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Green Deals to Accelerate Climate Action Post-COVID-19

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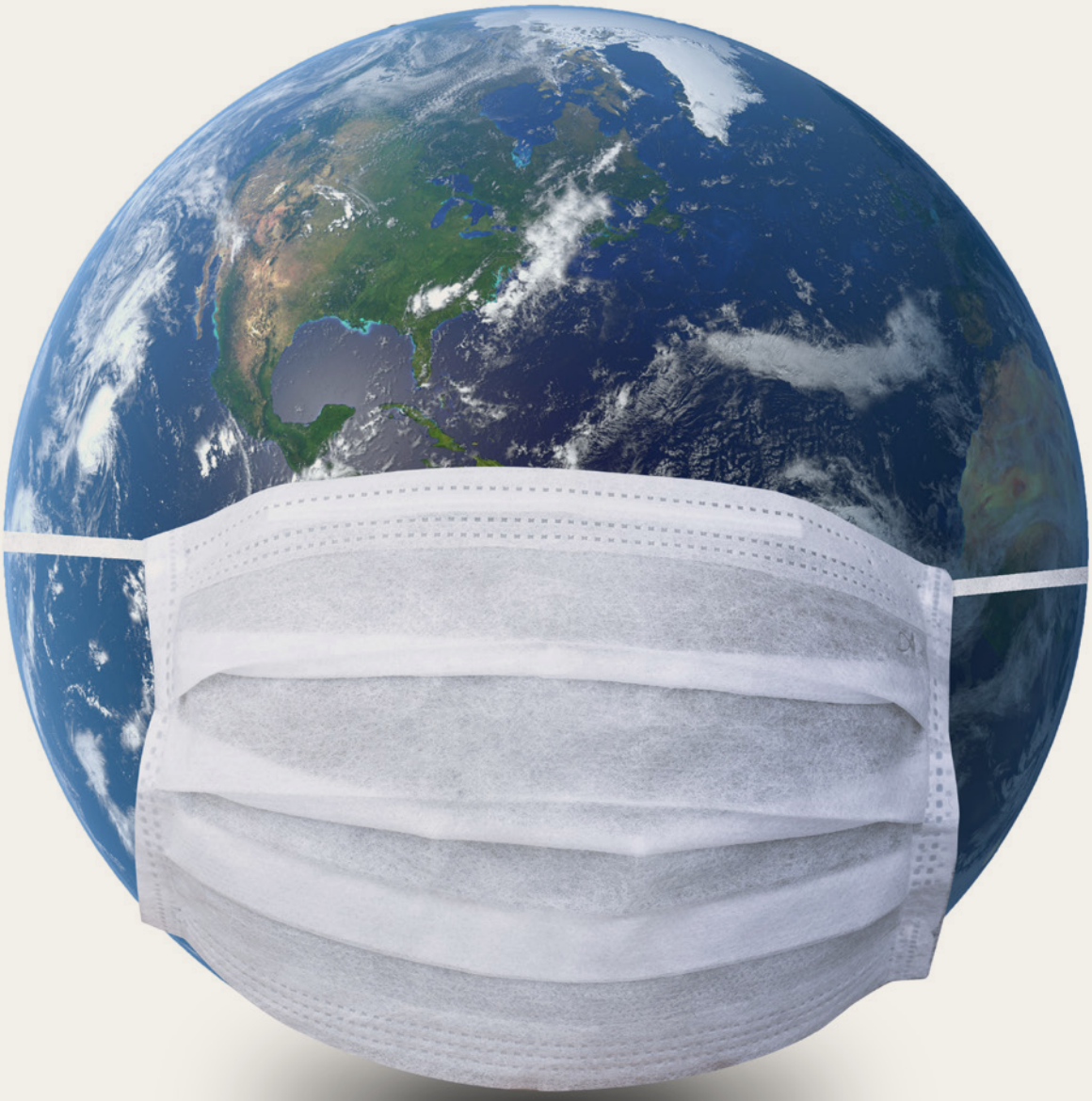

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1. Mind the Gap: Bridging the Climate Financing Gap with Innovative Financial Mechanisms, Eric Plunkett, Vikalp Sabhlok, December 2016.
2. Solutions for the Missing Middle: The Case for Large-Scale Mini-Grid Development, Gulshan Vashistha, Eric Plunkett, September 2017.
3. Assessment and Main Findings on the Green Growth Index, December 2019.
4. Green Deals to Accelerate Climate Action Post-COVID-19, Frank Rijsberman, October 2020.

