



RESPONDING TO THE ECONOMIC CRISIS TO BUILD BACK BETTER

Short-Lived Climate Pollutants and the Economic Recovery

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Introduction

The COVID-19 pandemic has resulted in a tragic loss of life and significant social disruption. The response to the pandemic has also inflicted severe economic damage at all scales, from the local to the global economy. The fiscal position of governments has also been severely affected—with consequences potentially over the medium to long term—particularly for economies in developing countries.

Around the world, countries are developing economic recovery plans, recognizing that these plans must create jobs and stabilize the economy. Several countries are also embracing the idea of “building back better” with investments to deliver lasting social, economic, and environmental benefits. Governments are establishing economic recovery plans for the energy, agriculture, transport, and waste sectors, which are responsible for large emissions of short-lived climate pollutants (SLCPs). SLCPs, such as methane, black carbon, hydrofluorocarbons, and ground-level (tropospheric) ozone, have a powerful effect on global temperature rise, and many are also damaging air pollutants. These governments recognize the importance of SLCP mitigation in the recovery—in effect, delivering on both immediate economic goals as well as longer-term climate and population health goals.

This note promotes the links between SLCP mitigation and the economic recovery. It highlights examples of how countries are addressing SLCPs in their recovery plans and provides options for resourcing the recovery. The note is aimed at public policymakers and their advisers. It deals with both the immediate stimulus that many governments injected into their economies and also the longer-term transformational policies and actions that will drive and sustain the recovery. Indeed, the outcomes that are achieved by reducing SLCPs are relevant to many of these longer-term objectives:

- **Reducing SLCPs improves public health and equity.** Ground-level ozone, driven by methane emissions, is a major health concern that decreases lung function and aggravates asthma and other lung diseases, leading to premature mortality. Black carbon and some of its copollutants are key components of fine particulate matter (PM_{2.5}) air pollution, the leading environmental cause of poor health and premature deaths. These illnesses and premature deaths do not occur in equal proportions, with significantly higher negative impacts in low- and middle-income countries (WHO 2018). A range of solutions exist to reduce or eliminate air pollution, and the health benefits alone outweigh the costs of mitigation actions (Markandya et al. 2018). For example, policies and investments that prioritize dedicated rapid transit and walking and cycling networks can promote safe active travel, reducing health risks and economic impacts from air pollution (CCAC and WHO 2015).
- **Reducing SLCPs promotes food security.** Ground-level ozone and black carbon can significantly reduce crop yields. It is estimated that 52 million metric tons of staple crops can be saved each year by implementing measures to reduce methane and black carbon (UNEP 2019). Indeed, the agriculture gains from reducing SLCPs are among the many reasons why implementing mitigation measures for these pollutants can be advantageous for supporting food security and reducing poverty (Hottle and Damassa 2018).



- **Reducing SLCPs is a key part of the global climate response.** Reducing SLCPs is one of the most powerful tools we have to slow down the rate of global warming in the near term. Actions to quickly curb these powerful climate forcers are essential to avoid dangerous temperature increases in the near-term because they are more potent than carbon dioxide (CO₂) and live a short time in the atmosphere. In fact, SLCPs are responsible for more global warming to date than CO₂ (Xu and Ramanathan 2017). The projected global temperature rise can be cut by about 0.6°C by 2050 by using existing, readily deployable, and cost-effective technologies to reduce SLCPs (Xu and Ramanathan 2017).

Actions to Deliver Immediate and Lasting Benefits

Actions to mitigate SLCPs can deliver high economic returns (i.e., improve productivity, reduce waste, cut costs, and improve efficiency) and thereby support the recovery. Although most national governments have yet to explicitly discuss SLCP mitigation in their recovery plans, there are several examples (as noted below) in which plans contribute to SLCP reductions. This section delves deeper into the multiple benefits that can accrue from SLCP mitigation and highlights examples from countries' economic recovery plans—a good basis on which to expand this effort.

