

# Greening the green: repackaging recovery packages

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## Summary

Emissions pathways after COVID-19 will be shaped by how governments' economic response translates into infrastructure expansion, energy use, investment planning and societal changes. Climate action is pledged to be embedded in most of recovery packages launched so far, but with sharp differences at regional and national levels. This paper provides novel evidence on the energy system and emission implications of post-COVID recovery packages by revealing the wide gap between pledged recovery packages and the actual investment need of the energy transition concluding that currently planned recovery from COVID-19 is not enough to enhance societal responses to climate urgency.

## Abstract

The impact of the COVID-19 pandemic on climate change mitigation will ultimately depend on long-term structural shifts caused by economic recovery (Hepburn et al., 2020). The emission reduction rate observed during the restrictive confinement period in the first half of 2020 is broadly comparable to the annual emissions reduction rate needed to achieve the 1.5°C target (Le Quéré et al., 2020). However, the sharp 7% drop in emissions experienced during 2020 is likely to reflect only the very short term, not to causing any lasting effect since the previous fossil-fuel based infrastructure is still in place and could rapidly get back to full-capacity (Forster et al., 2020; Le Quéré et al., 2021). IEA (2021) is predicting a major surge in CO<sub>2</sub> emissions from the energy sector in 2021, as the world rebounds from the pandemic via accelerating rollouts of Covid-19 vaccinations in many major economies and widespread fiscal responses to the economic crisis. Emission pathways after COVID-19 will ultimately be shaped by how economic responses translate into infrastructure expansion, energy use, investment planning and societal changes in the short- and long-term.

Arguably, both the climate crisis and the pandemic-related crisis should be tackled at once through a low-carbon economic response, by ensuring that large funding is directed to clean energy (Hepburn et al., 2020). As a response to the COVID crisis, most governments worldwide developed recovery packages aiming to boost their economies, support employment and enhance their competitiveness. Climate action is embedded in most of these packages, but with sharp differences at regional level.

Indeed, the European Union has launched a €750 billion recovery package from which at least 30% of expenditure is committed to mainstreaming climate action (European Council Conclusions, 17-21 July 2020 - Consilium, n.d.). The United States Biden administration, similarly, has launched a “Build Back Better plan” which aims at canalising US\$2 trillion low-carbon investment, including US\$400 billion directly to clean energy over the next ten years (Biden, 2021). In contrast, an economic recovery based on investment in fossil fuel infrastructure would hinder progress towards limiting global temperature rise and would increase the risk of locking our economies into high-emission trajectories.

This paper draws on the existing IPCC scenario framework (IPCC, 2018, 2014) to advance the field by including potential long-term impacts of policy responses to the COVID-19 pandemic. We provide novel evidence on the energy system and emission implications of the green energy stimulus within post-COVID recovery packages.

This study uses two different modelling frameworks to assess the impacts of green recovery packages – the COFFEE-TEA IAM suite of models and PROMETHEUS (IAMC, 2021a). The COFFEE-TEA IAM suite of models (IAMC, 2021b), which comprehends a bottom-up, partial equilibrium, global model for the energy and land systems (COFFEE - COmputable Framework For Energy and the Environment) linked with a global Computable General Equilibrium (CGE) model (TEA - Total Economy Assessment model). The COFFEE model can represent the optimal pathway for the interaction and competition between technologies and energy sources to meet a demand for energy services, by minimizing the total cost of the system from pre-established policy restrictions. PROMETHEUS is a global energy system model that represents the complex interlinkages between energy demand and supply and assesses the energy, emission and economic implications of energy and climate policies (Fragkos and Kouvaritakis, 2018).

We depart from a Baseline scenario framed within the Shared Socioeconomic Pathway - SSP2 “middle of the road” (O’Neill et al., 2014) rationale, but applying short-term regional GDP growth shocks. We have chosen to use short-term projections of the COVID-19 pandemic impact from the International Monetary Fund World Economic Outlook updated in October 2020 (IMF, 2020), since they are the most up to date projections, reflecting the most recent economic disruptions of the pandemic.

To design the recovery package scenarios reflecting policies launched as a response to the COVID-19 economic crisis, we screened total energy investment embedded in policy packages announced up to May 2021. For this purpose, we assessed government plans and tools created specifically to analyse the greenness and brownness of post-COVID-19 stimulus, namely: the Energy Policy Tracker (Energy Policy Tracker, 2021), the Climate Action Tracker (Climate Action Tracker, 2021). When regional trend data are needed, the IEA Country Statistics (IEA, 2020) are used.

Having screened national and regional policy packages for the post-COVID19 pandemic economic responses, we translate them into assumptions for each of the scenarios. The national recovery package scenario assumes the implementation of plans for investments on a portfolio of green energy options in each country. The global recovery package scenario considers that the investments are not restricted to each region, but the total amount of recovery funds are allocated globally according to the models’ optimization. Finally, two mitigation scenarios are assessed consistent with the Paris Agreement goals, assuming carbon budget restrictions of 600 GtCO<sub>2</sub> and 1000 GtCO<sub>2</sub> by 2100 without temperature overshoot.

Our preliminary results show that even the current green recovery packages, despite providing limited emission reductions from Baseline levels and somewhat increased uptake of renewable energy, are clearly not enough to deal with climate urgency, but (if upscaled) can potentially catalyse the transition to net-zero emission emissions by mid-century. A green recovery should therefore include considerably higher and longer-lasting higher green investment packages, for

the next five to ten years at least, directed towards renewable energy expansion, uptake of electric vehicles and energy efficiency, combined with more ambitious climate policies in all economies.

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