Hot or Cool
THINKPIECE

Only Radical is Realistic Now

International Carbon Rationing in a Climate Emergency

Joachim H. Spangenberg

Abstract

Climate disruption and biodiversity collapse are but two symptoms of the environmental crisis caused by ever-growing resource consumption. Multiple overshoots of Earth's planetary boundaries have pushed our natural systems close to or even beyond critical tipping points. Effective reduction of resource consumption, in particular fossil fuels, is now an immediate necessity for civilisation to survive and must be reached within less than a decade. Since traditional policies have failed, and the time pressure is extreme, new instruments for immediate reduction of consumption are required. We suggest that rationing of fossil fuel consumption is such a measure, capping the resource input to national economies while permitting trade between them. Nationally, new allocation mechanisms based in justice, resilience, and social sustainability are suggested.

Keywords: climate crisis, biodiversity crisis, inter-nationally tradeable carbon permits, new resource allocation schemes

SERI Sustainable Europe Research Institute

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Impressum

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The perfect storm

"We need to stop regarding the climate emergency as a stand-alone environmental problem. Global heating, although ruinous, is not the sole symptom of our present struggling Earth system but is only one of the many facets of the accelerating environmental crisis. Policies to alleviate the climate crisis or any of the other threatened planetary boundary transgressions should not be focused on symptom relief but on addressing their root cause: the overexploitation of the Earth (Rockström et al. 2009). [...] So long as humanity's pressure on the Earth system continues, attempted remedies can only redistribute this pressure" (Ripple et al. 2021).

The climate crisis and biodiversity loss are not 'twin crises', but rather 'one crisis, two emergencies', and the driving force behind them and other environmental crises like water scarcity, deforestation, soil loss, and global pollution is the overconsumption of resources, including fossil fuels, biomass, and exploitation of land and sea. For over half a century, worldwide growth in affluence has continuously increased resource use and pollutant emissions far more rapidly than these have been reduced through better technology. Unfortunately, a decoupling of production and environmental impact has not occurred (Wiedmann et al. 2020), at least not globally, absolute, fast-enough and long-enough to sufficiently reduce human overshoot of planetary boundaries and safeguard ecological sustainability (Hickel, Kallis 2020). Based on more than 200 articles covering 1990–2019, Vadén et al. (2020) and Parrique et al. (2019) concluded that despite rare cases of success, there is no evidence of the kind of decoupling needed for ecological sustainability (Pihl 2021, Supplement). They find that the major drivers of global impacts are technological change and per-capita consumption. It is the affluent citizens of the world who are responsible for most environmental impacts; wealthy countries like the US, the UK, and Germany tend to use significantly more than their fair share of resources, and their extent of ecological overshoot beyond planetary boundaries has generally been increasing. These wealthy countries need to radically and immediately scale down resource use by applying post-growth policies that directly target non-material improvements in human well-being and radical reductions in resource use (Fanning et al. 2021). Fanning et al. (2021) found an additionally worrying trend: countries tend to overshoot planetary boundaries by using their fair share of resources faster than they achieve minimum social wellbeing thresholds, indicating the need for unprecedented global transformation in all countries.

This points to a manifest social-ecological crisis as we are nearing or have already crossed tipping points associated with critical parts of the system. There is mounting evidence that the interaction of Earth system tipping elements is increasing the risk of Earth system domino effects (Wunderling et al. 2021) For instance, Zou et al. (2021) found the unprecedented wildfires in the Western United States to be linked to diminishing sea ice in the Arctic. Impacts beyond climate include, for instance, the degradation and subsequent collapse of the most biodiversity-rich ecosystems, like warm-water coral reefs and the Amazon rainforest (Ripple et al. 2021). The Pantanal region, an equally biodiversity rich area neighbouring the Amazon, saw unprecedented fires in 2020 that destroyed about a quarter of the already fragile ecosystem. The region may never recover from this damage. In fact, some evidence shows that the destruction might trigger the system to shift into a different state (Mega 2020). These examples illustrate that we have unleashed a mass extinction event, comparable in size to the meteorite which led to the extinction of the dinosaurs (Ripple et al. 2017). Many current life forms could be annihilated or at least committed to extinction by the end of this century; IPBES estimates that a million of (known) species are at risk (IPBES 2019). Clearly, we are confronted with profound changes in the essential life-sustaining functions of planet Earth. These changes are caused by human activities, and our current trajectory of action shows that we are not solving social and environmental problems, but instead are continuing to create additional ones. And as these multiple crises – climate, biodiversity and social – are inseparable, so are the solutions. For example,

