

Achieving Green Growth and Climate Action Post-COVID-19

July 2020



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Global Green Growth Institute
Jeongdong Building 19F
21-15 Jeongdong-gil
Jung-gu, Seoul 04518
Republic of Korea

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Authors: Frank Rijsberman, Lilibeth Acosta, Nishant Bhardwaj, Chris Dickinson, Mark Gibson, Stelios Grafakos, Ingvild Solvang, and Donovan Storey

Research Support: Inwoo Jung, Jinyoung Seong, and Haemin Won

Reviewers: Fenella Aouane, Chiden Oseo Balmes, Romain Brillie, Marshall Brown, Karolien Casaer, Kristin Deason, Susanne Pedersen, Nicole Perkins, Lasse Ringius, Dereje Senshaw, Jan Stelter, and Bertha Wakisa Chiudza

Copy Editor: Marijke Vermaak

Coordination and Layout: Nera Mariz Puyo



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Abbreviations

4R	Recycle, Reuse, Reduce, Recover
BAU	Business-as-usual
BNEF	Bloomberg New Energy Finance
CEO	Chief Executive Officer
CO₂	Carbon dioxide
COP26	The 26th session of the Conference of the Parties
COVID-19	Coronavirus Disease of 2019
EU	European Union
EUR	Euro
FAO	Food and Agriculture Organization of the United Nations
G20	Group of 20
GDP	Gross Domestic Product
GGGI	Global Green Growth Institute
GHG	Greenhouse gas
GW	Gigawatt
IEA	International Energy Agency
ILO	International Labour Organization
IMF	International Monetary Fund
IPC	Integrated Food Security Phase Classification
IRENA	International Renewable Energy Agency
LCOE	Levelized Cost of Electricity
LDC	Least developed country
LT-LEDS	Long-term low emissions development strategy
NAP	National Adaptation Plan
NDC	Nationally Determined Contribution
NGO	Non-Government Organization
OECD	Organisation for Economic Co-operation and Development
PPE	Personal Protective Equipment
PV	Photovoltaic
SDGs	Sustainable Development Goals
SIDS	Small Island Developing States
SME	Small and Medium-sized Enterprises
UN	United Nations
UNFCCC	United Nations Framework Convention on Climate Change
U.S.	United States
USD	United States Dollar
WASH	Water, Sanitation, and Hygiene
WFP	World Food Programme
WHO	World Health Organization





01 INTRODUCTION

Expectations were that the focus in 2020 would be on enhancing the national commitments to the Paris Agreement to limit climate change to less than 2 degrees Celsius. Scorching heatwaves, massive cyclones, and devastating forest fires in 2019 led to unprecedented public protests, school strikes for climate, and a growing number of governments committing to reduce greenhouse gas (GHG) emissions to net-zero by 2050 or before.

Instead, the coronavirus disease of 2019 (COVID-19) upended life as we know it in early 2020. On July 6, at the time of writing, there are 11.5 million confirmed cases and over 535 thousand deaths.¹ The public health crisis has overwhelmed health care systems in many countries, and the economic lockdowns in 120 countries² are affecting people everywhere. The full consequences of the economic crisis as a result of the pandemic are still unfolding. Still, it is already clear that the global scale and magnitude of the disruption are without precedent. According to estimates, developed economies are likely to see their Gross Domestic Product (GDP) decline by between 8-13 percent in the second

quarter of 2020.³ Job losses in the second quarter of 2020 were estimated as a reduction in hours worked of 10.7 percent, equivalent to 305 million full-time jobs.⁴ World output is expected to decline by 3 percent in 2020, according to the International Monetary Fund (IMF),⁵ a far worse impact than that of the 2008-2009 financial crisis. Restricted border crossings combined with the economic slowdown lead to collapsing global trade, down 13-32 percent, and foreign direct investment, down 30-40 percent. This economic crisis is estimated to push an additional 500 million people into poverty,⁶ leading to the first increase in poverty rates in decades.

Some sectors are exceptionally badly hit, notably the travel and tourism sectors, with international air travel falling by 90-95 percent in March-April 2020. All air travel, including domestic, is expected to decrease by 35-65 percent in 2020.⁷ Many small island nations are highly dependent on international tourism, e.g., Seychelles (67 percent of GDP), Maldives (66 percent), St Kitts and Nevis (62 percent), Grenada (56 percent), Vanuatu (48 percent), and Fiji (38 percent). These countries

experienced an instant collapse of their tourism revenue and employment as borders closed.⁸

Governments have responded with varying degrees of effectiveness, first to the public health crisis, and subsequently with emergency rescue packages along the following three axes:

1. Responding to the public health emergency by investing in testing, contact tracing, treatment facilities, and providing face masks and hand sanitizers for the general population, personal protective equipment (PPE) for medical staff and first responders, and ventilators at intensive care units (ICUs);
2. Flattening the epidemic curve by implementing additional policy measures such as travel restrictions, border closures, quarantine requirements, school closures, economic lockdown, and social distancing guidelines; and
3. Providing immediate economic relief by rolling out emergency rescue plans worth an estimated 12 trillion USD⁹ that provide short term income support for furloughed staff and access to grants and credit for the private sector. Only approximately USD 18 billion, or 0.2 percent, of this expenditure counts as green, according to the Bloomberg New Energy Finance (BNEF).¹⁰

Governments have generally responded boldly with unprecedented economic lockdowns covering billions of people, combined with emergency rescue stimulus packages to deal with the immediate fallout. Advanced economies have issued emergency rescue packages amounting to 14-28 percent of their GDP, worth trillions of USD. Emerging economies have issued more limited packages estimated at 4 percent of GDP.¹¹ Consequently, public debt is expected to reach record levels this year. In advanced economies alone, public debt is projected to soar from 105 percent of GDP in 2019 to 122 percent in 2020.¹²

Advanced, emerging, and developing economies are all experiencing an unprecedented combination of public health and socio-economic crises. Emerging and developing economies are, however, particularly vulnerable to the plunge in commodity prices, with two-thirds depending on commodity exports, and the sharp increase in borrowing costs, given their record level of indebtedness.¹³

On June 1, Pakistan became the first developing country to reopen the economy, despite surging infections and rising deaths because the country

could not afford the lockdown. The Prime Minister indicated that the government expects a 30 percent decline in revenues and remittances, leading to a projected deficit of 9.8 percent, and a bleak choice between responding to COVID-19 or hunger.¹⁴

The full impact of the COVID-19 pandemic is still unfolding. Still, the pressure is already mounting on governments to invest in COVID-19 recovery packages while facing budget shortfalls, rising debt, and declining tax revenues. For countries that can afford recovery packages, there is a crucial choice between designing economic recoveries to restart the brown economy or seizing the opportunity to accelerate the transition to a green economy. A green economy approach would be a deliberate choice for a green growth development approach to building back better. Will there be a Green New Deal for the economy, reinforcing climate action and sustainable development? And what advice can be provided to policymakers on the most effective design of such a Green New Deal? Those are the critical questions explored in this report.

In this report, we explore challenges and opportunities posed by the COVID-19 pandemic, the links between health and climate crises, and the lessons we have learned from past disasters to build back better. This document is intended to serve as a source of information and recommendations for GGGI Members and country teams as they design green COVID-19 recovery plans in the months to come.



02 COVID-19 AND CLIMATE ACTION: CHALLENGES AND OPPORTUNITIES

While the COVID-19 pandemic and the climate crisis are seemingly unrelated, they are both critical elements of a broader sustainability crisis that includes biodiversity loss, air pollution, and the ocean plastic crisis. Emerging infectious diseases are predominantly zoonotic, jumping from animals to people, and are exacerbated by the illegal wildlife trade and human consumption of wildlife meat. The loss of wildlife habitats to agricultural and urban expansion and intensive animal farming conditions are additional drivers of zoonotic diseases. The COVID-19 crisis also contributes to the plastic crisis due to the related increase in packaging waste from online purchases and the use of hygienic protection and medical equipment (see Section 5).

In the short-term, economic lockdowns have had positive environmental impacts surprisingly quickly. Many cities have experienced their best air quality in decades. Wildlife has reclaimed city streets left empty by humans. The International Energy Agency (IEA) expects global GHG emissions to fall by 8 percent in 2020 compared to 2019, as energy

demand plunges, calling it “the biggest shock since World War Two.”¹⁵

The pressing question is whether some of the trends emerging in early 2020 will lead to further structural change, or whether the world economy will simply return to business-as-usual. After the 2008-2009 financial crisis, global emissions decreased by 1 percent in 2009 but rose by 5 percent in subsequent years due to recovery investments.

Transportation is among the most affected sectors, and cross-border travel restrictions are likely to last well into 2021, possibly 2022. Prolonged restrictions may structurally affect air travel. Emissions from the transport sector account for about a quarter of global GHG emissions and are expected to increase faster than emissions from any other sector.¹⁶ Figure 1 shows that the transport sector has experienced the fastest increase in emissions after electricity and heat since 1990. On the other hand, the stigmatization of public transport (see Section 6), combined with social

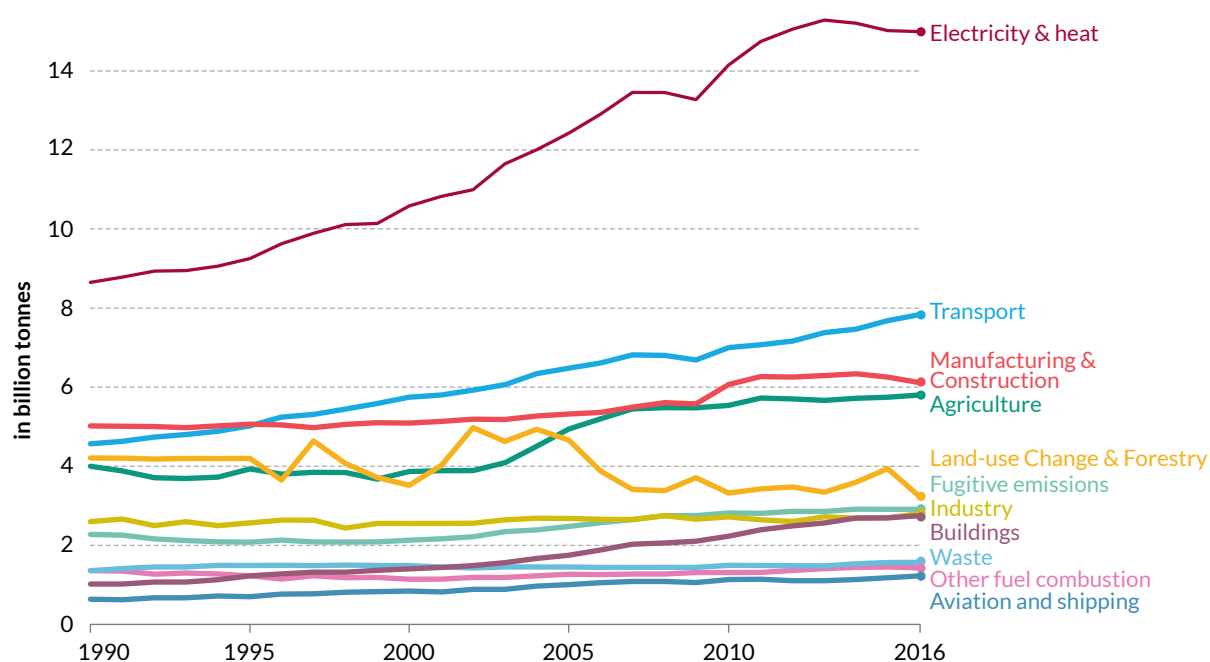


Figure 1. Global GHG emissions in tonnes of carbon dioxide-equivalent (CO₂e), by sector (1990-2016)

Source: Adapted from Our World in Data based on the data published by the CAIT Climate Data Explorer via Climate Watch¹⁸

distancing guidelines, may lead to both a rebound in personal vehicle use and an increase in non-motorized transportation, for example, cycling or walking. The latter contributes to climate mitigation through a reduction in emissions. Another positive sign for the climate is that despite the overall downturn in automobile sales during the COVID-19 crisis, electric car sales were resilient, according to BNEF, accelerating the electrification of mobility.¹⁷

In its Global Energy Review 2020, the IEA says that “renewable energy has so far been the energy source most resilient to Covid-19 lockdown measures... as the supply cannot be regulated, variable costs are low, and access to the grid is preferential in many countries.”¹⁹ In its Renewable Energy Market Update, it forecasts that while 2020 will see the first annual decline in the addition of renewable power capacity, with 167 gigawatts (GW) added globally, 13 percent less than in 2019.²⁰ Conversely, economic lockdowns have affected coal demand far more severely, particularly in India, the world’s second-largest coal user. Energy demand in India reportedly dropped by 30 percent in March following the lockdown, with coal bearing the brunt, prompting energy sector observers to predict a peak in Indian coal use as early as 2025.²¹ Based on the IEA assessment, carbon dioxide (CO₂) emissions from coal combustion contributed significantly to climate change, “responsible for over 0.3°C of the

1°C increase in global average annual surface temperatures above pre-industrial levels.”²²

Fundamental changes in the way people work, live, and play that will affect our resource use and GHG emissions include:

- Reduced travel for business and leisure due to travel restrictions;
- More remote working arrangements and online meetings; and
- Greater reliance on digital technology for work, shopping, and leisure activities, including accelerating all forms of contactless engagement.

COVID-19 has accelerated these already emerging trends, using existing technologies. It remains to be seen whether these trends will be reversed post-COVID-19 or will become permanent societal changes.

Greening COVID-19 recovery plans: Building back better

Asia Pacific is the region with the fastest-growing GHG emissions in rapidly developing emerging economies. A regional analysis identified six positive entry points that can spur the transformation to a green economy and the achievement of the

Sustainable Development Goals (SDGs) in the context of the pandemic:²³

- Strengthening human well-being and capabilities;
- Shifting towards sustainable and just economies;
- Building sustainable food systems and healthy nutrition patterns;
- Achieving energy decarbonization and universal access to energy;
- Promoting sustainable urban and peri-urban development; and
- Securing the global environmental commons.

For each of the six entry points, the analysis identifies countries that are getting ahead of others rapidly as ‘sprinters’. No countries are sprinters in all areas. However, the report identifies Indonesia and Malaysia as sprinters on four out of six entry points, and another 11 countries as sprinters on three entry points. The analysis does not find progress in reducing GHG emissions for the region as a whole, with emissions continuing to grow at pre-COVID-19 levels.

Many organizations are releasing recommendations for a green recovery, such as the United Nations Department of Economic and Social Affairs (UNDESA),²⁴ the Organisation for Economic Co-operation and Development (OECD)²⁵, and the COP26 Universities Network.²⁶ For example, the IMF recommends:²⁷

- Choosing to support green, rather than brown, activities;
- Making support for brown activities conditional on making progress on climate;
- Pricing carbon right;
- Assessing the climate impact of support measures;
- Making finance green;
- Developing a new, ambitious, medium-term climate plan; and
- Coordinating and supporting others

The transition to a net zero carbon society will have significant consequences for employment. These consequences include jobs lost in the brown economy, jobs gained in the green economy, and the need to reskill or retrain workers.²⁸ Concerns over the employment impacts of climate action form the basis for the Just Transition language in the Paris Agreement, led by the trade union movement and International Labour Organization (ILO). According to Rosemberg, Just Transition strategies should be a package of policies and actions aimed at anticipating the impacts of climate policies on employment; protecting and even improving workers’ livelihoods including health, skills, and rights; and supporting their communities.²⁹ The European Commission built a Just Transition Mechanism into its European Green Deal, in the form of “financial support and technical assistance to help people, businesses and regions that are most affected by the move towards the green economy.”³⁰

Given the dire job losses and furloughs as a result of the COVID-19 lockdowns,³¹ the primary focus of recovery plans will be on employment. This focus means that the Just Transition concerns and green jobs related efforts will become even more relevant post-COVID-19. Several authors have examined the economic benefits of the green transition, including impacts on employment. For example, Garret-Peltier found that for the United States (U.S.), a USD 1 million investment in fossil fuel projects generates 2.65 new jobs, compared with 7.49 and 7.72 for investments in renewable energy and energy efficiency.³² In other words, investment in clean energy creates close to three times the number of green jobs compared to the brown jobs related to fossil fuel.

Nair and Rutt estimated that USD 1 million invested in forestry in less developed countries results in the creation of between 500 and 1,000 jobs, indicating the high value of investments focusing on forestry sector for job creation.³³ Finally, the OECD reviewed the employment impacts of green growth policies and found that they do not harm employment, if well designed and implemented.³⁴ Section 4 of this report explores green job creation opportunities and provides recommendations for well-designed policies.

The ongoing debate on Green New Deal type policies in the European Union (EU), the U.S., and the Republic of Korea, provides a real opportunity for governments to link climate action to COVID-19 recovery packages. This report outlines these opportunities in detail.



03 HEALTH AND CLIMATE INTERACTIONS

Air pollution and climate

The COVID-19 pandemic has put the spotlight on health and quality of life³⁵ in a broader context. Before the COVID-19 crisis, there was already recognition of the linkages between climate change and health, mostly focused on air pollution. The Climate and Clean Air Coalition is a collaboration between several countries and the United Nations Environment Programme (UNEP) that has documented the many co-benefits of addressing climate change and air pollution concerns jointly in China, among other case study countries.³⁶ Seven million people die prematurely every year from the effects breathing dirty air has on our bodies and minds, over half in Asia.³⁷ While this has directly stimulated effective action in China, leading to cleaner air and more ambitious climate action, it has not led to drastic action in response to the COVID-19 pandemic. The number of deaths caused by air pollution each year is over 15 times higher than those caused by the COVID-19 pandemic at the time of writing.

