

STATEMENT OF THE
LANCET COVID-19 COMMISSION
TASK FORCE ON GREEN RECOVERY

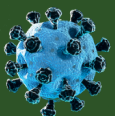
Transforming Recovery into a Green Future

MARCH 2021



The *Lancet* COVID-19 Commission

Task Force on Green Recovery



THE LANCET
COVID-19 COMMISSION

Task Force Members and Staff

TASK FORCE MEMBERS

Phoebe Koundouri (Co-chair), Professor, Athens University of Economics & Business, Greece
Ismail Serageldin (Co-chair), Nizami Ganjavi International Center, Egypt
Min Zhu (Co-chair), Chairman, National Institution of Financial Research, Tsinghua University, China
Josep M. Antó, Senior Research Professor (ISGlobal) & Professor of Medicine, Universitat Pompeu Fabra, Spain
Ian Bateman, Professor of Environmental Economics, University of Exeter Business, UK
Kirsten Brosbøl, Founder, Parliamentarians for the Global Goals, Denmark
Richard Carson, Distinguished Professor of Economics, University of California, San Diego, USA
Anthony Cox, Deputy Director Environment Directorate, OECD, Australia
Rabia Ferroukhi, Director at the Knowledge, Policy and Finance Centre, IRENA, United Arab Emirates
Luiz Augusto Galvão, Senior Researcher, Fundação Oswaldo Cruz (Fiocruz), Brazil
Ben Groom, Professor, Department of Economics, University of Exeter, UK
Heba Handoussa, Managing Director, Egypt Network for Integrated Development, Egypt
Cameron Hepburn, Professor of Environmental Economics, University of Oxford, UK
Lamia Kamal-Chaoui, Director of the Centre for Entrepreneurship, SMEs, Regions and Cities (CFE), OECD (France)
Catherine Kilelu, Senior Research Fellow, African Center for Technology Studies (ACTS), Kenya
Manfred Lenzen, Professor of Sustainability Research, University of Sydney, Australia
Trudi Makhaya, Economic Advisor to His Excellency President Cyril Ramaphosa, South Africa
Arunima Malik, Academic, Sustainability Research, University of Sydney, Australia
Brian O'Callaghan, Lead Researcher and Project Manager, Oxford University Economic Recovery Project, UK
E. Somanathan, Professor, Economics and Planning Unit, Indian Statistical Institute, India
Thomas Sterner, Professor of Environmental Economics, University of Gothenburg, Sweden
Dale Squires, Adjunct Professor of Economics at the University of California, San Diego, USA
Theodoros Zachariadis, Associate Professor, The Cyprus Institute, Cyprus

SECRETARIAT STAFF

Guillaume Lafortune, Director, Paris Office, UN Sustainable Development Solutions Network (SDSN), France
Emma Torres, VP of the Americas & Head of New York Office, UN Sustainable Development Solutions Network (SDSN), USA

TASK FORCE STAFF

Neena Joshi, Consultant, *Lancet* COVID-19 Commission, USA
Isabella Leite Lucas, Project Manager, Science Panel for the Amazon, UN Sustainable Development Solutions Network (SDSN), USA

The following report has been posted online by the Commission Secretariat, and has not been peer-reviewed or published in *The Lancet*, nor in any other journal. This report intends to bring together expert views on key topics as the COVID-19 pandemic unfolds.

Disclaimer: This statement represents the views of the authors listed and not necessarily the views of their host institutions.

Summary of key messages	4
1. COVID-19: A turning point for sustainable, inclusive, and resilient development?	5
2. Leadership to move from pandemic emergency to a transformative recovery	9
3. ESG-based and sustainability investing	10
4. Initial assessment of the “greenness” of recovery plans	11
5. Proposed criteria to inform the content of green, fair, and digital recovery plans	13
6. Global governance and key actors	17
Annex 1. Case study: Europe’s recovery plan	22
Annex 2. Case study: Egypt goes green	29
Annex 3. Case study: Costa Rica green recovery	29
References	31

More information about the Green Recovery Task Force of the *Lancet* COVID-19 Commission can be found here:
<https://covid19commission.org/green-recovery>

SUMMARY OF KEY MESSAGES

This statement, prepared by the Task Force on Green Recovery of the Lancet COVID-19 Commission provides some initial reflections on key priorities to support a green, fair and resilient recovery from COVID-19. At this stage, the Task Force on Green Recovery emphasizes six key messages:

1. Recovery packages across the world should finance the transformations needed for a green, digital and fair future. A “green” fiscal expansion is more growth-enhancing compared to investing in a “return-to-normal,” and it builds a sustainable and resilient future for the current and next generations.
2. Recent commitments to achieve net zero greenhouse gas (GHG) emissions by around mid-century in Europe, China and other major economies can provide the needed momentum for deep transformations of economies and societies.
3. Environmental, social and governance (ESG)-based and sustainability investing strategies now account for over one-third of global Assets Under Management (AUM) and are likely to be a majority of global assets in the coming years. This fundamentally changes the direction of global capital flows. The recovery should build on this momentum.
4. Yet, so far, financial resources devoted to and commitments made for post COVID-19 recovery are largely insufficient for a green recovery, including in most G20 countries. One exception is the European Union (EU) where the European Green Deal (EGD) provides strong ambition and where efforts have been made to align investments framework for a green recovery. Yet, the effective implementation of the plan remains to be seen.
5. Low-income countries (LICs) and some emerging markets (EMs) urgently need support to address the immediate consequences of the pandemic

but also to build back more sustainable, inclusive and resilient.

6. Ensuring a successful biodiversity COP in Kunming, a climate COP in Glasgow and the World Food Summit in Copenhagen is essential for coordinated global governance actions on climate and biodiversity. Combined with other annual meetings (UNGA, G20, HLPF etc.) these can make 2021 the “super year for nature and climate” and can set the foundation for long-term international cooperation on the environment.

The final report of the *Lancet* COVID-19 Commission is scheduled for the end of 2021.

The COVID-19 pandemic is a serious setback for sustainable development, but United Nations (UN) Member States should not scale back their ambition. The COVID-19 pandemic has caused the worst economic contraction since the Great Depression.¹ **The Agenda 2030**, the Sustainable Development Goals (SDGs) and the Paris Climate Agreement (Paris Agreement) provide the long-term vision and remain “The Future we Want.”^{2,3} They provide a roadmap for sustainable, inclusive, and resilient recovery. Beyond fiscal expansion that boost aggregate demand, this crisis calls for transformative public investments that shape a sustainable, fair, and digital transition, and leverage private sector investment.

At the beginning of 2021 there was a 51% decrease in the number of COVID-19 cases for about five weeks, and it was the first consistent decline of COVID-19 cases seen at the global level.⁴ Based on country and region-specific data, the United States (US) and Europe were the main drivers of the decline and can be considered as the main drivers behind the overall epidemic trajectory.⁵

In most countries in the Asia-Pacific, the spread of the virus has been suppressed for many months thanks to effective public health policies. In other parts of the world containment measures have often been less effective, which are leading to higher health and economic impacts. While a portion of the world population may be vaccinated against COVID-19 by the end of 2021, ensuring fair access to the vaccine in low-income countries (LICs) and some emerging markets (EMs) remains a high policy priority and logistical challenge.

This statement, prepared by the Task Force on Green Recovery of the Lancet COVID-19 Commission, provides the contour of what the green recovery should look like. It is divided into six sections:

1. COVID-19: A turning point for sustainable, inclusive, and resilient development?
2. Leadership to move from pandemic emergency to a transformative recovery
3. Environmental, social and governance (ESG)-based and sustainability investing
4. Initial assessment of the “greenness” of recovery plans
5. Proposed criteria to inform the content of green and digital recovery plans
6. Global governance and key actors

This statement is complemented by three short case-studies. One on the European Green Deal (EGD), another considering how Egypt has gone green, and lastly one on Costa Rica’s green recovery. **The final report of the Lancet COVID-19 Commission will be released at the end of 2021.**

1. COVID-19: A TURNING POINT FOR SUSTAINABLE, INCLUSIVE, AND RESILIENT DEVELOPMENT?

The COVID-19 pandemic has induced the worst economic contraction since the Great Depression.¹ All countries need to “build forward better” guided by the 2030 Agenda for Sustainable Development and the Paris Agreement.¹ Nations considering a fiscal response must invest in “transformative spending” that boosts long-term growth and social prosperity by accelerating the transition to a green, digital and inclusive economy. The transition is no longer a choice, rather an imperative to meet global sustainable development and climate ambitions which reflect the limits of a business-as-usual approach from an economic, environmental, resource and equity standpoint. Beyond altering investment choices, systemic changes in the economy and society may equally be required to facilitate the transition to a green, digital and inclusive economy.⁶⁻⁸ It is paramount to understand and integrate the connection between the environmental and the public health agendas in policymaking.⁹

There are several drivers pushing policy makers to use the COVID-19 recovery as a springboard to accelerate the green transformation. **First, to reduce the risk of and increase the resilience from more extreme weather events and to keep hundreds of millions of people from entering poverty due to climate**

change impacts. Since 1990, the Intergovernmental Panel on Climate Change (IPCC) has been alerting governments, policy makers at all levels and the United Nations Framework Convention on Climate Change (UNFCCC) on the dramatic consequences of global warming.¹⁰ The Paris Agreement adopted in 2015 aims to keep global temperature rise this century well below 2°C above pre-industrial levels and to pursue efforts to limit the temperature increase even further to 1.5°C.⁷ This goal is linked to a requirement that all countries work together to bring greenhouse gas (GHG) emissions to zero within the second half of the 21st century, with the timing of when the zero emissions are reached being determined by the best available science. The *Lancet* Countdown on Climate Change and Health in its 2020 report has shown increasing relevant impacts of climate change on health with some 296,000 deaths occurring as a result of high temperatures in 2018.¹⁰ As this report points out, the window of opportunity is narrow, and if the response to COVID-19 is not fully and directly aligned with national climate change strategies, the world will be unable to meet its commitments under the Paris Agreement, damaging health and health systems today, and in the future. Failure to meet the SDGs could lead to deepening the climate and biodiversity crises as well as rising inequalities and poverty that will threaten current and future generations in all countries. Policy responses to reduce GHG emissions have been grossly insufficient to date.¹¹⁻¹⁴

Resilience is a term often invoked but rarely precisely defined. At its core our definition of resilience follows work put forth by the ecologist C.S. Hollings, and related phenomena long examined in various context by economists, mathematicians, and physicists.¹⁵ Concisely stated: resilience is the ability to withstand and recover from a disturbance. Both clauses of this definition are important. The first looks at how large of a disturbance a system can absorb without experiencing fundamental long-term changes to its structure and function. The second is concerned with the ability of that system to restore itself without unplanned outside intervention and, if so, the speed with which it returns to its original state.

Abstract work in this area typically refers the disturbance as a shock to a system. The relevant system can be a natural one like an ecosystem, an economic one like world trade among countries, a health-related one, or a social one involving networks between people. Shocks involve unexpected random components, of which the classic example is a large adverse weather event. Other types of shocks are possible such as the Global Financial Crisis in 2008, the advent of armed conflict within a country, and, of particular interest here, pandemics. A single shock can impact multiple systems and, as such, examining the sequence of changes a shock propagates is one way to illustrating interdependencies between systems.

Some improvements in resiliency can be put in conventional metrics such as reductions in loss of life or economic output given that a particular adverse shock occurs at some specific point in the future. This makes it clear that investments in resiliency are a form of insurance that requires current action to reduce uncertain future harm. The difference between an insurance investment and a resiliency investment is that the former pays out money to help mitigate the adverse shock *ex post* after it does harm, while the later reduces the harm of an adverse shock if it occurs. Neither type of investment makes sense if there is no threat of an adverse shock and the optimal insurance or resiliency investment increases with the expected magnitude or frequency of adverse shocks. A resiliency investment frequently looks more attractive than an insurance investment when not possible to adequately insure against all of the harm that might result from the shock. This will often likely be the case where multiple systems are hit by the same shock, something which has clearly characterized the current COVID-19 pandemic.

Our focus is on how pandemic-related shocks influence different systems and what actions might be taken to make them more resilient to such shocks in the future.

Second, to boost economic activity, employment and address social inequities. Simply reviving the existing “brown” economy may exacerbate irreversible climate change risks and heighten economic and

social risks.¹⁶ Based on a robust analysis of previous efforts to green the economic recovery during the 2008–2009 Great Recession, five policies with high potential to generate substantial positive economic and climate impacts in G20 countries were identified: clean physical infrastructure, building efficiency retrofits, investment in education and training, natural capital investment and clean research and development (R&D).¹⁷ For lower- and middle-income countries (LMICs) rural support and broad sectoral interventions (energy, agriculture, water, urban development, etc.) can catalyze the development of new enterprises and new jobs.^{17–20} Recent simulations of the effect of green recovery plans worldwide also suggest that a green economic stimulus is more growth-enhancing than a “return-to-normal” stimulus that could merely boost the unsustainable current consumption and production patterns.^{21,22} Greening recovery packages can deliver significant co-benefits beyond economic and climate contributions, including improved biodiversity outcomes, reduced air pollution and improved health status, as well as enhanced and cheaper energy access and supply.¹³ The International Renewable Energy Agency (IRENA) estimates that the transition to renewables, efficiency and electrification aligned with the Paris Agreement can drive broad socio-economic development.²³ Jobs in the renewables sector could reach 42 million globally by 2050, four times their current level.²³ In the US, the full set of investments to achieve a net zero emissions economy between 2020 – 2050 may produce approximately 2.5 million jobs per year, considering direct and indirect channels. Over four million jobs per year may be created if jobs generated through “induced” channels (i.e., multiplier effects of newly employed workers spending their earnings) are also considered. Effective industrial policies can expand total job creation to approximately 10%.²⁴ Effectively-targeted investments with positive climate mitigation and adaptation impacts can also benefit the most vulnerable and address social and gender inequalities. Distributed renewable energy solutions deployed through innovative delivery models and digital technologies offer an opportunity to bridge the significant energy access deficit particularly in Sub-Saharan Africa. Achieving universal access to modern energy is crucial to strengthen delivery

of public services as healthcare, improve people’s livelihoods and offer a pathway out of poverty for hundreds of millions globally.^{25,26}

Third, to reduce the likelihood of future pandemics.