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For additional context and detail, refer to the companion volume:

GGGI Technical Report No. 13:
Achieving Green Growth and Climate Action Post-COVID-19

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COVID-19 and climate action: challenges and opportunities

2020 was to be the year of truth for the Paris Agreement

Expectations were that the focus in 2020 would be on enhancing the national commitments under the Paris Agreement, that aims to limit global temperature increase 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, by December 2019, 73 national governments had committed to reducing greenhouse gas (GHG) emissions to net-zero by 2050 or before, i.e., adopted the NetZero2050 target.

Then COVID-19 changed everything

Instead, the coronavirus disease of 2019 (COVID-19) pandemic 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 daily rate of new infections is still rising, and it is still a relatively early stage in the pandemic.

Underlining the need for green growth

However, the climate crisis has not gone away. The COVID-19 pandemic is a stark reminder of the vulnerability of the current global economic system. Both the COVID-19 pandemic and the climate crisis are symptoms of a deeper sustainability crisis affecting our socio-economic system. It reinforces the need for an alternative economic development path centered around economic growth that is sustainable and socially inclusive – that is green growth. The Global Green Growth Institute (GGGI) defines green growth as an economic development approach that is both environmentally sustainable and socially inclusive.[2]

Employment was already a key factor in the green transition to a low-carbon economy. Job losses in the brown economy are the main reason that regions heavily dependent on, for example, coal mining or manufacturing of diesel engines, resist going green. Support for those who lose their jobs, and initiatives to provide re-skilling, are the essence of a Just Transition under the Paris Agreement. Job creation is of paramount concern in the economic recovery from the COVID-19 pandemic. Assessing the job creation potential of green growth investments and climate action, has, therefore, become particularly important. As a recent GGGI study shows, renewable energy investments to meet the Nationally Determined Contributions (NDCs) for the Paris Agreement have significant green job creation potential, including for developing and emerging economies[3].

COVID-19 impact on GHG emissions and climate action

In the very short-term, the economic lockdowns have had some surprisingly quick, positive environmental impacts. Many cities have seen better air quality this Spring than in decades. Wildlife has entered city streets left bare by humans. Global GHG emissions are expected to fall by 8 percent in 2020 compared to 2019 according to the International Energy Agency (IEA), as energy demand plunges in response to what the IEA called “the biggest shock since World War Two”[4].

Among the most affected economic sectors are transportation and tourism. Cross-border travel restrictions are likely to last well into 2021, possibly 2022, and may well affect air travel structurally. On the other hand, stigmatization of public transport, combined with social distancing guidelines, may see a rebound of personal vehicle use as well as an increase in non-motorized transportation. Climate-positive signs are the resilience of renewable energy production in the energy mix and the sale of electric vehicles in otherwise depressed energy and automobile markets[5].

Renewable energy resilient

In its Global Energy Review 2020, the IEA says that "renewable energy has so far been the energy source most resilient to COVID19 lockdown measures… as the supply cannot be regulated, variable costs are low, and access to the grid is preferential in many countries."[6] 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.[7] 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.[8]

Green Deals: Building Back Better post-COVID-19

By June 2020, the governments of the 50 largest economies had provided immediate economic relief for those suffering from impacts of the economic lock-downs through emergency rescue plans worth an estimated 12 trillion USD.[9] Only about USD 18 billion, or 0.015 percent, of this could be counted as green, according to Bloomberg New Energy Finance (BNEF)[10]. The size of the fiscal stimulus in response to the pandemic has also been uneven, with advanced economies investing 17 percent of their GDP, emerging economies 6 percent, and Africa 4 percent, according to the African Development Bank.[11]

Following the global financial crisis in 2008-2009, while GHG emissions dipped initially, they quickly rebounded as a result of the economic recovery support provided to energy-intensive industries[12]. While some countries had green components in their recovery packages, brown support outweighed green.

A critical question is, therefore, whether the trillions more that will be invested in the COVID-19 recovery will accelerate the green transition or derail it. Can we build back better? Will the recovery contribute towards achieving the Paris Agreement? Will global GHG emissions peak in 2020 and put the world on a path towards net zero emissions by 2050?

Some regions and countries, including the European Union (EU), Germany, and the Republic of Korea, are designing their COVID-19 recovery packages as a "Green Deal", or "Green New Deal". Can other countries follow suit? Is a Green Deal achievable and affordable for developing and emerging economies? And if so, how can a Green Deal be designed to deliver low-carbon growth and green jobs for all? This Policy Brief discusses these questions, covers Green Deal experience to date, recommends a Green Deal package for emerging and developing countries, and an accompanying set of policy and investment recommendations for policymakers faced with the COVID-19 crisis.

