

Building back better: How climate-friendly cooling can support a clean, resilient Covid-19 recovery

June 2020



KIGALI
COOLING EFFICIENCY PROGRAM

EXECUTIVE SUMMARY

Covid-19 and the measures being taken to mitigate the subsequent public health and economic crises are creating huge global shocks. In response, governments and financial institutions are quickly developing fiscal and monetary packages that are unprecedented in scale. The [World Bank](#), [International Monetary Fund](#), [International Energy Agency](#), [European Commission](#), and others across industry, academia, and civil society are challenging governments to keep sight of the climate crisis and to use Covid-19 stimulus packages and recovery plans as an opportunity to build back better, for a cleaner, more resilient world.

Cooling plays a central role in supporting societies through this crisis; from protecting temperature-sensitive medical supplies and patients in crowded hospitals, to ensuring reliable food supplies while food systems are disrupted. Efficient, climate-friendly cooling could also help many struggling businesses get back on the road to profitability through significant energy cost savings. All of this, in turn, will help governments meet near-term stimulus objectives while also meeting the commitments that were made as a part of the Paris Agreement, Kigali Amendment to the Montreal Protocol, and Sustainable Development Goals (SDGs), which are all crucial for a better recovery.

The [Kigali Cooling Efficiency Program \(K-CEP\)](#), a philanthropic collaboration active in over 50 countries, has identified six high-impact opportunities that can reduce emissions, **increase job creation, and enhance economic output through the inclusion of efficient, climate-friendly cooling in stimulus packages.**



- 1. Bailouts for hard-hit sectors that support sustainable cooling.** Funds that are made available to bail out hard-hit sectors (e.g., hospitality) are made conditional on the adoption of efficient, climate-friendly cooling, which offers long-term reduced costs for businesses and sets industries on a path toward decarbonization.
- 2. Cooling efficiency in the built environment.** Rebate and incentive programs encourage the uptake of more efficient appliances and technologies in homes, businesses, hospitals, and other buildings, stimulating the manufacturing sector and creating jobs and more disposable income due to energy cost savings, which in turn boosts economic activity.
- 3. Resilient and responsive cold chain logistics for healthcare and food security.** Immediate and future growth in cooling demand for food and medical supply chains are met with more efficient cold chain equipment and less fragmented systems. This would reduce food and vaccine waste, improve health outcomes, and expand health system capacity for delivery of routine vaccinations, while also building capacity to respond to future shocks.
- 4. Cool retrofits and passive technologies.** Low-capital initiatives support labor-intensive projects by retrofitting houses, schools, and public buildings with better passive cooling features. This would reduce indoor temperatures and cooling needs at a low marginal cost, while also returning people to work.
- 5. Expanding financing models to meet cooling needs.** Catalyze an explosion in [Pay-As-You-Save \(PAYS\)](#), [on-bill financing](#), [Cooling as a Service \(CaaS\)](#), and other models that encourage spending now and unleash savings and future pay back.
- 6. Public and private investment in R&D for cooling.** Grants and loans sustain innovation in efficient, climate-friendly cooling, offering leading innovators a competitive advantage.

INTRODUCTION

Covid-19 and the measures being taken to mitigate the associated public health crisis are creating huge shocks across the globe. In response, governments and financial institutions are quickly developing fiscal and monetary packages that are unprecedented in scale. The first round of response has been focused on stabilization, for social protection and safety net measures during lockdown. In the second round, stimulus measures have shifted focus toward rebooting economies as lockdowns lift, with longer-term structural recovery plans to follow. The [World Bank](#), [International Monetary Fund](#), [International Energy Agency](#), [European Commission](#), and countless others across industry, academia, and civil society are challenging governments to keep sight of the climate crisis, and to use Covid-19 stimulus packages and recovery plans as an opportunity to **build back better, for a cleaner, more resilient world**.

The varying timescales of these three waves of fiscal and monetary responses – stabilization, stimulus, and recovery – depend on each country's progression through the pandemic. Decisions taken over the next few months and years regarding income support, assistance for businesses in the medium term, and stimulus choices will significantly influence the path of sustainable development for the next decade and beyond.

COOLING IS CRITICAL, PARTICULARLY RIGHT NOW

In general, cooling is central to the health and prosperity of the world's population. It helps to keep food fresh and temperature-sensitive vaccines viable. It maintains comfort in buildings and vehicles, and it provides a safe, productive environment for workers and students. It is an essential part of modern life, yet over 1 billion people are without access to it. While such a large proportion of the world are being left behind, unmanaged growth in the demand for cooling threatens to prolong the consumption of fossil fuels, undermining the much-needed transition to a clean and resilient economy that does not damage the global climate. Efficient, climate-friendly cooling for all – through both passive and mechanical measures – can meet this cooling need and help to realize a number of the SDGs, while also staying on track to meet global climate agreements.

