESIDENT, ENVIRONMENTAL DEFENSE FUND**

children's asthma and health issues and costs of wildfire, could enable greater awareness and progress. According to EDF, the recent US mid-term elections saw a higher number of politicians putting money behind climate messaging, particularly in states including Florida and California. Across the country, the elections saw 1,400 candidates and ten governors pledging that if elected, they would support clean energy. Despite the growing impetus at the state and local level, galvanizing federal support remains important in leveling the playing field and internalizing the carbon externality into our economic system. That is the central thesis of the recent Nobel Prize for Economics, which was awarded for research on carbon pricing as a tool to address climate change. Transforming the economy and addressing climate change will require the confluence of all actors and action at the local, federal and global level.

Bridging the Finance Divide

Gender

> *In the 21st century, no country can get ahead if half of its population is left behind. This is true in peace and security, this is true in development and it is certainly true with respect to women and economic growth.*
>
> **RACHEL VOGELSTEIN, DOUGLAS DILLON SENIOR FELLOW; DIRECTOR OF WOMEN AND FOREIGN POLICY PROGRAM, COUNCIL ON FOREIGN RELATIONS**

Investing in women is not only about social justice or equitable public policy, but also good business and smart economics. A growing body of evidence suggests that gender diversity drives performance, both in terms of bottom line financial returns as well as soft targets like attendance rates and participation in social programs. For example, a study by the Peterson Institute found that the presence of women in corporate leadership positions is correlated with positive performance in terms of profitability and takeover defense.[1] Similarly, at the global level, economies can gain $28 trillion by closing the gap in female workplace participation.[2] Despite the data and growing business and public support for gender diversity, progress has been slow as evidenced by the ~2% of venture capital dollars that went to female founders last year.[3]

Addressing the challenge of access to capital requires building an ecosystem of female entrepreneurs and founders that not only creates a role model system ("she can do it, I can do it"), but also encourages women to re-invest in their communities, generating a multiplier effect. This effect is particularly impactful given 90% of women's income is recycled back into the community. The value proposition for investing in women today is even stronger because women entrepreneurs are increasingly investing in tech enabled platforms across healthcare and education, where there is high growth. In addition, data supports the outperformance thesis for diverse teams. For example, First Round Capital studied their investments and found that female founders had 63% better financial returns compared to all-male founding teams. Higher number of women led businesses also drives innovation in the economy. Fostering a network of female leaders and investing in women have positive spillover effects not only for investors but across markets, communities and society at large.

Women economic empowerment and gender diversity is an area where there is bipartisan support. Building on the Obama administration's partnership between OPIC, IFC and Goldman Sachs' *10,000 Women* program, the current administration has launched an innovative public-private partnership (P3) called OPIC 2X (see next page). These types of P3s not only facilitate capital access but also help address structural issues and accelerate progress on women's participation around the world. More broadly, governments play a critical role in removing some of the legal and social barriers, such as property rights, spousal consent, jobs that restrict female participation. The private sector also has an important role particularly in providing access to financial services and capital. This access to capital is important, but women are sometimes precluded from receiving investment due to a lack of track record, creating a vicious cycle. Institutional investors and big companies need to signal support, a willingness to look at the data, and take initial risk on women.

1 Is Gender Diversity Profitable? Evidence from a Global Survey, Peterson Institute of International Economics, February 2016
2 Growing Economies Through Gender Parity, Council on Foreign Relations, October 2018
3 Data from PitchBook 2017

From left to right: *Moderator:* **Dina Powell**, Managing Director, Investment Banking Division, Goldman Sachs; **Linda Rottenberg**, Co-Founder and Chief Executive Officer, Endeavor Global; **Jenny Abramson**, Founder and Managing Partner, Rethink Impact; **Rachel Vogelstein**, Douglas Dillon Senior Fellow Director, Women & Foreign Policy Program, Council on Foreign Relations

> *At the end of the day, performance, regardless of political party, is what drives changes in capital. If we, as a society, can move mainstream dollars because they follow what is a clear performance… in gender… in impact businesses… we can drive growth.*
>
> **JENNY ABRAMSON, FOUNDER AND MANAGING PARTNER, RETHINK IMPACT**

Millennials will inherit up to $59 trillion by 2060[4] and they have a strong inclination to invest with impact and invest in diversity. Add to that the fact that some two-thirds of the wealth in the US will be controlled by women by 2030 and it's clear that the market opportunity is well-positioned to grow. The key is to get more women to the table, either in politics or business, track progress and use the evidence to bolster the case for investing in women.