2

Health and climate interactions

The COVID-19 pandemic has put the spotlight on health and quality of life[13] 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.[14] Seven million people die prematurely every year from breathing dirty air has, over half in Asia.[15] While this has directly stimulated effective action in China, leading to cleaner air and more ambitious climate action, climate action has been modest compared to the policy response to the COVID-19 pandemic.

Air pollution and obesity increase COVID-19 mortality

The COVID-19 crisis provides an opportunity to examine the many linkages in the sustainability crisis we face across environmental concerns such as air pollution, climate, waste, and infectious disease – together with more hidden factors such as dietary diseases like coronary disease and diabetes. A recent nationwide study in England found that all types of diabetes are independently associated with a significantly increased risk, a factor of 2-3, of in-hospital death with COVID-19.[16] Long-term exposure to air pollution also increases COVID-19 mortality, as a recent study found that an increase of only 1 $\mu g/m^3$ in $PM_{2.5}$ is associated with an 8% increase in the COVID-19 death rate.[17]

Assessing health impacts and co-benefits related to climate action explicitly

Remarkably quickly, the economic lockdowns to flatten the curve of COVID-19 infections have produced the co-benefit of a significant improvement in air quality during April and May of 2020 in many cities around the world[18]. While climate action does not directly improve resilience to infectious disease outbreaks such as the COVID-19 pandemic, it does improve air quality, directly improving human health and indirectly reducing the vulnerability to diseases such as COVID-19. Going forward, it will be a higher priority to include the direct and indirect health impacts of the climate crisis, and linked issues such as air pollution, in the assessment of climate change impacts, and the benefits and co-benefits of climate action.

3 Green Deal experience post global financial crisis

After the global financial crisis of 2008-2009, some countries invested part of their stimulus funds into green measures. But while GHG emissions declined by 1.4 percent in 2009, they rebounded by 5.1 percent in 2010[19]. The cleantech investments made as part of these Green Deals, including support for research and development in renewable energy and related green technology, have likely contributed to the sharp decline in the cost of renewable energy and energy storage technologies, such as batteries of the last decade. However, the same stimulus packages included support for the brown economy in the form of energy-intensive industries and fossil-fueled power plants.

In this section we review Green Deal experiences following the global financial crisis. Although this economic crisis differs from the global financial crisis in 2008-2009, past experiences in economic recovery package design still offer 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.[20] 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 than comparable investments in fossil-fuel based energy projects. 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 multipliers 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 maintenance[21] 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.

Green Deals generated jobs

Table 1 provides examples of green recovery packages implemented in the U.S., Europe, 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 Europe. 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.[22] Schwartz et al.[23] 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 Deals improved renewable energy competitiveness

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,[24] but investments in railway infrastructure did have long-term benefits for energy conservation.[25]

A similar conclusion holds for other stimulus packages after the global financial crisis. Globally, while GHG emissions dipped briefly, they rebounded the following year. The stimulus packages were effective in restarting the economy, but the brown elements far outweighed the green. It is therefore critical that there are green components in the COVID-19 recovery and that the brown components are eliminated or minimized.

In its review of green stimulus packages following the global financial crisis, the IEA identified several principles for policymakers to incorporate into their planning for the post-COVID-19 green stimulus packages:[26]

- Scale up existing policies;
- Take technology readiness into account;
- Boost comparative advantages in industrial policy;
- Be wary of the structural barriers posed by complex infrastructure projects; and
- Consider policies' wider benefits.

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

Country	Recovery Packages	Green Features	Employment Impacts	Other Economic Benefits
U.S.	American Recovery and Reinvestment Act (ARRA), 2009[27]	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.
Europe	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.[28]	Action areas included launching a major European employment support initiative and creating demand for labor[29], but employment started to rebound only from 2013.[30]	Positive effects on real GDP growth;[31] 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.[32]
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.[33]	About 0.68% increase in total employment for every 1% increase in the share of solar PV generation.[34]	Significant effects on output at both the national and the subnational levels; Contributed to financing the start of China's green economy transition.[35]
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).[36]	Intended to create 950,000 jobs, albeit not entirely achieved.[37]	An effective economic policy instrument to recover from the global financial crisis.[38]

4

Designing a Green Deal post-COVID-19

To date, the published information on Green Deals, or Green New Deals, focuses primarily on advanced economies. In this section, we propose the design of a Green Deal package with particular relevance for developing and emerging economies. The design is based on GGGI's experience working on green growth in member countries, as described at greater length in a companion report,[39] the experience described in the literature, and recent recommendations from many organizations related to COVID-19 recovery packages.

