



FII INSTITUTE | Impact
Future Investment Initiative Institute on Humanity

DON'T FORGET OUR PLANET!

**SECOND LIVE VIRTUAL EVENT OF THE
FII INSTITUTE SERIES**

A WHITE PAPER BY THE FII INSTITUTE



ABOUT THE FII INSTITUTE

The Future Investment Initiative Institute is a new generation of not-for-profit foundation dedicated to empowering the world's brightest minds to shape a brighter future for all, with all. A central focus of the Institute will be to curate and enable ideas that can solve today's global challenges using technologies that have the potential to positively impact humanity. The initial work will concentrate on four strategic pillars: artificial intelligence, healthcare, robotics and sustainability.

The mandate of the FII Institute is driven by a forward-looking vision and mission, as well as four strategic impact areas.

VISION

Empower the world's brightest minds to shape a brighter future for all, with all.

MISSION

Curate & enable ideas that can solve today's global challenges using technologies that have the potential to impact humanity sustainably.

The FII Institute has four main IMPACT areas:



HEALTHCARE

Leverage new dynamic applications of technology to disrupt the traditional healthcare industry



SUSTAINABILITY

Deploy technologies to ensure development meets the needs of the present while considering needs of future generations



ARTIFICIAL INTELLIGENCE

Teach machines to think and act like humans to take over an increasing share of "human work"



ROBOTICS

Design, construct and operate robots and computer systems based on their control, sensory feedback and information processing

FORWARD

Our world is in dire need of a sustainable restart. We are losing biodiversity faster than any time in history. According to the latest report of the International Energy Agency, this year is our last chance to avoid a rebound in carbon emissions. The list goes on.

The COVID-19 pandemic also gave us a glimpse of what environmental healing looks like. We all saw the before and after images of Beijing's air or the Venice Canals. But how can we ensure continuous healing, even after we return to our day-to-day lives? One thing is certain: we can't rely on an annual 5-month worldwide lockdown.

Governments now face the important task of restarting the economic engine and putting people back to work. Some have rightfully committed to a "green recovery", directing investments to technologies and industries that can deliver both growth and sustainability objectives. This is not only desirable, it is also more efficient in terms of creating jobs, upgrading infrastructure and delivering financial returns.

Pursued at the global scale, a sustainable recovery approach could bring about the long-awaited turning point in climate action. Ushering it requires a new perspective on how we as business leaders, investors, politicians, innovators and individuals understand our impact and relationships with capital and with the planet.

The benefits of sustainable investments are now unequivocally clear. For companies, investment decisions fueled by sustainability considerations translate into multiple benefits, from improved brand equity to customer loyalty, rapid growth and reduced cost of capital. As for investors, the data is clear: sustainable investments not only perform better than their unsustainable counterparts but are also more resilient to shocks. Bottom line: money talks and it's speaking green.

Developing the right technologies is another critical component of ensuring a sustainable future. From geospatial technologies revealing environmental data

at the asset level to algorithms deciphering animal communications, innovation is transforming the way we understand and interact with nature. As we connect to our planet in these new ways, a new sense of responsibility regarding our global footprint will arise.

For too long, the burden of climate change has been passed down from generation to generation. As the people who will ultimately pay for today's stimulus packages and the ones with the most at stake, the youth should have a voice in shaping the global recovery effort. Meanwhile, those with decision-making power have a duty to ensure a just transition for all, with all. Views will differ on how best to do so. What we can all agree on is that we won't get a better moment, or another chance.



RICHARD ATTIAS
 CEO, FII Institute



EXECUTIVE SUMMARY



With countries easing lockdowns across the globe, focus is shifting from rescue packages to recovery plans. How these address the sustainability question will in large part determine whether we succeed in delivering a world resilient to systemic threats - climate change and biodiversity loss being two critical ones.

Fortunately, the way out of the recession lies in reconnecting with our natural environment. It is time to think big. We need to rethink how we value and connect with the planet as individuals, as companies and as investors.

With these objectives in mind, the FII Institute conducted extensive interviews, analyzed data and scouted for innovative projects to inspire global leaders to herald a global sustainable restart.

This white paper highlights five important messages:

- **A sustainable recovery is not only desirable, it is also more efficient and effective** in creating jobs, upgrading infrastructure and delivering financial returns. Nature-based solutions, meanwhile, create new avenues for growth, innovation and markets.
- **There is an unprecedented demand for change from all stakeholder groups.** Companies, investors and citizens alike are calling for a sustainable recovery. Momentum has gotten so strong even oil and gas companies are committing to net-zero emissions targets.

- **This collective momentum has yet to be leveraged at scale.** Current estimates put the green share of the global stimulus effort somewhere between 0.2%-4%. This is too low - both relative to previous efforts and in the face of the investment needs. We can and must do more.
- **Well used, technology could play a transformative role in redefining our relationship with the nature.** From the use of satellite technology for carbon emission tracking to natural language process for decoding animal languages and space technology to bring closed-loop villages to Earth, innovations allow us to see our impact in a more transparent way and make more informed decisions about interaction with nature.
- **The youth must be part of the solution.** Their voices are being neglected whilst their future is being decided. No one should be left behind, let alone those that will ultimately pay for today's debt-financed recovery. By empowering the youth, we will ensure a sustainable recovery and a sustainable future for all, with all.

This paper delves into some of the dynamics underlying each of the findings. These will be discussed in more details during the June 25th virtual event of the Institute on a theme that summarizes this report in one powerful message: **"Don't forget our Planet!"**.

TIME FOR A SUSTAINABLE RESTART

The crisis has made clear the cost of neglecting our environment. Today, one million species are at risk of extinction. This is nearly a fourth of all animals and plants on earth. And while emissions have dropped as a result of the pandemic, the trend is still a dangerously upwards one.

The world cannot self-isolate from these sustainability risks, nor can it afford to. It took a global crisis to bring emissions down about 7-8% this year. Yet that is the amount of annual reduction we must achieve each year over the next decade if we are to deliver the Paris Agreement. Clearly, a worldwide lockdown cannot be the solution; but neither can business as usual.

