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Carbon and climate

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We can learn from the two converging trends of increasing mission-orientation in support of public health and decreasing energy demand in support of planetary health. Both are outcomes of the Covid-19 crisis. The former intentionally, through the mobilisation of resources as the impossible has become inevitable regarding state intervention and collaboration. The latter unintentionally, as restrictions on the freedom of movement have scaled back demand for goods and services. This mission-orientation experience around public health needs to be translated into international collaborative mission-orientation around planetary health to ensure there is no return to business-as-usual, with energy demand and carbon emissions rebounding accordingly. This essay explores mechanisms within the Paris Agreement on Climate Change to operationalize such collaboration through climate clubs. Such clubs allow the market-fixing carbon tax/cap-and-trade dichotomy to be overcome through the reducer-receives principle based on the positive pricing of carbon emission mitigation actions. Economic stimulus to foster a Green Deal is the first step to embody planetary health objectives in our economic trajectory.

Carbon emissions

On 20 April 2020, US oil prices dropped below zero for the first time in history. With oil demand slumping by a third worldwide and storage at capacity, Western Texas Intermediate oil traders were essentially paying other market participants to alleviate their supply as oil contracts approached their expiry date for May delivery. With subdued demand because of the Covid-19 crisis, oil is no longer the investment safe-haven it used to be. In more general terms, this crisis is associated with a supply shock arising from the intentional constraints on economic activity due to lockdown. Its associated demand shock arises from the loss of disposable income and declines in investment activity as lockdown leads to a 20-40% decline of economic output (IEA 2020; Hepburn et al. 2020).

As a result of this crisis, the share of global energy use exposed to lockdown measures increased from 5% in mid-March to 50% in mid-April. Countries in full lockdown in mid-April experienced, on average, a 25% decline in energy demand per week as large end users such as manufacturers scaled back demand and offices, schools, universities, retailers, restaurants, pubs, gyms and cinemas shut across the service sector (IEA 2020). Amid the suffering and death that Covid-19 has caused, this was good news for planetary health.

While global energy demand declined by 3.8% in the first quarter of 2020 compared to the first quarter in 2019, coal demand declined by almost 8% because of China's Covid-19 lockdown, cheap gas, growth in renewables and mild weather. Oil demand declined by 5% with global transport activity almost 50% below the 2019 average in late March. Gas demand declined by only 2% as a decline in industrial gas use has been partially offset by greater heating demand in homes under lockdown. Renewables, on the other hand, were the only energy source that recorded a growth in the first quarter of 2020 (IEA 2020).

These figures suggest that the impact of this decline in economic activity on energy demand is highly asymmetrical. Cars are considered safer than other means of transport, which has led to a smaller decline in oil demand relative to distances travelled at a local level. Electricity demand, on the other hand, has witnessed the most significant reductions. According to the International Energy Agency, in countries under full lockdown 'the shape of demand resembled that of a prolonged Sunday' (IEA 2020: 3).

While relatively smaller declines in car use is bad news for both planetary health (climate) and public health (accidents and road deaths), the decrease in electricity demand has led to a relative increase in the share of renewable energy in our energy mix. As renewable energy generation is not affected by demand, and as daily demand peaks under lockdown conditions are more closely aligned with solar power supply, the renewable energy share in electricity generation increased proportionally. As a result, Germany alone is likely to reduce carbon emissions associated with electricity generation by around 15mtCO_2 in 2020, which might put Germany on track to achieve its 40% carbon emission reduction target vis-à-vis 1990, an achievement deemed impossible in late 2019.

Globally, carbon emissions might fall by an unprecedented 8% in 2020 (IEA 2020). This compares to a 4% decline during World War 2, a 3% decline during the 1991-1992 recessions, a 1% decline during the 1980-1981 energy crisis and a 1% decline during the 2009 financial crisis (Boden et al. 2017). To reach zero-carbon emissions in 2050 and comply with the targets of the Paris Agreement, this decline in carbon emissions we are witnessing as a result of Covid-19 will need to be repeated year after year (Hepburn et al. 2020).

Declining energy demand because of declining economic activity is also having very positive effects on air pollution. In Europe, lockdown has led to an approximately 40% reduction in average nitrogen dioxide levels and a 10% reduction in average levels of particulate matter throughout April 2020. This is primarily the result of falling coal and oil demand. Across Europe, reduced chronic air pollution exposure is expected to avoid 11,000 premature deaths, 6,000 new asthma cases among children and 600 preterm births during this period (Myllyvirta and Thieriot 2020).

Given the substantial permanent loss in economic activity likely to result from the crisis, this demand depression might result in more permanent energy demand reduction with associated planetary health benefits. Under such a scenario, fossil fuels will experience a year-on-year decline in demand while demand for renewables might increase because of low operating costs. Carbon emission and air pollution would decline accordingly.