Countries should take action to recover from the COVID-19 crisis in a way that increases their resilience to future shocks of this nature, and produces co-benefits where possible, as in the case of air quality and climate.

Sustainable energy and health

Access to energy is a prerequisite for quality health care and is fundamental to the achievement of universal health care coverage.³⁸ Many health clinics, particularly those in rural areas, lack reliable, affordable electricity supplies to power basic services such as lighting, communications, refrigeration, diagnostics, and the medical devices required to provide health services.

Even developed countries with robust health systems have struggled to allocate medical resources to a population strained by COVID-19. Many health facilities in developing economies struggle every day with infrastructure and energy access challenges. A World Health Organization (WHO) review revealed that one in four health

facilities in sub-Saharan Africa had no access to electricity. Only 28 percent of health facilities and 34 percent of hospitals had what could be called reliable access to electricity.³⁹ Nearly 40,000 government health facilities that serve an estimated 230 million people in rural India are still operating without electricity supply.⁴⁰ Often, health facilities must rely on noisy CO₂-emitting diesel generators as primary or back-up power systems. As a result, they lack access to critical capabilities such as reliable cold storage for medicine, or sterilizers for equipment. It is challenging to effectively implement the recommended testing and tracing response to COVID-19 under these circumstances.

Linking health and climate resilience

There are similarities between the long-term solutions needed to address the COVID-19 pandemic and climate change. It is essential to understand the electricity and health nexus and the role of sustainable energy in better delivery of health services, necessary in a truly inclusive society. The COVID-19 pandemic is both a crisis and an opportunity to enhance healthcare infrastructure with access to reliable, clean energy that would also support climate action and the achievement of other SDGs.

Speed of solutions deployment is critical during a pandemic and to prepare for the post-pandemic future. Off-grid decentralized renewable power can meet this challenge for many vulnerable communities. Off-grid energy solutions not only allow people to access the healthcare they need now but are also an investment into clean, sustainable energy infrastructure for the future.

Climate policymakers can expect increased public interest in health issues for the foreseeable future. It will also be interesting to understand whether the COVID-19 pandemic has influenced attitudes towards other aspects of the sustainability crisis. Even at the early stages of the pandemic, an Ipsos MORI survey in April 2020 in 29 countries, including all G20 economies, shows that 65 percent of all respondents globally favor a green recovery, with government actions that prioritize climate change.⁴¹



04 EMPLOYMENT AND INCLUSIVE RECOVERY

COVID-19 pandemic impacts on employment

Around the world, large companies and small and medium-sized enterprises (SMEs) alike are facing significant economic challenges such as severe declines in revenues, insolvencies, and a massive increase in job losses due to COVID-19.⁴² According to Statista's COVID-19 impact index, manufacturing and travel and transportation are the two most impacted sectors, as shown in figure 2. Statista assigns both sectors impact index scores of 5 (severe impact) in four dimensions – personnel, operations, supply chain, and revenue. As of May 27, 2020, according to the ILO, 25 million people have lost their jobs, with the loss of income amounting to 3.4 trillion USD on a global scale.⁴³

Figure 3 depicts outputs of the ILO's new model, based on real-time economic and labor market data,

predicting the fall in working hours. The results show that the total amount of hours worked by workers around the world could fall by around 10.7 percent in the current quarter. This decrease is equivalent to 305 million full-time workers with a 48-hour workweek.

Particularly for Small Island Developing States (SIDS) and least developed countries (LDCs), the employment, income, and food security of the millions of traders, roadside vendors (mostly women), small restaurant owners and workers, and others in informal food systems are at risk. Open markets and roadside stands have closed on many islands. Small shops continue to provide plentiful food stocks, although not as nutritious as the variety available in markets and larger stores. Moreover, many small island nations have experienced a drastic decline in revenue and employment from international tourism due to travel restrictions.

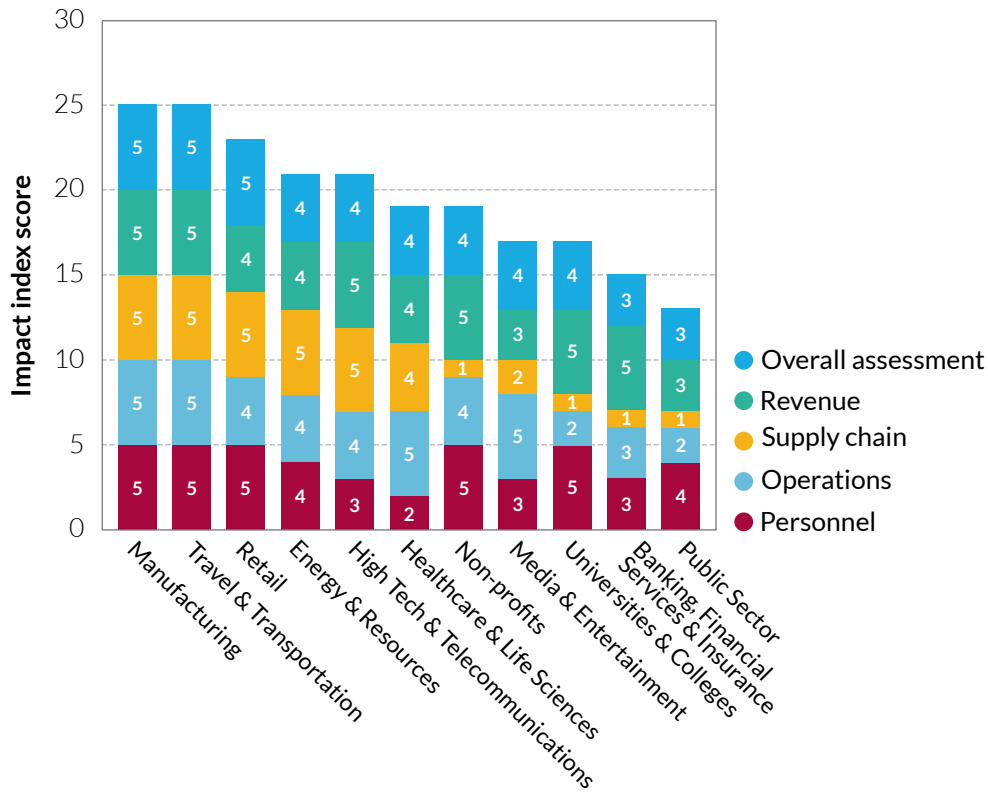


Figure 2. Projected COVID-19 impact index by industry and dimension (2020)

Source: Adapted from Statista⁴⁴

Note: The impact is ranked on a 5-point scale from minor impact to severe impact: 1 - minor impact, 2 - moderate impact, 3 - significant impact, 4 - major impact, 5 - severe impact.

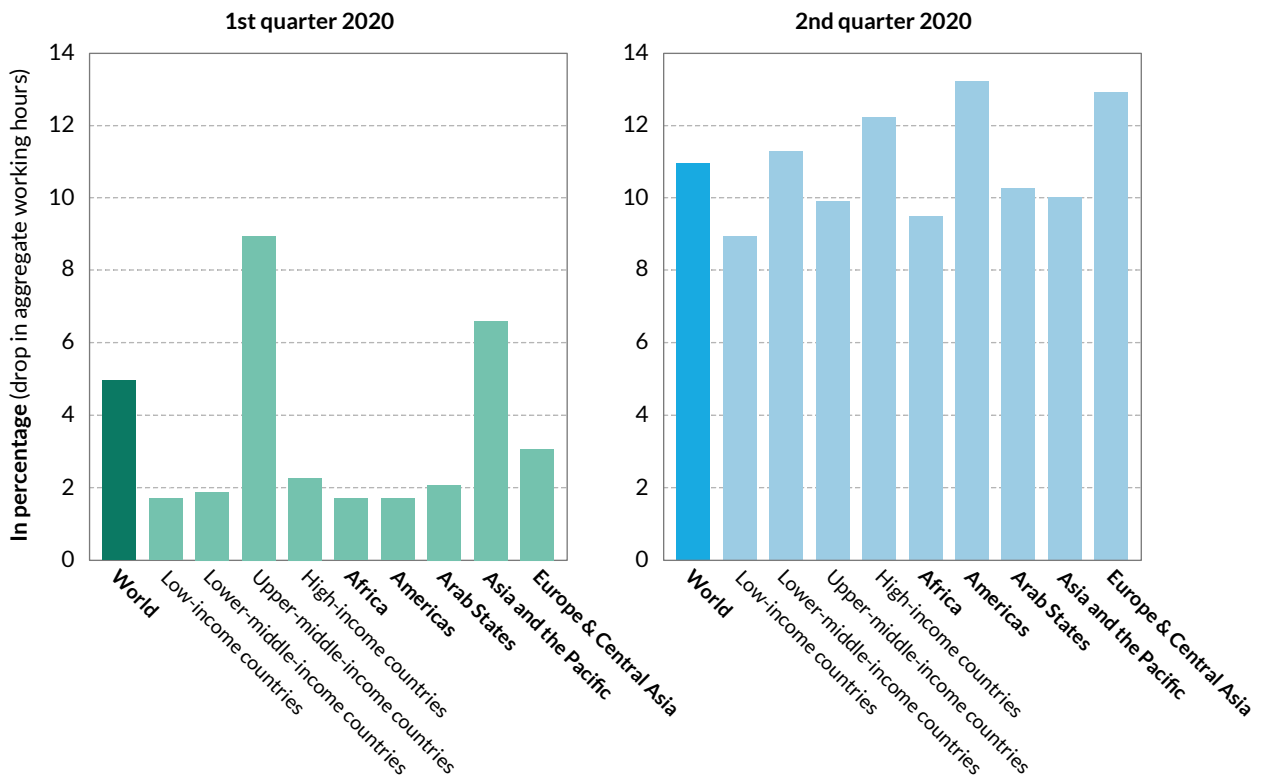


Figure 3. Estimated drop in aggregate working hours relative to the pre-crisis headline (4th quarter 2019, seasonally adjusted)

Source: Adapted from ILO⁴⁵

In 2020, two billion workers are informal.⁴⁶ These workers represent 62 percent of the world's workforce and constitute 90 percent of employment in low-income countries, 67 percent in middle-income countries, and 18 percent in high-income countries.⁴⁷ Additionally, informal enterprises constitute 8 out of 10 enterprises in the world.⁴⁸ Informal sector actors are more vulnerable to economic shocks in general and, in the context of the pandemic, are most likely to be faced with a dilemma between 'social distancing' to avoid infection or working to avoid starvation. Women are over-represented in the hardest-hit sectors.⁴⁹ Informal workers also risk exclusion from the COVID-19 relief and recovery packages.

As governments design their economic recovery packages, it is critical to incorporate green measures to tackle the climate crisis while stimulating the economy. In general, governments must consider the following issues when designing their economic recovery packages:

- Past experiences and lessons learned from countries that allocated part of their stimulus packages to green sectors and measures;
- The enormous potential of green technologies and investments to provide green jobs;
- Short-term employment needs and the long term transition to a green and climate resilient economy;
- Mitigation of the effects of the low carbon and green economy transition on fossil fuel

and brown economy workers, exacerbated by COVID-19;

- The need for skills gap assessments, skilling, reskilling, and training activities to equip the labor force for the green transition; and
- Relief and employment support for informal workers who are the most vulnerable.

Experiences from past green economic recovery packages

This economic crisis is different from previous ones, as shocks in both aggregate demand and supply have caused it. However, experience in designing economic recovery packages still provides valuable lessons. A team of economists recently conducted a rapid assessment of 196 stimulatory fiscal recovery policies implemented in response to the 2008-2009 global financial crisis.⁵⁰ They found that 63 were "green", 117 were "colorless", and 16 were "brown". The authors concluded that green stimulus measures often have advantages over traditional fiscal stimulus measures. For instance, renewable energy investments could deliver benefits both in the short and the long-term. In the short-term, renewable energy creates more **direct jobs** during manufacturing and distribution and construction and installation stages. Jobs in these sectors are particularly relevant in cases when the economy reaches high levels of unemployment in the middle of a recession. Renewable energy investments consequently boost spending and increase short-term GDP multipliers⁵¹ derived from expanding demand. Investment in renewable energy sectors also increases the demand for goods and services from industries in the supply chain that support the creation of **indirect jobs**. Employees in those industries spend their income on different goods and services, thereby creating **induced jobs**. In the long-term, renewable energy requires less labor for operation and maintenance⁵² compared to fossil fuels. Labor is freed up as the economy returns to capacity, allowing for more efficient use of labor in the long-term.

Table 1 provides examples of green recovery packages implemented in the U.S., EU, China, and the Republic of Korea in response to the 2008-2009 global financial crisis. The green features of these packages vary across countries, but they all have positive impacts on domestic employment generation. The focus on renewable energy and low-carbon manufacturing industries is predominant in studies from the U.S and the EU. However, job creation opportunities exist in





developing countries in other more labor-intensive sectors, including land management, sustainable agriculture, forestry, and water management. These sectors provide the economic foundation for many low-income countries and offer far better employment generation opportunities than other sectors.⁵³ Schwartz et al.⁵⁴ studied the direct employment impacts of fiscal stimulus measures in Honduras, Brazil, and Peru. The jobs created per USD invested varied widely across the different projects assessed. Water network rehabilitation and expansion in Honduras was around ten times more effective in creating jobs than hydroelectric energy projects in Brazil. Rural electrification in Peru created jobs at a level between the Brazil and Honduras programs. Lastly, past responses to health emergencies and natural disasters have shown that employment-intensive investment in health, water, sanitation, and hygiene (WASH) infrastructure and services is effective in creating immediate jobs in crises.

Green recovery packages have economic benefits in addition to creating jobs. The USD 21 billion invested as part of the U.S. green recovery package produced an economic output equivalent to 1.2 to 2.1 times the value for the period 2009–2011, as detailed in table 1. Wind turbine prices also declined, and the economic attractiveness of wind energy improved, leading to growing sales revenue

in the small wind turbine sector. The low-cost debt available under the loan guarantee program had the potential to reduce the levelized cost of electricity (LCOE) by approximately 20 percent. Federal incentives were crucial in enabling renewable energy technologies to compete with conventional fuel sources on a cost basis.

The Chinese economy also benefited from a stimulus package that restored growth in the wake of the global financial crisis. However, while the package had green components, infrastructure growth led to an almost threefold mid-term increase in coal consumption and emissions between 2000 and 2013. On the back of this rapid growth, China became the largest net importer of coal in 2009, and by the end of 2013, the country was responsible for half of global coal consumption. China's stimulus investment expanded its energy-intensive industries, including steel and iron, increasing energy consumption, and related emissions, thereby outweighing the green components.⁵⁵

Table 1. Examples of green economic recovery packages during the global financial crisis

Country	Recovery Packages	Green Features	Employment Impacts	Other Economic Benefits
United States	American Recovery and Reinvestment Act (ARRA), 2009 ⁵⁶	A 'clean energy' or 'green' component of between USD 67 and USD 112 billion, representing circa 0.7% of GDP and 12% of the total recovery package.	Created an estimated 26,600 jobs.	An economic output equivalent to 1.2 to 2.1 times the value of the USD 21 billion investment for the period 2009–2011. Revenue from Photovoltaic (PV) technology increased to nearly USD 2.1 billion in 2010, up from USD 941 million in 2009.
European Union (EU)	European Economic Recovery Plan (EERP), 2008	Green investments accounted for 13.2% of the total stimulus worth EUR 200 billion, accounting for about 1.5% of the EU's GDP. A third of green stimulus invested in energy efficiency and other green initiatives. ⁵⁷	Action areas included launching a major European employment support initiative and creating demand for labor ⁵⁸ , but employment started to rebound only from 2013. ⁵⁹	Positive effects on real GDP growth, ⁶⁰ Economic impacts from green investment ranged from around 0.6% to 1.1% of GDP at the national level and up to 1.5% of GDP at the European level. ⁶¹
China	Stimulus Package, 2008–2009	A 'green' component of about USD 221 billion, accounting for a third of the total stimulus package, which is about 12.5% of GDP. Approximately 5.25% invested in energy savings, pollution control, and ecological improvement. ⁶²	About 0.68% increase in total employment for every 1% increase in the share of solar PV generation. ⁶³	Significant effects on output at both the national and the subnational levels; Contributed to financing the start of China's green economy transition. ⁶⁴
Republic of Korea	Green New Deal, 2009–2012	A 'green stimulus' plan of USD 38.1 billion, representing about 4% of the GDP. 80% allocated to green measures such as renewable energies (USD 1.80 billion), energy-efficient buildings (USD 6.19 billion), low carbon vehicles (USD 1.80 billion), railways (USD 7.01 billion), and water and waste management (USD 13.89 billion). ⁶⁵	Intended to create 950,000 jobs, albeit not entirely achieved. ⁶⁶	An effective economic policy instrument to recover from the global financial crisis. ⁶⁷

Opportunities to harness the inclusive green jobs potential

Low-carbon development is expected to generate over 65 million additional jobs globally by 2030 compared to business-as-usual (BAU)⁶⁸. There is growing evidence in low- and middle-income countries that investing in green growth offers significantly more employment opportunities when compared with further investments in the current unsustainable economic model.⁶⁹ At the national level, recent GGGI analysis shows that Mexico could generate around 72 percent more jobs by meeting the renewable electricity targets under its Nationally Determined Contribution (NDC) compared to BAU by 2030.⁷⁰ Indonesia can create about 7.1 million direct, indirect, and induced jobs by 2030 by meeting the renewable energy targets set in its National Electricity Plan. The study also shows that renewable energy sectors can generate 2 to 6 times more jobs per USD invested compared to coal. This result aligns with findings from global studies that investments of one million USD could generate around 7.5 full-time jobs in renewable energy infrastructure, and approximately 7.7 full-time jobs in energy efficiency, compared to only 2.6 full-time jobs in fossil fuels.⁷¹

A separate GGGI analysis in Cambodia shows that meeting resource efficiency targets in key industrial subsectors can create half a million jobs.⁷²

In the context of SIDS, Fiji has set an ambitious long-term target to reach carbon neutrality by 2050 under its long-term low emissions development strategy (LT-LEDS). By following this pathway, Fiji could generate twice as many new jobs compared to BAU in sectors such as electricity, transport, and forestry.⁷³ Local initiatives like composting and recycling could provide a significant number of new, better-paid jobs, the potential for improved working conditions, and new revenue streams for local governments. According to estimates, in Bangladesh alone, new carbon-reducing solid waste management programs could generate over 200,000 jobs and livelihoods by 2050.⁷⁴

As underlined by Hepburn et al., the speed and ease of implementation of steps to stimulate the economy are critical to ensuring an immediate and effective response to sudden job losses.⁷⁵ At the same time, it is vital to consider whether the long-term impacts of recovery packages will lock the economy into carbon-intensive or low or zero-carbon development pathways.