Many GGGI Members have worked on national green growth plans or prepared NDC road maps or long-term low carbon emission development plans that already contain projects and measures that are well analyzed and consulted in these countries. These measures provide readily available building blocks to construct a Green Deal package.

In this section, we discuss several fundamental features of a GGGI recommended Green Deal package, summarized in table 2, section 4.6, namely:

- ***Priorities*** that governments should consider to maximize the green elements of the recovery package;
- ***Policies***, or the enabling green growth policy environment. The effectiveness of a Green Deal will depend both on the capital mobilized and the design of the measures selected and on the accompanying policy measures;
- ***Investment or package size***, related to the country's size and GDP per capita;
- ***Selection of measures*** that have high green growth potential, both in terms of green jobs and low carbon growth;
- ***Prioritization of measures*** within the package; and
- ***Estimated impacts*** of the package in terms of employment (project-related or temporary employment), gross value added, GHG emissions reduction, and several other co-benefits.

4.1 Green Deal priorities

For the COVID-19 recovery plans to have a net-positive impact on climate change as well as on economic recovery and job creation, we suggest the following three Green Deal Priorities that should be considered when greening COVID-19 recovery 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., as shown in 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. On balance, green components should outweigh brown components where those are deemed to be unavoidable (see point 2 below).

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.

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.40 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.

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. As mentioned in Section 3, a large part of the 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.

4. 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. Most of the time, the analysis is focused 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.

Governments could screen climate and green growth actions against economic recovery criteria and utilize robust employment creation potential assessment, macro-economic analysis, particularly the calculation of economic multipliers, and socio-economic analysis. 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.[41] ILO is also supporting governments to address employment issues in their NDCs by incorporating the guiding principles of the just transition.[42]

4.2 Green Growth policies

Based on GGGI's experience supporting its member governments in their green transformation, there are several key policy areas that in many countries need reform, and that have a critical impact on the green transition. Many of these areas are complex, and whether they are quick wins or long-term processes depends on the baseline situation in each case, and on the socio-economic and political contexts. These policy areas are all worth considering as accompanying measures for a Green Deal.

Power sector reform. Many countries have transitioned, or are in the process of transitioning, from a single national monopoly, authority, state company or regulated private sector entity that is solely responsible for production, transmission, and distribution towards forms of a more open market. A more open market allows alternate producers of renewable energy to connect to the grid; multiple distribution companies to compete for efficient service to electricity consumers; and self-generation by large consumers or industrial estates. Deregulating the power sector, and determining the conditions under which electricity producers can sell to the grid, such as government set Feed-In-Tariffs, and the conditions that govern service provision, such as the terms of the Power Purchase Agreements, are critical elements in the introduction of renewable energy.

Phase-out of fossil fuel subsidies, and replacing them with renewable energy subsidies, green Feed-In-Tariffs for renewable energy, renewable energy auctions, or energy efficiency incentives. Many countries subsidize electricity rates (and thereby fossil fuels indirectly), or the price of fossil fuels such as coal, oil and gas directly, both to increase access to electricity by low-income groups, as well as to stimulate industry as well as agriculture. Globally, fossil fuel subsidies remain high and amounted to some USD 5 trillion, or 6 percent of global GDP in 2015 - 2017[43]. The COVID-19 induced low fossil

fuel prices are an opportunity for the government to phase out such subsidies and, where necessary, replace these by investments in the clean energy transition. This may include investments in the grid, to increase the absorption capacity for renewable energy, or direct renewable subsidies through, for example, green feed-in-tariffs.

Cancellation of restrictions on rooftop solar and introducing net-metering policies. Many countries place restrictions on the right to produce or sell electricity to protect the national energy authority's monopoly. To promote private investment in distributed renewable energy, such as rooftop solar photovoltaic (PV), countries can reassess and phase out these restrictions and replace them with policies that allow solar panel owners to provide their excess energy to the grid, such as net-metering schemes.[44]

Green public procurement. Almost all OECD countries have introduced forms of green public procurement[45] and the OECD concludes that green public procurement can be a major driver for innovation as it provides incentives to develop environment-friendly works, products, and services.