INVESTING IN WOMEN – EXAMPLES

*As part of the new **2X Womens' Initiative**, Overseas Private Investment Corporation (OPIC) will directly invest $350 million and lever up to $1 billion in financing to support lending to women-owned businesses, female entrepreneurs, as well as women-owned and women-led emerging market private equity funds. OPIC has partnered with banks, microfinance institutions and traditional PE funds to meet the goals of this initiative.*

*Earlier this year, Goldman Sachs announced **Launch With GS**, a new initiative that will invest $500 million of the firm's and clients' capital in private, late-stage, women-founded, women-owned or women-led companies. This includes directly funding companies as well as seeding women investment managers who are starting their own funds.*

4 Center on Wealth and Philanthropy, Boston College, 2014

THE BOARD PERSPECTIVE

ESG

From left to right: *Moderator:* **Heather Miner**, Global Head of Investor Relations, Goldman Sachs; **Ellen Kullman**, Former Chairman and CEO, DuPont; Board of Directors of Goldman Sachs, Amgen, Dell Technologies, United Technologies

The focus on ESG topics has expanded from corporate governance to include the breadth of environmental and social issues. There are more expectations of companies than ever before, driven by increased shareholder engagement on material ESG issues and what companies are doing for the long-term as well as from growing reputational issues. As companies address the growing importance of ESG, the role of the board in providing oversight, asking the right questions, and ensuring the appropriate process and procedures are in place is becoming critical. Ellen Kullman shared her thoughts on how sustainability has evolved to be part of core business strategy as well as the ways in which boards are responding to ESG issues.

While every company has a different set of issues it considers, leading management teams are thinking about societal impact through the core business and risk management processes. Boards are not only increasingly discussing companies' ESG and related reputational issues across risk, audit, compensation, and public responsibility committees, but are also reviewing their own performance and structures in order to enhance accountability. In doing so, the key question that boards are looking to answer is whether the company has the right processes and procedures for dealing with the myriad of ESG issues that are coming up, and whether the board is getting the necessary information.

As sustainability has evolved to encompass issues beyond just operational impact, there is the recognition that a company's sustainability strategy must speak to several key stakeholders – shareholders, employees, customers, and communities. Equally important is evaluating the success of any sustainability strategy and that requires goal setting and a commitment to transparency. Companies that have robust mechanisms to establish goals and measure their performance on material ESG issues – through boards and internal processes – are well positioned for long term, sustainable growth.

ON DIVERSITY

"In my experience, I have found that diverse teams make better decisions… more holistic as to how they look at a problem. …if you have an inclusive work environment, people are going to be comfortable at really looking at the issues, talking about the elephant in the room, and making sure that the decisions and that the process comes out in the right place. So boards are very concerned about that because at the end of the day, that is what shareholders expect of us."

The Paradigm for Parity® movement, co-chaired by Ellen Kullman, is a coalition of business leaders dedicated to addressing the corporate leadership gender gap. The goal is to achieve full gender parity by 2030, with a near-term goal of women holding at least 30% of senior roles.

INFRASTRUCTURE

Pathway to Sustainable Development

> *Lots of people viewed infrastructure as a bond like substitute, but it's not anymore. Now you're getting into development pipelines, you're getting into merchant power at the backend, you're getting into intermediation by new technologies, and you're getting into a lot more operating risk.*
>
> **EDWIN CASS, GLOBAL HEAD OF REAL ASSETS, CANADA PENSION PLAN INVESTMENT BOARD (CPPIB)**

Global demand for new infrastructure is estimated to exceed $90 trillion through 2030[1], almost double the current $50 trillion value of the world's existing stock. Rapid urbanization coupled with growing climate risk is increasing demand for energy and water services while stressing existing infrastructure. The scale of infrastructure spending required, coupled with widespread public-sector fiscal constraints, means that private finance is increasingly important in meeting these needs. Shifting capital to sustainable infrastructure presents a challenge, but also a large opportunity, particularly for investors who are willing to think more expansively, beyond traditional infrastructure, to leverage technology innovations and take a systems approach.

Infrastructure is expanding beyond singular projects to an integrated approach that increases efficiency, resiliency and sustainability. Given the rapidly improving economics, the investment thesis for renewable energy infrastructure is compelling, but also projects that take a closed loop approach, such as by combining traditional water and energy services with waste management, are growing. For example, Veolia is recycling waste water for manufacturing reuse across the US and globally, including its operations in Durban, South Africa where it recycles 98% of the city's waste water. Additionally, Veolia, both within its own investment portfolio and in partnership with infrastructure fund investors, is leveraging combined heat and power (CHP) infrastructure, including in the central business district of Boston and the biotech corridor in Cambridge Massachusetts, through 'green steam projects' and investments which eliminate thermal discharge into the river and significantly reduce greenhouse gas emissions. According to Arup, in developed markets, where there are fewer greenfield opportunities, better utilization of existing infrastructure and improved resiliency present opportunities. Upgrades of buildings, transit systems, and water and energy facilities can be carried out in a way that incorporates 5G and big data, creating a network of inter-connected assets. Transferring infrastructure operations from municipalities or industrial customers, where it is non-core, to operators where it is core, helps improve utilization and risk transfer, while bringing in much needed investment for capital improvements and enhancements.