Quickly implementable low carbon actions include

residential and commercial energy-efficiency retrofits, and investments in natural capital such as afforestation, reforestation, and enhancement of rural ecosystems.⁷⁶ In many cases, there are existing and well-designed programs⁷⁷ in energy-efficiency retrofits that can be a quick-win option both from short-term employment and long-term low carbon development perspectives. The European Commission will put forward the Renovation Wave initiative that aims to act as a catalyst to drive investments in energy-efficiency measures in the building sector. In general, investments in building retrofits require low skilled workers, which makes this measure particularly attractive during an economic recession with high rates of unemployment of unskilled and low skilled workers.

Investment in natural capital or nature-based solutions is another particularly relevant area for low-income countries. Rapid implementation is possible with low worker skills and training requirements and with short planning and procurement processes in many cases. Another advantage of investing in natural infrastructure is that workers can perform their tasks while meeting social distancing requirements.⁷⁸ Section 6 in this report discusses investments in nature-based solutions further.

Lastly, Green Growth Action Plans, NDCs, and LT-LEDS already include many low carbon, climate-resilient, and green growth measures, often accompanied by an implementation and finance plan. Recovery packages provide an excellent opportunity for low- and middle-income countries to speed up their implementation. Many of these measures are low carbon and climate-resilient infrastructure projects which are essential for the sustainable economic growth of low-income countries.

Investing in training and skills development while supporting the just transition

Measures such as (re)training programs, including vocational training promoting green innovation and entrepreneurship, are essential as an immediate response to the economic crisis and surging unemployment rates. Investing in human resources through training programs can employ people in the short-term while supporting a just transition to the green economy in the medium to long-term. GGGI's employment study⁷⁹ on renewable energy finds that investments in solar and wind technology to meet countries' renewable energy targets specified in their NDCs and national energy plans will require 48-76 percent low to medium skilled workers and

24-52 percent high skilled occupations. The requirements for low to medium skilled labor in the renewable energy sectors must be immediately met in the short-term by investing in vocational training programs responding to high unemployment rates and severely affected energy sectors such as the coal mining industry. Vocational and on-the-job (re-)training programs should be designed for occupations in need. Multilateral organizations can share international experience and best practices for enhanced learning in partnership with government.

Careful anticipation of employment shifts is necessary to implement green transitions. A well-managed approach is essential to avoid or minimize adverse impacts or risks to workers, communities, and businesses. A robust transition requires the right policies to be in place, promoting participation, social protection, and reskilling.⁸⁰

Several good examples of well-designed schemes addressing the issue of employment shifts and impacts in specific sectors exist, mostly related to coal mining. In Alberta, Canada, the government redistributed revenues from carbon taxes to support coal communities affected by jobs declining in the coal sector due to the takeoff of modern and clean energy generation.⁸¹ The Just Transition Fund in the U.S., established and funded by the Federal Government, is another example of government support to coal sector communities in Appalachia due to the decline of the coal sector. The fund invested in bottom-up innovation projects in sustainable economic development.⁸² China has created a USD 15 billion fund to support retraining, reskilling, reallocation, and early retirement of 5-6 million workers affected by efforts to slow down the construction of coal-fired power plants.⁸³ The National Planning Commission in South Africa has prioritized the urgent need for a stakeholder engagement process driven by the government to enable a transparent and participatory process on designing a just energy transition plan that will determine the future of the national coal industry.⁸⁴

Achieving an inclusive green recovery

Principles of a Just Transition are embedded in green growth and climate action development concepts to ensure inclusive outcomes in contribution to sustainable development goals. The COVID-19 pandemic has laid bare existing inequalities within and between countries, as people already medically, socially and economically disadvantaged are disproportionately impacted by the crisis. This further highlights the importance of equality and inclusion to economic and social

resilience. The health and economic impacts cut across different aspects of society, calling for COVID-19 recovery packages that go beyond a just transition in the employment sector to support people with vulnerabilities related to socio-economic inequality.

The most medically vulnerable groups to COVID-19 are older people and people with pre-existing conditions. Men also seem to be more susceptible to the medical impacts of COVID-19, highlighting the importance of sex-disaggregation of data to understand the virus and enable effective treatment approaches. Similarly, women, poor people, and informal sector actors are vulnerable from a socio-economic perspective, by nature of their employment as front line health workers. These workers face a double burden of unpaid care work, or lack of ability to observe social distancing regulations, and lack of access to social benefits and welfare. These vulnerabilities are particularly evident in countries that are not able to invest in health care, social protection, and unemployment schemes. Adequate retirement programs have been essential to protect the elderly, who, in contexts of poverty, may be forced to work and place themselves at risk of infection. Finally, the COVID-19 pandemic also exposes vulnerable groups in dense cities where people have been less able to isolate, particularly those who live in inadequate housing and who lack access to basic services, as discussed further in Section 5.

Globally, the impact of the pandemic on society and the economy is causing a significant decline in human development⁸⁵ and an increase in poverty levels for the first time in decades.⁸⁶ Lessons from previous crises show that the damage can lead to reversals of sustainable development progress and deep, long-lasting inequalities. Therefore, an equity lens is needed to understand the impact of the crisis, the short-term response, and longer-term recovery plans.

Efforts 'to flatten the curve' have led to various disproportionate impacts on vulnerable groups. For example, low-income single-headed households face difficulties observing social distancing as they need an income to feed their families in the absence of social protection schemes. The poor do not have access to work-from-home opportunities or the technology to access work, information, and in some cases, services.⁸⁷ The world's 2 billion informal sector workers are particularly vulnerable as they lack access to available benefits.⁸⁸ As schools are on lockdown, children living in poverty without the technology to access e-learning programs are deprived of an education. Children in

unstable homes are more exposed to neglect violence, exploitation, and abuse.⁸⁹ Globally, nearly 70 percent of care workers are women, many in low-paid jobs, facing significant risks at work. In contrast, women are under-represented in leadership roles in the health sector, a sign of the vertical gender gap in the labor force. In a lockdown, the longstanding gender imbalance in unpaid work is magnified, while gender-based violence has increased.⁹⁰

In longer-term recovery, it is essential to have a metric for recovery for low and middle-income countries, aligned with NDCs and SDGs, and which includes social indicators promoting poverty alleviation and gender equality founded on the principle of leaving no one behind. The challenge is how to “build back better”, balancing health concerns with social and economic stimulation, balancing short-term measures to mitigate the spread of the virus with longer-term recovery measures, and tackling the underlying barriers to equality. Governments are prioritizing recovery and creation of jobs alongside investments in health care. Efforts to promote environmental sustainability and climate action at the core of recovery would fail without an explicit articulation of socio-economic benefits to demonstrate the complementarity of multiple objectives. Such co-benefits exist in labor-intensive sectors, such as energy efficiency, which will create maximum jobs per dollar of investment.⁹¹ The promotion of equal opportunities for women under NDC targets in renewable energy could even out the gender gap in the sector.⁹²

This report outlines the importance of an inclusive recovery planning process that incorporates disaggregated analysis of COVID-19 impacts on women, men, and different vulnerable groups specific to a country’s context. Such analysis will enable better targeting of policies and help to build political and public support for green recovery initiatives. The GGGI Green Growth Index⁹³ provides a metric for green recovery, which incorporates indicators for social inclusion and SDG alignment, as outlined in Section 9. Gender budgeting mechanisms can support the monitoring and measuring of inclusive outcomes in the short and long-term.

Inclusive recovery green solutions will depend on the national context and may include:

- o **Ending fossil fuel subsidies** to free up public funds for reallocation to public services, social protection, and green stimulus packages, (e.g., Indonesia’s phase-out of fuel subsidies in

2014 with the rollout of targeted social welfare);

- o **Supporting poor workers and households** through temporary or permanent expansion of social assistance programs to more people (e.g., Vietnam) or increased payments (e.g., Bangladesh). Support could include cash transfers to poor households and the informal sector (e.g., Colombia, Nepal, and India), utility subsidies for poor households (e.g., Indonesia), temporary monthly cash transfers to farmers and informal workers not covered by existing social security programs (e.g., Thailand), food support to vulnerable households (e.g., Colombia), and value-added tax (VAT) free goods and services such as mobile phones (e.g., Colombia);
- o **Providing unemployment insurance to the sick and those unable to work from home** (e.g., Chile);
- o **Implementing nature-based solutions in social assistance programs** such as tree planting, weeding, or land preparation for employment in rural areas. Such schemes, when conditional on individual savings account ownership, can improve financial inclusion of women and the poor (e.g., India);
- o **Focusing on labor-intensive sectors such as energy efficiency** with high potential for job creation per investment, while also including energy savings;
- o **Promoting gender equality in green investments with high potential for jobs creation** such as renewable energy and energy efficiency while acknowledging and responding to the gender gap in the energy sector;
- o **Designing green stimulus packages for micro, small and medium-sized enterprises (MSMEs)** to retain and create green jobs (e.g., Malaysia), and address legal and regulatory barriers, particularly to startups and women led enterprises. Such policies can also aim to bring informal enterprises and workers into the formal sectors with improved access to stimulus packages and social welfare; and
- o **Stimulating climate-smart agricultural (CSA) practices** targeting male and female smallholders to create rural jobs.



05 GREEN CITIES

COVID-19 impacts on green city agendas

Cities have always been shaped and reshaped by environmental, health, natural, and other shocks. Such shocks have often had a significant impact on physical and spatial development planning for generations to come. They have also fundamentally shaped public expectations, attitudes, and values. The COVID-19 pandemic will do the same. As such, it provides a space in which to rethink cities and their role in green growth to 'lock-in' the urgent policy and investment shifts needed to support green, climate-resilient, inclusive, and prosperous urban futures.

As cities play such an essential role in global green growth agendas, their resilience and future prosperity are vital. However, COVID-19 has placed tremendous pressure on urban systems and disrupted a long period of urban-led prosperity, including transitions to greener growth paths. Cities have been on the frontlines of the pandemic. In some cases, this has exposed persistent inequalities and development gaps. However, in several areas,

the crisis has reiterated the urgent need to invest in the key drivers that underpin the transition to low-carbon, resilient, inclusive, and sustainable cities.

Specifically, the pandemic has challenged compact and connected city goals, with their emphasis on density, proximity to high volume services, and a focus on mass public transport systems. However, in the latter case, such urban transitions could now build in outcomes that support healthy and green transitions at an earlier stage of development, planning, and investment. There is already much evidence to support possibilities in future urban design and planning, which leave cities much more resilient and adaptive as a result of the pandemic.⁹⁴

The attainment of low-carbon and green cities requires supporting and investing in green urban planning, designing compact and connected cities with greater access to urban infrastructure, investing in sustainable mobility with a focus on public transport systems, supporting circular economies, and providing essential services such as sanitation and waste. The global pandemic poses

significant challenges in all of these areas and has already led to a reprioritization of planning goals and investment directions. The crisis has also led to ongoing public debate about what makes for a livable, healthy, and prosperous city.

The impact of COVID-19, and therefore the responses, have not been even, however. Responses will consequently need to be related to capacity and build upon the hard and soft urban infrastructure which may or may not exist. As the OECD has summarized, these building blocks include public service delivery, population size, regulatory frameworks, fiscal capacity, and the infrastructure in place.⁹⁵ In the case of waste management services, for example, Vienna was able to continue the provision of waste services with adjustments for changing volumes, safe disposal, and to ensure the health of its workforce. At the same time, other cities suspended source separation and even collection.⁹⁶

As the pandemic is ongoing, the extent to which temporary responses will become permanent, and the financial and social sustainability of such approaches are unclear. What is clear, is that there are more consistent calls for 'temporary' measures such as services and transport planning to be put in place in response to the pandemic, which are connected to longer-term solutions and investments. For future cities, the crisis has stimulated discussion on how cities can better respond and become more resilient to future threats, including the projected environmental and health impacts of climate change.⁹⁷ It has also raised questions over vulnerabilities to food supply chains and rural-urban linkages.⁹⁸ Any New Green Deal concerning cities will need to address these challenges and opportunities.

Towards 'healthy density'

COVID-19 has reignited the debate on the pros and cons of density and urban design in which compact cities have been actively promoted in climate advocacy due to lower emissions, greater 'efficiency', and with regards to service delivery. A more explicit alignment of low-carbon cities and healthy density will be necessary following the COVID-19 crisis.⁹⁹

Access to essential services such as waste management, safe water, and sanitation supports healthy environments and will need to be more clearly balanced with densification. People have sought to flee compact urban areas in response to COVID-19 and have felt 'locked-in' and vulnerable when they cannot. Dense cities have been

associated with contagious environments where vulnerable and poor people have been less able to isolate themselves. Some cities have seen a temporary out-migration, as was also evident in the Asian Financial Crisis. While in some cities, density has been associated with the pandemic's rapid spread and impact, other dense cities such as Tokyo, Taipei, and Seoul have faced far fewer repercussions. Nevertheless, concern over the health of dense and connected urban life has been evident across countries.

This concern raises a key challenge for meeting the needs of healthy and resilient cities, in an urban future of much larger and denser environments. Proximity to services is, of course, also a requisite for healthy cities. Practitioners, professionals, and policymakers must support 'good' density, as critical to achieving efficient and affordable service delivery and lower carbon cities, in the context of COVID-19. This requires reflection on density, public health, and the intersections between low-carbon and post-COVID-19 urban and regional planning towards healthy density. Without such a clear repositioning and alignment of 'green' goals and public health and well-being outcomes, urban resilience will likely be undermined, and a sense of increased urban vulnerability could persist for a generation.

The demand for healthier urban spaces is likely to reshape urban and regional planning for some time, providing opportunities to green the urban agenda further. There will also be a demand for investment in green space and quality of life outcomes linked to innovative green design, which supports both density and healthy environments. It is a challenge for OECD countries to broaden agendas and stakeholder engagement, but also for developing countries where cities are denser without benefit.

An equally urgent and related challenge is in meeting global housing and service provision gaps. COVID-19 has fundamentally exposed the costs of not providing safe, adequate, and affordable housing for all.¹⁰⁰ There will be more than 2.5 billion more urban dwellers by 2050, 90 percent of them in Africa and Asia. A large proportion of the world's urban population will continue to be housed in inadequate, informal housing with insecure tenure and, therefore, less access to 'legal' services. Some 1.2 billion city dwellers lack access to affordable and secure housing today. This number is estimated to rise to 1.6 billion people by 2025. It is, therefore, even more urgent to accelerate efforts in meeting SDG 11.1 by 2030; to ensure access for all to basic services, adequate, safe and affordable housing, and to upgrade slums.

Due to this continued housing poverty, quarantine and lockdown advisories have perversely increased vulnerabilities and proximity to unhealthy environments for many.¹⁰¹ Physical distancing guidelines have not been possible to follow. This has reinforced the need to allocate more considerable resources and attention to the growing number of those living in slum conditions and the urgent priority for upgrading, in particular.¹⁰² Throughout the pandemic the ILO has emphasized the vulnerabilities of refugee and migrant worker populations, including cramped and inadequate living conditions.¹⁰³ The pandemic and resulting lockdowns have also demonstrated the need for healthier homes and environments, beyond the need for shelter. GGGI advocates that building back better must, therefore, address the urgent need for healthier, low-carbon, and low-cost housing.¹⁰⁴

Universal access to affordable services

Beyond housing, additional urban gaps and vulnerabilities have exposed the consequences of continued inadequate access to vital services – especially access to waste, sanitation, and safe water. Inadequate access has significant implications for key advisories and strategies to deal with the pandemic, for example, calls for improved hygiene and regular hand washing. The COVID-19 pandemic has undoubtedly given greater prominence to healthy cities and environments, and the essential role of access to waste, sanitation, and water services. For a green, inclusive urban recovery, recommitting to the WASH agenda, and meeting the water, sanitation, and waste service delivery goals and targets of the SDGs is necessary.