Mitigating Methane

The largest source of human-induced methane emissions is agriculture (farming and rearing livestock), which is responsible for around 40 percent of global emissions (IEA 2020a). This is closely followed by the energy sector, which includes emissions from the production, transport, and use of fossil fuels (natural gas, oil, and coal); and then by the waste sector, which involves the decay of organic waste in municipal solid waste landfills and wastewater facilities (IEA 2020a). The mitigation strategies and related economic benefits for these sectors are examined in more detail below.

AGRICULTURE

Improved agricultural practices—specifically those that improve efficiency—enhance crop and livestock yields and benefit farmers (Bapna et al. 2019; Ross et al. 2019) while also reducing emissions per unit of output. A recent global study shows that a range of efficient food production practices can be implemented at zero cost or with immediate cost savings (Ahmed et al. 2020). (The level of benefits accrued in each country will depend on the nature of the agriculture sector and national context.) These methane-reducing practices include improved rice paddy water management and better livestock management through improved breeding, feeds, and supplements as well as illness prevention (Ross et al. 2019). In Vietnam, for example, farmers can achieve a higher net income of around US\$137 per hectare when using alternate wetting and drying for rice cultivation, when water is not subsidized (McKinley et al. 2020). Biogas generation from agricultural waste, including manure, can also provide valuable, cost-effective clean energy and create new local revenue streams (Cyrs et al., forthcoming).

The European Union's economic recovery plan shows that the agriculture sector plays a central role in both the recovery as well as the region's transition to a climate-neutral economy (Box 1).

BOX 1 | Agriculture Elements of the European Union's Economic Recovery Plan

The European Union (EU) supports a green transition through its economic recovery. It includes a €15 billion (approximately US\$17.5 billion) reinforcement for the European Agricultural Fund for Rural Development, which helps rural areas make structural changes in line with the EU's Farm to Fork Strategy, among others. Specific elements of the Farm to Fork Strategy that will reduce methane emissions include halving per capita food waste by 2030, creating a circular bio-based economy (including biodigesters), promoting sustainable and innovative feed additives for livestock, and facilitating the shift to a healthy, sustainable diet by reducing the intake of red meat. The EU's recovery plan and Farm to Fork Strategy also dovetails with its recently released methane reduction strategy. The EU's methane strategy highlights the range of methane mitigation technologies and practices available in the agriculture sector, recognizing the importance of reducing methane to achieve the EU's 2030 and 2050 economy-wide emissions reduction targets.

Source: European Commission 2020a, 2020b, n.d.a, n.d.b.

OIL AND GAS

The oil and gas sector is responsible for about a quarter of global anthropogenic methane emissions (IEA 2020a). Low-cost opportunities exist to mitigate these emissions and even realize economic savings in some cases. These opportunities include detecting leaks and repairing fugitive emissions in facilities, gas compressors, and transmission lines as well as reduced venting of associated gases. The International Energy Agency estimates the industry could reduce its worldwide emissions by 75 percent—and that up to two-thirds of those reductions can be realized at zero net cost (IEA 2020a). In the United States, for example, the methane leak rate from oil and gas systems in 2015 was 2.3 percent, worth an estimated US\$2 billion annually (Alvarez et al. 2018). Despite the clear economic case for sealing leaks, utilities often recoup the costs of leaked gas by passing them on to consumers (Webb 2015). Regulations can assist to cost-effectively control flaring and venting and mandate leak repair (Saha 2019).

Canada has indicated that reducing methane emissions in the oil and gas sector is an important part of building back better—specifically by cleaning up orphan and inactive oil and gas wells. This type of recovery measure may apply to many other producing jurisdictions and indicates the opportunities available to reduce emissions and keep fossil fuel workers employed (Box 2).