Different sources of capital are chasing these opportunities and blending their traditional investment thesis, with PE firms launching infrastructure funds and infrastructure funds moving up the risk curve. Given the lack of attractive yield, growing competition, and a broadening set of solutions, infrastructure investing is no longer confined to long-term cash flows and low risk that have traditionally defined the asset class. For example, leading infrastructure investors are getting into project development, merchant power, and intermediation of new technologies, and are taking greater operating risk. In some cases, they are also partnering with strategic developers and looking at greenfield projects. Investors are also tapping into different pools of capital. For example, earlier this year, CPPIB

1 New Climate Economy Report 2014

From left to right: *Moderator:* **Rich Friedman**, Global Head of Merchant Banking Division, Goldman Sachs; **Edwin Cass**, Global Head of Real Assets, Canada Pension Plan Investment Board; **Brian Sullivan**, Senior Vice President and Treasurer, Veolia North America; **Leo Argiris**, Chief Operating Officer, Arup Americas

became the first pension fund to issue a green bond, expanding the funding base and raising visibility for its investments in sustainable infrastructure. Operators like Veolia have developed innovation arms to invest in technology solutions that can be applied across its waste, water and energy businesses. In the US, traditional tax exempt bonds and federal programs such as the Water Infrastructure Finance and Innovation Act (WIFIA), similar to the TIFIA programs in place for transportation, remain important in facilitating private capital flow.

Despite the urgent need and the deep capital base, getting infrastructure projects off the ground is still challenging. Focusing on mega projects requires building consensus across many decision-makers and the political will to partner with the private sector. Taking a systems approach across a series of smaller interconnected projects can help drive better and more efficient development of projects particularly in the US where decision-making is largely happening at the local level. The role of federal policy and national governments is important in emerging markets like India, where investors like CPPIB see larger opportunity sets in areas such as renewable energy given the government's 175GW renewable target. Integration of ESG risks is also instrumental in building resiliency and safety in light of climate change induced disasters. The increased focus on ESG is driving the development of a new emerging market for structures, similar to catastrophe bonds, focused on integrating resiliency through improvements to the underlying infrastructure, which in turn enables better pricing on financing and insurance.

TECHNOLOGY & INNOVATION

The Next Frontier

> *There is never a tradeoff in any sense of the word. Infusing your investment approach with attention to the social, environmental and economic implications can actually build better companies.*
>
> **NANCY PFUND, FOUNDER AND MANAGING PARTNER, DBL PARTNERS**

We are living in a time of unprecedented technological innovation in scope, pace and breadth. The rate of adoption is providing opportunity to transform entire value chains and industry sectors. Markets are seeing different approaches to capital raising – from public-private partnerships to collaboration between incumbents and start-ups, as well as venture and strategic investments.

With technology providing an opportunity to deliver positive environmental and social impacts while capturing market based returns, impact investors like DBL Partners are looking to capture the double bottom line by investing in start-ups that address sustainability issues. The value proposition is particularly significant because it is not just the communication and computing sectors, which have already seen and continue to see radical innovation, but also traditional sectors like electricity and agriculture, which have largely used the same production and delivery systems that existed a generation ago, that are starting to see massive innovation.

With the majority of current global electricity markets built on excel based ledger platforms, energy is a sector that is prime for disruptive innovation. Start-ups like Grid Singularity are leveraging blockchain technology to create token-based open source code, which can exchange and authenticate data faster and more securely to clear and balance electricity market transactions. As part of the effort, Grid Singularity partnered with the Rocky Mountain Institute to establish the Energy Web Foundation, now the largest energy blockchain consortium. In creating a common language for blockchain based electricity transactions, the use of Grid Singularity's solution within the consortium allows smaller companies to participate and distributed markets to scale.

Similarly, technology is helping to address the food challenge, wherein one in nine people on the planet currently go hungry. Start-ups like Apeel Sciences are increasingly partnering with major retailers to tackle food waste from perishable products. The issue is less of a production problem, but more a distribution and storage problem. By coating fruits and vegetables with a plant-derived layer to slow down oxidation, Apeel is building an optimized micro-climate for each piece of produce, increasing the shelf-life of perishable foods by at least two times. Applying some of these innovative technologies to agriculture has broader impacts, given 30% of carbon emissions come from food and agriculture, and the sector employs 40% of the global population.