Fuel standards. Given the transport sector's substantial contribution to both climate change and air pollution, fuel standards are a key policy tool. Standards should regulate both the desired fuel economy or mileage and limit air pollution by limiting the emission of harmful pollutants such as carbon monoxide, nitrous oxides, and particulate matter.[46]

Green building codes. Buildings are a significant source of GHG emissions, although it is technically feasible to reduce emissions from buildings to net zero. The World Green Building Council coordinates an initiative of organizations committed to net zero carbon buildings by 2030.[47] While these are primarily from OECD countries, developing countries such as Rwanda have made progress by introducing a Green Building Minimum Compliance System, with GGGI support.[48]

Green fiscal policies. A myriad of fiscal policies can lay the foundation for low-carbon and climate-resilient development, ranging from preferential import duties on clean technologies to environmental tax reform, carbon pricing, and the development of carbon trading schemes.[49]

Tipping fees for waste management. The rising volume of municipal solid waste is a serious and worsening problem in almost all countries, consuming a substantial share of the budget for most municipalities. The environmental impacts of improperly managed waste streams include significant GHG emissions, and water and air pollution. While tipping fees at landfill sites have reached USD55/ton in the U.S.,[50] many countries are not charging enough to cover the costs. Increasing tipping fees is an incentive to increase re-use and recycling and enable investments in waste to resource projects.[51]

Measurement, reporting, and verification (MRV), accounting, and transparency of GHG emissions. The Paris Agreement has put in place a global framework for managing climate change and GHG emissions, that requires all countries to measure, and report, their emissions. As capacity is still lacking in this area in many developing and emerging economies, this is another priority area for policy action.

4.3 Sizing the Green Deal

The amount of money required for an effective Green Deal depends on a large number of factors that will differ between countries and cannot be generalized. It is more useful to describe a model, or modular, Green Deal with recommended components and priorities, that can be adjusted and sized to meet the needs and priorities of each country.

Major factors that determine the cost to government of an effective Green Deal that helps recover the economy and creates green jobs while reducing GHG emissions are:

- The target number of jobs to be created;
- The cost of creating a job, which depends both on the capital and labor intensity of the investment, and the cost of labor;
- The degree to which the private sector can participate in co-financing, i.e., whether the Green Deal has to cover the entire cost, or can provide a subsidy for a share of the cost to incentivize the private sector to provide the remaining cost; and
- The emissions reduction potential of the Green Deal measures.

Advanced economies have issued initial 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.[52] While subsequent recovery packages announced to date are more modest than the initial emergency rescue packages, they have been of a similar order of magnitude, with tens of billions of USD committed over multiple years for individual countries, and a Green Deal for the EU sized at a trillion Euro.

Recovery packages for emerging and developing economies are smaller in absolute terms because their economies are smaller. Based on 2018 World Bank data, the GDP per capita in high-income countries was USD 44,806 in 2018, while it was USD 4,975 in low- and middle-income countries, or 9 times lower. Providing an equivalent stimulus to

the economy would require a package that is 9-10 times smaller.

In most of the packages GGGI has analyzed, the stimulus was primarily designed around the number of jobs to be created, whereas climate action plans are primarily designed around the emission reduction targets to be achieved. Effective Green New Deals should be designed to create both green jobs and reduce emissions, while also maximizing other co-benefits, including increased resilience to manage health and climate crises. The number of jobs that can be created depends on (a) the labor intensity of the measure or sector under consideration; (b) the wage level in the sector; (c) the local content share of the measure or industry; (d) the availability of human resources and skills in the country; and (e) the indirect and induced employment effects of each measure. This will be discussed in detail in the next section.

The share of the package to be funded by the government, or international aid sources, and the share to be co-invested by the private sector is a separate issue. This will in part depend on the nature of measures considered. It may be possible for the government to subsidize new jobs only partially in manufacturing, or services, by 30-50 percent, for example, and count on the private sector to invest the remainder. Employment-based social assistance to implement nature-based solutions, on the other hand, is likely to require 100 percent public financing, and may also require government management or implementation.

In this paper, GGGI recommends priority measures for a USD 1 billion Green New Deal, targeting the improved socio-economic conditions in emerging and developing countries, recommending priority measures, assessing potential impacts, and recognizing that the size of the deal must be tailored to specific country needs.

4.4 Green growth investments

The distribution of the model USD 1 billion GGGI Green New Deal across investment measures is based on GGGI's experience supporting its Members with the green transition in more than 30 countries and published examples of recovery packages from other countries.

The measures recommended by GGGI in this Policy Brief also align well with the conclusions of a recent survey of more than 200 experts and policymakers on COVID-19 recovery measures with the highest climate action potential conducted by Oxford University's Smith School on Enterprise and the Environment[53]. The survey respondents included officials in ministries of finance and central from a mix of developed and developing economies.