Cooling plays a central role in supporting societies through this crisis. It is vital for keeping overcrowded hospitals safe, and for eventually delivering an effective vaccine to each one of the planet's nearly 8 billion people. Cooling is key to ensuring reliable food supply and storage, particularly during a time when food systems have been disrupted. Efficient, climate-friendly cooling could also be used to help many struggling businesses get back on the road to profitability through significant energy cost savings. All of this, in turn, will help governments to meet near-term stimulus objectives, while also meeting longer-term commitments that were made as a part of the Paris Agreement, the Kigali Amendment to the Montreal Protocol, and Sustainable Development Goals (SDGs), which are all crucial for a better recovery.

In this briefing note, the [Kigali Cooling Efficiency Program \(K-CEP\)](#), a philanthropic collaboration active in over 50 countries, highlights the vital role that cooling is currently playing to help manage the health and economic shocks of Covid-19, and outlines how cooling is crucial to a resilient recovery. The briefing details six high-impact, near-term, and cost effective opportunities that can help to stimulate the economy while also building a strong foundation for long-term recovery and decarbonization.

Regarding Covid-19 specifically, cooling is playing a critical role in managing the pandemic's health impacts and associated shocks on a global scale. This is particularly true in regard to the delivery of acute medical care and temperature-sensitive treatments, reliable food supply, and safety for all people, whether patients and staff in hospitals, essential personnel at work, or the public sheltering in place.

Now, more than ever, public health is a global priority and access to cooling is an essential component. Cooling is needed in hospitals, where [90% of medical facilities lack access to modern cold chain equipment](#), and refrigerated storage and vehicles allow temperature-sensitive goods, such as medicines, to be transported safely from production to consumption. If the eventual

Covid-19 vaccine is not thermostable, [we cannot successfully deploy it without first addressing the cold chain](#) in order to ensure its efficacy is safeguarded along the way to every patient, whether they live in a major city or in a remote, last-mile community.

In addition to public health, food security has become a major global concern due to a sharp increase in demand, a lack of [access to food](#), and [disrupted food systems](#). Such [disruption to an increasingly globalized food trade](#) could result in a shift toward more reliance on domestic food systems, and an increased need for more extensive cold chain networks to help keep food fresh and nutritious while being stored and transported. In response to Covid-19, a more resilient food supply may mean increased storage capacity at each stage of the supply chain, as well as increased capacity in domestic refrigeration as the frequency of grocery shopping drops. Better cold chains reduce food loss, increase access to fresh and frozen foods, and can decrease greenhouse gas emissions due to more efficient cooling equipment that use renewable energy sources.

Cooling for human comfort is particularly critical in hot climates and cities that frequently suffer from the urban

heat island effect. In the hottest climates, passive cooling, fans, and air conditioning (AC) allow people to be comfortable and productive while they are inside, which has been required, or at least encouraged, for a large proportion of the world's population during partial or full lockdowns.

As the Northern Hemisphere enters into the summer months, recent [record-setting temperatures from July 2019](#) are concerning. In India, **Covid-19 is already colliding with another public health threat, extreme heat**, with temperatures beginning to climb in April 2020, reaching up to 113°F (45°C). Most of India's 1.3 billion residents – only 5% of whom have access to AC – have been under lockdown since March 25 and these [measures will continue in containment zones up until June 30](#) to minimize the spread of the disease. The National Disaster Management Authority of India – tasked with responding to both Covid-19 and heatwave impacts – is working with the Natural Resources Defense Council, the Public Health Foundation of India, and other partners to [protect communities from the imminent threat of heatwaves](#) through sub-national heat action plans and passive cooling measures such as cool, solar-reflective roofs.



TABLE 1: WORLD BANK SUSTAINABILITY CHECKLIST FOR COVID-19 RECOVERY

Timescale	Considerations for the sustainability of response
Short term	<p>Jobs creation: How many jobs are created? What types of jobs? Who benefits and where? Is upskilling needed or desirable?</p> <p>Boost to economic activity: How quickly does the policy stimulate consumer spending? Does this create disposable income for households and small- and medium-sized businesses (SMEs)?</p> <p>Timeliness and risk: How quickly can investments move out the door? Are there established programs or delivery mechanisms that can be used?</p>
Long term	<p>Long-term growth potential: Does this build human, natural, and physical capital? Does this improve future skills and health outcomes? Does this address market failures?</p> <p>Resilience to future shocks: Does this build societal capacity to cope with and recover from future shocks?</p> <p>Decarbonization and sustainable growth trajectory: Does this support and disseminate green technologies?</p>