The majority (70%) of emerging diseases (e.g. Ebola, Zika, Nipah encephalitis), and almost all known pandemics (e.g. influenza, HIV/AIDS, COVID-19), are caused by microbes of animal origin (so called zoonoses).²⁷ According to the 2020 Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) Pandemics Report “the underlying causes of pandemics are the same global environmental changes that drive biodiversity loss and climate change.”^{28–30} These include notably land-use change, deforestation and wildlife trade and consumption. Habitat loss and degradation facilitate an increased likelihood of contact between wildlife and humans, which increases the risk of virus spillovers. For example, outbreaks of Ebola in Central and West Africa have been shown to occur mostly in hotspots of forest fragmentation and in areas that had been recently deforested.^{31,32} There are also predictions that species experiencing population declines connected to hunting, wildlife trade and habitat change might host twice as many zoonotic viruses compared to threatened species that had populations falling for other reasons.³³ It is paramount to understand and integrate the connection between environmental and public health agendas in policymaking. COVID-19 is considered a “disease of the Anthropocene,” – an unofficial unit of geologic time, used to describe the most recent period in Earth’s history when human activity started to have a significant impact on the planet’s climate and ecosystems – so cleaning unsustainable supply chains and production processes that lead to deforestation and biodiversity threats can help reduce the risk of future zoonotic diseases and pandemics.^{34–36}

Recent global commitments to reach net-zero emissions around the middle of the century provide strong impetus for accelerated and coordinated global actions. The 2019 EGD adopted in 2019 aims for net-zero GHG emissions by mid-century. China has committed to carbon neutrality before 2060, followed by Japan and South Korea’s

pledges to carbon neutrality by mid-century. The US Biden Administration has also pledged to achieve carbon neutrality by 2050. Canada proposed the Pact for a Green New Deal (PGND) in May 2019.^{37,38} India has started to discuss its own plan for achieving climate neutrality. Other countries have also committed to net-zero emissions by 2050 including Chile, Costa Rica, South Africa and other countries. To achieve zero emission goals, sustainable cities are crucial. The C40 Cities Climate Leadership Group, which include 90 of the world's most populated cities, is driving urban action towards zero emission while increasing wellbeing and development.

Yet, there is a risk that the actual degree of investment in green recovery strategies may be at best insufficient to meet global climate aspirations and at worst dwarfed by spending on high emission conventional industries and investment initiatives. This may deepen the crisis facing the environment, upon which economic activity and welfare depends. Lack of experience in implementing such deep transformations of energy, transport and labor markets coupled with the depth of recession risks leads to the generation of a volatile mix of economic pressures that can result in the promotion of short-term conventional re-expansion policies.

Green recovery and nature-based solutions (NbS) offer potential cost-effective ways to recover from the pandemic and create jobs. NbS are actions addressing key societal challenges through the protection, sustainable management, and restoration of both natural and modified ecosystems.³⁹ NbS can provide over one-third of the cost-effective climate mitigation needed between now and 2030 to stabilize warming to below 2 °C, achieving nature's mitigation potential of 10-12 gigatons of CO₂ per year.⁴⁰ Investments in NbS can help reduce financial consequences of climate change and support job creation, resilience to critical risks and reduce poverty and inequalities. Well-designed NbS can be effective, long-term, cost-efficient (especially when including costs for future generations of climate and biodiversity inaction) and globally scalable.⁴⁰ However, for a NbS to avoid negative consequences and maximize its positive impact, it must prioritize biodiversity,

incorporate gender priorities, and be implemented with the full engagement and consent of the local community. The financial cost of pandemics (Table 1) makes a strong economic case for NbS and further efforts to clean international supply chains and address the environmental degradation that has been responsible for most recent pandemics.^{30,41-43} In August 2020, Ethiopia announced a USD 3.6 million project on NbS to improve water resources and create 1,500 jobs.⁴⁴ According to the World Economic Forum, 2021 is a crucial year in mainstreaming NbS.⁴⁵

Well-designed climate adaptation investment programs can also be attractive additions to recovery programs, as they generate a triple dividend: avoided losses due to climate change, economic benefits from the investment programs and social and environmental benefits.

One example is that competitive costs make renewables highly attractive for the recovery. As emphasized by IRENA, the cost of renewables has dropped significantly.⁴⁶ More than half of the renewable energy capacity added in 2019 achieved lower power costs than the cheapest new coal plants, while renewable energy storage installations accelerated across the globe.⁴⁶ Adding to these, the potential for growth and job generation from improving the energy and resource efficiency of buildings and from the transition to circular economy, one can make the technological cost-efficiency case for a green recovery.⁴⁷ Renewable-based electricity generation and energy-efficiency-enhancing investment are more job-intensive than the generation of electricity from fossil fuels.²¹ In rural areas, off-grid renewables can support productive activity at all stages of the agri-food chain, including irrigation and post-harvest processes, driving community development, strengthening livelihoods and improving the quality of life.⁴⁸ France, Italy, Nigeria, Colombia and Morocco are some of the countries who announced plans to incentivize green investment in renewable energy.⁴⁹⁻⁵² Rural regions, especially remote ones, are leading in renewable electricity production and have a particular role to play in the recovery. Remote regions record a higher share of renewables (51% of total production) than

regions that are close to a small or medium city (33% of total production).⁵³ This means that some rural areas have a clear comparative advantage in producing renewable electricity, largely because of their favorable geographies such as elevated and open spaces, biomass availability and low population density. However, not all rural geographies offer equally favorable conditions. It is therefore important to identify potential based on a place-based analysis. The energy retrofits of buildings in line with the 2050 net-zero GHG emission objectives adopted by the Organization for Economic Co-operation and Development (OECD) countries, is an ideal opportunity for job-rich and environment spending in a sector that offers low- and middle skill employment. Since all buildings must be renovated and renovations are behind, this would be an opportunity to create many jobs quickly and lastingly.

For countries not yet on a green path, the sustainability transition may involve higher adjustment costs and reallocation of workers. Investments can be used as an opportunity to invest in sustainable production, infrastructure and waste management, among others, which are adapted to each country's reality and supports them to become more resilient. It is wrong to massively invest in dirty assets, which may soon become "stranded" due to technological, market or policy changes.⁵⁴ Bringing workers back to jobs in industries soon to become obsolete is not a good long-term investment. It will also be important to combine policy and financing instruments like "just transition" funds to re-skill and up-skill workers for the green and digital economy.⁴⁷

2. LEADERSHIP TO MOVE FROM PANDEMIC EMERGENCY TO A TRANSFORMATIVE RECOVERY

Many parts of the world continue experiencing COVID-19 waves and new variants, which is delaying political attention from the focus on the green recovery. Apart from some countries in the Asia-Pacific, most countries have not suppressed the spread of the virus and the vast majority of countries were in recession in 2020. Some economic recovery is projected in 2021; albeit at different speeds across countries and regions.⁵⁵ Unprecedented policy moves by central banks and strong fiscal support helped restore orderly market conditions and mitigate the economic impacts of the crisis in advanced economies (AEs) and some EMs. Limited access to financing remains a barrier in LICs and some other EMs for dealing with the health and economic impacts of the crisis and long-term green recovery. In the short-term, the priority should remain the suppression of COVID-19, while maintaining economic lifelines, as there can be no sustained economic recovery when a pandemic is raging. In addition, the post-COVID-19 response should be based on reinforcing public health infrastructures to successfully prevent and control future pandemics. This should include strong preparedness, evidence-based preventive approaches and global, interdisciplinary and integrated systems for pandemic risk prediction.⁵⁶ Equally important is to leverage the COVID-19 response to achieve universal access to diagnosis and treatments.⁵⁷

Table 1. The Financial Cost of Pandemics

Pandemic	Economic Cost (USD 2020, billions)
COVID-19 (2019-2020) to date (20/11/2020)	8000-16000
Ebola (2014)	53
Zika (2017)	7-29
SARS (2003)	40-80
Spanish flu (1918)	3000
Prediction of pandemic cost in 2007 (Influenza, avian flu)	800

Source: IPBES (2020); Garrett (2007); Jonas (2014); Amadeo (2020)

The International Monetary Fund (IMF) predicts positive GDP growth in 2021 globally (5.2%), in AEs (3.9%) and in EMs and developing economies (6%).²¹ The OECD revised upward, by one percentage point, its global GDP growth projections for 2021 in its latest Economic Outlook (March 2021). In the short-run, the priority should be to implement non-pharmaceutical interventions to contain the spread of the virus followed by the global roll-out of the vaccine as early as science permits. Progressively, targeted public investment oriented towards green and digital technologies should be implemented to compensate for low private investment and ultimately stimulate aggregate demand for sustainable goods and services. In the short and possibly medium run, public investment may be an important source of economic growth since private investment and trade may remain disrupted due to health and economic uncertainties.

LICs considerably lack fiscal space to implement green recovery stimulus. According to the OECD's latest Global Outlook on Financing for Sustainable Development, "developing countries are facing a shortfall of USD 1.7 trillion in the financing they need this year to keep them on track for the 2030 SDGs, as governments and investors grapple with the health, economic and social impacts of the COVID-19 crisis."⁵⁸ It is crucial that multilateral financial institutions and development banks mobilize substantial resources to support LICs and EMs from green recovery to green development: green recovery policy formation, green infrastructure investment, green energy technology transformation and green financing. This should be coupled with requisite technical and institutional capacity building for an effective green recovery.⁵⁹ They should also leverage the commitments submitted to the 2021 Conference of the Parties (COP 26) and to the UNFCCC by Nationally Determined Contributions (NDCs).⁵⁴

COVID-19 showed that it is possible to mobilize political will and resources and promote policy change in a short time frame, if the threat is perceived as urgent enough.⁹ The climate crisis is also an urgent threat and because of the pandemic, politicians may be willing to listen, learn and have

open dialogue for solutions. Different regions will have different capabilities to respond to the crisis, however, green recovery should be the same and common principle for all. A key priority is to identify what are the financing opportunities, how technology can be transformed, and what leadership is needed for this effort. Governments should expand green development, green recovery stimulus/investment package as a major policy driver today. The COVID-19 crisis also shows that significant leaps in human behavior and their impacts on the environment are possible.⁶⁰

3. ESG-BASED AND SUSTAINABILITY INVESTING

The fiscal spending to combat the economic impact of COVID-19 and safeguard the world's assets suggests that **investments can be aligned with the SDGs**. Financing energy and infrastructure will require collaboration among nations, an assessment of fiscal priorities for the global stimulus packages in light of SDG targets, and the development of a pact to make further financing available for at-risk areas. This fiscal spending takes place against a background of a movement in the global finance industry and financing towards addressing issues such as climate change, inequalities and financial inclusion, with ESG investment strategies becoming increasingly relevant.

Over the last few years, the financial industry started including as stakeholders: employees, customers, local communities and suppliers. The allocation of their capital away from harmful activities has contributed to the active role financial firms are playing in including ESG-based considerations on sustainable financing. Current observed trends are:^{61,62} (1) there is common ground among leaders in the finance industry in terms of their initiative to drive sustainability and sustainable development, (2) a number of financial institutions are leveraging and adapting their businesses to drive initiatives with the potential for high impact, (3) there is a link between a focus on sustainability and high levels of performance, and the integration of ESG and sustainability criteria can have a positive impact on returns as shown in

Figure 1, and lastly (4) the potential of these initiatives to transform the overall system of investment by catalyzing change in the industry, so that they adapt to changes in the world around them.

More than one-third of global Assets Under Management (AUM) are ESG-based and sustainability investing strategies. They are changing to the direction of global capital flows and as seen in Figure 3, are likely to become the majority of global assets. It is possible that the leading investors of the future that deliver superior returns (with lower risk) are those that (1) Shift investment allocation strategy on an explicit ESG and sustainability basis, (2) Restructure portfolios and allocate with active or passive impact and “do no harm” criteria investment, (3) develop domain expertise in sustainability, and (4) invest in product and service innovation.

Finally, the conceptualization and development of such hybrid metrics composed of both financial and ESG indicators, giving a joint indication of performance, is a significant initial step towards clear-cut quantitative assessment of the economic impact of sustainability.⁶³ The possibility to introduce a standardized set of metrics capable of correlating financial and economic indicators with ESG qualifiers has great potential to support a transition towards a sustainable economy.⁶³ Such a system when devised and deployed extensively, has the potential of reorienting business and investment decisions by matching optimal economic and sustainability choices, as it would directly illustrate the difficult trade-off between short- and long-term returns on both economic and socio-environmental dimensions.⁶³

4. INITIAL ASSESSMENT OF THE “GREENNESS” OF RECOVERY PLANS

The slowdown of economic growth and global output in 2020 is likely to have little direct long-term effect on global warming and biodiversity. Estimates show that the lockdowns and economic impacts of COVID-19 mobility restrictions, supply line contractions, and associated economic impacts might cause GHG emissions to drop in 2020 by 3-11%, which is comparable to the rates of decrease needed

per year over the next decades to limit climate change to 1.5°C above pre-industrial levels.^{64,65} However, emissions also picked up rapidly as countries removed lockdowns and mobility restrictions.⁶⁶ Currently implemented policies, including the effect of the pandemic, may lead to a 2.9°C temperature rise by the end of the century – well above the target set in the Paris Agreement.¹³ Although the immediate impacts of the pandemic may have minimal long-term effects on global warming and biodiversity conservation, the medium- and long-term impacts could be quite substantial,¹⁷ since COVID-19 provides a breakthrough moment to decouple economic growth from fossil emissions by implementing a green recovery program that offers short-term multiplier and employment benefits as well as long-term improvements to environmental capital, climate change mitigation efforts and the prosperity of future generations.⁶⁷

The magnitude of fiscal support introduced in 2020 was massive and helped avoid the worst health and economic impacts of the pandemic. As is natural given the severity of immediate COVID-19 health and economic threats, in November 2020, public spending in the largest 50 nations (including the European Commission – EC) had skewed significantly to rescue-type measures (USD 11.6 trillion) over recovery-type measures (USD 1.8 trillion) with approximately USD 2.1 trillion of spending of unclear type.⁶⁸ Rescue-type support focuses on keeping people, businesses, and livelihoods alive, while recovery-type support, prioritizes reinvigorating the economy following the crisis period. While there are opportunities to target clean outcomes through rescue measures (e.g., conditional liquidity support), governments have far greater flexibility in their recovery spending. As such, recovery-type spending deserves pronounced focus when considering a green recovery.