Fortunately, the way out of the recession lies in reconnecting with our natural environment. A sustainable recovery is not only desirable, it is also more efficient and effective in creating jobs, upgrading infrastructure and delivering financial returns. In the energy sector alone, a sustainable recovery would create 9 million jobs each year, reduce emissions by 4.5GtCO₂ over the next three years, and add 1.1% to annual GDP growth.

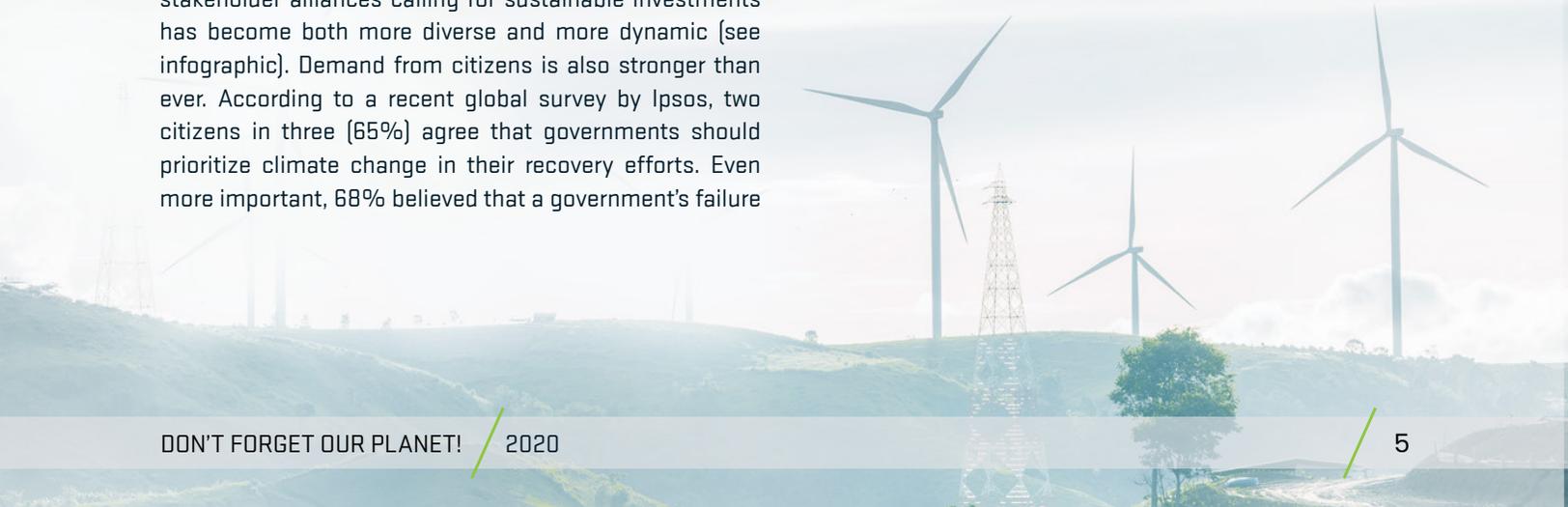
Nature-based solutions, meanwhile, create new avenues for growth, innovation and markets. The economic prize is substantial there too. According to UNEP, around half of global GDP (\$44trn) is dependent on nature-based services. Research also indicates that nature-based solutions could provide over one-third of the cost-effective climate mitigation needed to stabilize global warming below 2°C.

Companies and investors from all sizes are demanding change. Over the past five years, the ecosystem of multi-stakeholder alliances calling for sustainable investments has become both more diverse and more dynamic (see infographic). Demand from citizens is also stronger than ever. According to a recent global survey by Ipsos, two citizens in three (65%) agree that governments should prioritize climate change in their recovery efforts. Even more important, 68% believed that a government's failure

to act on climate change now amounts to failing its citizens.

Governments have started to respond. Leading the pack is the EU. Combined, its green deal and recovery package aim to mobilize some EUR 1.85 trillion towards a just and sustainable transition, with a focus on achieving circular economy, deploying clean energy infrastructure and leveraging digital technology. South Korea is another important leader and the first in East Asia to explicitly tie its recovery package to sustainability objectives. Calls for a green recovery are also being issued in the UK, Canada and Japan, and we expect to see more commitments from the government across the world as institutions like OECD and the United Nations support the call to 'build back better'.

To succeed in delivering on their sustainable promise, these commitments will need to be matched by capital allocation. Current estimates put the green share of the global stimulus effort between 0.2%-4% depending on how stringent (or broad) one defines green activities. This is low - both relative to previous efforts (the share during the global financial crisis was about 16%) and in the face of the needs. According to the science, annual investments in clean energy need to reach \$2.4trn if we are to address climate change. Today, current commitments amount to just \$1trn for the entire decade. Clearly, more must be done, and fast. Fortunately, economics and market dynamics are now in favor of rapid acceleration.

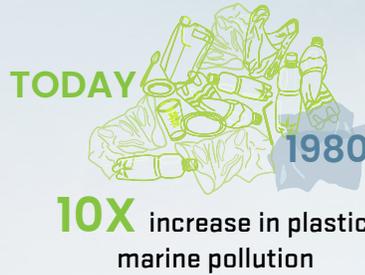


DON'T FORGET OUR PLANET

As focus shifts from rescue packages to recovery plans, countries have the important task of correcting the damage done and putting people back to work. But they cannot and must not forget about the planet.