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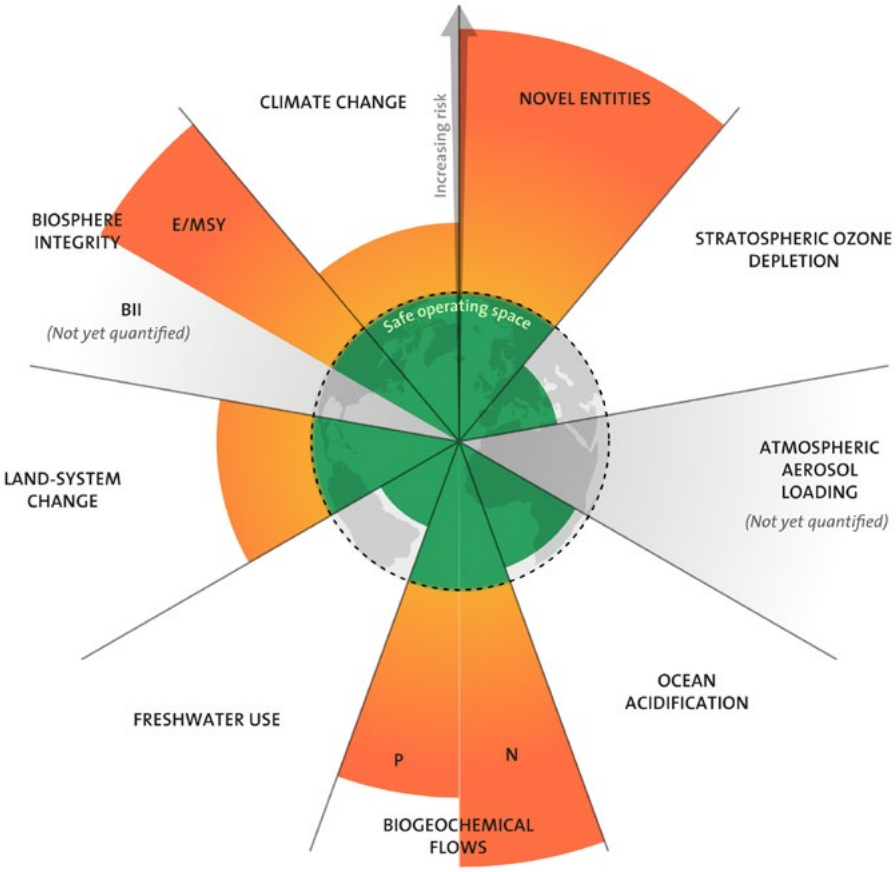
Figure 1. The nine planetary boundaries



Source: Designed by Azote for Stockholm Resilience Centre, based on analysis in Persson et al 2022 and Steffen et al 2015. (https://www.stockholmresilience.org/research/planetary-boundaries.html)

halting the unsustainable exploitation of natural habitats can simultaneously reduce zoonotic disease transmission risks, conserve biodiversity, protect carbon stocks and safeguard local livelihoods (IPBES 2020).

While under current production and consumption systems, meeting basic needs for all people on Earth appears possible, reaching higher levels of consumption-based quality of life (even if significantly below current affluent country standards) would require a level of resource use that is 2–6 times above the sustainable level. This underscores a main lesson from COVID-19 measures: namely that even colossally decreased levels of transportation and consumption are not nearly enough to sufficiently reduce environmental and social pressures; instead, transformational system change is required (Ripple et al. 2021; Visseren-Hamakers et al. 2021; Turnhout et al. 2021). This also demands significant reorientations in research (Oliver et al. 2021), not least in climate research (Spangenberg et al. 2021).

Despite this multiple-symptom general environmental crisis, the public is focussed so exclusively on the climate disaster that even measures that threaten biodiversity, such as prioritising renewable energies over nature protection are often suggested to combat climate change. Another such proposal is to use biomass as a fossil fuel substitute – nonsensical as the demand would be more than 10 times higher than the available biomass (Spangenberg 2008; Giampietro, Mayumi 2012). Still such ideas are upheld, a tendency intensified by the energy crisis caused by the Russian invasion into Ukraine.