COOLING IS ESSENTIAL FOR A CLEAN AND RESILIENT COVID-19 RESPONSE

Efficient, climate-friendly cooling is key to providing resilient public health, food security, and comfort, as well as getting economies on a road to a recovery that is clean and resilient. To guide governments and policymakers in the development of their stimulus and recovery packages, the [World Bank has outlined a sustainability checklist](#) – summarized in Table 1 – to assess Covid-19 responses and hone in on strategies that “build back better.” The checklist, intended as a complementary tool to existing sustainability taxonomies and policy decisionmaking processes, lays out both short- and longer-term considerations for Covid-19 responses.

Addressing both short- and long-term considerations for sustainability, K-CEP has identified **six high-impact opportunities** to reduce emissions through the inclusion of efficient, climate-friendly cooling in stimulus packages. All six considerations meet near-term priorities to accelerate economic recovery for all, by protecting and providing good quality jobs, and boosting consumer spending, while also supporting a recovery that is cleaner and resilient. The six opportunities are:

1. **Bailouts for hard-hit sectors that support sustainable cooling**
2. **Cooling efficiency in the built environment**
3. **Resilient and responsive cold chain logistics for healthcare and food security**
4. **Cool retrofits and passive technologies**
5. **Expanding financing models to meet cooling needs**
6. **Public and private investment in R&D for cooling**

In Table 2, we outline and expand on the present situation relevant to these six opportunities, all of which respond to current cooling needs; leverage efficient, climate-friendly cooling to stimulate the economy in the immediate future; and build a strong foundation for clean and resilient longer-term recovery. While these opportunities do not fully reflect the many critical roles that cooling will play in the Covid-19 recovery, they will, given the considerations above, help to set the cooling sector on the path to decarbonization and sustainability.

TABLE 2: HOW ECONOMIC STIMULUS CAN PROMOTE SUSTAINABLE COOLING AND A CLEAN AND RESILIENT RECOVERY

Opportunity	Present Situation	Stimulus Opportunities Over Next Two Years	Long-Term Clean and Resilient Recovery
<p>1. Bailouts for hard-hit sectors that support sustainable cooling</p>	<p>The hotel, automobile manufacturing, and aviation industries - to name a few - all have a large demand for cooling, have been hit hard by the crisis, and are asking for bailouts. These bailouts - if not made conditional on the use of higher efficiency and low global warming potential cooling technologies and systems - could lock us into a highly polluting pathway and significantly increase energy costs for businesses. Existing financial models could provide efficient, climate-friendly cooling with minimal upfront costs for businesses, which in turn, lead to a faster path back to profitability.</p>	<p>Civil society and industry leaders should call on governments to ensure that funds made available to hard-hit sectors with a large cooling demand are conditional on the use of efficient, climate-friendly cooling. This would offer long-term emissions reductions, reduced operating costs for businesses, lower bailout costs, and set industries on a decarbonization path.</p> <p>In the commercial sector, Cooling as a Service (CaaS) could present an accelerated road back to profitability, particularly for the hospitality industry.</p>	<p>Conditional bailouts would set sectors that have a high cooling demand on a sustainable cooling path. It would realign manufacturing to produce more efficient cooling equipment for the commercial sector and support a transformation of the cooling industry by accelerating uptake of cooling service models.</p> <p>Boosts in retrofits and equipment upgrades associated with conditional bailouts would reduce energy costs in hard-hit sectors and disproportionately benefit the construction industry and its workers.</p>
<p>2. Cooling efficiency in the built environment</p>	<p>Disposable incomes are falling sharply for households and businesses, and in many places are being propped up by fiscal and monetary interventions. In places where the public has been asked to stay home, domestic energy demand is likely to have risen against a backdrop of reduced overall spending, which is dragging economies down. Inefficient cooling exacerbates this problem.</p> <p>For businesses with reduced incomes, finding a road back to profitability will be key. Reducing the overhead cost of energy consumption through the improved efficiency of cooling equipment.</p>	<p>Equipment replacement programs reduce the upfront cost of purchasing efficient, climate-friendly cooling equipment, while also boosting consumer spending on two fronts. By increasing spending on new equipment and increasing disposable income from energy cost savings, consumers increase spending on higher value-added goods and services, in turn increasing business income and profits.</p> <p>Replacement incentives can take the form of “cash for clunker” rebates that help consumers to upgrade old and inefficient appliances, coupons for purchasing more efficient equipment, or tax credits. They are relatively easy to administer, can be combined with on-bill financing, stimulate demand quickly, and support jobs in appliance manufacturing.</p>	<p>Equipment replacement incentives can accelerate transformation of the cooling market, stimulate innovation, drive down costs, and offer consumers a greater choice of efficient, climate-friendly equipment. This also reduces the overall cooling load, which lessens the need for investment in the power sector and creates more space for minimum energy performance standards to be introduced or enhanced sooner and more frequently. This, in turn, lays the foundation for the development of ambitious National Cooling Plans.</p>
<p>3. Resilient and responsive cold chain logistics for healthcare and food security</p>	<p>Efforts to distribute a Covid-19 vaccine and other medication, if not thermostable, require robust and resilient cold chains. Broken cold chains are a major contributor to the loss of half of freeze-dried vaccines and a quarter of liquid vaccines globally. Medical cold chains are under unprecedented strain from the public health response to the pandemic, increasing the cost of efforts to tackle the virus.</p> <p>The pandemic also poses significant risk to food security in vulnerable countries and communities. Broken cold chains are largely responsible for food loss between harvest and retail, including with 14% of food produced in 2018. These issues now could exacerbate the worsening food security risks that countries are facing due to Covid-19.</p>	<p>Government and development finance institutions (DFIs) can invest in medical cold chains to ensure effective delivery of a Covid-19 vaccine and other crucial medical supplies. International organizations and DFIs can update procurement standards to include efficient, low global warming potential equipment, building on PATH's operating costs tool and Gavi Alliance's Cold Chain Equipment Optimization Platform.</p> <p>Investments in cold chains can support food security, especially for remote and vulnerable communities through community and off-grid cooling hubs, potentially co-financed by CaaS models. Cold chain investment and standards offer training opportunities on use and maintenance, and new job opportunities while also improving access to cooling.</p>	<p>Enhanced access to cooling – particularly last-mile solutions to ensure close-to-universal vaccine coverage – and the monitoring, maintenance, and servicing of newly improved cold chains will enhance vaccine distribution and efficacy, as well as reduce climate impact and operating costs.</p> <p>Meeting the immediate and future growth in cooling demand for food and medical supply chains with more efficient, climate-friendly equipment and less fragmented systems, will reduce food and vaccine wastage and help to meet multiple SDGs by improving health outcomes and livelihoods in agriculture, engineering, and logistics, while also enhancing resilience to future shocks.</p>