BOX 2 | Oil and Gas Elements of Canada's Economic Recovery Plan

As part of Canada's COVID-19 Economic Response Plan, the national government is providing up to C\$1.72 billion (US\$1.29 billion) to the Alberta Orphan Well Association and the provincial governments of Alberta, Saskatchewan, and British Columbia to clean up orphan and inactive oil and gas wells and reduce methane emissions. Although actions to reduce methane emissions may create fewer construction and manufacturing jobs per dollar invested when compared to renewable technologies such as solar, these actions can help retain and provide jobs where they are needed most. According to Canadian prime minister Justin Trudeau, the "goal is to create immediate jobs in these provinces, while helping companies avoid bankruptcy, and supporting our environmental targets."^a The investments to clean up orphaned and abandoned wells is expected to maintain approximately 5,200 jobs in Alberta alone. Canada has also established a new C\$750 million (US\$563 million) Emissions Reduction Fund to help onshore and offshore oil and gas companies "invest in green solutions,"^b reduce methane emissions, and retain jobs in the sector. Canada's investments in the oil and gas sector also support the national emissions reduction target—to reduce methane emissions from the oil and gas sector by 40–45 percent by 2025 relative to 2012 levels.

Sources: Government of Canada 2018, 2020; IEA 2020b.

a. Anderson 2020.

b. Government of Canada n.d.

MUNICIPAL SOLID WASTE

The waste sector accounts for around 20 percent of global anthropogenic methane emissions (IEA 2020a), predominantly from decomposing organic waste in landfills. Minimizing the amount of waste sent to landfills, specifically by separating organic matter, represents a significant opportunity to reduce methane emissions, create jobs, and support a circular economy. Additionally, capturing landfill gas onsite and generating energy will reduce methane emissions, displace other forms of fuels (using biogas rather than fossil fuels), and create new streams of revenue (Cyrs et al., forthcoming). These activities can lower energy costs, improve local air quality, and strengthen public-private partnerships that can increase recycling rates and provide new job opportunities (Ross et al. 2018). For example, in Ontario, Canada, collecting and recovering 1,000 metric tons of food and organic waste has been shown to generate 60 percent more gross domestic product and 40 percent more jobs than disposal (Government of Ontario 2017).

Although few countries are dealing with the waste sector explicitly as part of their economic recovery plans, New Zealand is supporting waste minimization initiatives to reduce environmental pollution, which may also reduce methane emissions (Box 3).

BOX 3 | Waste Elements of New Zealand's Economic Recovery Plan

As part of New Zealand's Covid-19 Response and Recovery Fund, the government is investing NZ\$124 million (US\$83 million) in several waste initiatives across the country. The initiatives, which may reduce methane emissions (though this has not been explicitly stated), will increase and expand the waste levy to divert material from landfills and will collect better data about the waste that is created and disposed to support better management. According to the New Zealand government, "Increased investment in waste minimization and resource recovery infrastructure will ensure New Zealand emerges from the Covid-19 pandemic with a far better resource recovery and recycling system, creating hundreds of permanent jobs and incomes across New Zealand."

Source: Government of New Zealand 2020.

Mitigating Black Carbon

Black carbon (soot) is a component of $PM_{2.5}$. Emissions sources include incomplete combustion in diesel and petrol vehicles, the burning of agriculture waste, other open burning of waste, biomass burning to meet household energy needs, and coal for electricity. The lockdown imposed by many governments in response to COVID-19 resulted in dramatically cleaner air in many cities (Dang and Trinh 2021). The health benefits were prominently covered in news outlets, and citizens realized that cleaner air is possible and, indeed, essential.

TRANSPORT

Switching vehicles from fossil fuels to clean energy can significantly reduce black carbon emissions and improve local air quality. Several countries are investing in their transport sectors to stimulate their economies and spark innovation in areas such as electric and hydrogen vehicles.

Germany's economic recovery plan promotes the switch to electric vehicles through a number of measures (Box 4); the Republic of Korea's economic recovery plan promotes eco-mobility by deploying electric and hydrogen vehicles and by scrapping old diesel vehicles (Box 5). Many countries beyond these are prioritizing electric vehicle infrastructure as part of their recovery stimulus (including Australia, China, and France); the United Kingdom has also introduced earlier dates to phase out internal combustion engines.