1 MILLION species faced extinction in 2019. That's 1/4 of all animals and plants on earth.

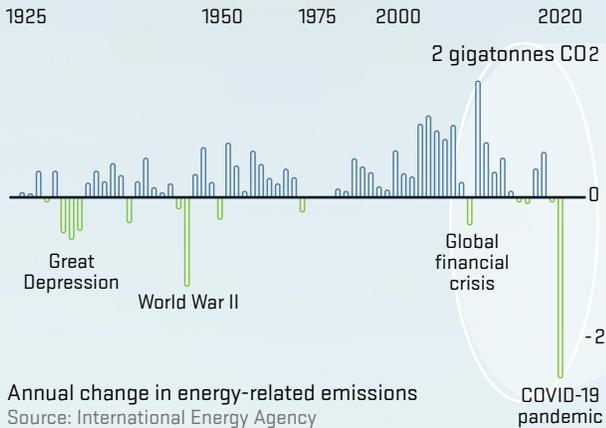


290 MILLION HECTARES:

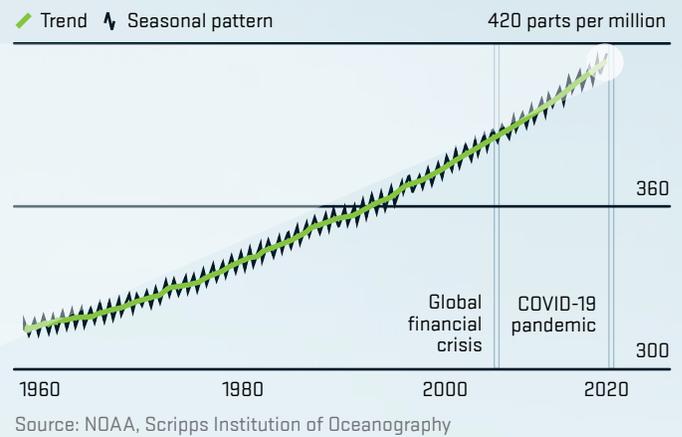
The surface of native forest lost between 1990-2015.



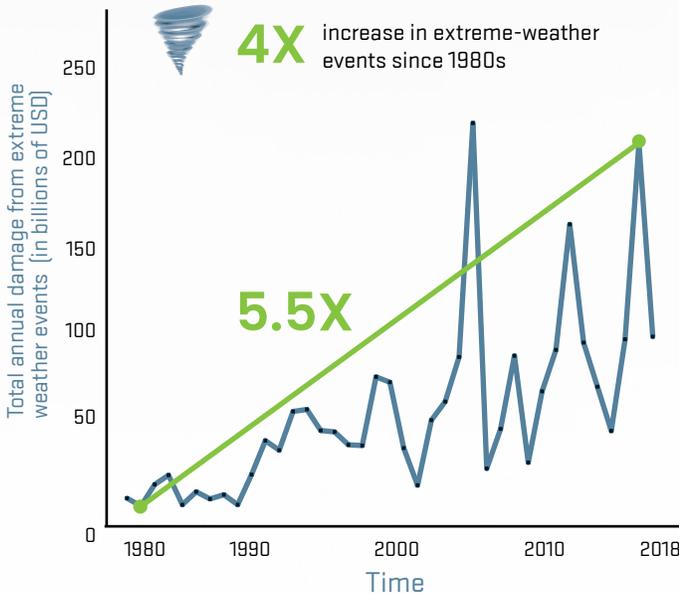
Emissions have seen a historic drop as a result of COVID-19



BUT the trend is still a dangerously upward one



The cost of inaction is too high to ignore.



“ The COVID-19 tragedy proves we can't wish away systemic risks but need to invest upfront to avoid disaster down the road. And so it is with climate change, a crisis that:

- Involves the entire world, from which no one will be able to self-isolate
- Is predicted by science to be tomorrow's central scenario (not risk)

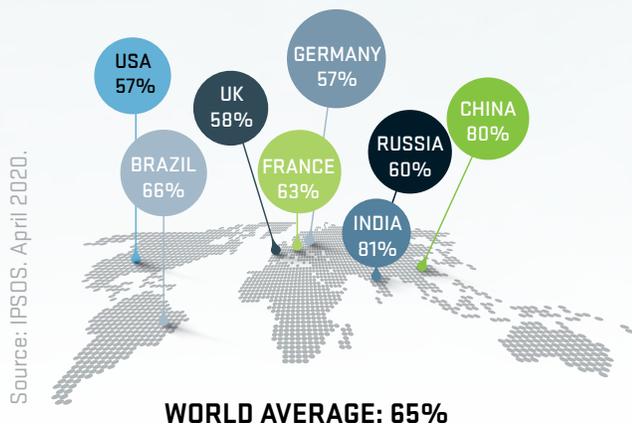
Mark Carney
Special Envoy of the Secretary-General for Climate Action and Finance

TIME FOR A SUSTAINABLE RESTART

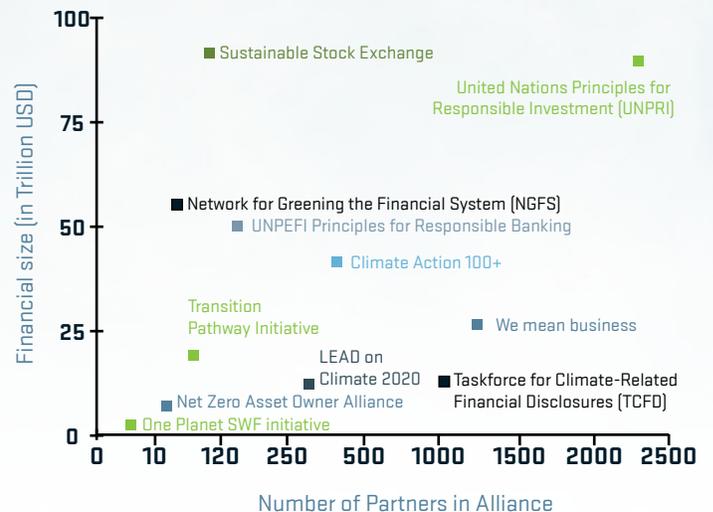
From citizens to companies and investors, demand for a green recovery has reached unprecedented levels. Governments are leading the way by aligning their recovery efforts with sustainability objectives, yet success requires action on a wider and more ambitious scale. We need a global sustainable restart.

COVID-19 has made people deeply aware of the impact of systemic risk

Percent of people who believe government should prioritize climate change in their recovery efforts



Investors and companies of all sizes demand action



6 MILLION PEOPLE:

the size of 2019 global climate strike

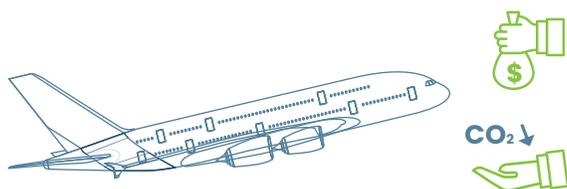


75%

of US citizens want recovery packages to prioritize clean energy companies over fossil fuel ones.

Source: Yale, GMU & Climate Nexus. April 2020

57% of US citizens agree that airline bailouts should be conditional on lowering emissions.