However, this depends on financial stimulus aligning with the targets of the Paris Agreement on Climate Change as it is equally likely that lower oil prices might lead to increasing demand for oil and inhibit investments into cleaner energy sources. The International Energy Agency has warned that 'the rebound in emissions may be larger than the decline, unless the wave of investment to restart the economy is dedicated to cleaner and more resilient energy infrastructure' (IEA 2020: 4).

Mission-orientation

Covid-19 has caused mission-oriented market interventions on scales equivalent only to wartime economies. What was deemed impossible before the crisis, has become inevitable, with government encouraging collaboration and cooperation throughout society and the economy. In particular, the mission-criticality of protecting lives through restrictions on the freedom of movement has coincided with market intervention to facilitate medical supplies such as ventilators and protective clothing.

Economic knock-on effects of this mission-orientation have also led to market intervention in other sectors. In the UK for example, railway franchises have been brought under government control.

These examples indicate the capacity of governments to intervene in times of crisis. Public support to act decisively has led to a major increase of the role of the state. The success of these interventions is reflected in low numbers of both new infections and deaths, and the easing of lockdown restrictions. Now the challenge lies in channelling and harnessing this momentum for the deeper and more prolonged interventions necessary to tackle the climate emergency. With the United Nations Framework Convention on Climate Change (UNFCCC) Conference of Parties (COP26) in Glasgow (Global Climate Conference) postponed to 2021 as a result of this crisis, the intervening months are a rare if not unique window of opportunity to devise plans to 'build back better', rather than rebound into the system of corporate gain and environmental decline.

Amid the suffering and death there is thus a real opportunity to harness this mission-orientation to foster transformative socio-ecological change by recognising public health priorities as a function of planetary health. With the 2050 net-zero carbon emissions target in place and climate emergencies declared across most local authorities across the UK, there is also a political mandate for politicians to act on climate change. Leadership for decisive and long-term action is necessary to navigate complex climate diplomacy to ensure that the Paris Agreement will be implemented, and countries commit to its objective of limiting global warming to no more than 2 degrees above pre-industrial levels.

Current mechanisms

Traditionally, many economists have treated planetary health as an externality. Following the sequential focus on i) stabilisation of the national income; ii) economic efficiency; and iii) fair distribution in times of crisis (Hepburn et al. 2020), there is a temptation to follow a familiar pattern in this point of time: First you get the economy right, then you think about externalities. In relation to climate change, the latter usually involves the imposition of carbon pricing, either through the polluter-pays-principle or the grandfathering-principle.

The main difficulty with imposing such carbon pricing systems at the tail end of this sequential focus on public finance is the allocation of responsibility. In the case of polluter-pays taxation, the question is whether one taxes households for consuming carbon emitting goods and services or companies that produce and sell these goods and services. Either way, it usually takes the form of a direct tax on carbon emissions, usually through a proxy such as fuel or energy consumption. This polluter-pays-principle is thus concerned with the distribution of duties.

The other popular carbon pricing system involves the grandfathering-principle based on the distribution of rights. Emissions trading schemes are the most common application of this principle based on capping and distributing 'rights to emit' carbon emissions through allocation and auctioning among electricity intense industries. This principle 'states that the right to pollute today and in the future should be distributed in proportion to the amount of pollution agents have emitted in the past' (Granqvist and Grover 2016: 91).

Major issues particularly with the grandfathering-principle are evident in this time of crisis. The EU Emissions Trading Scheme (EU-ETS) has seen a sharp drop in carbon prices and a collapse of the market for the distribution of 'rights to emit' under decreased demand. This is likely to lead to

reduced public income from auctioning revenues, which in turn might reduce further zero-carbon investments.

A similar market structure for the airline industry, CORSIA, was to be established based on average airline emissions in 2019 and 2020. This baseline would have established the means to distribute 'rights to pollute' in the future. With the decline in flights peaking at just over 90% because of the crises, the baseline would be lower, and the offsetting requirements significantly higher compared to a business-as-usual scenario. Costs for airlines could easily increase 5-fold if this baseline is to be maintained. This prospect has resulted in increasing lobbying efforts by airlines to change the baseline years or scrap the entire scheme.

The effect that the crisis is having on carbon pricing structures based on the grandfathering principle are evident: the silver lining of declining carbon emissions threatens market structures designed to reduce such emissions based on value assigned to 'rights to emit'. The most common suggestions put forward to stabilise these mechanisms is the establishment of a carbon floor price to counter the perverse effects that declining carbon emissions are having on carbon markets.