Opportunity	Present Situation	Stimulus Opportunities Over Next Two Years	Long-Term Clean and Resilient Recovery
<p>3. Cool retrofits and passive technologies</p>	<p>With people sheltering at home, they may be more exposed to heat stress, discomfort, and adverse impacts on their health and wellbeing. Low cost, passive measures can reduce cooling load on power systems and improve living conditions.</p> <p>Large swathes of commercial and public buildings have been under- or unoccupied during lockdowns, while countless construction and renovation projects have ground to a halt. This could allow for accelerated building energy audits, maintenance, and retrofits to be carried out safely and with minimal disruption.</p>	<p>Governments and DFIs can introduce and fund low-capital initiatives to support labor-intensive projects that create skilled and semi-skilled employment opportunities (e.g., audits, roof coatings and other cool roofs, shading, urban greening, maintenance), as well as training programs to tide over furloughed, under-employed, and unemployed workers. Projects could include passive and low-carbon audits, retrofit, construction, and maintenance in housing, offices, and schools. Passive measures reduce indoor temperatures, decrease cooling loads, and enhance indoor health, all of which can be achieved at low marginal cost while also returning workers safely back to work.</p>	<p>Retrofits can help manage the growth of cooling demand in a warming world, while making cooler environments more accessible and affordable to all, whether at home, work, or school. The labor-intensity of construction and renovation work builds human capital, supports green employment, and upskills the construction industry to be able to deliver across a full spectrum of buildings.</p> <p>Green corridors and other passive cooling and urban-heat-island-reducing investments deliver on the promise of cleaner, more resilient, and more livable cities, all the while preventing the additional emission of greenhouse gases from mechanical cooling measures.</p>
<p>5. Expanding financing models to meet cooling needs</p>	<p>The pandemic's economic shocks are rooted in falling household and business incomes, resulting in reduced demand for products and services. Reduced budgets risk pushing buyers toward inefficient cooling equipment, which are traditionally the cheaper options and will lock in unsustainable cooling for longer.</p> <p>Additionally, economic losses sustained as a result of lockdowns will affect the ability of businesses to borrow. It will push back or eliminate all non-essential or discretionary expenditures, which could include the replacement of outdated, inefficient cooling systems.</p>	<p>Governments and DFIs can underwrite and offer credit lines for banks and retailers to catalyze the growth of Pay-As-You-Save (PAYS) financing, on-bill repayment, CaaS, and other models that enable households and SMEs to invest in efficient, climate-friendly cooling. These options drive economic activity, leverage energy cost savings, and return businesses to profitability sooner, without big upfront costs.</p> <p>Financing mechanisms like the Blended Finance Task Force will be particularly important in developing countries, where risk premiums are high and serve as a deterrent to foreign investment. Philanthropy can help mitigate perceived risk by defraying the costs of project preparation, providing risk mitigation in the financing plan, and working in concert with the public and private sectors to improve investability.</p>	<p>Conditional bailouts would set sectors that have a high cooling demand on a sustainable cooling path. It would realign manufacturing to produce more efficient cooling equipment for the commercial sector and support a transformation of the cooling industry by accelerating uptake of cooling service models.</p> <p>Boosts in retrofits and equipment upgrades associated with conditional bailouts would reduce energy costs in hard-hit sectors and disproportionately benefit the construction industry and its workers.</p>
<p>6. Public and private investment in R&D for cooling</p>	<p>Universities and colleges have been hit hard by the pandemic's impact on enrollment and the consequent impact on their income and R&D capacity. Increased government debt may mean further cuts to academic research, and the uncertainties that businesses face will adversely impact private sector R&D investments and associated entrepreneurship.</p> <p>Innovation prizes – such as the Rocky Mountain Institute Global Cooling Prize or the CaaS Initiative's Global CaaS Prize – can stimulate R&D in the short term. However, the pace of innovation, which is essential to meeting current and future cooling needs sustainably, is at risk, and could take a long time to recover.</p>	<p>Government grants and loans are needed now to sustain at-risk innovation activity in academia and the private sector. Financing is essential for continued innovation in efficient, climate-friendly space cooling, cold chains, and passive cooling technologies, all of which can take advantage of the expected growth in global cooling needs, delivering a competitive advantage for leading innovators as economies recover.</p> <p>SMEs and startups innovating in the “cooling access” space should also be supported as they navigate cash flow issues, which are challenging their existing business models.</p>	<p>The establishment of and support for cooling centers for excellence – for example, those recently created in India and proposed in Rwanda – in partnership with universities in developing countries, is needed to support longer-term innovation and R&D cycles, and the achievement of multiple SDGs.</p> <p>Relevant education and training programs – for example in architecture and urban planning – should incorporate passive cooling and design in order to train up the next generation of designers.</p>