BOX 4 | Transport Elements of Germany's Economic Recovery Plan

Germany's stimulus package includes a set of measures to "accelerate the country's modernization," with a focus on sustainable mobility. Specific measures to spur the replacement of fossil fuel vehicles (and thus reduce black carbon emissions and improve local air quality) include

- providing consumers with an increased "eco-bonus" when they purchase an electric vehicle of up to €40,000;
- investing an additional €2.5 billion (US\$3 billion) in the expansion of charging infrastructure and in research and development for electric mobility and battery cell production;
- promoting a temporary vehicle fleet replacement program to provide electric mobility;
- investing in a program to modernize the country's fleets of buses and heavy-duty vehicles; and
- creating an investment package to promote hydrogen technology, including support for the ultimate objective of carbon-neutral heavy-duty vehicles.

Source: Federal Ministry of Finance n.d.

BOX 5 | Transport Elements of the Republic of Korea's Economic Recovery Plan

A key element of the Republic of Korea's economic recovery plan, the Korean New Deal, is to support future eco-mobility. Specifically, the plan aims to phase out old diesel cars and support the provision of electric and hydrogen vehicles "to reduce the emission of greenhouse gases and to enhance competitiveness in the future car market." The eco-mobility work will be supported through the investment of ₩20.3 trillion (US\$18 billion) by 2025, which the government has indicated will create 151,000 new jobs. The goals of the plan include

- increasing the number of electric vehicles (passenger cars, buses, and freight vehicles), supported by the installation of charging facilities;
- increasing the number of hydrogen vehicles, supported by the installation of charging facilities as well as fuel cell plants and other hydrogen distribution infrastructure;
- scrapping diesel vehicles; and
- transitioning freight cars and school buses to liquified petroleum gas.

Source: MOEF 2020.

HOUSEHOLD ENERGY

Over 3 billion people globally still use kerosene and solid fuels (such as wood, crop wastes, charcoal, coal, and dung) for cooking and lighting. Most of these people are poor and live in low- and middle-income countries. Each year, close to 4 million people die prematurely from illnesses attributable to household air pollution from inefficient cooking practices (WHO 2018). Improving household energy through rapid access to better fuels and more efficient cookstoves can reduce PM_{2.5} and premature deaths.

Nigeria's economic recovery plan focuses on improving indoor air quality by household fuel switching (Box 6).

BOX 6 | Household Energy Elements of Nigeria's Economic Recovery Plan

As part of an overall federal government stimulus package of ₦2.3 trillion (US\$6 billion), the Nigerian government has committed ₦240 billion (US\$63 million) in the clean energy sector to provide solar power to 5 million households currently not connected to the national grid and to create 250,000 jobs. The Nigerian government has also committed ₦90 billion (US\$236 million) for a national program to promote domestic use of compressed natural gas (CNG) and ₦23.4 billion (US\$61.4 million) to convert 30 million homes from dirty fuels (kerosene, charcoal, and diesel) to liquified petroleum gas (LPG), applying more LPG in agriculture, power generation, transport, and industry. The conversion to LPG will help create 1 million jobs and will also reduce black carbon emissions from the burning of fossil fuels. (Ideally, CNG and LPG will be used as transition fuels before the implementation of renewable technologies, thus minimizing carbon lock-in.)

Source: Government of Nigeria 2020.

Resourcing the Recovery

Although the public policy (including cost/benefit) case for SLCP mitigation is sound, many of the changes outlined here will nonetheless require new/increased investment by the government, the private sector, or both. With government revenues facing severe challenges as a result of the economic contraction caused by COVID-19, the question arises as to how governments can financially support new investments. There are several options/recommendations to consider.