A World Leaders Call To Action on COVID-19 is now leading a global recommitment with the support of world leaders, the United Nations (UN) system, non-government organizations (NGOs), and the academic community. This call to action has highlighted the following pressing areas:

- Making water, sanitation, and hygiene

available to everyone, eliminating inequalities and leaving no one behind, taking care of those who are most vulnerable to COVID-19;

- Working collaboratively with all stakeholders in a coordinated manner to improve water and sanitation services, as each actor, whether public, private, donor or civil society has something to offer to protect populations from COVID-19;
- Ensuring that water and sanitation systems are resilient and sustainable to protect people's health and support national health systems;
- Prioritizing the mobilization of finance to support countries in their response to this crisis; and
- Delivering accurate information in a transparent manner.¹⁰⁵

Almost 800 million people still lack adequate access to a sustainable drinking water supply, and only 45 percent of the global population use safely managed sanitation facilities. COVID-19 has exposed the limitations of public health messages on behavior change, when not supported by access to essential services and infrastructure. In support of the short and longer-term shift required, WHO has developed a series of Interim Guidelines on hand hygiene and waste management, which have provided short-term advice and identified longer-term investments and co-benefits in critical public infrastructure. The guidelines also recommend how these should be integrated into broader planning and investments.¹⁰⁶ These guidelines should form the basis of longer-term commitment, including through recovery packages.

Specific infrastructure and service vulnerabilities often result from a lack of legal status, denying access to social protection and health systems. Vulnerabilities are related to a lack of access to





information and lack of security of livelihoods, for example, for traders, and the inability to freely move across cities for more transient workers.¹⁰⁷ The ILO has referred to this exposure and lack of protection as a ‘wakeup call’. Social protection and redistributive systems, where they exist, have proved critical in providing cash and other support directly to individuals and households, especially those most vulnerable.¹⁰⁸ In the case of the Philippines, Thailand, and Kerala in India, near-universal social protection systems could be rapidly expanded and deepened to address medical support, testing, and cash transfers in dealing with the pandemic.¹⁰⁹ For future cities, there will need to be greater engagement across the nexus of urban resilience, access to services and basic infrastructure, social protection, inclusion, and public health.¹¹⁰ Such commitments must be included in the just transition to green cities, and the strengthening of social safeguards.

Urban circular economies under threat

There have been severe disruptions to circular economies, as cities have either stopped collecting waste, requested households not to source separate, or resorted to incineration and deep burial of all waste due to potential contamination.¹¹¹ Efforts to extend bans on single-use plastics have been placed on hold across several U.S. cities and states, Europe, Asia, and Africa as plastic is in high demand for offering hygienic protection, including medical equipment. Even countries such as the Republic of Korea that have been at the forefront of effective waste management are facing imminent circular economy crises.¹¹² Jacob Duer, president of the Alliance to End Plastics Waste (AEPW), noted that the crisis “has shown us that we need to increase our investments; our focus on sustainability ... because our waste-management system is broken.”¹¹³

Straws, single-use plastic gloves, double bagging of waste, among others, have driven a rise in single-use plastics¹¹⁴ with limited collection and recycling value, resurrecting a plastics industry that was struggling for profitability. With the dramatic drop in oil prices, the cost of producing virgin plastic materials is the lowest in decades, meaning that alternatives to plastic and the recycling of plastics have become less competitive and financially viable. Additionally, many shops are actively discouraging the use of recycled and multi-use bags. Likewise, there has been a surge in packaging waste, driven by lockdowns and the rapid proliferation of online purchase systems. However, this has driven prices for recyclable paper and cardboard up. Overall, the COVID-19 pandemic has substantially shaken many circular systems that were already faltering. Governments will need to focus on the rebuilding of circular economies as a priority area for green new deals.

At the same time, however, the pandemic has enhanced the understanding of the importance of clean environments, and decent service provision. There are many opportunities for a green recovery that supports circular economies. The first policy imperative is for governments to maintain commitments to phase out single-use plastics, including through taxes and levies, and to support innovation in alternative materials through fiscal and other incentives. A second priority area is to accelerate extended producer responsibility to ensure that the costs of supporting circular economies are factored into the whole of product life. A third is to recommit to invest in infrastructure which supports the 4R approach to waste generation, management, and circularity. Support for the 4R approach has become more urgent in light of local and global disruptions to recycling economies.

Revaluating green, public space

At the urban level, decentralized urban environments in which people benefited from private space, including green space, has been linked to better mental and physical health.¹¹⁵ In that respect, public and green space is an essential physical asset and public infrastructure for well-being in cities. The social and ecological benefits of private space have been undervalued to date in urban planning and design.¹¹⁶ In an ongoing study, the Stockholm Environment Institute (SEI) is assessing green space use and access in the pandemic to better understand co-benefits, in both a European and developing country urban context.¹¹⁷

To date, however, green spaces have been lost in cities through a lack of ‘bankability’ and investment opportunity in the context of private and public development and infrastructure projects. Yet the current crisis demonstrates that they are invaluable and have a key role to play as urban social, environmental, and economic assets.¹¹⁸ Integrating green spaces into urban planning as essential assets for healthy and sustainable cities must be placed more firmly on urban and regional planning agendas.¹¹⁹ The current crisis demonstrates that public green spaces must play a key role – in social, environmental, and economic well-being and resilience. Integrating green spaces into urban planning, as essential assets for healthy and sustainable cities, must be placed more firmly on urban planning agendas.¹²⁰ Investing in ecological systems not only provides benefits in terms of urban well-being but also offers critical buffers against other natural disasters and the impacts of

climate change. Green spaces are essential to broader urban resilience, and their co-benefits across multiple challenges faced by cities are now much more evident.

Re-thinking investments in sustainable mobility and transportation

Public transportation is critical, on a large and accessible scale, to achieve both climate and clean air goals. Yet through the pandemic public transport has been seen as a ‘health threat’, and several organizations have recently recognized that the ‘stigmatization’ of public transport will significantly set back gains made – at least in the short-term. A recent article explained New York’s vulnerability compared to Los Angeles not only in terms of density but the numbers that use public rather than private transport, a ratio of eight to one.¹²¹ Figure 4 shows a significant decline in the use of public transport across all regions and transport types, with only a few exceptions. Some countries, such as the Republic of Korea, were able to quickly return public transport use to normal, partially by mandating the use of masks and providing sanitizer upon boarding at an early stage, while other cities and countries have seen a more protracted decline. In general, even in cities where public transport is highly valued, people have fled public transport and government has discouraged its use. In several countries, such as the United Kingdom, planned investment has been placed on hold, pending a review of changing demand and viability in light of greater social distancing.¹²²

A rethink of public transport for public health will be necessary in the short to medium-term. There is

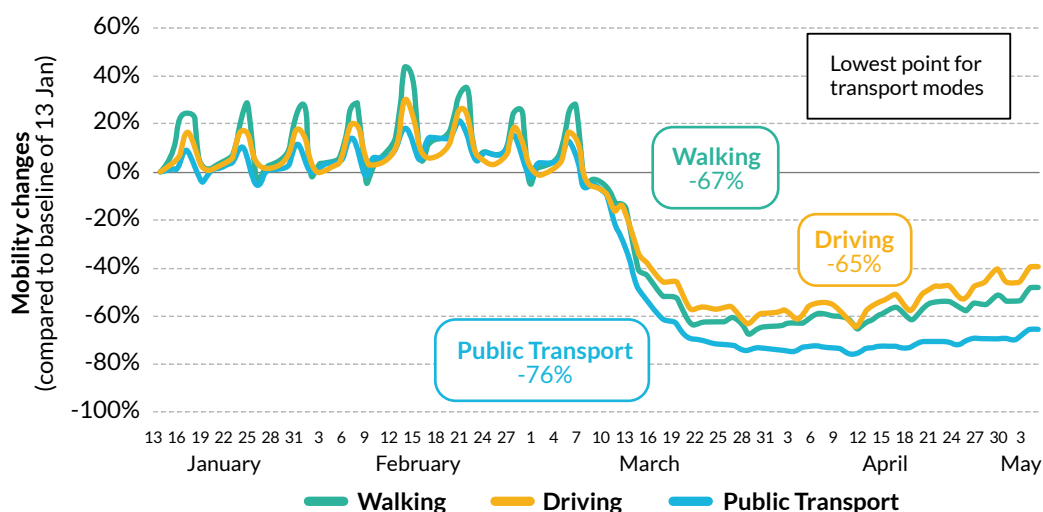


Figure 4. Decline in urban mobility, based on Google and Apple mobility data sets.

Source: Adapted from SLOCAT¹²³

evidence of both positive and negative trends to replace public transport. On the one hand, walking and non-motorized transport has increased and has been facilitated through road closures and less busy roads.¹²⁴ On the other hand, private vehicle purchases have increased in China and private cars are likely to be more attractive than public and ride-share systems. The pandemic allows for a reimagining of mobility patterns and necessary investments and creates a significant opportunity to support less travel and a shift to non-motorized transport.¹²⁵ The International Transport Forum (ITF) has already identified a potentially substantial ‘respacing’ of cities, whereby more than 150 cities worldwide created emergency pedestrian walkways and cycle routes during the pandemic, many of which have already led to an acceptance of permanent shifts in the use of public space.¹²⁶

A post-COVID-19 green recovery provides significant opportunities to reinvest in healthier and higher quality public transport systems, and to reprioritize the transition towards non-motorized modalities, with co-benefits for urban skies, health, and spatial transformation.¹²⁷ The ‘Seoul Green New Deal’ policy starting in 2020 provides a salient example. The Seoul Metropolitan Government has focused on increasing the number of pedestrian walkways and strengthening green mobility, including bike-sharing¹²⁸ as a longer-term shift in support for alternative mobility patterns. The IEA has warned that significant positive shifts in mobility patterns are likely to be short-term unless they are supported by policy and investment.¹²⁹ Consequently, any green new deal must support accelerated changes in mobility, in terms of modes and intensity of use, to translate positive shifts into longer-term behavioral and planning revolutions.



06 FOOD SECURITY AND NATURE-BASED SOLUTIONS

COVID-19 and food security

In April 2020, the World Food Programme (WFP) Executive Director warned the UN Security Council that the number of people on the brink of starvation, facing a crisis level of hunger, could double from 135 million pre-COVID-19 to 265 million by the end of the year.¹³⁰ As early as April, the Food Crisis Prevention Network had forecast that approximately 17 million people in the Sahel and West Africa will need food during the June – August lean season.¹³¹ An additional 50 million people could be at risk of insufficient food and nutrition from a combination of violent insecurity and the COVID-19 crisis, at a time when the region is already under pronounced pressure due to “the effects of climate change on its land, food, and water resources.”¹³²

Scale of food security

Currently, hunger affects the lives of over 820 million people, both limiting their options for the future and weakening their immunity and health – a

situation exacerbated by the current pandemic.¹³³ The food security of 135 million people is categorized as chronic or worse based on recent data.¹³⁴ The WFP notes that, due to the pandemic, that number could double by the year’s end.¹³⁵ Every percentage drop in global GDP is predicted to lead to an additional 700,000 children with stunted growth.¹³⁶ Food insecurity and poverty are particularly pronounced among vulnerable rural groups, including women and youth.

Quantifying the effects of the COVID-19 pandemic, including the economic recession, on food security is challenging as the full impacts are still unfolding. In late May, the World Bank noted that, due to “morbidity, movement restrictions (and) social distancing rules,” labor supply shortages had begun to affect supply chain actors and their supply chains.¹³⁷ Shortages occur when food production requires workers to be nearby. The World Bank highlighted concerns around farmers’ access to inputs, labor for the next planting season, and how losses of income and remittances have reduced consumers’ purchases and, thus, the means

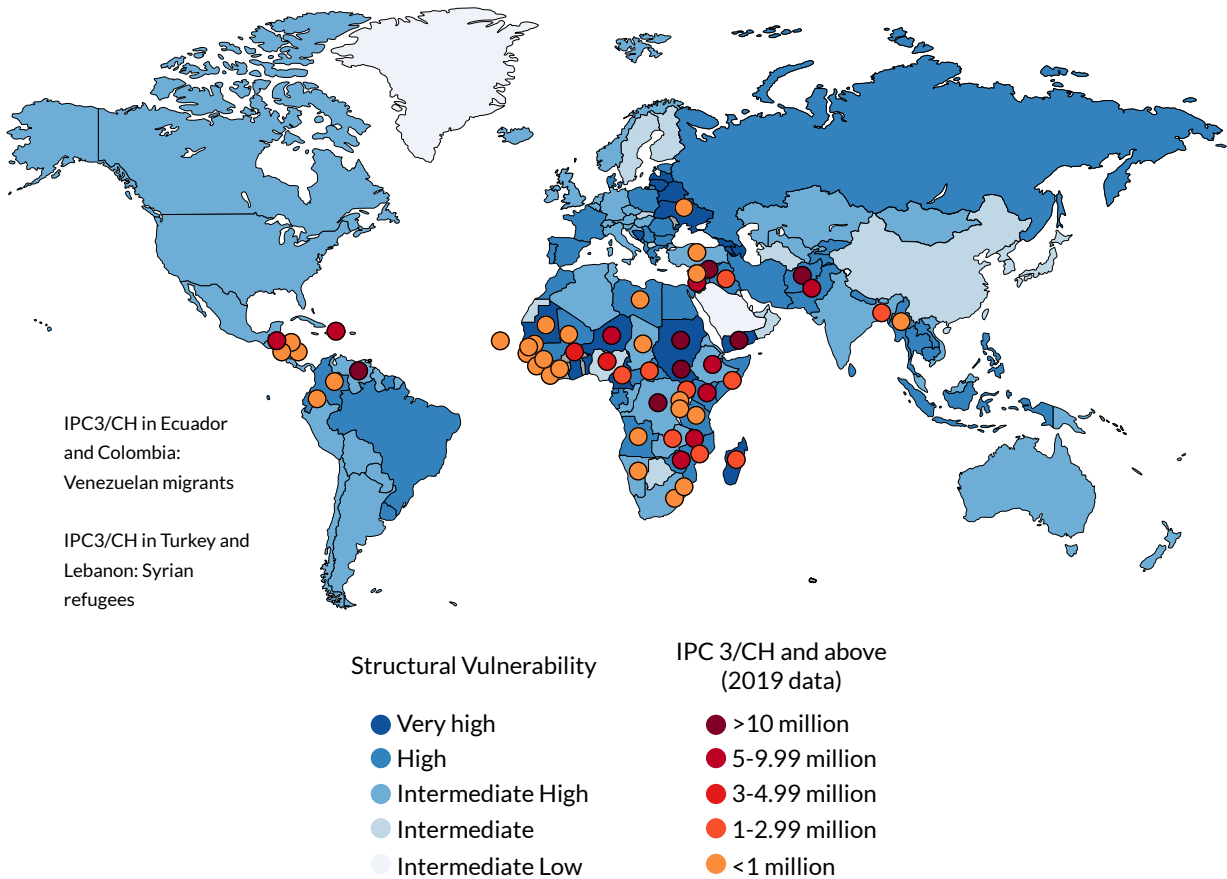


Figure 5. Structural vulnerability and known food insecurity hotspots
 Source: Adapted from FAO/Hand-in-Hand, IPCinfo; 2020¹⁴¹

to pay farmers for produce.¹³⁸

Figure 5 provides an overlay of information on “structural vulnerability” and pre-COVID-19 hotspots. Structural vulnerability centers on six possible transmission channels: agricultural supply, exchange rates, energy markets, credit markets, trade, agricultural demand, and macroeconomic factors. The factors are used to “construct a scale of exposure to COVID-19 crisis impacts on the food and agriculture sectors.”¹³⁹ According to the Integrated Food Security Phase Classification (IPC) scale, IPC 1 is ‘Generally Food Secure’, and the IPC 3 phase shown in figure 5 is that of ‘Acute Food and Livelihood Crisis.’ IPC 3 is defined as “highly stressed and critical lack of food access with high and above usual malnutrition and accelerated depletion of livelihood assets that, if continued, will slide the population into Phase 4 (Humanitarian Emergency) or 5 (Famine / Humanitarian Catastrophe) and/or likely result in chronic poverty.”¹⁴⁰

High levels of structural vulnerability, together with pre-COVID-19 hotspots, are concentrated in Africa, as seen in figure 5. Increases in transmission rates and other factors, including climate change,

conflict, poverty, and the presence of locusts are likely to both heighten countries’ structural vulnerability and increase the number of food-insecure people. The implications for health and well-being, as well as food supply, are apparent. The extent to which developing countries, particularly in Africa, can fund responding to immediate and pressing needs from their resources is debatable. Opportunities are abundant to provide the support that enables a green recovery, for example, cash transfers to construct infrastructure to address climate change, renewable energy for food production, processing and storage, and training in sustainable land management practices.

Food prices and waste

While food prices are declining in many countries’ rural areas, due to challenges related to connecting to urban and export demand, those in urban areas have been increasing.¹⁴² Because of the likelihood of price changes and increased volatility due to the pandemic, the Food and Agriculture Organization of the United Nations (FAO) has been monitoring the consumer prices of 14 main food products, including bread, chicken, and onions. It compiles the

average price change for each product since 14 February 2020. Table 2 presents average consumer price changes for those 14 food products in selected countries showing significant increases in just over four months. The hypothesis is that, on average, consumers have had to reduce purchases, substitute components of their shopping baskets for cheaper alternatives, or use their savings to maintain dietary composition as a consequence of travel restrictions and reduced economic activity.