While some countries have started to align their recoveries with climate goals, **less than 0.2% of the stimulus deployed globally* is explicitly focused on stimulating the low-carbon economy.**

* According to data compiled by Bloomberg looking at the recovery packages of the world's top 50 economies

IT IS TIME TO ACT. WE NEED A SUSTAINABLE RESTART **NOW.**

BUILDING BACK BETTER, TOGETHER

An interview with **Fiona Reynolds**, CEO of the Principles for Responsible Investment

Why is the demand for a sustainable recovery stronger now than ever?

COVID-19 has provided one of the clearest demonstrations we have ever seen of the impossibility of maintaining a healthy economy without healthy people and a healthy planet underpinning it. Global governments and the business and investor community, who may have previously been in doubt, are beginning to understand the deep interconnection between people, profit and planet. At PRI this step change is becoming increasingly clear as we're seeing global investors actively engaged in driving the recovery to a degree we've not experienced before.

The convergence of crises—health, social and environmental—has woken up the world to the need to build back better and not simply return to normal.

What would a global sustainable recovery plan look like and what opportunities would this create for investors?

A global sustainable recovery plan must first and foremostly be a collaborative and united one. The COVID-19 pandemic has shown us that it is possible to respond to an unseen crisis with a whole of economy approach—one driven jointly by governments, corporations, investors and civil society.

Now, as governments find themselves facing growing debt-to-GDP ratios, it's becoming abundantly clear the critical role that investors, and the private sector more broadly, will need to play in enabling and funding the recovery. In the coming months we need to see governments working even more closely with investors on public private partnerships to develop a clear pipeline of scalable, investable and bankable projects.

The recovery plan must drive forward the commitments made to the Paris Agreement and the Sustainable Development Goals (SDGs).



Some countries have started aligning their recovery efforts with sustainability objectives. Yet recent estimates put the focus on a green recovery between 0.2%-4% of the overall global stimulus efforts. What are the most effective ways to increase this share to the level we need to address climate change?

Ultimately, investors want to see a recovery which is sustainable, green and inclusive and creates a global economy that's fit for the 21st century. With some 10-20trn US dollars in stimulus packages being rolled out globally, governments have an unprecedented opportunity to accelerate the transition to net-zero. In order to do this, they need to embed the private sector in the recovery and set the appropriate conditions and incentives to facilitate a recovery with social and environmental considerations at its heart.



With some 20-10trn US dollars in stimulus packages being rolled out globally, governments have an unprecedented opportunity to accelerate the transition to net-zero.

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This requires bailout packages to be both conditional and sustainable, long-term businesses to be supported and human relief and job creation to be prioritised—all without locking in high-carbon pathways. There are already some strong examples of this taking place such as the Canadian government’s TCFD bailout requirements and the French government’s environmental criteria in its Air France funding.

What would such a mobilization mean for investors and capitalism as we know it?

Taking a step back, it’s clear to me that a lot has been learned about how you should handle a crisis. In 2008 we had a financial crisis, and this is a health crisis that has become an economic crisis, but what we have seen is a far more human centred response. It hasn’t all been about bailing out major intuitions. It has also been about how we support people to stay in jobs and companies to support their employees – in many but not all parts of the world.



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I hope future generations look back on this moment and say that we did not squander the opportunity, but rather that we harnessed a crisis to build a better future.

I believe what we’re witnessing now is the beginning of a move away from Friedman style economic theory and toward stakeholder capitalism. This new model encompasses sustainability and is inclusive of shareholders, employees, communities, customers and suppliers.

When future generations look back 10 or 15 years from now, what do you hope they will say about our actions today?

Today the most significant challenges we are facing as a human race are being laid bare in front of us—human, environmental and economic health, climate change, racial justice and equality, labor rights and human rights. The risks of not acting are evident and so too are the opportunities ahead if we’re bold enough to reach for them. We must leverage this time of clarity and unity to leapfrog into a better future. What’s more, we already have a roadmap to take us there. The SDGs provide us a kind of business plan for the world and they have never been more important.

So, I hope future generations look back on this moment and say that we did not squander the opportunity, but rather that we harnessed a crisis to build a better future. To help realise this vision, at PRI we’ve just launched our Investing with SDG outcomes report, which provides a high-level framework for investors looking to shape their outcomes on the world in line with the SDGs.

PUTTING NATURE ON THE BALANCE SHEET

Sustainable investments are back with a revenge. Long touted as delivering subpar financial returns, research has now made clear that sustainable investments not only perform better than their unsustainable counterparts but are also more resilient to shocks.

The data is telling. In a recent study by Blackrock, 94% of the sustainable indices analyzed had outperformed their parent benchmarks in the first quarter of 2020. The results also hold over time. Over the past decade, for example, US renewable stocks generated an annual return of 11.4%, compared 7% for fossil fuels portfolios. Similar results are found on the debt side of the equation, with both green bonds issuance and corporate bonds from sustainable companies outperforming their non-green counterparts.

Obviously, not all sustainable products are equal in their outperformance. Yet the overall consistency of this positive picture in a context of critical market failures is significant in three important ways.

The first is that there is much more value to be captured by putting nature on the balance sheet. Without properly accounting for the benefits of nature or the cost of harming it, some of the economic value underlying sustainable investments will remain unpriced – resulting both in reduced benefits and increased exposure to risk.

On the positive side, methods such as natural capital accounting or the Return on Sustainability Investment

framework (ROSI) have helped companies monetize on sustainability investments. Studies have notably found that sustainability-focused companies also experience better employee morale and loyalty, helping reduce turnover by up to 50% and productivity by up to 13%.

On the negative side, the absence of proper pricing of externalities means that our entire economy and financial system remain over-exposed to systemic risks. To put this vulnerability in perspective, some \$44trn of our global economic output (or about half of global GDP) is dependent on a functioning natural ecosystem. Trigger the wrong ecosystem collapse and it is easy to see how this can turn into a global financial meltdown. Sustainable investments are thus not just good investments, they are key to effective risk management.

The outperformance also shows that the underlying market fundamentals have changed. Sectors such as technology and clean energy are particularly favored by sustainable fund managers. These were generally less impacted by the lockdown. Renewable energy is also more effective in creating short-term growth through job creation as well as long-term economic benefits by driving down clean energy costs. Over the past decade, for example, the cost of solar and energy storage dropped by 85%. The result? ‘Round the clock’ renewable power – a combination of solar, wind and battery that can deliver utility scale power at least 80% of the year - is now more competitive than coal to meet peak electricity demand in India.