As one example, fiscal support to ensure tourism economy survival and recovery has been unprecedented. In the US, the travel and tourism sector has benefited from a USD 2.2 trillion economic stimulus package open to all businesses, delivered through a mix of measures including cash payments, loans, grants and guarantees. According to the OECD, a number of countries are also using the crisis as an

opportunity to support the green transition as part of recovery actions.^{53,69} For instance, Colombia is developing a National Sustainable Tourism Policy to place the sector at the forefront of a wider sustainable development and environmental protection agenda, while Mexico has developed a Sustainable Tourism Strategy 2030, to leverage the COVID-19 pandemic to

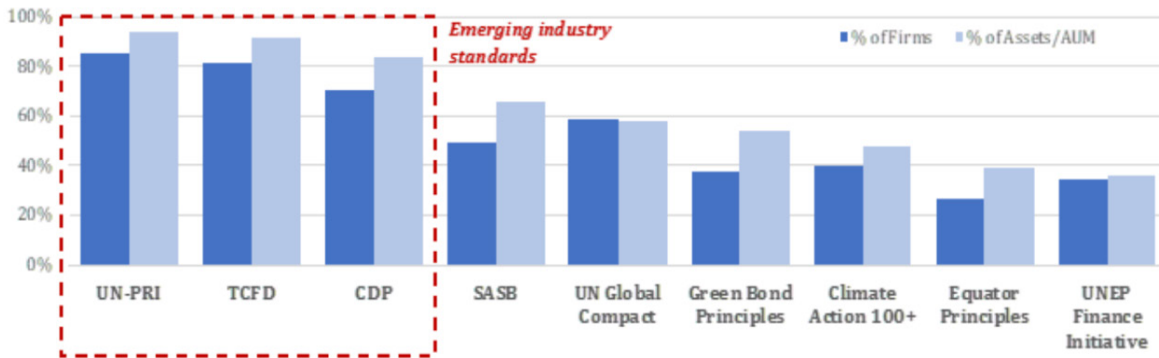
generate a radical change in tourism destinations, and to promote a socially inclusive sector that is committed to nature conservation. Other destinations, including Posio (Finland), Kyoto (Japan), and Bay of Plenty (New Zealand), are implementing initiatives to support sustainable and inclusive tourism development and the green transition.

Figure 1. ESG and Sustainability Oriented Investment Strategies Produce Better Returns

Asset Class	Percentage of Sustainable Funds Outperforming Market by Asset Strategy			
	1-Year	3-Year	5-Year	10-Year
Global Large-Cap Blended Equity	75.1	73.7	76.9	67.3
Global Large-Cap Growth Equity	60.3	43.2	37.5	56.7
Global Emerging Markets Equity	41.3	60.0	58.8	50.0
US Large-Cap Blend Equity	76.4	71.4	76.9	81.3
Europe Large-Cap Blend Equity	71.1	75.0	67.2	55.1
Eurozone Large-Cap Equity	63.5	63.0	60.6	62.3
EUR Corporate Bond	58.0	58.5	62.2	33.3
All Categories	65.6	65.6	64.4	58.8

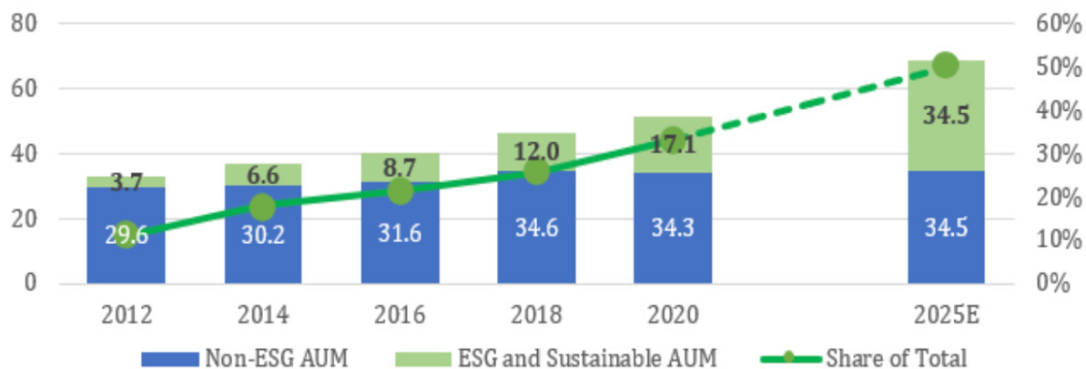
Source: Force for Good: Global Finance Industry Leaders Transforming Capitalism for a Sustainable Future” 2020

Figure 2. Membership of International Associations by Leading Global Financial Service Firms



Source: The Rise of Sustainable Finance: Global Investment Implications. Greater Pacific Capital, 2021.

Figure 3. Total ESG-Mandated Assets in the US (USD trillion) as Share of Total Professionally Managed Assets (%)



Source: The Rise of Sustainable Finance: Global Investment Implications. Greater Pacific Capital, 2021.

There is strong evidence to suggest that fiscal investment in green initiatives could bring strong environmental returns without sacrificing economic gains.

As summarized in the 2020 UN Environmental Programme (UNEP) Emissions Gap Report,⁷⁰ tracking initiatives from Climate Action Tracker, Oxford University, the IMF and Vivid Economics all show that only a small fraction out of the USD 12.7 trillion in fiscal spending introduced by G20 countries by October 2020 will positively impact the climate and the environment.⁷¹ In 15 out of the G20 members, the Greenness of Stimulus Index (GSI) score is negative, suggesting that fiscal spending in most cases leans towards emissions-intensive and environmentally damaging industries.⁷¹ The Global Recovery Observatory, in Figure 5, indicates that, excluding the EC, green recovery spending announced to December 2020 represented 18% of total recovery spending, and overall green spending represented 2.5% of total spending (accounting for both rescue and recovery).⁷² Indeed, the financial resources so far committed to support the green recovery by G20 countries (which account for 80% of global GHG emissions) are largely insufficient to achieve the SDGs, 2030 Agenda and the objectives of the Paris Agreement.^{13,57,71} Early evidence also suggests that green measures have focused primarily on energy and surface transport sectors, with other sectors (such as industry, agriculture, forestry and waste management) being less targeted.⁵⁸ Additionally, the nexus between sectors is not emphasized, and this is where the opportunities are to shape a green recovery in the context of EMs and LICs.⁷³ EMs and LICs dependent on environmentally-intensive sectors and without strong regulatory systems have a challenging task ahead.⁴⁹ To keep decades of progress against poverty from unwinding, EMs and developing economies will require substantial concessional finance from international partners, without which debt constraints will restrict recovery.

G20 countries continue to subsidize fossil fuels massively. About 54% of total G20 COVID-19 fiscal support to the energy sector was directed to fossil fueled initiatives in the period leading to October 2020.⁴⁹ At least USD 170 billion of public money has been devoted to fossil fuel-intensive sectors since the

start of the pandemic.⁷⁴ To a large extent, support of fossil industries has not incorporated green conditions.⁷⁵

Spending has notably included price support initiatives, direct budget transfers, tax expenditure on fossil fuel use and investment into state-owned enterprises. This is in spite of repeated G20 commitments to phase out fossil fuel investments.⁷⁶ Under the Paris Agreement, all governments have committed to “making finance flows consistent with a pathway toward low GHG emissions and climate-resilient development.”⁷⁷

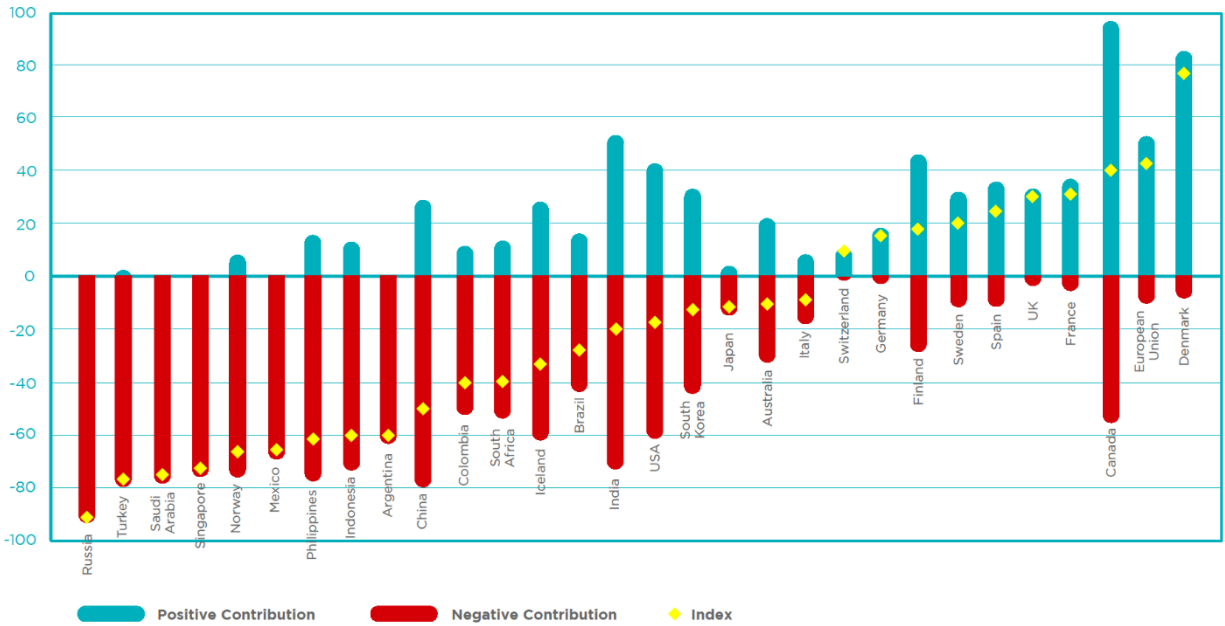
The pandemic might also slow down the implementation of climate and biodiversity conventions and the adoption of new laws and regulations.

More efforts are needed to protect the tropical rainforests (e.g., the Amazon), while also ensuring access to green infrastructure, health, education, and access to broadband in the region. According to preliminary data from Brazilian government space research agency, the National Institute for Space Research (INPE), deforestation in Brazil’s Amazon increased in October 2020 by 50% compared with the previous year and by 9.5% throughout the whole year 2020.^{78,79} Forest clearances were down 6% in the first 10 months of 2020, compared with the same period a year ago. It is urgent to enhance the bioeconomy in tropical forest area in a way that preserves biodiversity and benefits local communities.⁸⁰

5. PROPOSED CRITERIA TO INFORM THE CONTENT OF GREEN, FAIR, AND DIGITAL RECOVERY PLANS

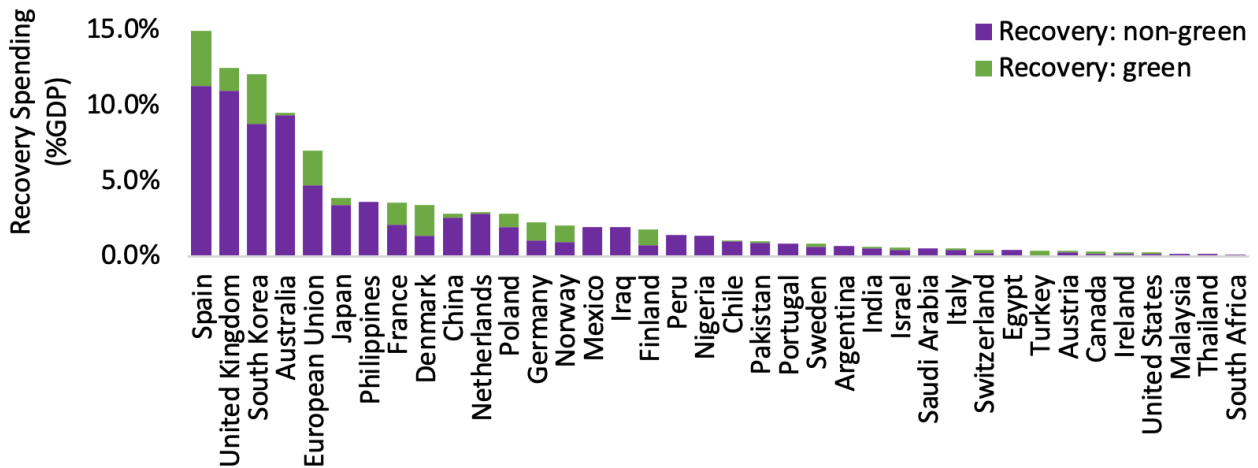
The COVID-19 recovery should accelerate the transformation of energy systems and societies to address the climate and biodiversity crisis while creating long-term quality jobs. Building on recent contributions, we propose a set of criteria to inform the design and evaluate the content of green recovery plans.^{13,17,35,49,81–84} These are largely indicative and not comprehensive. They will be refined by the Task Force in 2021.

Figure 4. Greenness of Stimulus Index (February 2021)



Source: Vivid Economics (2021)

Figure 5. Recovery COVID-19 fiscal spending as a proportion of GDP in the largest 50 economies (December 2020)



Source: Global Recovery Observatory (O’Callaghan et al., 2020). Note: nations spending less than 0.1% of GDP on recovery measures are excluded from this figure. Among the largest 50 economies, these are the Czech Republic, Belgium, Russia, Colombia, Singapore, Brazil, Bangladesh, Indonesia, Romania, Taiwan, Iran, UAE, and Vietnam.