It is common, for example, to invest a substantial share of the package in ***green building renovation***, because it is relatively labor intensive and relatively low-tech, not requiring technology that may be difficult to source. Besides, green building innovations require an unskilled or low skilled labor force, that has been worst affected by the COVID19 pandemic.

Another large allocation is for ***renewable energy investments,*** primarily in wind and solar energy. These investments create green jobs[54] and play a key role in low carbon growth and, in least-developed countries that lack reliable access to sustainable energy, increasing access to sustainable energy for all. Investments in solar photovoltaic (PV) energy have the advantage of being quick and easy to install, very scalable from the rooftop of a residence to large utility scale projects and requiring only limited advanced technical skills in terms of labor. Availability of land can be a key limitation in some countries, but rooftops and floating solar are good alternatives for smaller scale projects. Solar energy tends to be the entry level technology for developing countries. Wind energy requires more advanced technical capabilities and is mostly cost effective at relatively large project sizes, but has the advantage of requiring less land, particularly where off-shore locations are available.

A third significant allocation category is for ***low carbon infrastructure***, with its precise nature depending on the needs and priorities of each country. This can include a range of ***sustainable mobility*** investments, such as Bus Rapid Transit systems, or urban light rail, or bike lanes and other forms of infrastructure to promote non-motorized transport, such as pedestrianized city centers, or pedestrian flyovers. There is a growing opportunity to introduce electrified transportation options such as e-buses, or e-motorbikes, together with the associated renewable energy and charging infrastructure. Green infrastructure may also include sustainable ***waste management investments***. As many developing countries struggle to provide adequate landfill capacity, preventing waste from going to landfill through a holistic 4R-based approach[55] can serve multiple goals. It is a commercially attractive, or near commercially attractive opportunity, and it improves the lives of workers in the informal waste processing sector

The acceleration of the digitization in the economy through COVID-19 aligns with priorities from the fourth industrial revolution, the ongoing transformation of traditional manufacturing and industrial practices combined with the latest smart technology[56]. While this may be more relevant for emerging economies than developing countries, stimulus packages may be an opportunity to prioritize ***investment in digital infrastructure***, combining a green and digital new deal, as in the Republic of Korea. Basic internet infrastructure supports remote working, online education, online shopping,

and online entertainment, all of which have surged during the pandemic. As remote working, and the contact-less economy in general, has become a priority in all countries, expanding digital infrastructure and improving internet access has become a priority everywhere.

A fifth category of investment is in ***nature-based solutions***, such as reforestation, degraded ecosystem rehabilitation, and climate-smart agriculture. This is a high priority measure, particularly in least developed countries with a significant share of employment linked to agriculture, and the majority of poverty in rural areas.

A smaller category of investment, but critically important for an inclusive recovery, is in ***green job training, green innovation, and green entrepreneurship***, particularly support for start-ups in the small and medium enterprise sector, the backbone of employment in most developing countries. Greening the tourism sector, combined with reskilling the labor force, provides opportunities particularly for countries heavily dependent on international tourism, such as many small island developing states.

Several advanced economies have prioritized ***green, electricity-generated hydrogen*** in their green recovery packages. However, this may only be relevant for more advanced emerging economies. Energy efficiency measures in manufacturing are likely important for all emerging economies. Investment in clean-tech research and development is another attractive priority for emerging economies. On the other hand, rural employment-based social-assistance schemes are likely important for all developing economies with a large low-income rural population that is also highly vulnerable to climate change and has the least access to health systems.

Lastly, existing 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 activate and accelerate the implementation of these green growth and climate action plans.

4.5 Potential impacts on green jobs and low carbon development

Low-carbon development is expected to generate over 65 million additional jobs globally by 2030 compared to business-as-usual (BAU)[57] . There is growing evidence from low- and middle-income countries that investing in green growth offers significantly more employment opportunities compared with investments in the current unsustainable economic model.[58] 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 NDC as compared to BAU by 2030.[59] 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.[60]

A separate GGGI analysis in Cambodia shows that meeting resource efficiency targets in key industrial subsectors can create half a million jobs at a cost of about USD4 billion, or about USD 8 thousand per job.[61]

In the context of Small Island Developing States (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[62]. 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.[63]

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 [64]. 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[65] . In many cases, there are existing and well-designed programs[66] 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[67].

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 disproportionally 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.

4.6 GGGI Green Deal for developing and emerging economies

In this section, we outline GGGI's recommended Green Deal package of investments and estimate the potential resulting green jobs and GHG emission reductions, outlined in table 2.