The third implication is that coordinated action by governments could unleash capital flows towards sustainable solutions at a scale the world has never seen before - and yet urgently needs. Despite its rapid growth, sustainability remains a small fraction of the overall \$379trn that constitute our financial system. By actively pursuing a global sustainable recovery, governments have the opportunity not just to finance sustainability, but to create a sustainable financial system.

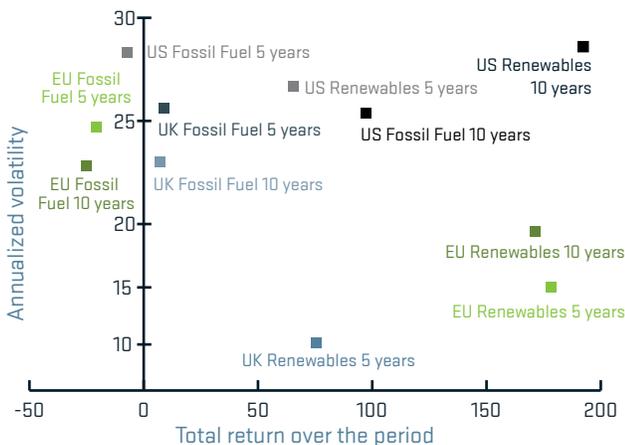
Lasting change, of course, is never about economics alone; behavioral aspects will also matter.



MONEY TALKS, AND IT SPEAKS GREEN

A sustainable recovery is not only desirable, it is also more efficient in creating jobs, upgrading infrastructure and delivering financial returns.

Sustainable investments offer better returns



* Source: Imperial College, London & International Energy Agency
 **Data for UK 10-year was not available due to the lack of listed companies between 2010 and 2015

They are also more resilient to shocks



94% of the sustainable indexes did better than their non-sustainable counterparts in the first quarter of 2020.

Source: Blackrock. May 2020.

US clean power stocks **increased 2.2%** in the first four months of the year, while **S&P 500 fell 9.4%** during the same period.



Dramatic cost reductions have made renewables the cheapest source of electricity in most places

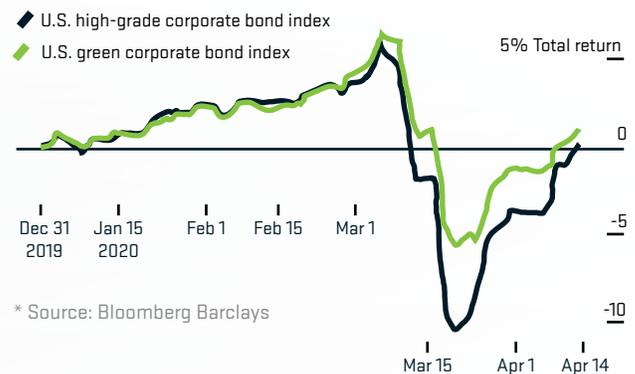
Cheapest source of new utility scale electricity by country (in USD per Megawatt hour)

Wind | Solar | Natural gas - CCGT | Coal



*Source: BloombergNEF 2020 and REPOD

This resilience also applies to debt



* Source: Bloomberg Barclays



85% The drop in cost of solar and battery technology since 2010



49% The drop in the cost of wind power over the same period

BOTTOM LINE: IT IS TIME TO INVEST

INVESTING IN THE SUSTAINABLE RECOVERY

An interview with **Noel Quinn**, Group Chief Executive, HSBC Holdings

What are the three main reasons why a sustainable recovery is an attractive proposition for investors?

The Covid-19 pandemic is a live example of a sustainability crisis. We have all felt its economic and social impact. A climate crisis has the potential to be much more drastic in its consequences and longevity. We should view this as a wakeup call: not one based on a hypothesis, but on reality.

In this context, there are three main reasons why a sustainable recovery is imperative.

First, sustainable investments are a form of risk management. It's no longer a question of balanced portfolios but of essential - and even defensive - investment.

Next, sustainability pays. It's no surprise that ESG and climate stocks consistently outperform the market. Demand for responsible investment is rapidly increasing as a result - and will continue to do so.



Upcoming multilateral discussions such as G20, G7, and of course COP26, will be crucial to informing the next phase of recovery.



Finally, a sustainable recovery opens up significant opportunities for investment in new innovations, industries and infrastructure. Many of these will be high growth.

We need to build back a more sustainable, resilient, and just model for economic stability. This is an opportunity to invest in the future of our planet.

The decisions governments will make over the coming months will have a profound impact on our future. What can financial institutions do to help them make the right decisions?

The COVID crisis has shown that the interests of government and business are aligned. Both have an interest in building competitive market economies that deliver strong stakeholder returns - both financially, for our customers, and for the planet. Neither the public nor private sectors can act alone on this. The scale of the challenge, or opportunity is too great.

We need to use this opportunity to increase our collective ambition to re-engineer the global economy towards sustainable growth. It's important for banks to advocate for sustainable growth, in the interests of our customers and the communities we serve. We can offer our expertise to governments to help shape policy and regulatory frameworks - to bring sustainable finance to the mainstream, deliver systemic change, and unlock capital flows for green growth.

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INVESTING IN THE SUSTAINABLE RECOVERY

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Success will require scale. What would a global sustainable recovery plan look like and what would it need to be able to rapidly mobilize capital at scale?

It needs to be a truly global effort. It's critical we don't focus just on OECD countries. Emerging markets face some of the biggest challenges, and sustainable investment here will have the greatest long-term impact. It's vital to build international, public-private coalitions to align all interests.

In practical terms, agreeing to common definitions for sustainable investment is the key to scaling up. HSBC has been working with the IFC, the OECD and others to mobilize infrastructure investment in emerging markets, through our Finance to Accelerate the Sustainable Transition-Infrastructure (FAST-Infra) initiative. This aims to develop a consistent labelling system for sustainable infrastructure investment.

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We need to develop pathways to net zero for businesses and industries.

Crucially, we need to develop pathways to net zero for businesses and industries. My personal priority is to support our customers to identify a way forward through transition risks and new ways of operating.