- Comprehensive and integrative in their scope and cover energy efficiency, renewable energy, circular economy and recycling, water and natural resource management, biodiversity and conservation, climate change adaptation, and resilience and digitization. They should be targeted to a wide range of sectors and their nexus, including transport, energy, industry, small and medium-sized enterprises (SMEs), tourism, food, agriculture, forestry, buildings, sanitation,

and waste management.⁸⁵ Recommendations should consider distinct landscapes, including terrestrial (i.e., forests, grasslands) and aquatic (i.e., oceans, rivers) ecosystems, as well as urban, peri-urban and rural areas. Public procurement should also be considered as a sector or as a key driver for green recovery. To achieve transformative changes, actions in different levers should be deployed together in an integrated and intentional manner.⁸⁶

- Aligned with the targets set in international conventions and treaties including the SDGs, 2030 Agenda, the IPCC, the Paris Agreement, and Convention on Biological Biodiversity (CBD). Ambitious time-bound targets aligned with international agreements should be set up and monitored.
- Ensure a fair transition and manage socio-economic trade-offs to ensure a just transition and public buy-in and support. The goal of bringing net carbon emissions to zero by 2050 in each country can be achieved through a comprehensive policy package that is growth friendly (especially in the short-term) and involves compensatory transfers to households to ensure inclusion.²¹ Yet, despite the synergies between environmental and economic goals that can be obtained from several green recovery measures, trade-offs between environmental and economic objectives also exist.^{87,88} Each country should determine the mix of recovery measures taking into account both synergies and trade-offs. There should be an unprecedented commitment to reskilling and upskilling people throughout working life, including skills to prepare workers for the digital economy.⁸⁹ In LICs, where unemployment rates are high, solutions should go beyond upskilling, but in investing in education systems and in providing platforms that allow innovation to happen at a local level (e.g. by strengthening local capability formation through North-South and South-South linkages).⁹⁰ The economic impact of the green transition will differ widely across space. While many regions within countries may benefit, regions that have carbon intensive industrial sectors risk experiencing a major negative impact on their regional economy with potentially long-lasting negative effects. A spatial dimension with particular help to foster regional development in such regions is hence a crucial element of any just transition. Finally, diversity, equity and inclusion should be transversal to all solutions, aiming to repair structural inequalities related to inter-alia gender, race, ethnicity, disability, and economic or other status, increasing opportunities and resilience for historic vulnerable groups.
- Operationalized through mid- and long-term pathways that help guide policy frameworks. These should leverage contributions from government, legislators, scientists, businesses, investors and the civil society. Trade-offs between short- and long-term effectiveness should be evaluated.^{1,91} Global networks for research institutions, such as the Deep Decarbonization Pathways Project or the Food, Agriculture, Biodiversity, Land, and Energy (FABLE) Consortium under the Food and Land Use Coalition, can strengthen capacity and share knowledge across countries.⁹²⁻⁹⁴
- Based on “Do no harm” principle and include clear exclusion criteria for investments. For instance, The European Union (EU) financing department and the European Investment Bank (EIB) made an important step in that direction by deciding to stop funding oil, gas and coal projects at the end of 2021, cutting EUR 2 billion of yearly investments.
- Cover international supply chains and trade policies so that negative environmental, biodiversity and resource use impacts are not outsourced to other countries. The importance of establishing sustainability metrics that track these spillovers has been highlighted by both policy experts and environmental advocates, including the Swedish activist Greta Thunberg who in 2019 accused rich countries of “creative carbon accounting” to the extent they track only “production-based” emissions, leaving aside the consumption-based emissions embodied in imported goods.⁹⁵⁻⁹⁸ International spillover effects are said to occur when one country’s

actions generate benefits or impose costs on another country that are not reflected in market prices, and therefore are not “internalized” by the actions of consumers and producers.⁹⁹ Addressing spillovers from unsustainable supply chains is only possible if it can be measured.¹⁰⁰ Data on economic transactions and Multi-Regional Input-Output tables (MRIOs) can be used to trace impact from producers to consumers.^{36,101,102}

- Identify opportunities to promote behavioral change. Deep transformations can only be achieved through behavioral changes by consumers, producers and distributors. Behavioral changes should be a consequence of self-determination and result from empowerment and participatory processes, since it might require challenging social norms and/or cultural practices.⁸⁶ Thus, green recovery plans should stimulate changes in citizen’s and consumer’s behavior towards more sustainable patterns through education, awareness raising, citizen science, observation and monitoring of their environmental impacts, civic engagement and social innovation. In some cases, new or adapted regulations could be implemented to encourage this transformation. Each recovery strategy should identify the best opportunities to engage its citizens and promote behavioral change.

The above criteria all fit within a need to change the way in which the environment is brought into economic and policy decision making. We have to recognize that human wellbeing and the economy rests upon the natural environment. Almost every good that is sold is just one or two steps away from an input from the natural environment – yet often that input is ignored or treated as free and infinitely available; this is simply not the case. The natural environment and the economy are two complex systems with myriad connections between them. Most business and policy decisions ignore these connections and the incredible variety of other vital benefits we get from the environment, which are not reflected in market priced goods alongside the non-market costs of economic activity, such as climate change, pollution and biodiversity loss.

Approaches to decision making and policy creation, which incorporate the connections between the environment, the economy, and the wider non-market benefits and costs of economic activity are now well established and increasingly incorporated within official guidelines regarding policy appraisal.^{103,104} However, decision support tools are only just becoming available for practical implementation of these approaches, and rapid development and use of such tools remains a priority to ensure that decision makers understand the full implications of their business and policy decisions.¹⁰⁵

The need to ensure that the wider consequences of decisions is known is self-evidently vital to delivering a green recovery. Decision makers require information on:¹⁰³

- **Sustainability of decisions:** How will a decision affect stocks of human, manufactured and natural capital between generations. Climate change of itself is proof that we are running down nature’s capital at an unsustainable rate while biodiversity loss, pressures on the natural world, and its evident link to disasters like the COVID-19 pandemic show that we are depleting nature so rapidly that even present generations are counting the cost
- **Efficiency:** While technology can help us improve our use of resources, ultimately, they are finite. Therefore, efficient use of resources, particularly those irreplaceable assets provided by the natural environment such as our climate, energy, and biodiversity is vital. This appraisal has to consider all of the values (positive and negative) arising from change – irrespective of those benefits and costs arising within or beyond the realm of marketed goods (e.g., GHG emissions have to be counted alongside the value of the goods they deliver).
- **Equity:** Those who reap the benefits of change and those suffering its costs are often not the same people. This can cut across social and policy objectives regarding distribution and equality. Knowing the winners and losers in advance allows decision makers to refine decisions or bring in compensating measures. This information is

also a vital ingredient in ensuring that change is correctly incentivized.

These three principles are fundamental to the delivery not just of a green recovery but to good decision making generally. Yet decision making systems often omit much of the above resorting simply to a focus on information on market prices irrespective of sustainability, wider efficiency or equity implications. Decision support systems also need to show the consequences of changing decisions. For example, carrying out activities at different locations and times, or simply using the available resources in different ways and to different ends.

This environmental-economic system (or “natural capital”) approach to decision making is vital to numerous SDGs. For example, SDG15 seeks to “protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss.”¹⁰⁶ Such an objective cannot be attained with a standard approach to decision making which only considers market priced benefits and costs. Take the example of restoring and extending forests to both avert future human-wildlife zoonoses such as COVID-19 and tackle the dual challenges of net zero emissions to address climate change and the ongoing global biodiversity extinction event. None of these essential benefits are reflected in the price of market goods and services and could be ignored by a conventional financial decision making approach. The natural capital approach overtly incorporates these non-market values as part of its assessment of the sustainability and efficiency of decisions, while its equity analysis highlights the very uneven distribution of the benefits and costs of land use change across society. Moving to a decision system which overtly recognizes sustainability, efficiency and equity is an unavoidable steppingstone on the path to green recovery.

6. GLOBAL GOVERNANCE AND KEY ACTORS

It is essential that all stimulus plans ensure that they contribute to a truly transformative recovery towards a green economy and are on the path of sustainable development, rather than simply maintain the existing companies and jobs (essentially the “business as usual” scenario). To launch and effectively implement such transformative programs, the top policy makers must ensure broad-based political and socio-economic support for the proposed actions and programs. Thus, the proposed measures for the “green recovery” should be designed, assessed and adopted with the broadest possible participation from all societal actors, be they public policy makers (including local and national members of the Executive and the Legislative branches), scientists and academics, private sector, local authorities or NGOs.

Private and public financing should be mobilized for the transition (including green financing) and new forms of public-private partnerships (PPPs) are needed to implement key transformations and stimulate green innovations. Mission-oriented PPPs should be considered.¹⁰⁷

In addition, the proposed green recovery strategies should be aligned with strategies to meet the SDGs by 2030 and informed by consensus reached at global fora, including (but not limited to) COVID-19. In that perspective, 2021 provides good opportunities to strengthen international actions and commitments for climate and biodiversity (UNFCCC COP26, CBD COP15, UN High Level Political Forum - HLPF, G20, UN General Assembly - UNGA, Food Systems Summit, World Ocean Summit, etc.). It should be one of the contributions of members of The Lancet COVID-19 Commission generally, and of this Task Force specifically, to participate in such international policy to emphasize the necessity of a transformative green recovery as we create by our acts of commission and omission the new post-COVID-19 world.

With the return of the US in the multilateral system, and in light of the Commitment made by China, the EU, Japan, South Korea and other countries to move towards carbon-neutrality, we can hope for increased political leadership and investment for climate action, and the engagement of the G20 in driving efforts for a green, inclusive, and resilient recovery.

To ensure that **governments and local authorities retain the ownership of green investments and reforms**, international organizations and other experts advising the governments need to provide technical support that is transparent and familiar to these governments:

Transparent: Open-source databases, models and platforms should be used as much as possible for policy advice and guidance, to which policy makers and other stakeholders have access. This should be seen as part of the Open Science model discussed below.

Familiar: Recovery measures should start from existing national policies and plans, (e.g., climate change adaptation plans, climate vulnerability risk assessments, national energy and climate plans, national biodiversity strategy) so that policy makers have already worked on them.

Each nation needs to identify tailor-made policies and interventions with embedded greening ambition that best suit their national, political, financial, human resources and cultural needs (e.g., Egypt Goes Green – attached separately). A strategy for economic recovery needs to be convincing to national decision makers and embraced by society, which is experiencing economic uncertainty and public health concerns. An example is the application of the World Bank “sustainability checklist” for recovery measures applied in Fiji’s Climate Vulnerability Assessment.¹⁰⁸⁻¹¹⁰ A similar methodology was applied in Cyprus, where recovery measures were included in the country’s National Energy and Climate Plan, and later expansion of measures was announced by the Finance Minister in May 2020.¹⁰⁸

Governments should stimulate the inclusion of NbS in inter-alia their own NDCs, spatial planning, national development plans and building plans. NDCs can also leverage Climate Relevant Innovation System Builders (CRIBs). “CRIBs are an evidence-based policy vehicle/institution through which innovation system building around climate technologies can be achieved.”¹¹¹ Regional coordination in implementing CRIBs to deliver NDCs represents a key opportunity for East African countries to show international leadership (which may be followed by other developing countries).¹¹¹ “CRIBs can ensure a nationally determined, needs based approach; fuel green growth, de-risk innovation, inform enabling policy environments, engage national stakeholders and mainstream a focus on women, youth and other marginalized groups.”¹¹¹ Local governments and city networks, like C40, provide a unique opportunity to develop, test and disseminate NbS and transformative development policies.

All social actors must participate. Commodity companies, financial institutions, governments, academia, and civil society organizations should collaborate, prioritize actions, develop inclusive governance models and track and report progress on key metrics, including the reduction of deforestation, sustainable management of biodiversity and reduced inequalities, the issue of water use and waste, and the move towards ever-better supply chains in both **rural and urban landscapes, with special emphasis on forests and cities.** Governments should reinforce social participation and be open to new forms of experimentation and innovation like the recent random citizens’ assembly to set France’s policy in carbon emissions.

Forests, and more generally, land use, play an important role in the economies of many parts of the developing world and are essential to deal with many of the global environmental and social challenges and the global effort to deal with climate change. We need new, science-based approaches to be adopted by the private sector in these countries, and governments should adopt evidence-based regulations and promote PPPs to both provide the needed incentives for industry and to ensure that the

local and indigenous communities are involved and benefit from the projects.¹¹² Indeed, the private sector can leverage the bio-economic potential of tropical rainforests through existing local technologies and new technologies emerging from the revolutions in digital technologies, biotechnologies, and material science.

Oceans and seas are the world's largest ecosystem, the global climate system regulator and essential for making the planet livable. The implementation of SDG14 to "Conserve and sustainably use the oceans, seas and marine resources for sustainable development" is crucial for the support of the global population's economic, social and environmental needs. Marine and maritime research for Blue Growth implemented through a strategic and coordinated approach across all challenges and priorities of SDG14 is needed and it should take into consideration pivotal concepts, such as the circular economy and the systems innovation approaches. We need to unlock the potential of resources from seas, oceans and inland waters for different uses and across the range of marine and maritime industries while protecting the environment and adapting to climate change. Blue Growth will support sustainable growth in the marine and maritime sectors, through sustainable exploitation of marine resources for healthy, productive, safe, secure and resilient seas and oceans.^{113,114}

National, regional and local governance structures should encourage and support new, more **transparent business models**, that internalize accountability for their social and environmental costs throughout supply chains. The push for a green recovery should include support for new forms of production based on a combination of local knowledge and technologies that have evolved in synergy with the region's ecology, as well as "smart technologies" drawn from the revolutions in information and communications technology (ICT), artificial intelligence (AI), biology, and materials science to improve production while minimizing waste and environmental impacts.

Cities account for about 70% of GHG emissions and need to become carbon neutral.¹¹⁵ At the same

time, cities are increasingly creating opportunities to decoupling economic growth from environmental degradation. Cities should be given the autonomy and resources to engage in effective evidence-based and inclusive participation in transformative changes to become carbon neutral. Here, the role of **municipal and regional authorities** is key to support the transition to smart mobility, smart living (reimagining cities and rural landscapes), digitization, and inclusive growth. Indeed, in the OECD, where this is extensively documented, subnational governments are responsible for two-thirds of public investments, and for an average of 65% of the total expenditure related to climate/environmental action.⁸⁶ Industrial Ecology Virtual Laboratory (IELabs) enable city- and regional-level assessments, and assess carbon emissions of households at a council-level and drivers of emissions at a global-level.¹¹⁵⁻¹¹⁷ Investments in nature-based solutions and sustainable agriculture in urban and peri-urban areas are ideally suited to tackle the ongoing crisis because they can be ready to use, are transitional, provide stimulus to particularly vulnerable and local populations, and are resilient to future lockdowns (i.e. can be socially distanced).^{97,118} Moreover, cities have a unique role to play not only on advancing SDG11 Sustainable Cities, but in contributing to most SDGs given their role in public investment. The OECD estimates that at least 105 of the 169 SDGs targets will not be reached without proper engagement and coordination with local and regional governments.¹¹⁹

Looking globally, OECD has been tracking the responses to COVID-19 in around 100 cities in the world, and many of them have been implementing not only emergency measures, but also permanent sustainable changes (i.e., urban mobility).¹²⁰ The C40 mayors have united to launch the Global Mayors COVID-19 Recovery Task Force.¹²¹ This task force aims to rebuild cities and economies in a way that improves public health, reduces inequality and addresses the climate crisis. The European Institute of Innovation and Technology has gathered data on how the transition to green and digital economies can be incentivized by participatory systems and innovative approaches, within cities and regions.