GGGI study results in emerging economies align 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.68

In May 2020, McKinsey & Company published its findings on how a post-pandemic stimulus package can both create jobs, and help the climate, in the form of a "model green new deal" for an average European country.69 McKinsey estimates job creation at 15-20 per million EUR, with a limited variation ranging from 13-18 for capital intensive investments to 20-25 for labor-intensive projects, including direct, indirect, and induced jobs. For developing and emerging economies, this estimate is likely a low boundary, given the lower labor costs and lower labor productivity in most, if not all, sectors of the economy.

According to the literature on employment multipliers in emerging and developing economies, green jobs created per million USD invested range from slightly more than 1 to over 50. Most multipliers fall in the range of 5 to 30 for investments in renewable energy, energy efficiency, and green infrastructure.[70]

Specifically, for nature-based solutions such as reforestation in developing countries, one million USD investment can generate between 500 and 1,000 direct jobs.[71]

There is, therefore, a wide range in the estimates of job creation potential per million USD invested, from 7 for renewable energy infrastructure in emerging economies to 1,000 for nature-based solutions in rural areas in developing countries.

For investments in green and digital infrastructure and energy efficiency retrofitting, in GGGI's Green Deal, it is assumed that one million USD generates 16-30 jobs, with an average of 24. Government participation can be partial, assumed as 50 percent, with the private sector providing the additional 50 percent. Based on these assumptions, an estimated 48 jobs are created per million USD invested from public sources, i.e. government and international aid sources.

For investments in nature-based solutions and climate-smart agriculture, it is assumed that one million USD generates 500-1,000 jobs, with an average of 750, likely through an employment-based social assistance program. Public sources (government and international aid sources) would likely need to absorb the full cost of this measure.

Table 2. GGGI Green Deal for emerging and developing economies

GGGI's recommended Green Deal for emerging and developing economies – **generating a total of jobs ranging from 223,500** in emerging economies to **258,600** in developing economies		Cost in USD (Million)	Cost Share in %
 **Green physical & digital infrastructure 16,800 jobs**	- Build solar and wind energy assets - Energy storage, including green hydrogen - Grid modernization - Digital network and AI infrastructure - Sustainable mobility - Green urban infra – bike lanes, waste recycling	350	30%
 **Building Energy Efficiency renovations & retrofits 14,400 jobs**	- Insulation - Energy-efficient heating and cooling - Domestic energy storage	300	25%
 **Education and training 2,400 jobs**	- Green job training - Online education systems - Online economy systems for the private sector	50	5%
 **Natural capital investment 187,500 jobs**	- Restoration carbon-rich habitats (forests, peatlands, mangroves) - Climate-smart agriculture	250	25%
 **Green technology R&D 2,400 jobs or Rural support schemes 37,500 jobs**	- Green technology R&D for emerging economies - Rural support schemes such as employment-based social assistance programs for developing economies	50	5%

The GHG mitigation potential that is available for the Green Deal depends on the situation in each country. Countries that have already invested significantly in emission reduction will generally have fewer low-cost reduction options relative to countries at an earlier stage in terms of renewable energy and energy efficiency. Early stage countries which will have more low-cost opportunities. Based on GGGI's work on investment multipliers in a range of sectors, it concluded the abatement cost is in the order of USD 10-30/tCO_2e (average of USD 20/tCO_2e).[72] It should be noted that the unit abatement cost increases with the size of the emission reduction volume/target, i.e. the average cost will rise as function of the amount of abatement as lower cost options are exhausted.

At an average abatement cost of USD 20/tCO_2e, a US$ 1 billion Green Deal can reduce 50 million tons of CO_2e.

In addition to the primary outcomes of green job creation and GHG emission reduction, a well-designed Green Deal will have several other co-benefits, including:

- ***Gross economic value added to the economy can be up to*** two to three times the value of the Green Deal package[73].
- ***Reduced air pollution***, particularly through measures reducing the use of coal for electricity production and diesel fuel for transportation.
- ***Increased resilience*** to climate change through, particularly, nature-based solutions and climate-smart agriculture, as well as pandemic resilience through digital infrastructure investments.
- ***Increased access to sustainable energy*** for all through renewable energy investments.
- ***More inclusive economy*** through decent green jobs in the informal economy through investments in waste management, rural support schemes, and employment-based social assistance schemes.

5

COVID-19 and climate policy recommendations

These conclusions and recommendations are based on GGGI's general experience working with its member countries on green growth plans and policies and the development of green investment projects. The background and source for these recommendations are discussed in more detail in the companion volume, GGGI Technical Report 13[74].