Sustainable finance will be an important accelerator of the green recovery. What are some of the most promising trends shaping the market today?

Recent events have sharpened the focus on resilience to economic shocks. As a consequence, there's increased emphasis on the link between the environmental and social elements of ESG and the role of sustainable finance in addressing these. I think resilience will – and must – remain an important focus for markets, and our customers, for some time.

We also need better data to help us move forward at pace. So it's important that governments and the financial sector work together to define common standards for disclosure and measurement. I am personally interested to see what role clean technology, nature-based solutions, and climate innovation can play in building a more resilient and sustainable economy, and in helping these businesses to scale.

There is a lot to do – and we all need to play our part.

UNDERSTANDING THE GENEROUS RETURNS ON SUSTAINABILITY INVESTMENTS

An interview with **Professor Tensie Whelan**,
 Director, Center for Sustainable Business at
 the NYU Stern School of Business



What are the three main reasons why a sustainable recovery is an attractive proposition for corporations?

COVID, climate change, #blacklivesmatter: these are three of many issues that underscore that business is part of the fabric of society and must support a recovery that helps people and the planet, not just CEOs and shareholders.

There are three main reasons why companies need to engage in a sustainable recovery. First, business is being held accountable for social challenges and needs to demonstrate positive engagement to ensure they have a license to operate. Second, a green recovery will increase corporate resiliency to future shocks such as climate change, water shortages and disease. Third, there is only one planet and globalization means that the success of every business as well as the welfare of their employees, communities and customers, is dependent on changing business practice and government policy to protect that planet.



Rather than making tweaks to existing structures, a successful global recovery plan will need to articulate what we want to be as a society and figure out how we get there. It is time to think big.

Evidence is now clear: Sustainable investments offer better returns. What else can companies and investors do to capture the benefits of sustainability investments?

Studies show that there is correlation between better corporate financial performance and sustainability (ESG). Causality is harder to establish because companies are not tracking the financial results of their investments. Companies must set up their accounting systems to track the benefits of sustainability strategies and monetize tangibles such as operational efficiency and intangibles such as employee engagement and retention. They then need to disclose the impacts; quarterly calls, for example, should be improved by providing the material financial impacts of sustainability strategies.

Our research on the Return on Sustainability Investment (ROSI) demonstrates that companies embedding sustainability into business strategy unlock operational efficiency, innovation, sales, employee engagement and retention, and risk mitigation, among other benefits. Waste reduction strategies, for example, create operational efficiencies, reduce costs for virgin materials, reduce waste disposal costs, and can create revenue when waste byproducts are sold for other uses. One automotive company we worked with had \$285 million net contribution to the bottom line through waste reduction strategies.

Success will require scale. What would a global sustainable recovery plan look like and what would it need to be able to rapidly mobilize capital at scale?

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UNDERSTANDING THE GENEROUS RETURNS ON SUSTAINABILITY INVESTMENTS

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In what way does COVID-19 change the way companies approach sustainability and what can corporations do to support a just and sustainable recovery?

COVID-19 has underscored what recently corporate leaders have begun to acknowledge—most workers are not getting a fair deal. When you don't have \$400 saved to cover an emergency, when you are working two jobs to make ends meet, the economic system is not working.

A shareholder primacy focus has caused disinvestment in workers as well as research and development, such that many companies are not well-prepared to weather COVID - and their fired employees certainly are not. We need to pay more attention to how companies treat workers, with a focus on equity, health and diversity.

Companies must invest in meeting science-based targets immediately through energy efficiency, renewable energy, and offsets, and investors need to continue disinvesting and raising the cost of capital for fossil fuel companies, as well as create a functioning market for carbon. COVID has underscored how compound growth can cause rapid and global destruction; and climate change is a compound growth nightmare.

This is the decisive decade to avoid the worst of the inevitable chain reactions that will cause immeasurable harm to habitat, flora and fauna, people and business. Companies need to have one voice in pressuring government to phase out environmentally destructive policies and harmful subsidies, and work with them to create the incentives that will help business build us the world we need.

COVID-19 has underscored what recently corporate leaders have begun to acknowledge—most workers are not getting a fair deal. When you don't have \$400 saved to cover an emergency, when you are working two jobs to make ends meet, the economic system is not working.

It is time to think big. Vacant offices and factories create a unique opportunity to install technology to make them more energy efficient, for example. On the infrastructure front, with people out of work and needing jobs, we have a unique opportunity to build green and resilient water management systems, sustainable and resilient transportation systems, sustainable and resilient food systems. The list goes on. We have the technologies and the workforce—we need the government to implement penalties and incentives to support private sector investment.

COVID has underscored how compound growth can cause rapid and global destruction; and climate change is a compound growth nightmare.

RECONNECTING WITH NATURE IN A TECHNOLOGY-DRIVEN WORLD

Digital technology will be a key enabler of a green recovery and of a sustainable future, with some reports estimating it will play a role in nearly half of the carbon reduction efforts by 2050. Yet the more we spend time in the virtual world, the less we interact with the natural one. Underlying the fourth industrial revolution, therefore, is the question of whether technology will drive us closer to nature or away from it.

A way out of this conundrum lies in promoting technologies that provide us with a deeper understanding of our environment and help us to protect it more effectively. The combination of AI and geospatial information is proving particularly powerful in that regard, with applications ranging from biodiversity and natural habitat monitoring, to large-scale climate system analysis and evaluation of emissions at the asset level.

Another option is to use the ubiquitous access to technology to incentivize interactions with the natural world. This is the approach chosen by iNaturalist, a joint initiative of the California Academy of Sciences and the National Geographic Society, which is built as a social network in which naturalist can upload pictures of the biodiversity they see around them. The platform then uses AI to identify the species pictured – and uses the information on species movements for scientific research and conservation work. So far, their 2.7 million users have mapped 280,000 species, including nearly a third of all known vertebrates.

Technology advancement can also be used to better understand life around us. New machine learning algorithms, for example, now allow to translate a language without any prior knowledge of any of its words or grammar. Using these methods, progress has been made in deciphering how dogs and dolphins communicate. Two-way communication is still far off, but if and once achieved, such a technology could be truly transformative for our societies as it would give a voice – and thus a say – to other species.