But in thinking of the recovery, it is paramount to **consider the differences between the Global North and South** in strengths, weaknesses, and opportunities. The **poorest countries** in the world will have enormous difficulty mobilizing the funds required to fully re-launch their economies, much less transform them, post COVID-19.

Financial Resources need to be mobilized to support emerging and developing economies in financing just transitions and to strengthen the capacity of developing economies to access these funds.¹²² Commitments towards means of implementation and associated global vehicles (such as the **Global Environment Facility (GEF), Green Climate Fund, the World Bank and the regional Development Banks**) need to be increased.

Debt relief and debt restructuring should be considered and funds that could have gone to repayments (plus an increased amount of new funds) should be spent to address rising poverty and hunger and transform these economies, including health and education systems and climate change mitigation and adaptation.

Financing should support and build capacity for **job creation, local innovation, growth of SMEs and new industries, and by retrofitting existing facilities**, they can also contribute to a green economy. Value can be created in these regions through innovation hubs/incubation centers and education systems (universities and technical training institutes). Innovation and entrepreneurship should be encouraged through mechanisms that facilitate funding for Science, Technology and Innovation (STI) hubs.¹²³ EMs and LICs should be seen as more than consumers of technology from developed countries, but as partners who promote their local talent, encourage knowledge and innovation, and advance technology.

Finally, the **African continent and Small Island Developing States** should receive particular focus for project commitments as they contributed least to climate change but remain extremely vulnerable to its effects.

While external aid is important, LMICs facing fiscal constraints can also increase fuel taxes that can raise revenues while increasing energy efficiency and lowering emissions. India has taken this approach. Fuel taxes are progressive in LICs and can be made more so by recycling revenues towards the poor as was done in Iran.^{124,125}

OUTLOOK:

This statement prepared by the Task Force on Green Recovery underlines the need for a green and digital sustainable recovery to respond to the climate and biodiversity crises while at the same time to create sustainable jobs and promote inclusive economic growth. The statement emphasizes the need for G20 countries, responsible for 80% of global GHG emissions and for a large share of environmental damages globally including through unsustainable supply chains, to beef up efforts. The statement underlines the crucial role of international and national actors, but also of subnational entities (including cities) and scientists in supporting a sustainable use of the large fiscal packages unleashed by governments to recover from the pandemic.

We emphasize six key messages:

1. Recovery packages across the world should finance the transformations needed for a green, digital and fair future. **A “green” fiscal expansion is more growth-enhancing** compared to investing in a “return-to-normal,” and it builds a sustainable and resilient future for the current and next generations.
2. Recent commitments to achieve net zero greenhouse gas (GHG) emissions by around mid-century in Europe, China and other major economies can provide the **needed momentum for deep transformations** of economies and societies.
3. Environmental, social and governance (ESG)-based and sustainability investing strategies now account for over one-third of global Assets Under Management (AUM) and are likely to be a majority of global assets in the coming years. This

fundamentally changes the direction of global capital flows. The recovery should build on this momentum.

4. Yet, so far, **financial resources devoted to and commitments made for post COVID-19 recovery are largely insufficient for a green recovery**, including in most G20 countries. One exception is the European Union (EU) where the European Green Deal (EGD) provides the right level of ambition and direction and where efforts have been made to align investments framework for a green recovery. Yet, the effective implementation of the plan remains to be seen.
5. **Low-income countries (LICs) and some emerging markets (EMs) urgently need support** to address the immediate consequences of the pandemic but also to build back more sustainable, inclusive and resilient.
6. Ensuring a successful biodiversity COP in Kunming, a climate COP in Glasgow and the World Food Summit in Copenhagen is essential for coordinated global governance actions on climate and biodiversity. Combined with other annual meetings (UNGA, G20, HLPF etc.) these can make **2021 the “super year for nature and climate”** and can set the foundation for long-term international cooperation on the environment.

ANNEX 1. CASE STUDY: EUROPE'S RECOVERY PLAN

The European Green Deal (EGD), announced in December 2019, sets out how to make Europe the first climate-neutral continent by 2050 and constitutes a leadership example for all continents.⁹² In addition to climate neutrality, the EGD aims to protect biodiversity and human health, become more resource-efficient, achieve clean technology leadership for European companies and “leave no-one behind” in an inclusive and fair sustainability transition.

The implementation of the nine policies of the EGD on Biodiversity: From Farm to Fork, Sustainable agriculture, Clean energy, Sustainable industry, Building and renovating, Sustainable mobility, Eliminating pollution, and Climate action, are supported by EUR 1 trillion. Approximately half of this EUR 1 trillion is derived from the EU budget and the Emission Trading System, and the other half is to be leveraged by PPPs. A just transition fund is earmarked for helping the transition in regions heavily affected by decarbonization.

Even after COVID-19 pandemic, the EGD remains the growth strategy of Europe. The multiannual financial framework (MFF) and the Next Generation EU (EUR 750 billion) provide an envelope of EUR 1,824 billion to recover from COVID-19 and support the transition to a green and digital economy.⁵⁵ Various implementation mechanisms, including macroeconomic coordination (European Semester), are being mobilized to streamline investments and member states' support to the objectives of the EGD.¹²⁶

European Climate Law and EU Climate Pact leverage EGD

The European Climate Law and the EU Climate Pact are supporting the implementation of the EGD.^{127,128} A revision of the Climate Law towards the following direction is needed (suggested revision derive from work done by the Climate Change Committee of Greece): include an ambitious goal with regards to GHG emissions by 2030, address the other legislative interventions and revisions that will be required to

achieve climate neutrality by 2050, allow the EC to impose sanctions on Member States, allow the EC to take additional measures and change policies that will correct possible deviations from the path to achieving the emission goals, include a clear reference to an assessment mechanism between today and 2050, include reference to financial mechanisms that will be required to achieve the goal of climate neutrality, and include reference to comprehensive framework that will recognize the relationship between water, energy, food security and biodiversity (WEF Nexus).

EGD success is dependent on citizen engagement

The success of the EGD will to a large extent depend on the EU's capacity to engage with its citizens. The EU is preparing a European Climate Pact to bring together various actors, including regions, local authorities, local communities, civil society, schools, businesses and individuals. The Climate Pact needs to leverage the power of Europeans to achieve the EGD's vision of a prosperous, inclusive, climate resilient society with a circular, net-zero emissions economy by 2050. A narrow focus on CO₂ reduction is counter-productive at the grassroots level – limiting the engagement, thinking and changes that are imagined and implemented. What is needed now is a fundamental transformation of economic, social and financial systems that will trigger exponential change in decarbonization rates and strengthen climate resilience.

The UN Sustainable Development Solutions Network senior working group on the “Transformation for EGD Implementation (SDSN-EGD-SWG) and SDSN Europe cross validates the European Semester, integrates technological pathways in European long run investment pathways, and integrates job creation effects in investment selection.”⁶³

Cross validation of SDGs, EGD policies, and the European Semester Recommendation

The United Nations Sustainable Development Solutions Network (SDSN) senior working group (SWG) on the “Transformations for EGD Implementation” (SDSN-EGD-SWG), and SDSN Europe on the “Transformations for the Joint Implementation

of agenda 2030 for Sustainable Development and the EGD: A Green and Digital, Job-Based and Inclusive Recovery” have investigated the relationship between the SDGs and the EGD policies, as well as cross-validated the European Semester process country-specific recommendations, with SDGs country-specific implementation performance.^{63,96} The report started with a textual analysis cross-mapping of the EGD policies with the 17 SDGs and 169 targets, which proved that the EGD is almost a mirror image of the SDGs, although the SDGs are more inclusive and holistic. This highlights that the EGD implementation will be facilitated if supported by the SDG framework and in particular the six transformations framework.¹²⁹ Moreover, the exercise confirmed the efficiency of the European Semester process in addressing the challenges identified in the SDSN Sustainable Development Report, although it clearly identified room for further improvements in aligning the two. The senior working group has also identified the EGD policies with the highest potential impact for economic recovery from COVID-19. These are the policies relevant to an environmentally friendly food system (“From farm to fork”), Sustainable Industry, Elimination of Pollution, and Climate Action. More explicitly, policies that have a direct impact on main pillars of human activity and should be prioritized for funding from EU Next Generation Instrument are: clean electricity generation, the green fuels of the future, the smart grids, the efficient utilization and recycling of materials, and the environmentally friendly use of land, especially in regards to agriculture.

Integration of technological pathways

The SDSN-EGD-SWG also integrates technological pathways in European long run investment pathways. These are identified in the EC Annual Sustainable Growth Strategy 2021 announced on 17 September, 2020.¹³⁰ Reforms and investments to create European flagships are: “Power up: lay the foundation for hydrogen lead markets in Europe and the related investments, Renovate: improve the energy and resource efficiency of buildings, Recharge and Refuel: promote future-proof clean technologies, Connect: provide universal access to rapid broadband services, Modernize: EU-ID and key digital public services, Scale up: increase cloud capacities and develop powerful,

cutting edge, and sustainable processors, and Reskill and Upskill: focus investments and reforms on digital skills and educational and vocational training for all ages. Reskilling and upskilling are crucial elements of the just transition process, as decarbonization affected labor force we need to be equipped with skills relevant to the new technologies mentioned above. Horizon Europe, the new European strategic framework research program that aims to incorporate research and innovation missions to increase the effectiveness of funding by pursuing clearly defined targets, is strongly aligned with the SDGs and the EGD, and is composed of 5 Mission areas (“adaptation to climate change including societal transformation”, “climate neutral and smart cities”, “healthy oceans, seas, coastal and inland waters”, “soil health and food”, and “cancer”).¹³¹

In their new report, “Transformations for the Joint Implementation of Agenda 2030 for Sustainable Development and the European Green Deal - A Green and Digital, Job-Based and Inclusive Recovery from the COVID-19 Pandemic,” SDSN Europe highlights the importance of consistent decisions from governments on investment flows and to enable a green financial sector for investing in technologies that can help achieve the objectives of the EGD. The report outlines technological and investment pathways to attain climate-neutral and circular economies, describing the necessary governance for preparing National Climate Neutrality Roadmaps for 2050, and providing elements for an enabling policy framework that can contribute to the decarbonization goal.⁶³

Incorporation of job-creation effects in investment selection

As it is highlighted in International Energy Agency’s (IEA) Sustainable Recovery Plan the EUR 1 trillion that will be mobilized by the EGD Investment Plan over the next decade will require a scale-up of energy and energy-related employment by nearly 900,000 people across Europe by 2030.¹³² In the early years, these jobs are concentrated in projects that can be ramped up rapidly through existing programs that can mobilize money quickly, such as energy efficiency retrofits and improvements to urban walking, cycling, and public transit infrastructure. In subsequent years,

higher levels of investment in power sector projects and manufacturing of electric and efficient vehicles may lead to jobs in the engineering and construction of new projects and manufacturing of new efficient and low-carbon technologies.

In its analysis SDSN Europe highlights that the impacts on employment prospects and the need for new skills in the population are essential elements of any economic recovery plan, especially since the pandemic has eliminated or endangered millions of jobs. Green energy and circular economy have significant growth and employment potential in Europe, as well as organic agriculture and nature-based solutions. The green transition requires commitments to public spending and pricing reform over a longer period, so policy makers should consider trade-offs involved for long-term growth. A just transition should reduce income inequalities with carefully designed policies (e.g., revenues generated by measures like energy and carbon pricing can be recycled to vulnerable sectors of the population) and appropriate skill and re-skill training should be provided through the European Just Transition Fund for vulnerable sectors of the workforce.

The SDSN-EGD-SWG highlights that the investment pathway will be supported by the use of the EU taxonomy.¹³³ The EU taxonomy is a tool to help investors understand whether an economic activity is environmentally sustainable and navigate the transition to a low-carbon economy. Setting a common language between investors, issuers, project promoters, and policy makers helps investors assess whether investments are meeting robust environmental standards and are consistent with high-level policy commitments. By the end of 2021, investors that offer funds in Europe described as “environmentally sustainable” will need to explain how, and to what extent, they have used the Taxonomy in determining the sustainability of the underlying investments. They must also disclose the proportion of underlying investments that are Taxonomy-aligned as a percentage of the investment, fund or portfolio. The EU taxonomy may accelerate sustainable finance, which will be instrumental for the allocation of public funds and for the development of PPPs to support

the implementation of the EGD. Sustainable finance has been endorsed by the EIB, the European Central Bank, the European Bank of Reconstruction and Development and many National Banks, not only in Europe, but also world-wide, while commercial banks are also trying to endorse the relevant principles.

Public investments in health or green growth will likely have insurance type properties that benefit future generations

Public investments in health or green growth and the evaluation of green growth in general, need to place the appropriate weight on the well-being of future generations and the future costs and benefits. Investments in health and environment have unique characteristics that affect the way in which their net benefits over time should be appraised to ensure that they provide social value. First there are long-run, intergenerational implications which can justify declining Social Discount Rates (SDR) if the net benefits are certain. Second, relative prices of health and environmental quality are likely to be increasing due to scarcity or income growth. This can also justify a lower SDR for health and environment. Third, investments in health, pandemic prevention, and environment are likely to have insurance type properties in that they, particularly health investments, pay off more in times of recession. Finally, in relation to pandemics or climate change, the avoidance of catastrophes cannot be ignored. Be it the prospect of an ensuing depression associated with a pandemic, or a climate shock, the catastrophe insurance properties of health, climate change mitigation and possibly biodiversity conservation investments should be clearly and systematically embodied in public investment appraisal.

Use of green bonds based on EU taxonomy for sustainable investment

The European Economic and Social Committee suggest that one way to increase financing of climate action is through green bonds issued by the public and private sectors based on the EU taxonomy for sustainable investment. Schemes to encourage this are urgently needed. The EIB can play an even larger role in two ways: by granting loans to projects contributing to climate action through outright

commitments and by stepping up the issuing of green bonds. These bonds could then be bought by the European Central Bank through its asset purchase program (APP) to a far greater extent than has been the case before.

SDSN Europe's report reviews the investment plans announced by the EU in support of both the EGD and the post-pandemic economic recovery. It outlines sustainable finance initiatives, points out the importance of adopting a systems approach and describes a successful example from the introduction of green bonds and their potential to contribute to specific SDGs.