New companies are tapping into different funding sources at various points in their growth trajectory. Mainstream venture investors are willing to take the market risk but usually not the technology risk, while foundations who are mission oriented are willing to take a bet on technologies

From left to right: *Moderator:* **Marty Chavez**, Vice Chairman and Global Co-Head of Securities Division, Goldman Sachs; **James Rogers**, Founder and Chief Executive Officer, Apeel Sciences; **Nancy Pfund**, Founder and Managing Partner, DBL Partners; **Ewald Hesse**, Chief Executive Officer, Grid Singularity

> **WHAT IS THE TECHNOLOGY THAT WILL BE THE MOST TRANSFORMATIONAL?**
>
> *Technology inspired by nature. … we are now at a point in human history where we have the ability to look into the natural world and identify the building blocks which nature has been using… and we can identify those materials and take them from the natural world and use them to create solutions… so we can be assured that we're not going to cause any of the negative externalities that we have been plagued by…*
>
> **JAMES ROGERS, FOUNDER AND CEO, APEEL SCIENCES**

that have the potential to address large environmental and social issues. In the case of Apeel, the Bill and Melinda Gates Foundation took the initial risk, which helped bring in angel investors, and eventually more established venture investors including Andreessen Horowitz, DBL, and Viking to help with additional capital raises. Through the funding cycle, the various partners have provided tremendous market knowledge and management experience. There is also an increase in participation from large companies making venture capital type investments. Traditional venture firms like DBL view strategic corporates as collaborators rather than competitors, helping with commercialization and providing demand visibility, as well as having deep pockets.

This technology revolution and the capital deployed to scale the technologies, when harnessed appropriately, has the potential to drive a vastly more sustainable future – one that is cleaner, smarter and more efficient and one that also democratizes and expands access to the benefits of innovation across both traditional and historically underserved customer segments.

INDUSTRIAL REVOLUTION 4.0

Delivering sustainable solutions

We are in the early innings of the fourth industrial revolution where the convergence of technologies like Augmented Reality (AR) and Virtual Reality (VR), 5G and the Internet of Things (IoT) will have a transformative impact on our industries, cities and the homes we live in.

Extended Reality (ER) is a technology platform that encapsulates both VR and AR. The applications are broad and multifaceted, and go far beyond the immediate gaming industry. For example, industries such as healthcare, education, manufacturing, and even philanthropy are seeing early applications. ER is starting to enable doctors to get trained more effectively by using a surgeon's field of view in real time. VR is reducing the need to travel for meetings, and changing how we raise empathy for charities by making people feel part of the story. ER is also facilitating broader access to education and healthcare services for people in remote parts of the world. Over the next several years, we are going to see the technology start to more expansively and positively impact people's lives.

IoT is helping deploy sensors for data networks that enable greater precision and efficiency across industry sectors. An area of rapid innovation in sensor development is optical solutions. This technology can be used for spectrometry on phones to point at any material and tell the form factor of the product. This type of technology can be deployed to provide radical transparency and detect the composition of drugs and food. If leveraged to track the ripeness of a fruit there will be significant cost savings and waste reduction in the almost 30% of perishable crops that never make it to the table. High speed broadband connections like 5G are also democratizing access to data and the internet, especially in rural areas, creating opportunities for education, better jobs, and resources for local businesses. More broadly, new technologies like autonomous vehicles, drones delivering packages, and other automated services can access high speed broadband connection and large amount of data to deliver services that are optimized.

"AgTech" or "precision farming" entails using a range of software and hardware to mass customize how we farm every acre of land, driving increasing productivity and crop yields, as well as promoting sustainable production. As an example, conventional farming today utilizes 40,000 pound tractors that compact soils and result in poor nutrient retention. With a smaller fleet of self-driving tractors, inputs can be applied with greater precision and efficiency. We are seeing uptake rates accelerating for planting and harvesting technologies – areas where the payback case is compelling without significant data processing investment by the farmer. However, to get more substantive yield benefits and input cost reductions from precision farming, complete data integration from a wide range of analog and digital sources will be critical.

AR/VR, 5G, IoT and AgTech are only snapshots in the broader convergence of low-cost processing power, big data, growing cloud capabilities and the acceleration of analytics and machine learning. The inexorable shift from simple digitization (the "Third Industrial Revolution") to convergence of these technologies will transform how we produce, deliver and consume our goods and services and make governments, companies, civil society and individuals re-think the modus operandi.

> *The changes that Extended Reality is going to bring across many different consumer touchpoints and enterprise touchpoints are going to be unprecedented. And it's just a matter of when. I don't think it's a matter of if.*
>
> **HEATHER BELLINI, GOLDMAN SACHS GLOBAL INVESTMENT RESEARCH**

IN CONCLUSION

Thank you to the speakers and the participants who contributed to making the Sustainable Finance Innovation Forum a success. The event showcased the next frontier of innovations across technologies, business models and finance that are helping to drive sustainable progress. We look forward to continuing the conversation and finding opportunities to collaborate further with all our stakeholders.

Learn more about Sustainable Finance Innovation at Goldman Sachs here.

For further information on our environmental stewardship, please visit gs.com/environment

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