Table 2. Average consumer price changes of 14 main food products in selected countries from 14 to February 21 June 2020

Source: FAO, 2020¹⁴³

Country	Average Consumer Price changes (%)
Cambodia	5.2
Colombia	7.4
Ethiopia	3.8
Fiji	5.3
India	5.0
Indonesia	4.7
Mexico	6.2
Myanmar	22.5
Peru	6.1
Rwanda	18.8
St. Lucia	18.0
Senegal	12.7
Sri Lanka	89
Uganda	12.7
Vietnam	3.3

Travel restrictions in many countries have already contributed to supply chain disruptions, with transport being reduced and labor shortages resulting in increased food loss and waste – especially of perishables, like dairy products, fish, fruit, meat, and vegetables.¹⁴⁴

Physical distancing measures have reduced the number of consumers that usually purchase food in developing countries' markets, adding to increased food waste in retail markets as well as lowered revenues for traders.

Before the emergence of COVID-19, most food losses occurred at the post-production and transportation stages of supply chains. Losses are primarily due to financial, managerial, and technical constraints related to harvesting and handling techniques together with limited availability of

storage and cooling facilities. For example, the FAO estimates that post-harvest losses in Africa amount to approximately 20 percent for cereals, 30 percent for dairy and fish, and 40 percent for fruit and vegetables.¹⁴⁵ Post-harvest food loss reduces the incomes of small-scale producers and processors, limiting their capacity to acquire new technologies or purchase inputs for the next season. In turn, this limits the supply of food to consumers from the subsequent harvest.

Climate vulnerability

Globally, agriculture, land-use change, and forestry account for 27 percent of total GHG emissions.¹⁴⁶ Figure 1 in Section 2 shows that GHG emissions from agriculture have continuously increased since 1990, while those from land-use change and forestry followed a somewhat erratic downward trend until 2016. McKinsey finds that if 'business as usual' continues, those emissions are likely to increase by 15 to 20 percent due to an increased population and the corresponding demand for food.¹⁴⁷ McKinsey explains that "limiting the impacts of climate change will require shifts in what we eat, how much we waste, and how we farm and use our land."¹⁴⁸ The FAO's work shows that actions to lower emissions such as restoring degraded forests and landscapes and reducing deforestation would annually "cut emissions by over 5 gigatonnes of carbon dioxide," simultaneously increasing biodiversity and restoring healthy functioning ecosystems. Actions that restore agricultural land and soils can, in total, "remove up to 51 gigatonnes of carbon dioxide from the atmosphere."¹⁴⁹

Many small-scale farmers and their dependents are already exposed to rising temperatures and variable inter- and intra-seasonal rainfall, droughts and floods, and increased incidences of pests and diseases impacting crop yields and thus incomes and food security.¹⁵⁰ The majority of small-scale farmers are vulnerable to the effects of a changing climate due to limited resources and capacity. However, small-scale farms are of great significance. Of the more than 570 million farms worldwide, small and family-operated ones are the majority. Those of 2 hectares or less manage approximately 12 percent and family farms about 75 percent of global agricultural land.¹⁵¹ Farms under 2 hectares globally "produce 28–31 percent of total crop production and 30–34 percent of food supply."¹⁵²

The presence of climate change-related pests, the most recent examples of which are the desert locusts in Africa, aggravate food and nutrition



insecurity and vulnerable livelihoods.¹⁵³ In January and February 2020, the largest locust outbreak in the last 70 years swarmed into Ethiopia, Kenya, Somalia, Uganda, and South Sudan. A second wave, hatching from the first wave's eggs, took flight in May.¹⁵⁴ With additional hatchings expected in late June and July, coinciding with the beginning of harvests in several countries, the impact on food availability and rural incomes will likely be severe. In Kenya, 75 percent of the population derives income from agriculture¹⁵⁵ representing approximately a third of GDP.¹⁵⁶ In Ethiopia, agriculture accounts for 75 percent of the labor force, 40 percent of GDP, and 80 percent of exports.¹⁵⁷ Here and in other countries in the region, the second wave of locusts is impacting economies and food security where COVID-19 has already led to disruptions in the functioning of markets and supply chains. The FAO has warned that the second wave may reduce the food security of approximately 25 million East Africans.¹⁵⁸ The FAO raises another concern, in the scenario of a relatively dry June, about the prospect of swarms migrating to West Africa, reaching as far west as Mauritania in July.¹⁵⁹

Investments to restore food security and resilient supply chains

Our current industrial food system has successfully met the demands of a rapidly growing global population through an emphasis on calories, on staple food crops, and increasing productivity. But this system has not managed to serve the 800 million people that are chronically hungry, the 2 billion people that are malnourished and lacking essential micro-nutrients, or the more than 2 billion people that are overweight and obese.

Considering the impacts of the COVID-19 pandemic on food security, particularly on poor and vulnerable populations, various organizations emphasize the need to strengthen sustainability goals related to food self-sufficiency, food accessibility, global food trade, and alignment with the SDGs. The World Bank reported three types of action it is taking to ensure food security¹⁶⁰:

1. Financing inputs for farmers that have become financially insecure due to reduced remittances;
2. Leveraging digital technologies to ensure delivery of inputs to prevent logistical bottlenecks in supply chains; and
3. Supporting the most vulnerable populations via safety net programs, complemented by food distributions in areas with severe supply chain disruptions.

Measures targeted to address liquidity issues affecting households and vulnerable firms along supply chains can ensure continued food production and access to adequate food and nutrition. Such measures can be supplemented by directing funding towards the introduction or scaling of green practices and technologies that enable a green recovery to the pandemic. Green practices could include climate-resilience enhancement measures such as drought- and heat-resistant seeds and solar-powered irrigation.

As a result of the COVID-19 pandemic, there appears to be a sharp increase in interest in personal and environmental health, leading to a higher prioritization of the quality of life over a narrower emphasis on income. These changing

priorities may lead to a reexamination of our overall economic system and vital sub-systems that are either fragile or broken. This reexamination is crucial since the current global food system is failing to keep the people and the planet healthy.

There are opportunities to transform the global food system in line with a green, circular, or bio-economy. The MacArthur Foundation has outlined a vision for a healthier food system, fit for the 21st century, based on three circular economy principles.¹⁶¹

1. Source healthier food locally, produced in ways that improve the health of the local ecosystem;
2. Increase food diversity and access to fresh food and vegetables and replace animal products with plant-based proteins; and
3. Make the most of food by reducing avoidable food waste and reusing by products in other high-value bio economy based products, including organic fertilizer and bioenergy.

The UN Secretary-General has stated that “this crisis can serve as a turning point to rebalance and transform our food systems, making them more inclusive, sustainable and resilient.”¹⁶² McKinsey sees changing how we farm as a critical step: to reduce agriculture emissions by producing food as efficiently as possible, using practices and technologies, the deployment of which is already underway, that could achieve approximately 20 percent of agriculture’s needed emissions reductions by 2050.¹⁶³ McKinsey finds that, of the 25 identified measures, 15 would result in cost savings or are cost neutral. The fifteen measures include zero-emissions of on-farm equipment and machinery, low- or zero-tillage, improved rice paddy water management, and nitrogen-fixing crop rotations. GGGI’s focus has been on nature-based solutions, restoring ecosystems, and solar irrigation.

Solar-powered irrigation for climate resilience and food security

Solar-powered irrigation, or irrigated agriculture where the energy is provided through solar photovoltaic (PV) powered pumps, is an action area with co-benefits for climate action, poverty reduction, and food security. This technology has the advantage of displacing diesel or grid-powered electric pumps in current irrigation systems and increasing water security in areas currently

dependent on rainfed agriculture. In Africa, where there is presently very limited use of irrigation and widespread water scarcity related to climate change, the main contribution of solar-powered irrigation is to increase resilience through climate adaptation. The introduction of solar-powered irrigation is most advanced in India, where the government heavily subsidizes it.

Solar-powered irrigation does, however, pose a sustainability risk in the form of groundwater over-pumping, leading to falling groundwater tables, as there are no operating costs for solar pumps once put in place. Thus, while there is an enormous potential to introduce solar-powered irrigation, it is a complex system that requires significant capacity building for all stakeholders. The rapid fall in the costs of solar PV energy and associated system components, such as the electronic pump controllers, has made solar-powered irrigation an attractive option for both small- and large-scale farmers. Sustainability of groundwater use, therefore, has to be addressed at the same time as the introduction of solar-powered irrigation. FAO provides a comprehensive overview of the benefits and risks of solar-powered irrigation.¹⁶⁴ In a recent market assessment of the potential for solar pumps, Dalberg assessed the current market potential for solar pumps in Sub-Saharan Africa and India to be USD 15.6 billion, representing 4.9 million units.¹⁶⁵ However, Section 7 highlights the vulnerability of the global solar PV value chain to the COVID-19 crisis due to the concentration of manufacturing in a few countries.

Nature-based solutions to address the climate emergency and COVID-19 pandemic

The primary focus of climate action has to date been on so-called ‘engineered solutions’ related to energy, such as solar-powered irrigation, transportation, infrastructure, and industry. Still, there is growing recognition that nature-based solutions can be a triple-win by contributing to:¹⁶⁶

1. Climate mitigation through carbon sequestration or avoided emissions;
2. Climate adaptation (i.e., ecosystem-based adaptation); and
3. Protection of biodiversity and ecosystem services.

Nature-based solutions comprise a wide range of measures that include protection and management of (semi-)natural ecosystems, ecological,

regenerative or climate-smart agriculture (CSA), and green infrastructure in urban areas. Section 4 presents CSA and other nature-based solutions that can create jobs for small-scale farming households and support social assistance programs as essential components of inclusive green solutions. The central tenet of nature-based solutions is to work with or enhance nature rather than replace it with engineered solutions. For example, maintaining or rehabilitating mangrove ecosystems can provide coastal protection naturally, instead of building seawalls to strengthen climate resilience.

Forests form a vital part of nature-based solutions, as deforestation is one of the main drivers of climate-related emissions and biodiversity loss. Preventing deforestation or increasing reforestation can contribute significantly to carbon sequestration, as well as provide a broad range of other livelihood and ecosystem services. Quick wins may also lead to landscape restoration, boosting landscape values by focusing on a mosaic of approaches. Approaches range from afforestation with fast-growing species such as eucalyptus, which provides income for farmers, to management strategies, including natural regeneration and protection of existing forests to maintain watershed services and reduce soil erosion, for example.

Natural capital needs to be maintained, or in some cases restored, to improve food security and livelihood conditions and achieve many of the SDG goals and targets. Restoring habitats and preserving biodiversity can help to enhance ecosystem services and provide numerous benefits in terms of food, revenue, and jobs. In Mexico, for example, restoration of 50 hectares of mangrove forest resulted in a six-fold increase in the daily income of fishers.¹⁶⁷ As heavy forest exploitation causes severe depletion of natural capital, balancing the provision of forest ecosystem services and sustainable food production is becoming a significant challenge, worsened when considering COVID-19 overall impacts. In China, intercropping techniques have more than doubled income when compared to monocultures, according to reports. There was no significant difference in the investment cost reported between monoculture and intercropped plantations.¹⁶⁸

In the context of green COVID-19 recovery planning, a particularly attractive feature of nature-based solutions is that their implementation can be labor-intensive. Social assistance or safety net programs in the form of paid employment to implement nature-based solutions are

attractive propositions for developing or emerging economies with significant under- and unemployment due to the pandemic. Many countries have had such policies in place, and there is a large body of knowledge that provides lessons for effective design and implementation. A recent study by Norton et al. provides a comprehensive overview of employment-based social assistance programs to scale up nature-based climate action.¹⁶⁹ They list over 80 such programs and review three large programs in Ethiopia, India, and Mexico in detail. They conclude that these programs do hold significant potential for improvements in local ecosystems, carbon sequestration, and biodiversity, complementing their social assistance goals on employment. As highlighted in Section 2, investing USD 1 million in nature-based solutions such as forests can generate between 500 and 1,000 jobs in developing countries.¹⁷⁰

Landscape restoration, a facet of nature-based solutions, is a crucial enabler for adaptation to improve the resiliency of rural communities and their agricultural production systems for both food and cash crops. Sustainable Land Management (SLM) offers a means to reverse land degradation trends and restore the provision of ecosystem services. SLM entails physical and biological interventions, including agroforestry, conservation agriculture, reforestation, and revegetation. It can contribute to climate change adaptation and mitigation. Over time, SLM practices can contribute to higher yields, and reduce the variability of production via practices that improve soil moisture or pest management practices that reduce vulnerability to pests, for example. Other methods, such as agroforestry, can enable rural populations to diversify their incomes.

In summary, the challenge for the post-COVID-19 recovery will be to accelerate investment in agricultural production, while minimizing the negative impact on the environment and building the resilience of the farming systems. It is critical to take advantage of the opportunities mentioned above to build resilience and enhance adaptive capacities in the agriculture sector to achieve energy, food, and water security objectives. Adopting nature-based solutions provides a basis to tackle and determine the extent of the interrelated challenges of climate change, biodiversity loss, deforestation, food and nutrition insecurity, water scarcity, unemployment, and poverty.



07 SUSTAINABLE ENERGY

COVID-19 and energy security

The COVID-19 pandemic has led to unprecedented supply and demand shocks across the energy sector, with oil prices falling to negative values at one point for the U.S. benchmark price due to lack of storage capacity. The expected economic downturn will challenge and disrupt existing energy systems, energy sector supply chains, and sector businesses, creating pressure for a new energy order. Electricity utilities will have to recover from a dramatic shortfall in revenues, and companies will have to overcome financing challenges to be able to tap into significant growth opportunities.

As the world fights the pandemic, energy sector trends are providing some insights on possible scenarios for energy security in a post-COVID-19 world. With more than half of the world's population under lockdown, the impact on energy use will depend on how long restrictions remain in place. In its *Global Energy Review 2020*,¹⁷¹ the IEA reported that global energy demand has collapsed everywhere. For the first quarter of 2020, demand

fell by 3.8 percent compared to last year. The collapse in demand is a result of lockdown measures of varying degrees in countries around the world. The IEA review shows that:

- Global travel and transport almost came to a halt because of the lockdown measures, resulting in a dramatic fall in oil consumption. Oil consumption alone is expected to fall by 9 percent, or approximately 9.3 million barrels per day, year-on-year, back to 2012 levels. Global electricity demand decreased by 2.5 percent in the first quarter of 2020. Full lockdown measures suppressed electricity demand by 20 percent or more. Economies that implemented strict measures and those where services make up a more substantial part of the economy have experienced the most considerable impacts.
- Coal was the hardest hit energy source due to a fall in demand. Restrictions on economic activity pushed global coal demand down by 8 percent in the first quarter of 2020,

mostly due to a drop in electricity needs.

- Renewables were the only energy sources to see demand grow in the first quarter, partly driven by new wind and solar installations coming onstream this year. Countries increased their share of renewables in the energy mix primarily because they cannot adjust renewable energy output to match demand, and variable costs are low. The combination of these three factors has resulted in an increase of renewables in the grid mix.
- Falling fossil fuel demand and rising renewable use mean that the biggest ever fall in CO₂ emissions is predicted for 2020, at around 8 percent. Annual emissions are likely to match levels from ten years ago, with the fall in output six times steeper than the previous record reduction following the financial crisis in 2009.

Assuming only a gradual easing of lockdown measures, the IEA estimates that global energy demand could fall by 6 percent this year - the highest percentage drop since the Great Depression in the 1930s. The decline would represent more than seven times the impact of the 2008-2009 financial crisis, bucking the trend for growing energy demand over the last five years.

After a decade of incredible growth momentum for renewable energy, “The Great Pause” of the COVID-19 pandemic will delay projects and lead us to question our strategies and reevaluate business models. The sudden crash in oil prices leading to loss of revenue for oil-producing countries adds to other problems in the region, such as rising populations and high unemployment, low productivity, and governments lacking capacity. At below USD 35 per barrel (Brent Crude 26 May 2020), countries such as Nigeria, Ghana, Angola, Algeria, Congo, Gabon, Equatorial Guinea, and Libya whose budgets are heavily reliant on oil revenues are likely to experience a significant decline in income. For example, Nigeria’s 2020 budget is based on an oil price of USD 57 per barrel and Angola on USD 55 per barrel. Both countries derive approximately 90 percent of their export earnings from the sale of oil.¹⁷² A collapse in the oil price will, therefore, have a severe impact on government investment and financing needed for projects.

In a pre-pandemic outlook, the global solar PV installed capacity was projected to increase from 495 GWs in 2018 to 3,142 GWs in 2040, adding

196 GWs per year on average.¹⁷³ The COVID-19 pandemic has exposed major weaknesses in the solar energy value chain that have slowed the pace of solar projects and threatened the viability of several renewable energy businesses. The global solar PV value chain is particularly affected by the heavy concentration of manufacturing capacity. Fifty leading solar PV panel manufacturers maintain factories in 23 countries, with China representing about two-thirds of global production in 2018.¹⁷⁴

Pandemic related travel restrictions have slowed down the pace of solar installation in many countries, mostly depending on imports of solar panels and international expertise. Despite anti-dumping measures and aggressive policies to ramp up solar cell production locally, China remains dominant in the solar PV panel market. The U.S., Europe, India, Japan, and the Republic of Korea jointly hold less than one-third of global production, suggesting that the COVID-19 pandemic will force countries to rethink towards localizing the full value chain. Developing local skills and capacity for development, installation, operations, and maintenance of solar installations should be an immediate action priority for countries with major solar PV expansion plans to keep the momentum.