Leveraging humanity's innate desire to reach for the stars is another powerful way to reconnect with nature. In space,

sustainability is not a choice: it is an imperative. Applying space-inspired principles and technologies can thus lead to important insights on how to build sustainable systems and circular economies here on Earth.

One company pursuing this approach is Interstellar Lab. The Paris based research group builds close-loop bio-regenerative villages designed to be deployed on any planet, Earth included. Contrary to Biosphere 2 - an earlier experiment that tried (unsuccessfully) to replicate Earth's ecosystems in a close-loop fashion, Interstellar lab designs close-loops ecosystems from the ground up. Another difference is the demand for the product. Back in the 1990s, when Biosphere 2 was developed, few would have paid to experience life in a close-loop environment. However, with commercial space flight now a reality, demand for such systems is bound to materialize – not just on Earth, but on the Moon and Mars as well.

Ensuring affordable access to the next frontier will also require innovation efforts on the sustainable front. Reusable rockets, for instance, are key to economies of scale, while affordable in-space transportation option will be key to establish a multi-planetary species. The X-Prize Foundation, which focused its inaugural prize on creating a reusable manned spacecraft able to go into space twice within two weeks, has been at the heart of the effort to democratize space travel while also promoting innovative sustainable solutions at scale both in space and on Earth.

Meanwhile, the availability of commercial space might also affect investment decisions. With a current price tag of \$52million, only the richest of the richest will be able to afford a trip to the international space station or other space orbiting hotels. How they decide to spend their wealth after witnessing first-hand the beauty, uniqueness and fragility of our planet remains to be seen - though it seems plausible that some at least will radically shift their investments towards sustainability.

EARTH SPECIES PROJECT

A new way to connect with animals



How would our understanding of non-human communication impact our actions and subsequent ecological impact on the planet? The Earth Species project, an open-source collaborative and non-profit organization, is dedicated to answering this question by translating animal communication.

Through machine learning techniques, the non-profit creates geometric representations of entire languages. The technique, known as “word mapping”, uses an unsupervised algorithm representing words as points in a high-dimension space. The position of one point in relation to another represents the relationship between words. By matching the geometric structures of different languages, languages can be translated without any prior example of translation.

The project has focused on cetacean communication so far and will expand its work to primates, corvids and other animal species. Decoding animal communication could provide us with an entirely new way to connect to nature, while also giving new significance to the choices we make regarding our planet and its ecosystems.

CARBON TRACKER INITIATIVE

Nowhere to hide: Satellite-based power plant monitoring



Emissions of greenhouse gases will need to fall significantly if we are to avoid catastrophic levels of warming. Accurate emission data can be hard to access independently of the company responsible for the pollution, however.

Technology can help. A joint initiative between Carbon Tracker, WattTime and the World Resource Institute uses satellite imagery to quantify carbon emissions from power plants worldwide at the asset level. This provides companies with key information on how each plant contributes to their overall emissions profile. It also provides investors with a more accurate picture of their portfolio's carbon footprint and their exposure to climate-related financial risks.

PROTECTING BIODIVERSITY WITH AI

An Interview with **Ganes Kesari**,
 Co-Founder & Head of Analytics at Gramener



How would you describe your research to a potential investor?

We help enterprises and not-for-profits unlock value from data. In the space of Data-for-Good, we use data science to solve some of the toughest challenges our world faces today.

These include:

- a) Conservation of endangered species like elephants or penguins by building solutions to detect, identify, count and respond to threats faced by biodiversity. We have partnered with Microsoft AI for Earth in this space.
- b) Control of deadly outbreaks like Dengue or COVID-19 by empowering NGOs and Governments to quickly respond and prevent future incidence.
- c) Empowering smart cities by working with municipalities to protect and restore green spaces.



Technology has helped us to not just detect animal populations, but also recognize animals individually.

How is technology changing, if at all, the field of conservation?

Conservation is a space that has been traditionally strapped for resources and limited by human abilities. Technology now makes it possible to do these interventions of monitoring, identification and protection on a global scale, something which a decade ago would have been completely impossible.

Today we can monitor endangered species at the individual level. Technology has helped us to not just detect animal populations, but also recognize animals individually. You can say hello to 'Tulips', a whale shark swimming in the Atlantic ocean, and months later spot her off the coast of Europe.

Thanks to Artificial Intelligence, we can use the fingerprints of certain species like whale sharks to uniquely identify them. Technology can also alert us when an elephant in the African savanna is pursued by poachers so that rangers can intervene before it's too late.

What are some of the most important technological trends shaping the use of AI for sustainability today?

There are 3 key trends shaping the use of AI in conservation:

1. Smart devices: We now have easy and economic access to a range of hardware such as camera traps, Internet of Things, drones, smartphones and feeds from satellites. Thanks to these devices, it is possible to collect rich, real-time data about our environment, non-intrusively. AI needs a lot of data to learn from and this is no longer a challenge.
2. Intelligent algorithms: Access to computer vision and deep learning techniques have democratized the ability

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to gain crucial insights about our environment. These algorithms are already better than humans in areas like speech recognition and are fast catching up in other disciplines. All of this capability is now available for conservation.

3. Power of the public: We need human assistance to train the AI and implement it on-the-ground. There are time-intensive tasks ranging from the most menial to highly complex ones such as data cleaning, labeling of data, implementing AI models and converting data into visual stories. Crowdsourcing is a trend that is solving this problem by making available the time of citizen scientists through initiatives like hackathons and online contests, often for free.

Where do you think the technology will be 10 years from now?

Here are two of my favorite predictions on the impact of technology in this space:

Quantify the direct environmental impact for every human action: We will be able to establish a clear, direct relationship between human actions and their impact on every aspect of our environment. Today, we have a lot of credible hypotheses, but not enough data. We can't solve a problem that we don't fully understand. Thanks to efforts such as Microsoft's Planetary computer, in some years we might be able to measure and manage the planet's natural resources and the state of our biodiversity more sustainably. This ability to measure the impact of every human activity could shape our actions and catalyze the efforts to reclaim, protect and nourish our environment.