Carbon pricing and Emissions Trading System (EU-ETS)

Efficient economy instruments are also crucial for a sustainable recovery. The two main European policy instruments are carbon taxation and the Emissions Trading System (EU-ETS). Ambitious carbon pricing is often correlated with high political trust and low corruption levels. It is typically much easier to implement in countries that import their fossil fuels and where the policy makers are less challenged by producer lobbies. Acceptability of carbon taxes can also be enhanced through several channels. One of these is careful earmarking of tax revenues for investments and technologies that actually contribute to the transitions to a climate sustainable future. One should note however that putting carbon tax revenue in the general budget is an excellent and very general type of revenue recycling. In principle, such a tax can then help lower other onerous taxes or expand useful payments and services throughout the budget. In a society with high trust in government this process is almost automatic, but it may still be useful to explain the process by saying that the revenues will be used to lower another tax or provide new services. Overall, careful marketing and communication may also be important. Specially earmarked fees and duties may be better terminology in some contexts than taxes, particularly in situations when trust in politicians is an issue.

Finally, it is important that the tax revenues collected are used transparently and fairly. It may for instance

be through revenue recycling either through checks to everyone or through payments that are more targeted to needy or deserving groups; however, the design of these mechanisms should be based on behavioral insights, in accordance with the political context and aligned with the availability of affordable green solutions. The EU-ETS Market Stability Reserve (MSR) has been absorbing excess allowances from the market since the beginning of 2019, which is the main reason for the pre-COVID-19 EUR 25 price. It will continue to take out the surplus and cancel those permits later. However, the MSR was designed to handle past oversupply accumulated over the years. It is not fit for purpose to deal with current or future surpluses. The MSR will need to be strengthened in the context of EU Climate Law implementation and the upcoming review of the EU carbon market rules. The pandemic-induced economic crisis has led to a drastic fall in fossil fuel prices which creates a good opportunity, particularly for importing countries, to tax fossil fuels. This will help provide revenue without immediately causing product prices so high as to cause protests.

Moving Forward

Europe, like the rest of the world, needs "transformative spending." A "return-to-normal" economic stimulus is not only environmentally unsustainable but also economically inferior to a green stimulus.^{21,22} Therefore, Europe needs integrated and coordinated interventions in economic, financial, political and social systems and along whole value chains, in order to identify an innovative new structure that will be resilient and sustainable. The EGD, the SDGs and the Paris Agreement are our blueprints to achieve this system innovation.

In this context, a holistic policy framework is necessary. The potential of economic policies and reforms to advance the sustainability agenda could be assessed through a comprehensive list of sustainability and resilience criteria which are explicitly linked with the UN SDGs. These provide clear guidance to decision makers on the different priorities against which a recovery measure has to be evaluated and can help design a green recovery plan that is adapted to each country's resources, conditions and needs. Table 2

illustrates a list of such criteria and their linkage with specific SDGs. Assessment of these criteria is possible only with a combination of quantitative evidence informed by expert modelling and qualitative input from stakeholders. To ensure inclusiveness and social acceptance of the green transition, measures need to be designed and assessed with the broadest possible participation from society (public policy makers, private sector, local authorities, and NGOs). This can help avoid relying solely on knowledge silos of academic experts or governmental policy makers, in line with the objectives of the European Climate Pact mentioned above and facilitate much needed mobilization of society for the transition to sustainability.¹³⁴

As signaled by SDSN Europe, “patient” finance is needed. Sustainable innovation requires long-term strategic finance, which the private sector may not provide unless there is a stable and consistent direction for investment so that regulation and innovation converge along a green trajectory.⁶³ For this purpose, an ecosystem of public finance is needed to direct the European economy towards a sustainable direction, which requires alignment of priorities of multiple financial institutions at various levels – from monetary and macroprudential policy down to firm-level economic policies.⁶³ Proactive government intervention and co-design of a systemic green transition with various stakeholders can ensure democratic oversight, increase ownership of investments and reforms of society, and direct public funds towards socially desirable uses.

The “UN framework for the immediate socio-economic response to COVID-19” from April 2020 established “five streams of work” to support the Member States build back better.¹³⁶ The framework aimed to fulfill the 2030 Agenda and its SDGs, building strong environmental sustainability and equality while responding to the COVID-19 emergency.

The five streams are:

1. Ensuring that essential health services are still available and protecting health systems;
2. Helping people cope with adversity through

- social protection and basic services;
3. Protecting jobs, supporting SMEs, and informal sector workers through economic response and recovery programs;
4. Guiding the necessary surge in fiscal and financial stimulus to make macroeconomic policies work for the most vulnerable and strengthening multilateral and regional responses; and
5. Promoting social cohesion and investing in community-led resilience and response systems.

To promote a science and innovation approach for implementing the UN Framework and its five pillars, and respond to a request from the Deputy Secretary-General’s (DSG) Office, a large group of scientists led by the Institute of Population & Public Health at the Canadian Institutes of Health Research (CIHR), developed the “UN Research Roadmap for the COVID-19 Recovery.”

The document is a framework to “leverage the power of science in support of a better socio-economic recovery and a more equitable, resilient and sustainable future.”¹³⁷ It aimed to articulate research priorities for the five pillars that can promote transformative changes to achieve a better recovery while attaining the goals of the 2030 Agenda for Sustainable Development.

The Roadmap includes proposing 25 research priorities (five for each pillar of the UN framework) and five strategies for strengthening research ecosystems. All components of the framework are intertwined in the same way the 2030 Agenda principles and goals are, and they are aligned with a green and more equitable recovery.

Table 2. Criteria used for the evaluation of green economic recovery measures and their relation to UN Sustainable Development Goals (SDGs)¹³⁵

a. Performance criteria for the short term (for the next 2 years):

	<i>Short name</i>	<i>Explanation</i>	<i>Related SDGs</i>
Environmental impact	Energy	Energy savings (ktoe) per million EUR invested	7
	CO2	CO ₂ emission savings (tn) per million EUR invested	13
	Nature	Will the intervention improve agriculture and land productivity? Will it protect biodiversity and ecosystem services?	11, 14, 15
	Other Environmental Impact	Other short-term environmental impact (on air quality, water resources, etc.)	3, 6, 11, 15
Economic / social impact	Economic multiplier	Economic output generation (million EUR) per million EUR invested	8
	Jobs	Net employment generation (persons) per million EUR invested	8
	Jobs for vulnerable	Are the employment opportunities of the intervention inclusive, gender-balanced, and available to vulnerable populations?	5, 8, 10
	Demand in affected sectors	Does the initiative generate demand in the most affected sectors? Or does this initiative target new or different sectors? If in a different sector, can the workforce easily shift to this new sector? Does the initiative include measures to facilitate the transition of workers and the required investments?	4, 8
	Skills	Are new skills required in new jobs? If yes, are they available in the population?	4, 8
	Time to Implement	How long will it take to fully implement this initiative and to create jobs and activity (including project design, consultation processes, budget mobilization, procurement, etc.)?	8
	Infrastructure & Productivity	Does the measure improve existing infrastructure? Does this affect productivity in the short term?	9, 12
	Technical feasibility	Is the intervention technically feasible with the country's capacity and know-how?	9
	Affordability	Is there a risk that vulnerable households or firms will incur high costs due to the measure?	1, 10
	Social acceptance	Could low social acceptance jeopardize the implementation of the measure?	1, 10

Table 2. Criteria used for the evaluation of green economic recovery measures and their relation to UN Sustainable Development Goals (SDGs)¹³⁵

		<i>Short name</i>	<i>Explanation</i>	<i>Related SDGs</i>
Environmental impact	Energy		Energy savings (ktoe) per million EUR invested	7
	CO2		CO ₂ emission savings (tn) per million EUR invested	13
	Nature		Will the intervention improve agriculture and land productivity? Will it protect biodiversity and ecosystem services?	11, 14, 15
	Other Environmental Impact		Other short-term environmental impact (on air quality, water resources, etc.)	3, 6, 11, 15
	Economic multiplier		Economic output generation (million EUR) per million EUR invested	8
	Jobs		Net employment generation (persons) per million EUR invested	8
Economic / social impact	Jobs for vulnerable		Are the employment opportunities of the intervention inclusive, gender-balanced, and available to vulnerable populations?	5, 8, 10
	Demand in affected sectors		Does the initiative generate demand in the most affected sectors? Or does this initiative target new or different sectors? If in a different sector, can the workforce easily shift to this new sector? Does the initiative include measures to facilitate the transition of workers and the required investments?	4, 8
	Skills		Are new skills required in new jobs? If yes, are they available in the population?	4, 8
	Time to Implement		How long will it take to fully implement this initiative and to create jobs and activity (including project design, consultation processes, budget mobilization, procurement, etc.)?	8
	Infrastructure & Productivity		Does the measure improve existing infrastructure? Does this affect productivity in the short term?	9, 12
	Technical feasibility		Is the intervention technically feasible with the country's capacity and know-how?	9
	Affordability		Is there a risk that vulnerable households or firms will incur high costs due to the measure?	1, 10
	Social acceptance		Could low social acceptance jeopardize the implementation of the measure?	1, 10

ANNEX 2. CASE STUDY: EGYPT GOES GREEN

The Egyptian Government in supporting its public spending program has organized a special green facility financed by green-bond financing, with a September issuance totaling USD 750 million. The first projects to benefit from the green bond issuance were: The new monorail project, three wastewater treatment facilities and a desalination plant, all of which will be partially financed through USD 500 million of these funds according to Al Mal, which obtained a list of the projects. Environment Minister Yasmine Fouad explained in October that the government had a list of 41 environment-friendly projects, out of which they selected five projects to receive two-thirds of the proceeds from the sale. According to informed sources, the government has allocated the funds to the monorail linking the new capital and Sixth of October city, a desalination plant in El Dabaa, and wastewater treatment plants in east Alexandria, Arab El Madabegh village in Assiut Governorate, and Al Ayat in Giza.

Preventing a water crisis is a top priority for the government and funding new desalination plants and wastewater treatment facilities whereby the treated wastewater could be reused for some agriculture projects is seen as the best way ahead as climate change and the Grand Ethiopian Renaissance Dam threaten to reduce the country's water supply.

These five environmentally friendly projects were selected from a longlist of 41 to receive USD 500 million in funds generated by Egypt's USD 750 million maiden green bond sale. The remaining USD 250 million will be allocated to other unnamed projects from the longlist. The World Bank is consulting with the government in preparing annual reports on the allocation of funds from the sale.

The government is spending much more than the amounts coming from the green bond sale. It has committed to some EGP 134.2 billion through 2050 to build seawater desalination plants that could provide some 6.4 million cbm/d of water. The plan

spans over six five-year phases, the first of which will see the government investing EGP 45 billion to build 47 desalination plants by 2025.

The new USD 4.5 billion monorail project extends a 54-km line (expected to be completed in 2022) between the new capital and Nasr City, and another 42-km line (scheduled for completion in 2023) from Sixth of October City to Gameat El Dowal street.

Source: Based on information from Enterprise 21 October 2020.

ANNEX 3. CASE STUDY: COSTA RICA GREEN RECOVERY

Costa Rica presents a success story of how protecting nature can support job creation rather than restrict it. In recent decades, the forest cover in the Central American country has doubled, while tripling the size of its economy.¹³⁸ Costa Rica has been a green pioneer and one of the first to turn commitments made to the Paris Climate Agreement into solid policies, framing the shift in terms of economic and social benefit. In February 2019, Costa Rica launched its National Decarbonization Plan, proposing ten lines of action - including NbS such as reforestation, and the expansion of electric transport - with the goal of becoming a net-zero emission economy by 2050.^{139,140} In response to that, Costa Rica was awarded the UNEP's Champions of the Earth award for policy leadership in 2019.¹⁴¹

Unsurprisingly, Costa Rica's economic recovery plans to COVID-19 have been largely connected to green solutions. In August 2020, Costa Rica launched its National Bioeconomy Strategy with the objective of making bioeconomy one of the main pillars of transformation in the country. This includes promoting a knowledge-based economy of innovation, high added value sustainable production, diversification, circular economy, decarbonization and fair and equitable use of biodiversity.¹⁴² The Strategy, which provides a framework to integrate public and private proposals, align incentives and public investments, and guide private initiative, has received the support

of the Comisión Económica para América Latina y el Caribe (CEPAL) and the GIZ.¹⁴²

In June 2020, a USD 300 million “Fiscal and Decarbonization Management Development Policy Loan” was approved by the World Bank Board of Executive Directors to support Costa Rica’s Government program.¹⁴³ además de favorecer a las pequeñas y medianas empresas (PYMES The program protects people’s income and jobs from the impact of COVID-19 through benefiting SMEs, reinforces fiscal sustainability in the aftermath of the crisis, and lays out the foundations for a strong post pandemic recovery by promoting green growth and low-carbon development.¹⁴³ además de favorecer a las pequeñas y medianas empresas (PYMES

In addition, UN Development Program’s (UNDP) Country Office in Costa Rica and its Nature, Climate and Energy (NCE) team are supporting the “Mainstreaming Decarbonization and Transitioning to a Green Economy into National Recovery Strategies.”¹⁴⁴ Through an economic impact assessment of COVID-19 and policy recommendations, it was identified that one-fifth of Costa Rica government’s income is dependent on fossil fuel consumption and prices, leaving the country fiscally vulnerable to oil demands and to respond to COVID-19 and future shocks.¹⁴⁴ These findings can further motivate the acceleration for the transition away from a carbon-based economy.¹⁴⁴

Currently, Costa Rica’s National Adaptation Plan (NAP) is identifying and analyzing the country’s major climate risks and vulnerabilities, projections on socioeconomic variables, and corresponding adaptation priorities. In this sense, the COVID-19 pandemic and its socioeconomic implications are receiving special attention.¹⁴⁵ The NAP Project is also identifying climate resilient investment opportunities at the subnational level, having a major focus on vulnerable groups affected by COVID-19 and developing a financing strategy for implementing these opportunities.¹⁴⁵

The fight against both COVID-19 and climate change require a high level of institutional coordination and cooperation. The NAP process is strengthening institutional integration, with multiple Costa Rica Ministries closely working together, as well as the capacities of subnational actors to conduct development planning processes that integrate climate risks.¹⁴⁵

In the global health cooperation sphere, Costa Rica had submitted a proposal to the WHO to create a COVID-19 “repository of information on diagnostic tests, devices, medication or vaccines, providing free access or licensing on reasonable and affordable terms to all member countries of the organization.”^{145,146}