COVID-19 and clean energy transition

The implications of the COVID-19 pandemic for energy systems and clean energy transitions are still evolving and governments face uncertainty in developing energy sector roadmaps to recover from economic slowdown. There are, however, a few imperatives that are expected to remain an integral part of post-COVID-19 energy planning:

- Energy security will play a central role in economic recovery and reviving demand;
- Governments and businesses will face the dilemma of clean energy transitions versus the use of fossil fuels given low fossil fuel prices;
- The resilience of electricity and other energy systems will become more relevant than ever before; and
- Energy access for those at the bottom of the pyramid will need to be prioritized for a complete recovery.

The crisis offers an opportunity to imagine a new energy order to enable the clean energy transition. This economic reboot provides the chance to launch aggressive, forward-thinking, and long-term

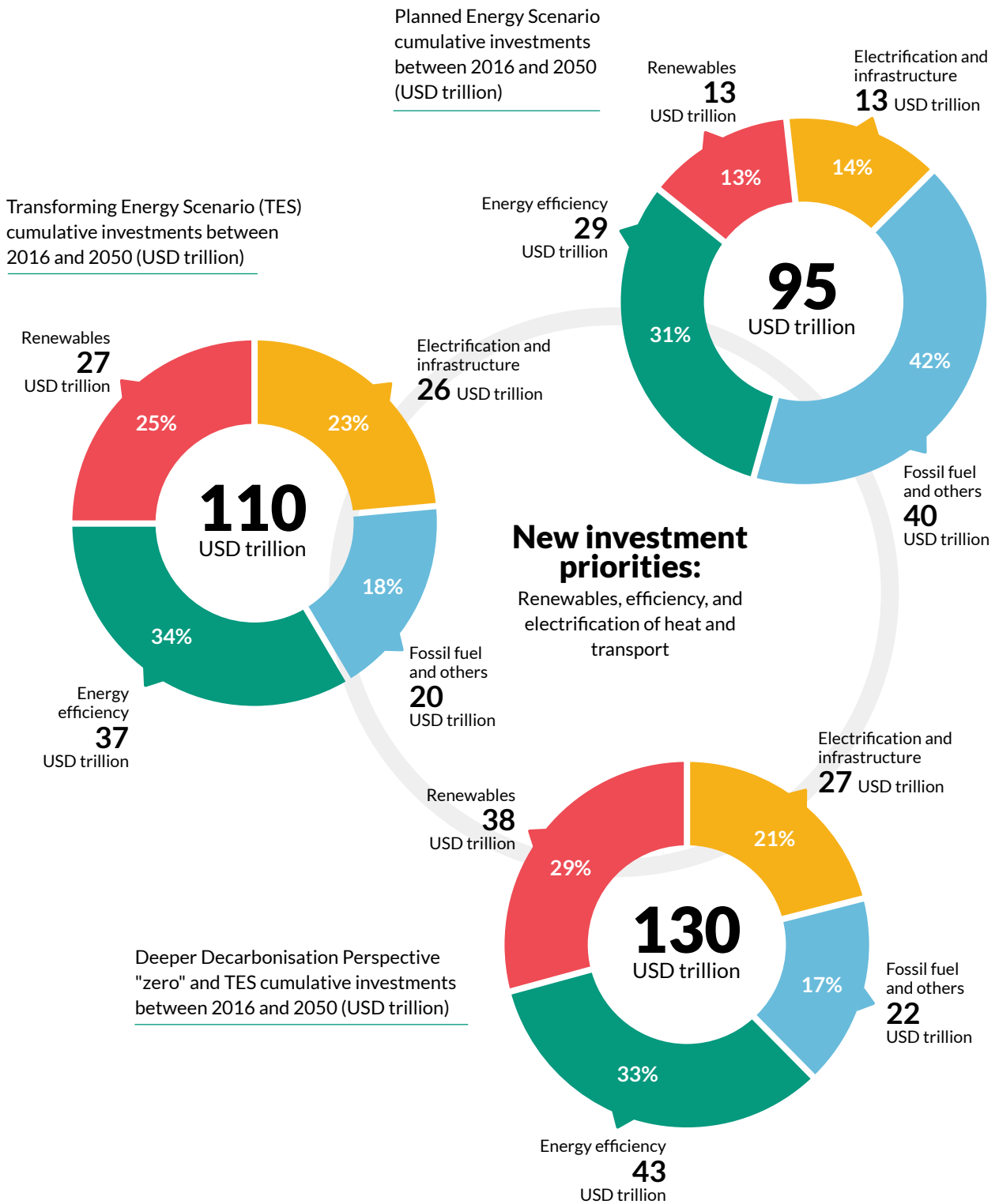
strategies, leading to a diversified, secure, and reliable energy system that will ultimately support the future growth of the world economy in a sustainable, low-carbon, and equitable way. The energy transition has so far been progressing slower than required by the Paris Agreement, due to the cost of the transition, financing constraints, and job losses, among other issues. It will cost trillions of dollars to reduce emissions and transition to a renewable energy system, supported by storage technologies and power markets for balancing the grid electricity distribution. The clean energy transition is critical due to the impacts of energy use on GHG emissions. Figure 1 in Section 2 shows that electricity and heat make up the largest portion of global GHG emissions and have been increasing at the fastest rate since 1990.

Oil and gas are still considered fundamental elements of the economy. Oil-producing countries earn income by selling the oil and oil-consuming countries generate revenue through the tax on domestic sale of oil, using it to finance infrastructure projects and investments in savings funds. Large energy-consuming countries have drastically reduced energy expenditures due to the collapse in oil prices. Current market conditions offer an opportunity to take a long-term view to balance energy and environmental security.

In India, for example, a USD 7 a barrel plunge in crude oil prices should narrow the 2021 financial year Current Account Deficit (CAD) down to 0.7 percent of GDP. If the fall is as high as USD 10 a barrel, then the CAD should come down to 0.3 percent of GDP.¹⁷⁵ Every USD 4 decrease in oil prices leads to about USD 5 billion in import bill savings for India, the world's third-largest energy consumer.¹⁷⁶

The reduction in fossil fuel prices can lead to savings in fuel subsidies that can be potentially used for the clean energy transition. Countries can now reinvest these savings in a more diversified energy system. At the global level, energy subsidies were estimated at USD 4.7 trillion, or 6.3 percent of world GDP, in 2015 and USD 5.2 trillion, or 6.5 percent of GDP, in 2017.¹⁷⁷ Governments will use a large portion of saved fossil fuel subsidies for fighting the COVID-19 pandemic and recovery response in the short-term. However, governments can reduce dependence on fossil fuels by setting aside saved fossil fuel subsidies for developing a diversified, secure, and reliable energy system. Deep decarbonization, in the form of the Net Zero by 2050 target, has been estimated to require USD 130 trillion in cumulative investments between 2016 and 2050 globally, as shown in figure 6.





Based on IRENA analysis

Figure 6. Investment projections for clean energy transition under three different scenarios
Source: Adapted from International Renewable Energy Agency (IRENA) ¹⁷⁸

Market data shows that the direction of the energy sector is moving away from oil and gas. According to Institute for Energy Economics and Financial Analysis (IEEFA), every other industry in the S&P 500 outperformed oil and gas, making energy the worst-performing since 2009 of the 11 sectors in the index, as shown in figure 7. The industry was even the worst performer in 2018, a year when overall oil prices and profits improved. As further evidence, in 1980, there were seven oil and gas companies in the top ten of the S&P 500 (Exxon, Mobil, Standard Oil of Indiana, Standard Oil of California, Schlumberger, Shell Oil, and Atlantic Richfield). Today, only one oil and gas company, ExxonMobil, is in the top ten, and it no longer heads the list.¹⁷⁹

Policymakers in the developing world must, therefore, rethink how to meet energy demand when it recovers post-COVID-19. Continued investments in the expansion of fossil-fuel supply infrastructure are shortsighted and increasingly risky. Such investments may lead to significant stranded assets and will lock in fossil-fuel emissions for decades to come and will also put the achievement of the aims of the Paris Agreement at risk.¹⁸⁰ Recent low oil prices are a reminder of the volatility of markets for oil and other fossil fuels and of the geopolitics associated with our current energy system.

In the post-COVID-19 economic recovery, policymakers can accelerate the clean energy transition by adapting the electricity regulatory

framework to support renewable energy development and reduce or abolish fossil fuel subsidies. Policy support and green procurement mechanisms such as auctions, feed-in-tariffs, and net metering can facilitate the deployment of renewable energy systems and can effectively drive clean energy costs down. Auctions, in particular, can provide a transparent and objective means to identify the recipients of government financial support.¹⁸² Additional policy measures that can encourage clean energy for productive use include tax incentives for the import of hardware, and financing for individuals, co-operatives, and small business enterprises through micro-finance institutions. Developing the institutional capacity to apply available policy support mechanisms for accelerated deployment of renewable energy should be a priority for developing countries.

Green recovery solutions for the energy sector

Electric mobility

Among several opportunities for a clean energy transition, electric mobility is a win-win option for a green recovery. As electricity demand collapses, governments will look to revive demand to help electricity utilities survive. In pre-pandemic times, enabling infrastructure to meet energy demand was considered a major challenge for the transition towards e-mobility. Electric vehicle charging stations need reliable access to power supply, a big stretch considering the frequent power outages

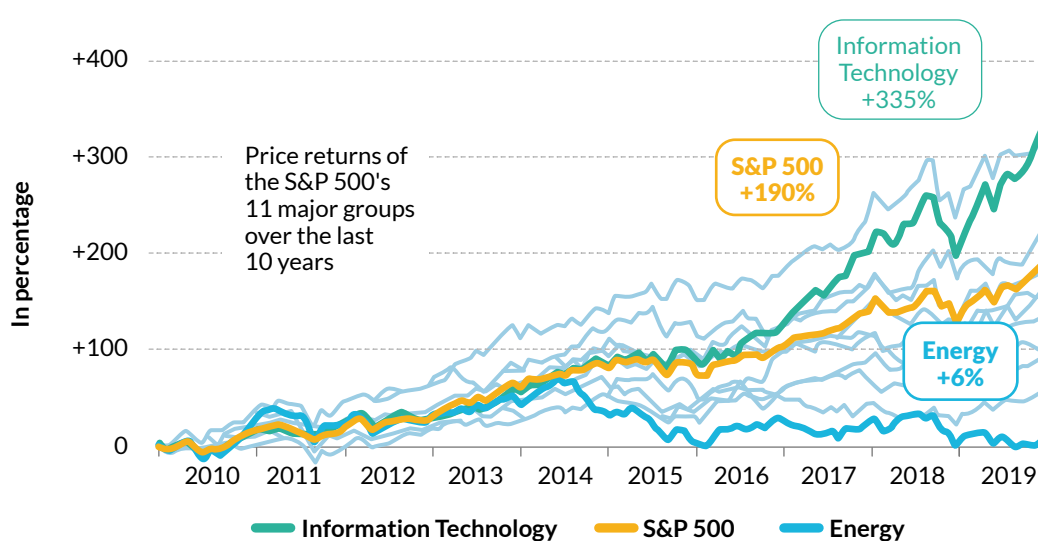


Figure 7. Energy Sector performance (2009-2019) on the S&P 500

Source: Adapted from Institute for Energy Economics and Financial Analysis (IEEFA)¹⁸¹

Note: The S&P is a stock market index that is used to track the performance of 500 large capital U.S. companies

experienced in many developing economies due to electricity supply shortages. In a scenario of suppressed demand, a push for e-mobility can revive demand, potentially keeping power utility businesses afloat.¹⁸³

Potential job losses also discouraged many developing countries from pushing an e-mobility transition.

When the General Motors Chief Executive Officer (CEO) announced plans in November 2019 to shift the company's workforce and lineup to build more electric vehicles, some 48,000 workers went on strike, fearing job losses, despite evidence of more job creation over the years.¹⁸⁴ A reboot of the economy through stimulus packages provides the space for politicians, policymakers, and auto manufacturers to make rapid progress on e-mobility. Governments could meet the increased electricity demand resulting from the transition more sustainably, while supporting workers and electricity sector businesses, creating positive multiplier effects on the economy.

Clean energy for productive use, access, and efficiency

Energy is a means to an end. Access to modern energy solutions will not only empower primary health facilities, power utilities, businesses, and citizens to effectively deal with challenges of the COVID-19 pandemic but will also pave the way for meeting the SDG 7 and climate goals. There are 789 million people without access to electricity and 2.8 billion people without access to clean cooking.¹⁸⁵ There is an urgent need to increase access to reliable electricity through centralized grid expansion, mini-grids, and off-grid solar to deal with the current pandemic and looming future climate and health challenges. For example, the average fully cost-reflective tariff for utilities across Sub-Saharan Africa is USD 0.27 per Kilowatt hours (KWh), with 25 percent of utilities requiring a cost-reflective tariff of more than USD 0.40 per KWh, and about half requiring a tariff of USD 0.20 – 0.40 per KWh. Third generation mini-grids with LCOE of USD 0.41 per KWh are, therefore, often the least-cost solution to connect communities where the cost of extending the main grid is simply too high.¹⁸⁶

A high priority opportunity lies in investment in energy infrastructure for healthcare and sanitation facilities. Modular solar with battery energy storage systems can be deployed quickly to underserved and rural health clinics, and for pumping and treating water to ensure hygiene.¹⁸⁷ Off-grid solar

systems are cleaner, more reliable, and often cheaper than existing diesel generators.¹⁸⁸ For example, the solarization of 405 health facilities across Zimbabwe with a total installed capacity of 5 Megawatt hours (Mwh) provides 24/7 health services to the population, including pregnant women and children, that previously had 4 hours of electricity supply. Electricity bills reduced by up to 60 percent, medicines and vaccines can be stored safely, solar-powered water pumps make clean water available for the clinics.¹⁸⁹ Private sector interventions can deliver quickly deployable mini-grids and off-grid systems to hospitals, health clinics, and other essential public institutions, to improve reliability or provide new access.

Restoring the food supply chain will be central to the COVID-19 recovery. There is a clear need to consider decentralized, reliable energy access to the agriculture sector, given the disruption in energy supply chains. Climate change mitigation and adaptation objectives should be integrated into the planning and implementation of recovery and stimulus packages going forward. Scaling up renewable energy in the agri-value chain for reliable power, such as solar-powered irrigation systems, solar-powered cold storage systems, and agro-processing, will speed up the recovery and have significant climate change mitigation benefits.

Energy efficiency programs in the labor-intensive building sector with specific additional measures, including economic incentives and building renovation plans for public buildings, can support consumers. SME investment can create a win-win for jobs and boosting economic activities. Post-COVID-19, energy efficiency in industrial units will become indispensable to keep industrial output competitive.

Smart energy solutions for rationalizing and maximizing energy efficiency through artificial intelligence (AI) and data technologies can also play a constructive role. Korea is leading the way, using state of the art IT systems for industrial energy efficiency. The state utility firm, Korea Electric Power Corp. (KEPCO), has developed a comprehensive energy management system, which allows real-time management of energy, including gas, electricity, and heat used at various manufacturing plants. It has installed the system at KEPCO's 120 office sites across the country and is now working towards installing the system in local factories.



08 GREENING COVID-19 RECOVERY PLANS AND ALIGNMENT WITH CLIMATE ACTION

The UN Climate Change Conference, COP26, has been postponed until November 2021. In the meantime, governments are in the process of revising their NDCs, due by the end of 2020. Many countries are also submitting their LT-LEDS to the United Nations Framework Convention on Climate Change (UNFCCC). As of the end of June 2017, the Climate Action Tracker¹⁹⁰ shows that seven countries have submitted revised emission reduction targets, one country has proposed a new emission reduction target, seven countries will not update their emission reduction targets, and the remaining 174 countries will submit their revised NDCs later in the year. According to the NDC Tracker,¹⁹¹ 105 countries have stated their intention to submit a revised NDC with enhanced ambition or action, while 33 countries have stated their intention to submit a revised NDC. Seventeen countries and the EU have submitted their LT-LEDS to the UNFCCC, including submissions in recent months by Slovakia and Singapore.

In April 2020, the NDC Partnership surveyed its member countries, primarily developing countries, on how COVID-19 will impact their work during the

NDC revision process. Responses were gathered through Ministries of Finance and Planning and Ministries of Environment and Climate Change.

Key themes emerging from the survey results include:¹⁹²

- Serious concerns regarding reduced climate spending due to the cost of COVID-19 responses, alongside capital flight, revenue loss, and increased debt;
- Risks to the quality, ambition and revision timeline of NDCs due to the challenges of collecting and validating data, maintaining communications and decision-making processes, and consulting with stakeholders;
- Enormous and immediate opportunities to promote a 'green growth' agenda in developing countries by including measures from the NDCs in stimulus packages
- Urgent needs for technical assistance, with all Ministries of Finance or Planning indicating

that their governments would benefit from specialized technical assistance; and

- Eagerness to engage in peer to peer learning among countries, particularly on strategies for utilizing fiscal instruments for green economic recovery.