SCALING EFFICIENT, CLIMATE-FRIENDLY COOLING NATIONALLY AND INTERNATIONALLY

The scale of the economic stimulus that will be deployed over the next six to 18 months will strongly influence whether we are able to meet the internationally agreed aim of limiting global warming to well below 2°C under the Paris Agreement. A window over the next three to six months is now open to influence significant capital allocation and the geopolitical dynamics that will guide the path of climate action for the next decade. How long this window remains open is uncertain, emphasizing the need for immediate action to ensure that Covid-19 responses are resilient and integrate ambitious climate action.

A critical challenge in the post-pandemic geopolitical landscape is that the channels where climate outcomes are determined are changing. Traditional means for climate action, like U.N. Conference of Parties (COP) meetings and the activities leading up to the annual summits (e.g., declaring new commitments and Nationally Determined Contributions) will continue to be important elements to demonstrate the strength of the Paris Agreement and multilateralism more broadly. However, other channels such as multilateral development banks, other international financial institutions, the G-7, and the G-20 are now elevated in the climate agenda. Climate and cooling action must now also be driven through these mainstream political and economic conversations on resilience.

Going forward, K-CEP will be working with different research and analytical partners to conduct further assessment. This will include considering how efficient, climate-friendly cooling can be seized as an opportunity within the forthcoming economic stimulus packages in key regions. K-CEP will also look at how such opportunities align with the forthcoming 'pathway to zero for cooling' to be launched in support of the COP26 Race to Zero campaign. We are also digging into the challenges surrounding Covid-19 vaccine deployment and cold chain infrastructure capacity, and exploring how best to ensure that newly developed capacity is efficient, low global warming potential, and ideally powered by renewable energy. Finally, we are in conversations with partners on the potential development of principles or guidelines for ensuring that international aid and investment supports efficient, climate-friendly medical cold chain infrastructure.

We welcome your views on how K-CEP and its partners can best respond to both the challenges and opportunities posed by Covid-19.

To find out more or to continue the discussion, contact the K-CEP Efficiency Cooling Office at k-cep@climateworks.org or Larissa Gross (E3G) at larissa.gross@e3g.org.