In addition, a proposal was presented by Costa Rican President Carlos Alvarado Quesada at the framework of the 75th UN General Assembly to create the Fund to Alleviate COVID-19 Economics (FACE). According to the President, FACE could be an instrument to provide the necessary funds for developing countries to be able to manage socioeconomic effects of COVID-19, on concessional and solidarity-based terms.¹⁴⁷ According to President Quesada, this could be “a fund of half a trillion USD for one-off support, financed with 0.7% of the GDP of the world’s biggest and strongest economies – those that account for 80% of global GDP – to be intermediated by one or several multilateral development banks, as concessional loans to developing countries [...] the funds will be lent for a long term and at fixed rates, to provide one-off financing to developing countries that have limited policy tools for responding to the crisis and keeping their countries on track to comply with the 2030 Sustainable Development Agenda and the SDGs.”¹⁴⁷

References

- 1 Barbier EB. Greening the Post-pandemic Recovery in the G20. *Environmental and Resource Economics* 2020; 76:685-703. doi:10.1007/s10640-020-00437-w
- 2 Rosa W, ed. *Transforming Our World: The 2030 Agenda for Sustainable Development*. In: *A New Era in Global Health*. Springer Publishing Company; 2017. doi:10.1891/9780826190123.ap02.
- 3 UN. *The Future We Want*. Resolution adopted by the General Assembly on 27 July 2012, A/RES/66/288
- 4 Coronavirus Pandemic (COVID-19) Data. Our World Data. <https://ourworldindata.org/coronavirus-data> (accessed March 9, 2021).
- 5 Salim S. Abdool Karim. COVID-19: Epidemic trends and Variants. 2021.
- 6 United Nations. *The Sustainable Development Goals Report 2020*. United Nations.
- 7 IPCC. *Global warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty* [V. Masson-Delmotte, P. Zhai, H. O. Pörtner, D. Roberts, J. Skea, P.R. Shukla, A. Pirani, W. Moufouma-Okia, C. Péan, R. Pidcock, S. Connors, J. B. R. Matthews, Y. Chen, X. Zhou, M. I. Gomis, E. Lonnoy, T. Maycock, M. Tignor, T. Waterfield (eds.)]. 2018.
- 8 Turner G. *Is global collapse imminent?* MSSI Research Paper No. 4, Melbourne Sustainable Society Institute, The University of Melbourne. 2014.
- 9 Klenert D, Funke F, Mattauch L, O'Callaghan B. Five Lessons from COVID-19 for Advancing Climate Change Mitigation. *Environ Resour Econ* 2020; 76: 751-78.
- 10 Watts N, Amann M, Arnell N, et al. The 2020 report of The Lancet Countdown on health and climate change: responding to converging crises. *The Lancet* 2021; 397: 129-70.
- 11 Lenton TM, Rockström J, Gaffney O, et al. Climate tipping points, too risky to bet against. *Nature* 2019; 575: 592-5.
- 12 International WWF. *Living Planet Report 2020*. WWF. <https://livingplanet.panda.org> (accessed Nov 24, 2020).
- 13 Climate Action Tracker. *Warming Projections Global Update - September 2020*. Published online 2020:26.
- 14 Central Intelligence Agency. *The World Factbook*. 2020. <https://www.cia.gov/library/publications/the-world-factbook/rankorder/2172rank.htm> (accessed Nov 24, 2020)
- 15 Holling CS. Resilience and Stability of Ecological Systems. *Annu Rev Ecol Syst* 1973; 4: 1-23.
- 16 Bateman IJ, Dannenberg A, Elliott R, et al. Editorial: Economics of the Environment in the Shadow of Coronavirus. *Environ Resour Econ* 2020; 76: 519-23.
- 17 Hepburn C, O'Callaghan B, Stern N, Stiglitz J, Zenghelis D. Will COVID-19 fiscal recovery packages accelerate or retard progress on climate change? *Oxf Rev Econ Policy* 2020; 36: S359-81.
- 18 Cooper A, Mukonza C, Fisher E, et al. Mapping Academic Literature on Governing Inclusive Green Growth in Africa: Geographical Biases and Topical Gaps. *Sustainability* 2020; 12: 1956.
- 19 Fonta WM, Ayuk ET, van Huysen T. Africa and the Green Climate Fund: current challenges and future opportunities. *Clim Policy* 2018; 18: 1210-25.
- 20 Atewamba C, Ngondjeb DY. *Inclusive Green Growth: Challenges and Opportunities for Green Business in Rural Africa*. Springer, 2020.
- 21 *World Economic Outlook. A Long and Difficult Ascent*. Washington D.C. International Monetary Fund, 2020.
- 22 Pollitt H. *Assessment of Green Recovery Plans after Covid-19*. Camb Econom Ltd 2020; 37.
- 23 IRENA. *Global Renewables Outlook: Energy Transformation 2050*. International Renewable Energy Agency. 2020.
- 24 *America's Zero Carbon Action Plan*. New York. Sustainable Development Solutions Network. 2020.
- 25 IRENA. *Off-grid renewable energy solutions to expand electricity access: An opportunity not to be missed*. International Renewable Energy Agency. 2019.
- 26 SELCO. *Sustainable Energy and Livelihoods*. SELCO Foundation. 2019
- 27 Jones KE, Patel NG, Levy MA, et al. Global trends in emerging infectious diseases. *Nature* 2008; 451: 990-3.
- 28 Di Marco M, Baker ML, Daszak P, et al. Opinion: Sustainable development must account for pandemic risk. *Proc Natl Acad Sci* 2020; 117: 3888-92.
- 29 Pike J, Bogich T, Elwood S, Finnoff DC, Daszak P. Economic optimization of a global strategy to address the pandemic threat. *Proc Natl Acad Sci* 2014; 111: 18519-23.
- 30 Intergovernmental Science-Policy Platform On Biodiversity And Ecosystem Services (IPBES). *Workshop Report on Biodiversity and Pandemics of the Intergovernmental Platform on Biodiversity and Ecosystem Services*. IPBES. Zenodo, 2020
- 31 Rulli MC, Santini M, Hayman DTS, D'Odorico P. The nexus between forest fragmentation in Africa and Ebola virus disease outbreaks. *Sci Rep* 2017; 7: 41613.
- 32 Olivero J, Fa JE, Real R, et al. Recent loss of closed forests is associated with Ebola virus disease outbreaks. *Sci Rep* 2017; 7: 14291.
- 33 Johnson CK, Hitchens PL, Pandit PS, et al. Global shifts in mammalian population trends reveal key predictors of virus spillover risk. *Proc R Soc B Biol Sci* 2020; 287: 20192736.
- 34 National Geographic. *Anthropocene*. *Natl. Geogr. Soc.* 2019; published online June 7. <http://www.nationalgeographic.org/encyclopedia/anthropocene/> (accessed March 2, 2021).
- 35 O'Callaghan-Gordo C, Antó JM. COVID-19: The disease of the anthropocene. *Environ Res* 2020; 187: 109683.
- 36 Lenzen M, Moran D, Kanemoto K, Foran B, Lobefaro L, Geschke A. International trade drives biodiversity threats in developing nations. *Nature* 2012; 109-12.

- 37 The Pact for a Green New Deal. Green New Deal. <https://act.greennewdealcanada.ca/the-text/> (accessed Nov 23, 2020).
- 38 MacArthur JL, Hoicka CE, Castleden H, Das R, Lieu J. Canada's Green New Deal: Forging the socio-political foundations of climate resilient infrastructure? *Energy Res Soc Sci* 2020; 65: 101442.
- 39 Ensuring effective Nature-based Solutions. IUCN. 2020; published online July 23. <https://www.iucn.org/resources/issues-briefs/ensuring-effective-nature-based-solutions> (accessed Nov 23, 2020).
- 40 UN Global Compact. Nature-Based Solutions. <https://www.unglobalcompact.org/take-action/events/climate-action-summit-2019/nature-based-solutions> (accessed Nov 23, 2020).
- 41 Garrett TA. History Warns of Economic Pain, Though Some Might Gain. 2007;2.
- 42 Jonas OB. World Development Report: Pandemic Risk. The World Bank, 2014
- 43 Amadeo K. How COVID and Other Pandemics Affect the Economy. The Balance. <https://www.thebalance.com/coronavirus-plague-ebola-economic-impact-4795744> (accessed Dec 2, 2020).
- 44 UN Economic Commission for Africa. Government of Ethiopia launch Decade of Action with tree planting, green jobs, livelihoods and health at the center. United Nations Economic Commission for Africa. <https://www.uneca.org/stories/eca-government-ethiopia-launch-decade-action-tree-planting-green-jobs-livelihoods-and-health> (accessed Nov 23, 2020).
- 45 Nature-Based Solutions. World Economic Forum. <https://www.weforum.org/communities/gfc-on-nature-based-solutions/> (accessed Feb 14, 2021).
- 46 IRENA. Renewable power generation costs in 2019. Abu Dhabi. International Renewable Energy Agency, 2020.
- 47 IRENA. Post COVID recovery: an agenda for resilience, development and equality. International Renewable Energy Agency, 2020
- 48 IRENA. Renewable Energy Benefits: Decentralised Solutions in the Agri-Food Chain. The International Renewable Energy Agency. Abu Dhabi, 2016
- 49 Vivid Economics. Green Stimulus Index. Finance for Biodiversity Initiative, 2020.
- 50 NIPC. Bouncing Back: Economic sustainability Plan. Nigerian Investment Promotion Commission. 2020
- 51 Con el nuevo 'Compromiso por el Futuro de Colombia', el país está haciendo las grandes apuestas: Duque. <https://idm.presidencia.gov.co/prensa/Paginas/Con-el-nuevo-Compromiso-por-el-Futuro-de-Colombia-el-pais-esta-haciendo-las-grandes-apuestas-Duque-200820.aspx> (accessed Nov 24, 2020).
- 52 Morocco's Green Recovery from COVID-19. Platform for Redesign 2020. <https://platform2020redesign.org/measures/2762/> (accessed Nov 24, 2020).
- 53 OECD. Rebuilding tourism for the future: COVID-19 policy responses and recovery. 2020
- 54 Van der Ploeg F. Fossil fuel producers under threat. *Oxf Rev Econ Policy* 2016; 32: 206–22.
- 55 Sachs JD, Abdool Karim S, Akin L, et al. The Lancet COVID-19 Commission Statement on the occasion of the 75th session of the UN General Assembly. *The Lancet* 2020; 396: 1102–24.
- 56 Morens DM, Fauci AS. Emerging Pandemic Diseases: How We Got to COVID-19. *Cell* 2020; 182: 1077–92.
- 57 Bassi LL, Hwenda L. COVID-19: time to plan for prompt universal access to diagnostics and treatments. *Lancet Glob Health* 2020; 8: e756–7.
- 58 OECD. Global Outlook on Financing for Sustainable Development 2021: A New Way to Invest for People and Planet. 2020 : <http://www.oecd.org/development/global-outlook-on-financing-for-sustainable-development-2021-e3c30a9a-en.htm>.
- 59 Adenle AA, Manning DT, Arbiol J. Mitigating Climate Change in Africa: Barriers to Financing Low-Carbon Development. *World Dev* 2017; 100: 123–32.
- 60 Bates AE, Primack RB, Moraga P, Duarte CM. COVID-19 pandemic and associated lockdown as a "Global Human Confinement Experiment" to investigate biodiversity conservation. *Biol Conserv* 2020; 248: 108665
- 61 Capital as a Force for Good: Global Finance Industry Leaders Transforming Capitalism for a Sustainable Future. Force for Good, 2020.
- 62 The Rise of Sustainable Finance: Global Investment Implications. <https://www.greaterpacifccapital.com/thought-leadership/the-rise-of-sustainable-finance-global-investment-implications> (accessed March 8, 2021).
- 63 SDSN. Transformations for the Joint Implementation of Agenda 2030 for Sustainable Development and the European Green Deal. Sustainable Development Solutions Network 2021.
- 64 Quéré CL, Jackson RB, Jones MW. Temporary reduction in daily global CO₂ emissions during the COVID-19 forced confinement. *Nat Clim Change* 2020; 10: 8.
- 65 ICOS. Supplementary data: Temporary reduction in daily global CO₂ emissions during the COVID-19 forced confinement. ICOS 2021. <https://www.icos-cp.eu/gcp-covid19> (accessed Feb 12, 2021).
- 66 Liu Z, Ciais P, Deng Z, et al. Near-real-time monitoring of global CO₂ emissions reveals the effects of the COVID-19 pandemic. *Nat Commun* 2020; 11: 5172.
- 67 The Wellbeing Economy: Time to move Europe 'beyond GDP'. WWF. https://www.wwf.eu/wwf_news/media_centre/?uNewsID=874941 (accessed Nov 30, 2020).
- 68 O'Callaghan, B., Yau, N., Murdock, E., Janz, A., Flodell, H., Blackwood, A., Purroy Sanchez, L., Sadler, A., Wen, E., Kope, H., Tillman-Morris, L., Ostrovsky, N., Kitsberg, A., Tritsch, D., Lee, T., Hristov, D., Hepburn, C. et al. (2020). Oxford Economic Stimulus Library [WWW Document]. <https://www.smithschool.ox.ac.uk/publications/wpapers/Oxford-Economic-Stimulus-Observatory.xlsx> (accessed Nov 1, 2020).
- 69 OECD. Managing tourism development for sustainable and inclusive recovery. 2021. doi: 10.1787/b062f603-en.
- 70 UN Environment Programme. The emissions gap report 2020. UNEP 2020 <https://www.unep.org/emissions-gap-report-2020> (accessed Feb 12, 2021).