The coming months will reveal whether or not the COVID-19 crisis, in practice, had an impact on raising the ambition of countries' NDCs and whether aspects related to economic recovery responses were incorporated. Participants in the NDC Partnership survey also highlighted that governments are seeking support in the process of submitting their revised NDCs and LT-LEDS in the context of the COVID-19 crisis.

There are great opportunities in linking the COVID-19 economic recovery packages with climate and green actions already included in NDCs, LT-LEDS, National Adaptation Plans (NAPs), and green growth plans prepared by country governments. According to the relevant literature,¹⁹³ governments have at their disposal the following main types of measures that apply to all economic sectors:

- public direct investments;
- provision of economic incentives and fiscal measures;
- bailout of companies;
- scale-up of educational programs, and
- funding for research and development (R&D).

According to the recent Intergovernmental Panel on Climate Change (IPCC) special report¹⁹⁴ on 1.5 degrees, only ten years remain to act on curbing the carbon emissions down to zero by 2050 to avoid the catastrophic consequences of climate change. Greening the economic recovery packages is a historic opportunity to boost countries' economies while simultaneously addressing the climate crisis. To do this, governments should undertake two interlinked activities:

- Greening the current economic recovery packages by adopting green stimulus priorities; and
- Aligning recovery packages with ongoing climate action and green growth efforts.

Three green stimulus priorities for greening COVID-19 packages

1. Maximizing the proportion of green measures and green sectors in stimulus packages

Following the 2008-2009 global financial crisis, varying shares of the stimulus packages were dedicated to green measures, around 80 percent in the Republic of Korea, 13 percent in the EU, and 12 percent in the U.S. (Table 1). This time, as the window of opportunity for climate action is narrowing, countries must prioritize the inclusion and maximization of the share of green measures and sectors in their stimulus packages. As noted in the previous sections of this report, many green measures are ready for quick implementation. Section 4 identified green recovery packages based on lessons learned from the global financial crisis and suggested inclusive green solutions for COVID-19 recovery. Sections 5-7 outlined green recovery solutions to address COVID-19 related challenges in cities, food security, and energy.

World Bank climate economists, Hallegatte and Hammer,¹⁹⁵ proposed a sustainability checklist for the assessment of economic recovery interventions. Green and low carbon measures that have already been proposed and included in countries' NDCs, LT-LEDS and green growth plans have gone through implementation, assessment, and finance planning. They can, therefore, be included in the stimulus packages immediately.

2. Greening and climate-proofing conventional measures in economic recovery packages while addressing market failures and environmental externalities

The second priority refers to greening and climate-proofing conventional, non-green measures of the economic recovery package. Governments should undertake screening of existing measures by applying green, low carbon, and climate-resilient criteria to assess the impact of the measures on natural capital, carbon emissions, and climate risk. Hallegatte and Hammer's¹⁹⁶ sustainability checklist provides relevant questions to consider when screening economic recovery measures.

Government bailout programs aimed at big companies with carbon-intensive operations that need immediate liquidity to avoid

bankruptcy are common measures in stimulus packages that should be scrutinized. In many cases, for strategic reasons or to avoid massive layoffs, governments bail big companies out, for example, in the automobile and airline sectors. In such cases, bailout packages should be attached to green or climate conditions, such as introducing low emission standards or canceling domestic flights that compete with speed railways. Conditions should minimize the environmental impact of the sector and steer it towards decarbonization. For instance, the French government is providing bailout funds to Air France on condition that they eliminate domestic flights that compete with high-speed trains. Above all, it is vital to make sure that governments do not direct their bailout funds towards fossil fuels or polluting industries.

3. Ensuring that measures do not reverse existing green, low carbon, and climate resilience policies and actions

Recovery packages should not roll back or relax any green, low carbon, or climate-resilience policies, including environmental standards and targets and regulatory, economic, and fiscal policies. They should also not support sectors that further the climate crisis. Adopting climate-damaging policies comes at high risk. Unfortunately, the U.S. has been relaxing its environmental regulations further during the pandemic.¹⁹⁷ As mentioned in Section 4, a large part of China's stimulus-response after the 2008-2009 global financial crisis was directed towards heavy industry, causing global GHG emissions to soar. Using part of the current economic recovery stimulus for building new coal-fired power plants will increase global GHG emissions.

Linking recovery packages with ongoing climate and green growth action efforts

Enhancing NDCs and developing LT-LEDS and green growth strategies is usually based on a thorough analysis and prioritization of climate and green growth actions. Figure 8 shows the general assessment framework for climate mitigation actions in NDCs and LT-LEDS. The framework typically focuses on the abatement potential of the proposed climate mitigation actions, and assessments of their associated costs and benefits, socio-economic impacts, and feasibility of implementation. In many cases, cost-benefit analysis is conducted. Other socio-economic co-benefits such as air quality and public health,

employment, quality of life, and macroeconomic aspects may be considered, albeit less often.

Robust employment creation potential assessment, macro-economic analysis, particularly the calculation of economic multipliers, and socio-economic analysis, are all useful tools in prioritizing efforts. These assessments and types of analysis should be incorporated as standard analytical methods in the process of developing and enhancing NDCs, LT-LEDS, and green growth strategies. GGGI is currently supporting Mexico and Indonesia to incorporate the results of the employment assessment of renewable energy targets in their NDC revision.¹⁹⁸ ILO is also supporting governments to address employment issues in their NDCs by incorporating the guiding principles of the just transition.¹⁹⁹

As governments are currently seeking the right economic recovery measures, projects, and investments, they can screen the climate and green growth actions in NDCs and LT-LEDS against economic recovery criteria. Building on the sustainability checklist,²⁰⁰ GGGI developed the following economic recovery criteria that can be applied to screen and rapidly assess the green and low carbon measures often ready to go in NDCs, LT-LEDS, and green growth strategies:

Socio-Economic:

- Economic multipliers, including direct, indirect and induced effects;
- Local content intensity, the percentage of components domestically sourced; and
- Employment intensity or job creation potential.

Implementation:

- Speed of implementation;
- Human resources availability; and
- Training needs based on skills matching and skills gap assessment.

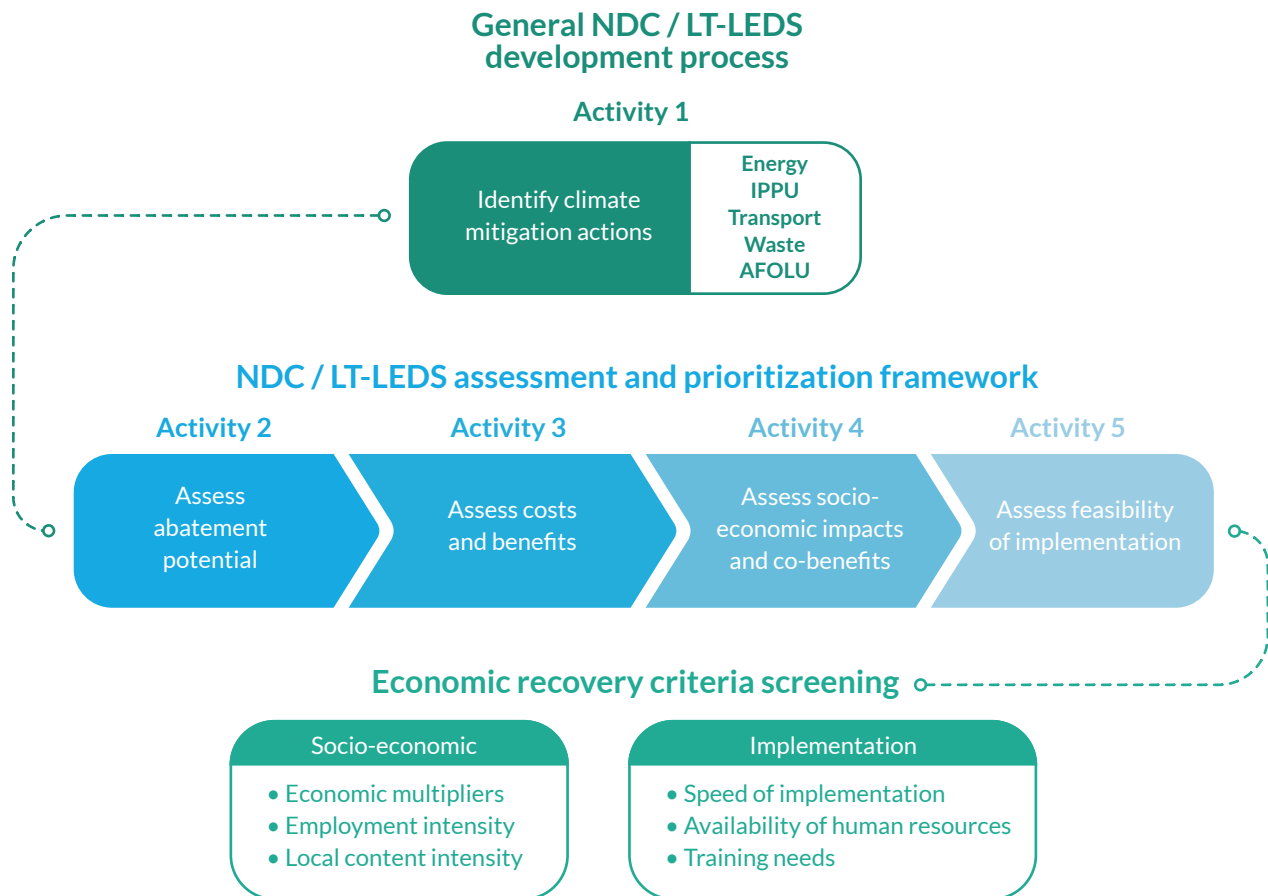


Figure 8. Utilizing economic recovery criteria to screen climate mitigation actions
 Source: Authors' own figure
 Note: IPPU - Industrial processes and product use, AFOLU - Agriculture, forest, and other land uses

The following technical assessment methods and approaches can be utilized:

- i. Economic multipliers based on Input-Output Tables or Social Accounting Matrices capturing direct, indirect, and induced macroeconomic effects (i.e., gross value-added).
- ii. Green job assessments incorporating Input-Output analysis, utilizing employment multipliers to capture indirect and induced employment effects. GGGI is a part of the green jobs assessment institution network (GAIN),²⁰¹ initiated by ILO, utilizing green job assessments in low and middle-income countries. GGGI has also supported various of its member countries in green jobs assessment initiatives.²⁰²
- iii. Marginal abatement cost (MAC) analysis, which assesses the costs of low carbon technologies and measures per ton of carbon abated. Cost assessments can be combined with employment studies and other socio-

economic-benefits assessments, incorporating employment, health, and quality of life co-benefits in adjusted MAC curves.²⁰³

MAC analysis can identify which low carbon measures provide economic returns in the long-term, and therefore are financially beneficial without considering any additional co-benefits. These measures, outlined in yellow in the example of Ethiopia’s MAC curve in Figure 9, should be the first ones to be considered based on the economy recovery criteria. Ethiopia’s MAC curve shows that sustainable measures in forestry and agriculture also have large abatement potential and high economic returns.

- iv. GGGI’s Green Growth Index to assess green growth performance, builds on the concept of sustainable development and integrates SDG indicators and targets that are relevant to four green growth dimensions, including efficient and sustainable resource use, natural capital protection, green economic opportunities, and social inclusion. GGGI is

currently developing a Simulation Tool for the Index, which can be applied to assess the impacts of green policies and investments,

including those in COVID-19 recovery packages, on green growth performance.

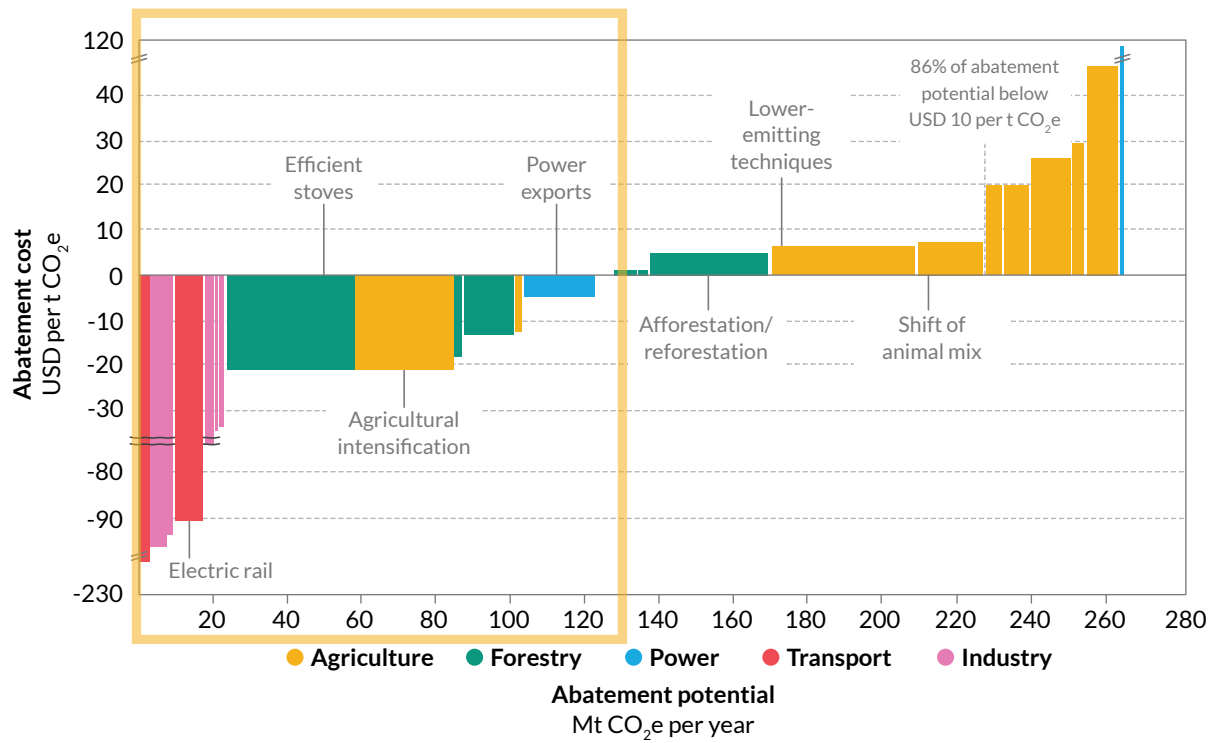


Figure 9. Ethiopia's Marginal Abatement Cost Curve

Source: Adapted from the Federal Democratic Republic of Ethiopia Environmental Protection Authority²⁰⁴



09 ASSESSING THE IMPACT OF COVID-19 AND CLIMATE RESPONSES

Assessment tools and COVID-19 responses

Assessment tools are playing a critical role in tracking and projecting not only hotspots of infections and mortalities but also impacts on businesses and unemployment. Recognizing the usefulness of rapid assessments during a pandemic period, governments, international organizations, the private sector, and academics have developed various tools to provide timely and accurate information to the public. The European Emergency Number Association (EENA) provides a summary of COVID-19 Apps used in different countries.²⁰⁵ Other assessment tools that have global coverage include the WHO Coronavirus Disease (COVID-19) Dashboard,²⁰⁶ the Johns Hopkins University Covid-19 dashboard,²⁰⁷ the DOMO Coronavirus tracker,²⁰⁸ Risklayer, and CEDIM Virus Tracking Maps.²⁰⁹

Country and global level assessment tools offer several advantages. First, they provide valuable indicators to guide policymakers in their short-term

responses. For example, expanding health facilities, distributing PPE to health workers, timing to introduce, relax, or lift economic lockdowns, and identifying rescue measures for business owners and workers. Second, they increase public awareness of the impacts of the crisis and stimulate the immediate mobilization of human and capital resources across society. Third, they reveal vulnerabilities to the interconnectedness of ecosystems and economies that warrant concerted global actions with positive spillover effects. And fourth, they emphasize the need for sustainable long-term recovery plans, or building back better, for both the economy and society.

While immediate and bold relief responses were needed to address unexpected and severe health and employment impacts, long-term COVID-19 recovery plans will need to build on existing efforts to achieve the SDGs. The overarching goal of sustainable development is to share benefits equitably for improved quality of life.²¹⁰ In this context, quality of life and the environment are closely interlinked, and economic growth should not

come at the expense of the environment. Human health and economic well-being suffer from a lack of environmental infrastructure and services such as water, sanitation, and transport; poor quality of environment due to air, water, and land pollution; environmental degradation due to unsustainable use of land and water resources; and climate change impacts such as global warming, sea-level rise, and extreme weather events.²¹¹ The SDGs are designed to benefit all people, to improve the quality of people vulnerable to these impacts. Aligning recovery plans with the SDGs will create opportunities to build social and economic resilience to not only future pandemics but also persistent global challenges such as climate change, biodiversity loss, and social inequality. Policies and investments related to long-term recovery plans should, therefore, be assessed on how they further countries' efforts to achieve the SDGs.