Pricing and Subsidy Reform

An increasing number of countries (and subnational jurisdictions) have carbon pricing systems in place, ranging from G7 countries such as Canada to emerging/developing countries such as South Africa—78 countries or subnational regions globally (World Bank 2020). These pricing systems can be significant sources of revenue that can be directed towards targeted mitigation support actions, including for SLCPs. For example, in the European Union (EU) a strengthened carbon price signal led to a record amount of revenues in 2018—€14 billion—more than doubling the revenues generated in 2017. EU states spent or planned to spend 70 percent of these revenues on climate and energy objectives (European Commission 2019). Globally, carbon pricing programs generated more than US\$45 billion in government revenues in 2019, with over 40 percent of revenues being directed to climate projects and another almost 40 percent directed to the general revenue to fund other social and economic programs (World Bank 2020). Launching such a process in conjunction with a COVID-19 stimulus/response program will have a long-term payoff.

Similarly, as the price of oil falls (partly due to COVID-19), households are seeing lower prices at the pumps and on their electricity bills; this is an opportunity for governments to phase out fossil fuel consumption subsidies, which are a huge burden to taxpayers. Globally, the estimated value of fossil fuel consumption subsidies amounted to more than US\$317 billion in 2019 (IEA 2020c). Nigeria, for example, has used the collapse in oil prices to remove fuel subsidies. Other countries that have also responded by removing fossil fuel subsidies or increasing energy prices include India, Sudan, Tunisia, and Venezuela. The end of such subsidies helps make funds available for climate action, critical infrastructure projects, spending for health and education, and programs to assist in targeting poverty and inequality (see, for example, Beaton and Viswamohan 2020).

Development Bank/Concessional Financing

Many of the measures discussed here fit well with public-private partnerships and can be financed by development banks. Many such programs exist. The World Bank's Pilot Auction Facility for Methane and Climate Mitigation (PAF) combines traditional climate financing with market systems by providing a guaranteed floor price on carbon credits; PAF has helped reduce CO₂ equivalent emissions by more than 20 million metric tons, including methane from landfills, animal waste projects, and wastewater sites (World Bank 2018).

General Revenue/Targeted Charges

Most of the actions outlined here are traditional areas of public financing (e.g., waste management, public transport, support for farmers). In addition to their general economic benefits, health and social benefits also accrue from well-designed SLCP investments. To date, governments have committed over US\$12 trillion to the COVID-19 response and recovery. As governments continue to seek recovery policies that deliver short-term gains (jobs, income, economic boost) and long-term sustainability, SLCP mitigation is an area that can deliver both. Particularly at the municipal level, targeted levies or charges (e.g., for waste collection/separation systems; see Box 3 for an example) can also be important sources of revenue for projects.

Emerging/Innovative Arrangements

Sovereign debt forgiveness in return for climate action (“climate debt swaps”) is an emerging area of climate financing that builds on the earlier debt-for-nature financing model. Incorporating SLCP mitigation into those arrangements, with the types of public projects described here, could be a very appropriate focus for such arrangements. Similarly, SLCP mitigation is conceivably a suitable area for internationally transferred mitigation outcomes under the Paris Agreement.

Conclusion

This note has provided a brief overview of the benefits of addressing SLCPs in the context of the economic recovery, highlighting some of the early actions that are being taken by national governments and offering options for resourcing the recovery. In sum, these are the features of an SLCP-related economic recovery package:

- **HEALTH:** Strong orientation to improved health outcomes, especially impacts linked to air pollution.
- **ECONOMIC RETURNS AND EMPLOYMENT:** Strong links to positive economic returns—including cost savings—and, more specifically, near-term job or income creation.
- **CLIMATE:** Direct contribution to climate change mitigation especially near-term temperature impacts.
- **IMPLEMENTATION:** Proven technologies, for immediate implementation and impact.

As shown, many countries are embracing these opportunities. Sharing of these practices and deepening our understanding of the role of SLCP mitigation from climate, development, and employment perspectives are important areas of ongoing research.

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