- 71 Vivid Economics. Greenness of Stimulus Index: An assessment of COVID-19 stimulus by G20 countries and other major economies in relation to climate action and biodiversity goals. Vivid Economics and Finance for Biodiversity Initiative. 2021.
- 72 O'Callaghan, B. & Murdock, E. (2021). Are We Building Back Better: Evidence from 2020 and pathways to inclusive green recovery spending. United Nations Environment Program. SSRN No: 3801666
- 73 Wakeford JJ, Lagrange SM, Kelly C. Managing the Energy-food-water-Nexus in Developing Countries: Case Studies of Transition Governance. QGRL Working Paper. 2016
- 74 Geddes A, Gerasimchuk I, Viswanathan B, et al. Doubling Back and Doubling Down: G20 scorecard on fossil fuel funding. IISD, 2020.
- 75 ODI. G20 Governments Have Committed USD 151 Billion to Fossil Fuels in COVID-19 Recovery Packages. ODI. <https://www.odi.org/news/17179-g20-governments-have-committed-usd-151-billion-fossil-fuels-covid-19-recovery-packages> (accessed Nov 23, 2020).
- 76 Hub ISK. Guest Article: All Change and No Change: G20 Commitment on Fossil Fuel Subsidy Reform, Ten Years On. SDG Knowledge Hub. IISD. <https://sdg.iisd.org:443/commentary/guest-articles/all-change-and-no-change-g20-commitment-on-fossil-fuel-subsidy-reform-ten-years-on/> (accessed Nov 23, 2020).
- 77 UNFCCC. Adoption of the Paris Agreement. FCCC/CP/2015/L.9/Rev.1.
- 78 Deforestation in Brazil's Amazon rises for first time in 4 months. Al Jazeera. published online 13 Nov 2020. <https://www.aljazeera.com/news/2020/11/13/deforestation-in-brazils-amazon-rises-for-first-time-in-4-months> (accessed Nov 23, 2020).
- 79 INPE. PRODES: Monitoring Deforestation of the Brazilian Amazon Forest by Satellite. <http://www.obt.inpe.br/OBT/assuntos/programas/amazonia/prodes> (accessed March 2, 2021).
- 80 SPA. SPA Statement on the eve of the UN Biodiversity Summit. September 2020
- 81 C Kejun J., Wills W., et al. Climate Transparency Report: Comparing G20 Climate Action and Responses to the COVID-19 Crisis. Climate Transparency 2020.
- 82 Stern N. The Economics of Climate Change: The Stern Review. Cambridge University Press; 2007
- 83 IIEP. Europe's recovery plans must pass five sustainability tests. <https://ieep.eu/news/europe-s-recovery-plans-must-pass-five-sustainability-tests> (accessed Nov 23, 2020).
- 84 Dafnomilis I, den Elzen M, van Soest H, Hans F, Kuramochi T, Höhne N. Exploring the impact of the COVID-19 pandemic on global emission projections. New Climate Institute, 2020.
- 85 Dumisani C. Towards the achievement of SDG 7 in Sub-Saharan Africa: Creating synergies between Power Africa, Sustainable Energy for All and climate finance in-order to achieve universal energy access before 2030. Renewable and Sustainable Energy Reviews. 2018;94:600-608.
- 86 UN. The Future is Now: Science for Achieving Sustainable Development. United Nations Global Sustainable Development Report 2019.
- 87 Popp D, Vona F, Noailly J. Green stimulus, jobs and the post-pandemic green recovery. VoxEU.org. 2020; published online July 4. <https://voxeu.org/article/green-stimulus-jobs-and-post-pandemic-green-recovery> (accessed Nov 23, 2020)
- 88 Engstrom DF, Ho DE, Sharkey CM, Cuéllar M-F. Government by Algorithm: Artificial Intelligence in Federal Administrative Agencies. SSRN Electron J 2020 doi:10.2139/ssrn.3551505.
- 89 Chen Z., Marin G., Popp D., Vona F. Green Stimulus in a Post-pandemic Recovery: the Role of Skills for a Resilient Recovery. Environmental and Resource Economics 2020; 76:901-911
- 90 Lema R, Hanlin R, Hansen UE, Nzila C. Renewable electrification and local capability formation: Linkages and interactive learning. Energy Policy 2018; 117: 326–39.
- 91 Strand J, Toman M. "Green Stimulus," Economic Recovery, And Long-Term Sustainable Development. The World Bank, 2010
- 92 USDDPP. Deep Decarbonization Pathways Project. <http://usddpp.org/> (accessed Feb 12, 2021).
- 93 FABLE. Pathways to Sustainable Land-Use and Food Systems. 2019 Report of the FABLE Consortium. Laxenburg and Paris: International Institute for Applied Systems Analysis (IIASA) and Sustainable Development Solutions Network (SDSN).
- 94 Schmidt-Traub G, Obersteiner M, Mosnier A. Fix the broken food system in three steps. Nature 2019; 569: 181–3.
- 95 Bley SJ, Hametner M, Kostetckaia M, et al., eds. Sustainable Development in the European Union: Monitoring Report on Progress towards the SDGS in an EU Context — 2020 Edition. Publications Office of the European Union; 2020. <https://ec.europa.eu/eurostat/web/products-statistical-books/-/KS-02-20-202> (accessed June 22, 2020)
- 96 Wendling ZA, Emerson JW, de Sherbinin A, Esty DC, et al. 2020 Environmental Performance Index. Yale Center for Environmental Law & Policy; 2020. epi.yale.edu
- 97 Sachs JD, Schmidt-Traub G, Kroll C, Lafortune G, Fuller G, Woelm F. Sustainable Development Report 2020. Cambridge University Press.; 2020.
- 98 Greta Thunberg accuses rich countries of "creative carbon accounting". The Economist 2019; published online Oct 17. <https://www.economist.com/finance-and-economics/2019/10/17/greta-thunberg-accuses-rich-countries-of-creative-carbon-accounting> (accessed Feb 12, 2021).
- 99 Sachs J, Schmidt-Traub G, Kroll C, Durand-Delacré D, Teksoz K. SDG Index and Dashboards Report 2017. New York: Bertelsmann Stiftung and Sustainable Development Solutions Network (SDSN), 2017
- 100 Hoff H, Monjeau A, Gomez-Paredes J, et al. International spillovers in SDG implementation: The case of soy from Argentina. Stockholm Environment Institute. 2019
- 101 Lenzen M, Li M, Malik A, et al. Global socio-economic losses and environmental gains from the Coronavirus pandemic. PLOS ONE 2020; 15: e0235654.
- 102 Wiedmann T, Lenzen M. Environmental and social footprints of international trade. Nat Geosci 2018; 11: 314–21.

- 103 Bateman IJ, Mace GM. The natural capital framework for sustainably efficient and equitable decision making. *Nat Sustain* 2020; 3: 776–83.
- 104 HM Treasury. Green Book: Central Government Guidance on Appraisal and Evaluation. 2020 https://www.webarchive.org.uk/access/resolve/20201125231833/https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/938046/The_Green_Book_2020.pdf (accessed Feb 12, 2021)
- 105 Day, B., Owen, N., Binner, A., Bateman, I., Cho, F., De-Gol, A., Ferguson-Gow, H., Ferrini, S., Fezzi, C., Harwood, A., Lee, C., Luizzio, L., Mancini, M., Pearson, R. The NEV Modelling Suite: A Summary Technical Report. Report to the Department for Environmental Food and Rural Affairs (Defra): Land Environment Economics and Policy Institute, University of Exeter Business School, 2020
- 106 UN. Goal 15. Department of Economic and Social Affairs. <https://sdgs.un.org/goals/goal15> (accessed Feb 12, 2021).
- 107 Mazzucato M. Mission-oriented innovation policies: challenges and opportunities. *Industrial and Corporate Change* 2018; 27(5) 803–815
- 108 World Bank. Planning for the economic recovery from COVID-19: A sustainability checklist for policymakers. <https://blogs.worldbank.org/climatechange/planning-economic-recovery-covid-19-coronavirus-sustainability-checklist-policymakers> (accessed Nov 23, 2020).
- 109 Fargher S, Hallegatte S. Best investments for an economic recovery from Coronavirus: World Bank Group. 2020.
- 110 World Bank. Sustainability Checklist for Assessing Economic Recovery Interventions. World Bank Group 2020.
- 111 Ockwell D, Byrne R. Improving technology transfer through national systems of innovation: climate relevant innovation-system builders (CRIBs). *Clim Policy*. 2016; 16(7):836–854.
- 112 OECD. Linking Indigenous Communities with Regional Development. 2019 doi:10.1787/3203c082-en.
- 113 Koundouri P. The Ocean of Tomorrow: The Transition to Sustainability. Springer, 2020 <https://link.springer.com/book/10.1007/978-3-030-56847-4>.
- 114 Koundouri P. The Ocean of Tomorrow, Investment Assessment of Multi-Use Offshore Platforms: Methodology and Applications. Springer International Publishing, 2017 <http://www.springer.com/gp/book/9783319557700>.
- 115 C40. https://www.c40.org/why_cities (accessed Nov 23, 2020).
- 116 Malik A, Lan J. The role of outsourcing in driving global carbon emissions. *Econ Syst Res* 2016; 28: 168–82
- 117 Malik A., Lenzen M., et al. Household Consumption Emissions in the Inner West Local Government Area. Inner West Council. The University of Sydney 2018
- 118 Faivre N, Fritz M, Freitas T, Boissezon B de, Vandewoestijne S. Nature-Based Solutions in the EU: Innovating with nature to address social, economic and environmental challenges. *Environ Res* 2017; 159: 509–18.
- 119 OECD. A Territorial Approach to the Sustainable Development Goals. 2020 doi:10.1787/e86fa715-en.
- 120 OECD. Cities policy responses to COVID-19. OECD <http://www.oecd.org/coronavirus/policy-responses/cities-policy-responses-fd1053ff/> (accessed Feb 12, 2021).
- 121 C40. The Global Mayors COVID-19 Recovery Task Force. <https://www.c40.org/other/covid-task-force> (accessed Nov 23, 2020)
- 122 Afful-Koomson T. The Green Climate Fund in Africa: what should be different? *Clim Dev* 2015; 7: 367–79..
- 123 Juma C, Serageldin I. Biotechnology in Africa's Development. African Union: New Partnership for Africa's Development. 2017.
- 124 Thomas Sterner. Fuel Taxes and the Poor: The Distributional Effects of Gasoline Taxation and Their Implications for Climate Policy. Routledge, 2012.
- 125 Atansah P. When Do Subsidy Reforms Stick? Lessons from Iran, Nigeria, and India; 30.
- 126 The European Semester. European Commission - European Commission. https://ec.europa.eu/info/business-economy-euro/economic-and-fiscal-policy-coordination/eu-economic-governance-monitoring-prevention-correction/european-semester_en (accessed Nov 23, 2020).
- 127 Cabuzel T. European Climate Pact. Climate Action - European Commission. Published February 27, 2020. https://ec.europa.eu/clima/policies/eu-climate-action/pact_en (accessed Nov 23, 2020).
- 128 European Commission. European Climate Law. Brussels, 2020. <https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1588581905912&uri=CELEX:52020PC0080> (accessed Nov 23, 2020).
- 129 Sachs JD, Schmidt-Traub G, Mazzucato M, Nebojsa N, Rockstrom J. Six Transformations to achieve the Sustainable Development Goals. *Nat Sustain* 2019; 2: 805–14.
- 130 European Commission. NextGenerationEU: Next steps for RRF. European Commission. https://ec.europa.eu/commission/presscorner/detail/en/IP_20_1658 (accessed Nov 23, 2020).
- 131 Horizon Europe. European Commission - Eur. https://ec.europa.eu/info/horizon-europe_en (accessed Nov 23, 2020).
- 132 IEA. Sustainable Recovery: Analysis. IEA. <https://www.iea.org/reports/sustainable-recovery> (accessed Nov 23, 2020).
- 133 EU-TEG. Taxonomy- Final Report of the Technical Expert Group on Sustainable Financing. Technical Report, 2020.
- 134 European Environment Agency. The European environment: state and outlook 2020: knowledge for transition to a sustainable Europe — European Environment Agency. <https://www.eea.europa.eu/soer/2020> (accessed Nov 23, 2020).
- 135 Zachariadis T. “Building Back Better” in Practice: A Science-Policy Framework for an Effective Green Economic Recovery After COVID-19. 2020.
- 136 A UN Framework for the Immediate Socio-economic Response to COVID-19. 2020
- 137 UN. UN Research Roadmap for the COVID-19 Recovery: Leveraging the Power of Science for a More Equitable, Resilient and Sustainable Future.

United Nations, 2020.

- 138 Goering L. COVID-19: How a green recovery could create millions of jobs. World Economic Forum. 2020. published online Jul 22. <https://www.weforum.org/agenda/2020/07/covid19-coronavirus-green-sustainableinvestment-economic-growth/> (accessed Nov 29, 2020).
- 139 Government of Costa Rica. National Decarbonization Plan 2018-2050. Costa Rica Bicentennial Government, 2018.
- 140 Costa Rica advances with its National Decarbonization Plan with IDB support. IADB. <https://www.iadb.org/en/news/costa-rica-advances-its-national-decarbonization-plan-idb-support> (accessed Nov 29, 2020)
- 141 UN Environment. Costa Rica: the 'living Eden' designing a template for a cleaner, carbon-free world. UN Environ. 2019; published online Sept 20. <http://www.unenvironment.org/ru/node/26401> (accessed Nov 29, 2020).
- 142 Costa Rica Gobierno Del Bicentenario. Costa Rica lanza Estrategia Nacional de Bioeconomía. Pres. Repúb. Costa Rica. <https://www.presidencia.go.cr/comunicados/2020/08/costa-rica-lanza-estrategia-nacional-de-bioeconomia/> (accessed Nov 29, 2020).
- 143 The World Bank. Costa Rica receives World Bank support for economic recovery and promoting low-carbon development. World Bank Group. <https://www.worldbank.org/en/news/press-release/2020/06/25/apoyo-del-banco-mundial-a-costa-rica-para-promover-la-recuperacion-economica-y-un-desarrollo-bajo-en-carbono> (accessed Nov 29, 2020).
- 144 Green Commodities Programme. Decabornising Costa Rica: The Pandemic Opportunity. <https://www.greencommodities.org/content/gcp/en/home/media-centre/decabornising-costa-rica--the-pandemic-opportunity.html> (accessed Nov 29, 2020).
- 145 Costa Rica's Green Recovery from COVID-19. Platform for redesign 2020. <https://platform2020redesign.org/measures/2057/> (accessed Nov 29, 2020).
- 146 Costa Rica Gobierno Del Bicentenario. Costa Rica submits proposal for WHO to facilitate access to technologies to combat COVID-19. Pres. Repúb. Costa Rica. <https://www.presidencia.go.cr/comunicados/2020/03/costa-rica-submits-proposal-for-who-to-facilitate-access-to-technologies-to-combat-covid-19/> (accessed Nov 29, 2020).
- 147 Economic Commission for Latin America and the Caribbean. Costa Rica Presents a Proposal for a COVID-19 Economic Relief Fund. UNECLAC. Published September 25, 2020. <https://www.cepal.org/en/pressreleases/costa-rica-presents-proposal-covid-19-economic-relief-fund>