With the markets for distribution of 'rights to emit' collapsing under decreased demand for such rights, and the negative connotation of duties limiting the appeal of taxation policies in times of crisis, the focus needs to shift to alternative approaches beyond the polluter-pays and the grandfathering-principle

Future possibilities

In this context, progressive voices challenge the sequential focus of public finance by instead calling for a rethink of the long-standing prioritisation of the autocatalytic effect of market economics unbound by regulation. With oil prices reaching record lows, there is an understandable temptation to base rapid recovery measures on established infrastructures and carbon capitalism. Such rescue packages implemented following the global financial crisis led to a rebound in carbon emission of 4.5% in 2010 following the decline of 1% in 2009 (Hepburn et al. 2020).

To counter this temptation, the International Monetary Fund for example is calling for a green recovery which prioritizes investment in 'green technologies, clean transport, sustainable agriculture, and climate resilience' to lay the foundation for the $2.3trn/a required for the zero-carbon transition of the global energy system alone. New mechanisms such as green bonds will be necessary to mobilise private finance for such investments, all underpinned by a higher carbon price as an integral element of stabilisation and stimulus packages (Geogieva 2020).

EU Commissioner Ursula von der Leyen has pledged to make the Green Deal the 'motor for the recovery' to 'avoid falling back in old, polluting habits'. She emphasised resilience, sustainable energy, demand reduction and circular economy principles to help protect planetary health. The trillion Euro recovery fund will be 'clearly linked' and funded through a temporary increase of the EU budget. It builds on the pledge to use the existing budget as a guarantee to generate €1trn for green financing between now and 2030. Particular emphasis lies on building efficiency retrofits through the 'renovation wave' (Simon 2020).

As a result, this is potentially the most significant pivot point in our socio-ecological trajectory. Financial stimulus packages could either entrench or replace carbon capitalism. An analysis of over 700 stimulus policies plus responses from over 230 experts in 53 countries in relation to 25 major fiscal recovery archetypes has revealed that projects combining carbon emission reductions with

economic stimulus deliver higher returns on government spending than conventional stimulus spending. This applies to the scaling up of clean physical infrastructure, building efficiency retrofits, investment in education and training, natural capital investment and clean R&D (Hepburn et al. 2020).

Global cooperation is necessary to address the global nature of Covid-19 and align financial stimulus with international climate change targets. A Sustainable Recovery Alliance outside the UNFCCC architecture (Hepburn et al. 2020) or a climate club within (Weischer et al. 2012) can help harness the mission-orientation around Covid-19 into mission-orientation for planetary health. While a Sustainable Recovery Alliance can help build a shared vision, a climate club ranks among the most promising options to commit countries and their political leaders to the long-term objectives of the Paris Agreement.

Climate club

The foundation for such a climate club was laid at COP25 in Madrid. In the early morning of 14 December 2019, nine countries, led by Costa Rica and Switzerland, established the San José Principles. These principles maintain environmental integrity in pursuit of the highest possible carbon emission reduction ambition while ensuring transparency, accuracy, consistency, comparability and completeness (Nolden and Stua 2020).

Combined with border carbon adjustments (a fiscal tool compatible with World Trade Organization rules which allows countries or groups of countries committed to specific carbon mitigation targets to impose compensation duties on products and services from non-committed nations, thus reducing what it known as 'carbon leakage'), potentially an element of the European Green Deal and supported by over 3,500 US economists (Wall Street Journal 2019), a homogenous demand-and-supply system for carbon emission reductions can be established. Border carbon adjustments help level the playing field between climate clubs and countries pursuing unilateral measures to support autocatalytic tendencies of market economies (Nolden and Stua 2020).

Climate clubs delineated by carbon adjusted borders enable the establishment of shared yet ambitious carbon emission mitigation targets. As reductions are awarded through carbon credits, they are converted into valuable assets. This 'reducer-receives-principle' can work alongside carbon taxation (polluter-pays-principle) and cap-and-trade (grandfathering-principle) while shifting the emphasis from duties and liabilities to assets that capture the social and environmental value of reducing carbon emissions.

Border carbon adjustment help effectively impose the reducer-received-principle upon countries unwilling to engage in more ambitious carbon emission reduction trajectories. By levying carbon tariffs or taxes on imported goods according to their carbon footprint, border carbon adjustments guarantee exclusivity by ensuring that the benefits of partaking in such a climate club only accrue to partaking countries which reduces the free rider problem. Border carbon adjustments thereby act as a membrane delineating and protecting carbon commons inherent in climate clubs (Nolden and Stua 2020).

It is a long way from declining energy demand as a result of a global health crisis to climate clubs assigning value to carbon emission reductions to address the planetary health crisis. The need to act decisively through financial stimulus, however, provides an unprecedented opportunity to place us on a socio-ecological trajectory compliant with the targets of the Paris Agreement. By carrying

forward the energy demand reductions and associated carbon emission reductions, unintentionally imposed on us through lockdown, with intent, first through green recovery stimulus and second through a global agreement at COP26 in Glasgow to address climate change through international collaboration, there is a real opportunity to plant the seeds of change into the rotten core of carbon capitalism.

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