Assessing COVID-19 recovery plans using the Green Growth Index

Impact assessment of COVID-19 recovery plans requires a tool that is explicitly aligned to the SDGs. GGGI's Green Growth Index is such an assessment tool because it is based on the concept of sustainable development and integrates SDG indicators and targets. Specifically,

- It is framed on sustainable development, delivering economic growth while protecting the environment (i.e., low-carbon and climate-resilient, prevent or remediate pollution, healthy and productive ecosystems), creating green jobs, reducing poverty, and enhancing social inclusion;²¹²
- It classifies and aggregates indicators according to four closely interlinked green growth dimensions that support quality of life – efficient and sustainable resource use, natural capital protection, green economic opportunities, and social inclusion (Figure 10); and
- It benchmarks indicators that are mainly derived from or directly related to the SDGs to measure performance in achieving sustainability targets related to the SDGs, the Paris Climate Agreement, and the Aichi Biodiversity Targets.²¹³

The Green Growth Index generates country performance scores ranging from 1 to 100, with 100 implying the achievement of a sustainability target for a given indicator. The 2019 Green Growth Index revealed that, out of 115 ranked countries with sufficient data for the four

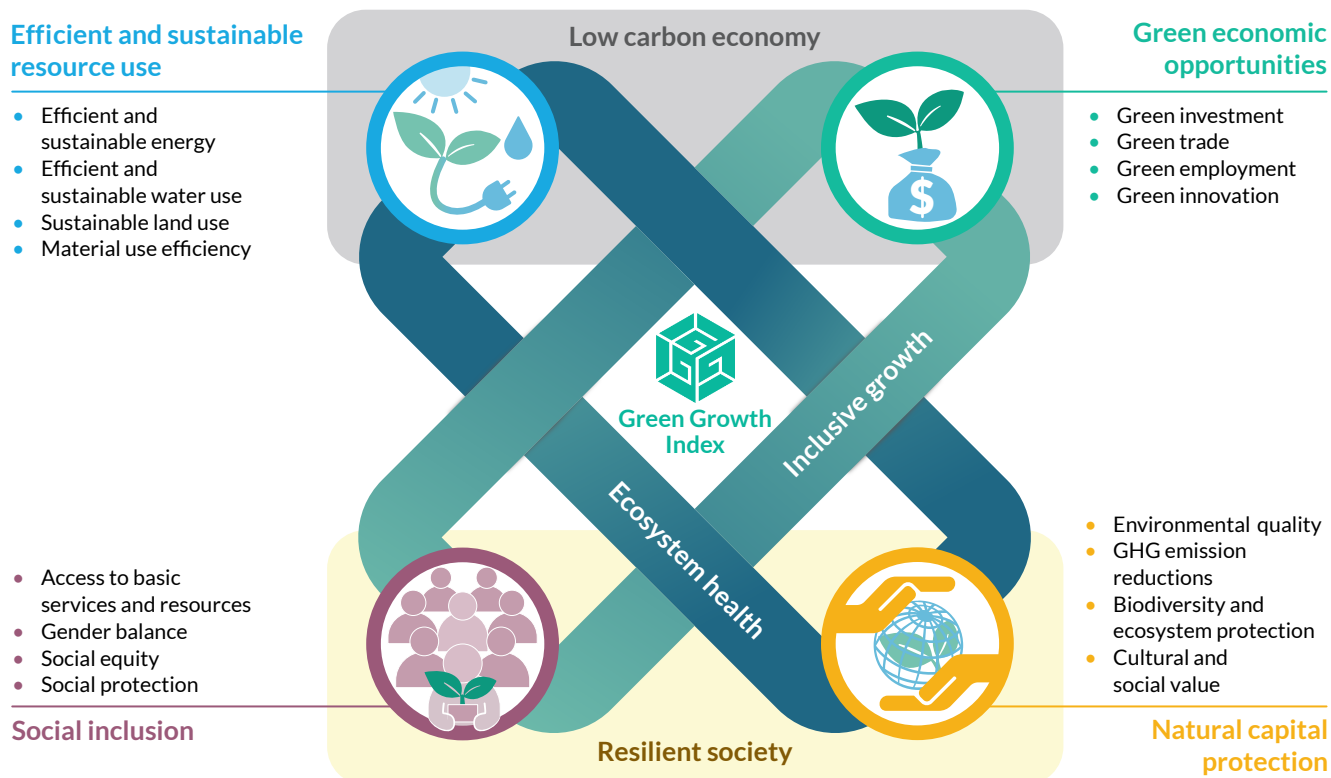


Figure 10. Conceptual framework for the Green Growth Index
Source: Global Green Growth Institute ²¹⁴

dimensions, only a quarter have scores between 60 and 80, and about half have mid-range scores of 40-60.²¹⁵ These results emphasize that, globally, there is an enormous opportunity for countries to improve green growth performance by implementing green policies and investments.

As mentioned in Section 1, developed countries have allocated significant resources to COVID-19 stimulus packages to soften the immediate economic fall-out. A recent study by Hepburn et al. found that only 4 percent of COVID-19 related

policies implemented by G20 governments as of May 2020 are green, i.e., have the potential to reduce long-term GHG emissions.²¹⁶ The IMF's Policy Tracker outlines key economic responses, including budget allocations that governments are making to reduce the human and economic impacts of the COVID-19 pandemic in 193 economies.²¹⁷ Many countries across the world are currently planning to allocate large-scale budgets to finance COVID-19 recovery packages, for example, EUR 130 billion in Germany,²¹⁸ and USD 50 billion in New Zealand.²¹⁹ If these long-term investment

Table 3. Links between the COVID-19 pandemic and sustainability issues and green growth indicators

Features / Impacts of COVID-19	Sustainability issues	Green growth indicators
Facilitated through zoonotic condition	Loss of wildlife habitats due to rapid urbanization, agricultural expansion, and intensive farming	Sustainable land use Biodiversity and ecosystem protection
High and rapid infection rates	Lack of access to health care Lack of reliable and affordable electricity in rural areas	Social protection Access to basic services and resources
	Inadequate and informal housing (e.g., slums) with limited social distancing and access to water and sanitation	Access to basic services and resources
	Dense cities associated with contagious environments	Environmental quality
	Urban design with green spaces supporting healthy environment	Environmental quality
	Public transport considered a health threat	Access to basic services and resources
	Waste management of plastic PPE	Environmental quality
Increase in mortality	Long-term exposure to air pollution	Environmental quality
	Food-related diseases (diabetes, obesity)	Social protection (healthcare)
Economic lockdowns	Reduction in GHG emissions from fossil fuels (e.g., reduced coal consumption, vehicle use)	Greenhouse gas emissions reductions
	Renewables electricity as a resilient source of energy	Efficient and sustainable energy
	Improvement in air quality	Environmental quality
	Increase in prices for staple food and affordability among vulnerable groups	Social equity
	Unemployment and income reductions	Social equity Social protection
	Paid employment in nature-based solutions (e.g., afforestation, soil, and water conservation measures)	Green employment Sustainable land and water use
	Disruption in solar energy value chain due to concentration of production system	Green investment

packages are used to support green projects and initiatives as described in Section 8, the Green Growth Index will reveal the transition towards a green economy through an increase in scores for relevant indicators. The multidimensional framework of the Green Growth Index facilitates assessments of impacts of policy decisions and actions related to COVID-19 recovery on various environmental, economic, and social sustainability indicators. This report has illustrated the links between COVID-19 pandemic and sustainability issues. Table 3 provides examples of these links, particularly those that can influence green growth indicators.

Assessing co-benefits using the Green Growth Index

Considering the multiple links of COVID-19 to sustainability issues outlined in table 3, strengthening green policies and investments through existing efforts and processes such as green new deals, national green growth plans, and climate action strategies will generate co-benefits. The green growth framework integrates relevant indicators as follows:

- Green new deals – efficient and sustainable energy, GHG emissions reduction, social equality, social protection;

- National green growth plans – all indicators in four green growth dimensions; and
- Climate action strategies – GHG emissions reductions, and all indicators in efficient and sustainable resource use and green economic opportunities.

The green growth scores for these indicators are useful metrics to assess country performance in implementing these efforts. A two-step approach of green growth performance and green co-benefits assessments can be used to evaluate the co-benefits from building COVID-19 resilience through green new deals, national green growth plans, or climate action strategies. Figure 11 illustrates the ongoing application of this approach to the greening of Uganda’s Third National Development Plan (NDPIII). Using the framework for the Green Growth Index, the indicators included in each of the NDPIII Programs will be assessed according to their relevance to the country’s green growth transition in the country (Step 1). The green growth scores are computed for each green growth indicator and aggregated to provide a quantitative measure of overall green growth performance, or the Green Growth Index. The importance of the green growth indicators to building resilience to zoonotic diseases like COVID-19 will be assessed based on relevant scientific literature (Step 2). The assessments will provide a list of co-benefits for greening Uganda’s NDPIII.

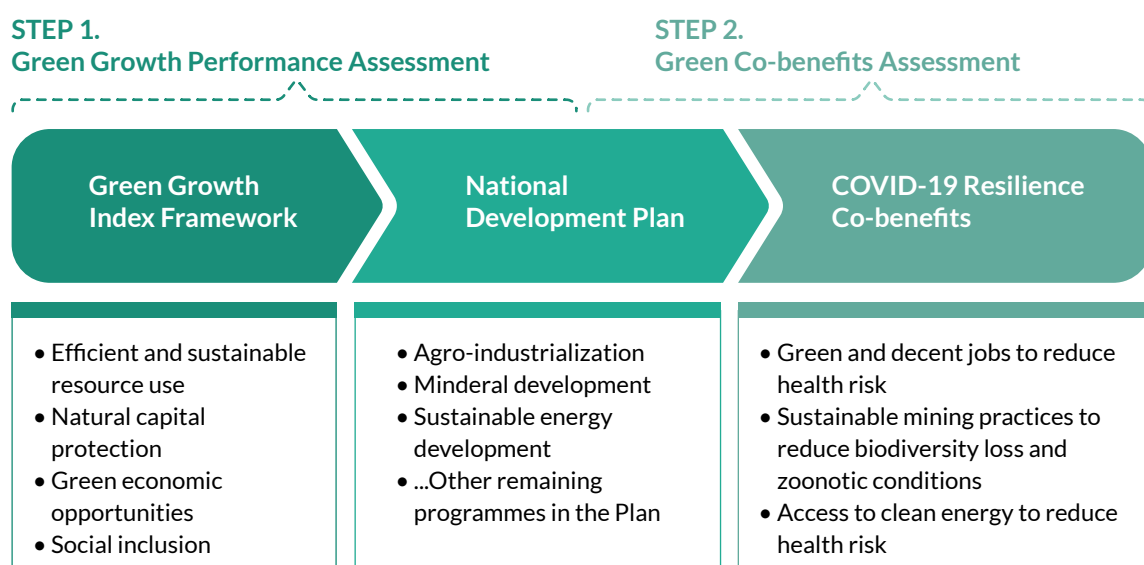


Figure 11. Assessment of COVID-19 co-benefits using the Green Growth Index framework
 Source: Authors’ own figure



10 COVID-19 AND CLIMATE POLICY RECOMMENDATIONS

Conclusions

1. The COVID-19 pandemic, and the economic lockdowns implemented to flatten the curve, have caused the harshest health and socio-economic crisis in a century. Pandemic preparedness, through planning and (public) health infrastructure, has proven its value. Early and effective implementation of testing, tracing and isolating has limited infections and mortality, and has helped to prevent a complete economic lockdown in the most successful countries.
2. The economic lockdowns have caused massive job losses throughout the economy, with particularly high impacts in transport and tourism, and relatively low impact to online businesses. The emergency economic rescue packages have cost an estimated USD 12 trillion in countries that have been able to afford them. The packages have resulted in large budget deficits and record levels of public debt, which will severely affect government flexibility in dealing with the longer-term recovery.
3. The COVID-19 pandemic has drastically changed the life and behavior of billions of people. For those able to work from home and shop online, the COVID-19 crisis has accelerated the digitization of everything from work, to education, shopping, and recreational activities. Countries with high prior investments in digital infrastructure were better able to withstand the COVID-19 shocks and to implement effective contact tracing and social distancing.
4. Emerging and developing economies have much lower resilience to shocks, which includes weaker health systems. They also lack the resources to sustain economic lockdowns or finance stimulus packages. Countries have been

- forced to end the lockdown prematurely amid surging infections because of the stark choice between COVID-19 and hunger. Developing countries have also incurred record levels of debt, which makes them more vulnerable to economic shocks and limits their ability to finance emergency rescue or recovery packages.
5. Many of the short-term environmental impacts of the COVID-19 crisis were positive, from blue skies and clean air in many cities to lower greenhouse gas emissions and a return of wildlife to urban streets. However, negative impacts included a backlash against public transportation associated with higher infection rates, and a return to higher plastic usage to promote hygiene.
 6. While GHG emissions are forecast to be 8 percent lower in 2020, lessons learned from the 2008-2009 global financial crisis show that stimulus measures benefiting energy-intensive industries can lead to a quick rebound.
 7. More green jobs can be created per dollar invested in green economy projects than in brown economy projects. Studies show that per USD invested, 2-3 times more green jobs are created by renewable energy and energy efficiency projects than the brown jobs created by fossil fuel projects.
 8. A well-analyzed set of climate-friendly, green measures that can be implemented on an accelerated timescale as part of the COVID-19 recovery already exists thanks to ongoing analysis for climate action and sustainable development, such as NDCs and LT-LEDS for the Paris Agreement.
 9. Analysis of climate action measures often focuses primarily on the mitigation of GHG emissions and should be complemented by an expanded analysis of co-benefits such as employment impacts – which are primary benefits in the COVID-19 recovery context.
 10. Sharp reductions in the demand for energy have led to low prices for fossil fuels, with coal most severely impacted. Renewable energy has proven to be the most resilient energy source. Restructuring in the energy sector offers an opportunity to phase out coal and accelerate the transition to clean energy. Low fossil fuel prices also allow for the phasing out of fossil fuel subsidies and the use of the savings to accelerate a green (energy) transformation. Conversely, low energy prices reduce the incentive for energy-efficiency measures as their pricing becomes less competitive.
 11. Employment-based social assistance plans can effectively contribute to implementing nature-based solutions to mitigate and adapt to climate change, for example, afforestation, watershed management, and mangrove restoration.
 12. For developing countries, the COVID-19 public health and socio-economic crisis exacerbates pre-existing fragilities and stresses, including a high debt ratio and a high dependence on tourism, remittances, and external aid. Early estimates are that in 2020 an additional 500 million people may fall below the poverty line, undoing many years of progress. The number of people on the brink of starvation may double from 135 to 265 million. It is too early in the pandemic to predict how many vulnerable LDCs will be affected. Still, many small island developing states that are highly dependent on international tourism have been hard hit from the moment borders closed in March.

Recommendations

COVID-19 recovery plans create an opportunity to build back better, and surveys show that there is public support for greening COVID-19 recovery plans. While the primary objective of COVID-19 recovery plans will be to generate short-term employment and income to restart the economy, the significant investments involved can serve a dual purpose to accelerate climate action.

Recovery packages should be designed to combine COVID-19 recovery with climate action, applying the following recommendations:

1. **Apply green stimulus priorities.**
 - a. Maximize the share of green and low carbon measures in the package so that brown components do not outweigh the green elements. A deal is not green if the green elements make up less than 50 percent of the package.
 - b. Make support to brown economy firms, for example, bail-outs to protect employment, conditional on measures to accelerate the green restructuring of brown firms.
 - c. Do not reverse existing green, environmental, low-carbon, or climate action policies to protect brown jobs.
2. **Transition fossil fuel subsidies to renewable energy subsidies.** Fossil fuel importing countries with existing subsidies can take advantage of the low fossil fuel prices to abolish or phase out brown subsidies. They should be replaced with green subsidies such as renewable energy feed-in tariffs, net-metering plans, and subsidies for energy efficiency in public, residential, office, and industrial buildings.
3. **Set ambitious targets as part of recovery packages or “green deals”.** Green deals are an investment opportunity to make climate action targets achievable. Blue Sky and Net Zero targets by 2050 or earlier should be announced as part of green deals.
4. **Align with climate and green growth strategies and plans.** COVID-19 recovery packages should be aligned with ambitious NDCs, LT-LEDS, and green growth strategies.
5. **Phase out coal.** Coal is the energy source hardest hit by the COVID-19 crisis, and recovery plans should not protect or resurrect coal-based projects, but instead accelerate the phasing out of coal, the fuel most harmful to the climate. All forms of government support for fossil fuel projects internationally should also be phased out.
6. **Stimulate green innovation and green jobs.** Small and medium companies provide the majority of employment, particularly in the service industry. Governments can green existing jobs through green job retraining and stimulate new green jobs through green entrepreneurship incubation programs and through subsidies for green jobs created by start-up companies. This is particularly relevant to hard-hit service sectors in vulnerable countries such as small island developing states and least developed countries, particularly tourism.
7. **Combine digital and green new deals.** The COVID-19 crisis has accelerated the digitization of the economy through remote working, online education, online shopping, and contactless transactions. Investments in digital infrastructure and digital inclusion can create employment, increase resilience, and increase access to the online economy for the most vulnerable.
8. **Promote nature-based solutions through employment-based social assistance programs.** Evaluations show that government programs to support income through work on green urban infrastructure, reforestation, watershed management, or ecosystem rehabilitation, such as mangrove restoration, can be effective COVID-19 support programs that enhance environmental assets and provide effective climate action.
9. **Accelerate solar-powered irrigation.** Employment, food security, and climate resilience can be effectively enhanced through solar-powered irrigation, particularly in South

Asia, to replace existing diesel-powered irrigation, and in Africa, to expand irrigated areas.

10. Upgrade health facilities with clean energy. Millions of off-grid community health centers in developing countries lack access to reliable energy or rely on expensive, polluting, diesel generators. Providing renewable energy packages – solar PV panels plus batteries – together with solar-powered equipment such as refrigerators and sterilizers, is a climate-friendly enhancement of the resilience of the public health system.

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