Conclusions

1. 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.
2. 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.
3. The economic lockdowns have caused massive job losses throughout the economy, with particularly high impacts in transportation and tourism, and relatively low impact in online businesses. The short-term economic rescue packages have cost an estimated USD 12 trillion in countries that can afford them and caused large budget deficits and record levels of public debt, which will severely impact government flexibility in dealing with the longer-term recovery.
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, such as renewable energy and energy efficiency, 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, mangrove restoration.

12. 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.

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. **Develop a locally appropriate Green Deal.** For developing and emerging economies this paper developed a modular USD 1 billion Green Deal package of investments, together with enabling green growth policies, that can potentially generate about 250 thousand green jobs and reduce GHG emissions by about 50 million tons. As circumstances vary greatly from country to country, these recommendations can be used to tailor a suitable Green Deal package that meets the needs and opportunities of each country.

2. **Apply green stimulus priorities**

   - 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.
   - Make support to brown economy firms, for example, bail-outs to protect employment conditional on measures to accelerate the green restructuring of brown firms.
   - Do not reverse existing green, environmental, low-carbon, or climate action policies to protect brown jobs.

3. **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. All public support for international fossil fuel projects, through development aid or export credit guarantees, for example, should be halted.

4. **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.

5. **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. Recovery packages should include many low carbon and climate-resilient measures that have already been proposed and assessed in these strategies and are, therefore, quickly implementable.

6. **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 coal projects internationally should also be phased out.

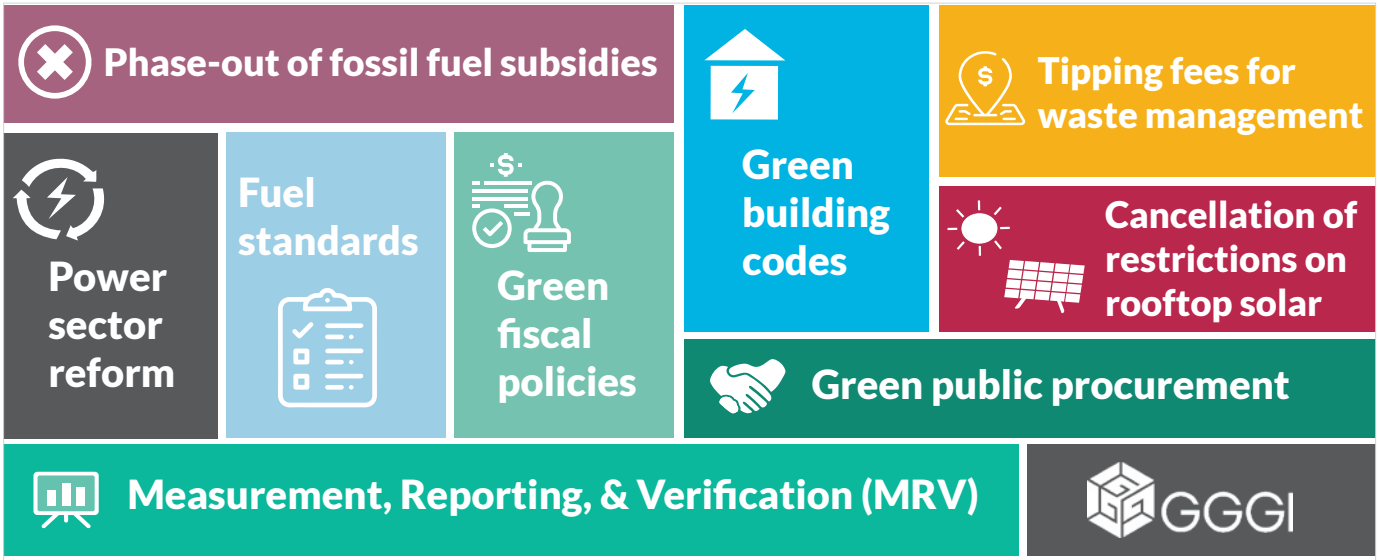
7. **Stimulate green innovation and green jobs.** Small and medium companies provide the majority of employment, particularly in the service industry. Governments can green existing jobs through green job retraining and stimulate new green jobs through green entrepreneurship incubation programs and through 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.

8. **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.

9. **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.

10. **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.

11. **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.



Green Deal Policies

Based on GGGI's experience supporting its member governments in their green transformation, there are several key policy areas that in many countries need reform, and that have a critical impact on the green transition. These policy areas are all worth considering as accompanying measures for a Green Deal.

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