Communicate with our biodiversity: There is ongoing early research to understand the calls of animals. Advances in computer vision, audio analytics and biosignals processing would give us the ability to find what animals want. In the next decade, we might be able to understand their actions better and perhaps, communicate back to them in a way that they can comprehend. This could fundamentally change the way we perceive our biodiversity and how we treat them.



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THREE GENERATIONS, ONE COMMON CHALLENGE

Today's youth ranks climate change as the most important issue facing the world. More than 60% of the younger generation (age 18-29) thinks climate change is a critical threat, compared to less than 50% for the older generation (age 45+).

This difference in perception is at the heart of the intergenerational issues associated with climate change. The younger generation is more concerned and has more at stake, yet by the time it reaches positions of power it will be too late to act. No wonder then that an increasing number of young climate activists are taking to the streets and demanding urgent climate action from their governments.

Adding to this tension is the COVID response, most of which is debt-financed and will thus fall on the next generation to pay back. Repayments for the EU recovery packages will start only in 2028, for example, with installments spread

over 30 years. While in this particular case the packages are explicitly focused on a just and a sustainable recovery, for many countries, the youth finds themselves in a situation where they will pay for something they cannot decide upon and which risks affecting their future irreversibly.

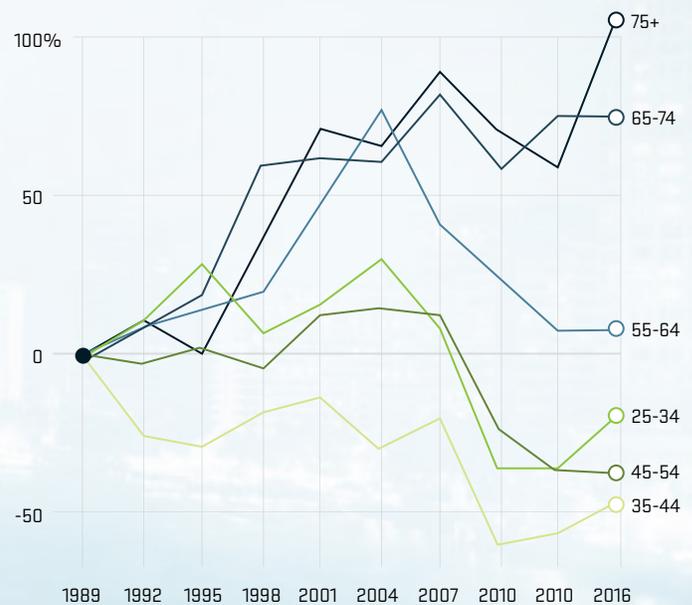
The crisis also poses a serious long-term economic threat to the youth. In a paper published in 2019, economist Kevin Rinz points out that while most millennials did find employment ten years after the global financial crisis, their average earning over that decade had suffered much more than that of previous generations. The result is a lower capacity to accumulate wealth which, combined with debt inherited from previous generations, makes younger generations much more vulnerable to external shocks. A sustainable recovery would help to ensure quality jobs can be rapidly secured.



SONIKA MANANDHAR
 Co-Founder and CTO,
 Aeloi Technologies,
 Nepal, 31 Years Old

“Because of COVID, we have seen depleted savings or large debt. We need to save more and consume less, mostly for the grassroots microentrepreneurs. Now is the time to identify the best possible financial stimulus to mobilize grassroots green microenterprises to achieve sustainable financial and economic recovery. Investing in projects that has three-dimensional impact such as energy efficiency, nature conservation, and clean energy option is an opportunity to reduce poverty, boost growth while transitioning away from fossil fuels.”

Change in wealth since 1989, by age



Source: Federal Reserve via William Gale, Hilary Gelfond, Jason J. Fichtner and Benjamin Harris THE WASHINGTON POST

As the people who will pay for it and the ones with the most at stake, the youth should have a say in how the world will be rebuilt. Today, however, only 1.65% and 11.87% of parliamentarians worldwide are in their 20s and 30s, respectively. It is thus incumbent on the existing generation of leaders to create space for their voices to be heard.

Some governments have started recognizing the power of this perspective. In the UAE, for example, youth are actively engaged and making their voice heard through dedicated platforms such as the Youth Circle and the Youth Majlis. Global organizations are also actively providing platforms for young people to voice their concerns around climate change and to engage with world leaders directly. Yet more must be done.

Harnessing the power of youth in decision-making is a must. Forty percent of the world population is now below 24 years old. We cannot address the challenges faced by mankind without them. The youth can be a creative force for change, bringing innovations and catalyzing important and necessary changes. With their future ahead of them, they offer an alternative and long-term perspective to the issues at hand.



TARIQ AL-OLAIMY
Co-Founder Public-Planet Partnerships,
Bahrain, 31 Years Old

“There needs to be youth inclusion in policy and decision making in all matters that affect our environment. In doing so, we need to go beyond tokenism of only bringing youth to public tables and forums and instead bring and include youth to the table that CEOs and ministers work at every single day.”

TOWARDS A SUSTAINABLE FUTURE FOR ALL, WITH ALL

Our self-isolation has given us ample opportunity to reflect over the past few months. As we gradually adapt to a new normal, it is up to us to transform these reflections into change and action. In the words of Winston Churchill: “Never let a good crisis go to waste”.

We hope that a major takeaway from this crisis will be the realization that sustainable investments offer great opportunities for businesses and individuals. Governments designing the “green” recovery plans and stimulus packages is a great start, but we need to do more. We need a global sustainable recovery effort. The full impact of this effort, however, will depend on continuous commitments made by our global leaders. Substantial change will not be possible without a similar mindset on green recovery by the private sector.

The other critical element is innovation, going hand-in-hand with the decision-making required for climate action.

Emerging technologies can provide us with new ways to understand, connect with, and protect nature. Supporting the transformation of these ideas into tangible solutions is essential to gain new perspectives on nature, realize the extent to which humanity has been harming the planet and finds ways to address it.

The next few months will be fundamental - for the individuals who have lost their jobs, the small businesses which have gone bankrupt, the large companies which have struggled and for the environment. Kickstarting our global economy cannot come at the expense of our planet, especially when the business case for sustainability has never been clearer.

The FII Institute is fully dedicated towards supporting a sustainable global restart. We recognize this time for the great opportunity and responsibility it provides us, and firmly believe that together, we can work towards a sustainable future for all, with all.

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