The misplaced focus on climate is easy to understand (even if misguided policies are not easy to excuse). Climate change is a rather simple challenge: humankind, and affluent people in particular, emit too much greenhouse gases. Their impact on atmospheric temperature has been known since John Tyndall (1873)

Positive CH_4 feedback loop emerging

Methane CH_4 is a greenhouse gas at least 28 times as potent as CO_2. Its emissions slowed around the turn of the millennium, but began a rapid and mysterious uptick around 2007. While livestock, agricultural waste, landfill and fossil-fuel extraction accounted for about 62% of total methane emissions since from 2007 to 2016, microbes are responsible for around 85% of the growth in emissions since 2007, with accelerating trends. It appears plausible now that global warming is driving up microbial activities in an unstoppable positive feedback loop.

Tollefson, J. 2022. Scientists raise alarm over 'dangerously fast' growth in atmospheric methane. Nature News (08 February 2022).

and Svante Arrhenius (1896)[1]. Consequently, the solution is, if not easy, at least straightforward: we must reduce greenhouse gas emissions to (almost) zero. Nonetheless, this simple challenge has not led to appropriate, problem-solving policies over the last 120 years, and conflicts of interest continue undermining joint efforts as the latest UN Climate COP in Glasgow has demonstrated. However, if collapse of essential Earth system functions—and with it modern societies (Romanello et al. 2021)—is to be avoided, the urgent need for even more radical measures increases with each year lost. It remains to be seen if the massive action announced in the wake of the war in Ukraine will lead to a substitution of fossil fuel suppliers, of fossil by renewable energy, or even to the necessary reduction of overconsumption of energy and other resources.

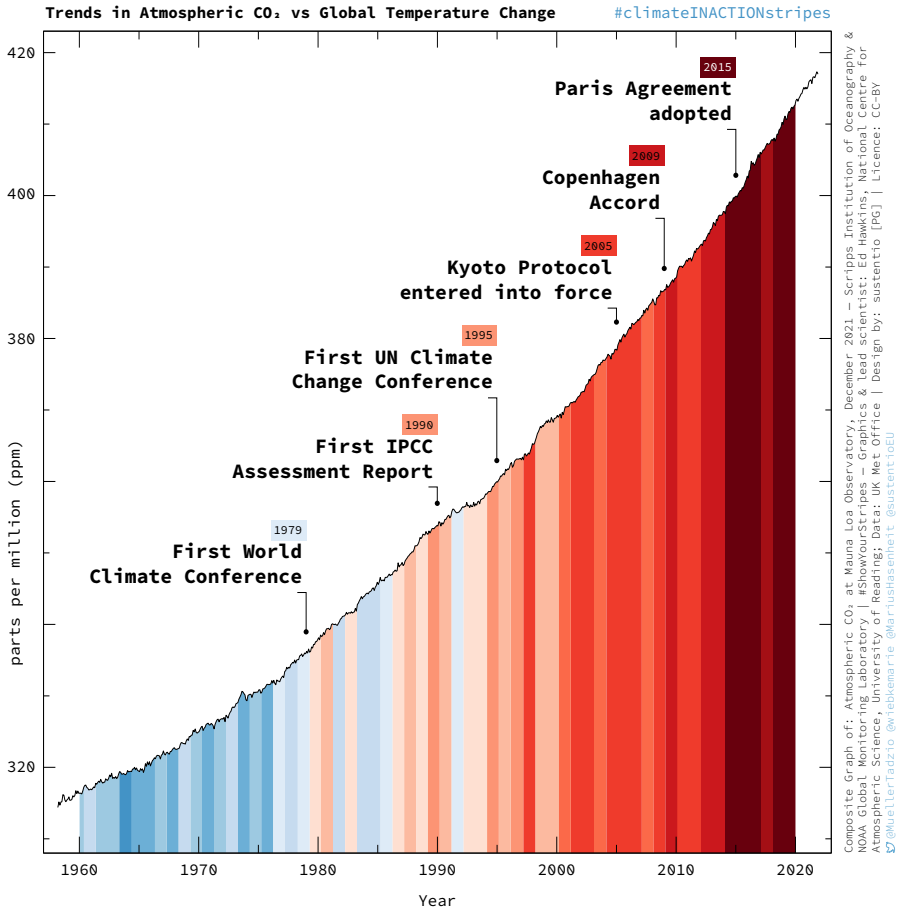
This paper describes measures that are suitable to rein in at least the most severe consequences of the climate crisis. These measures are possible and plausible, but of course still disputed. They illustrate the breadth of transformation required, by revealing the deep changes needed in the comparably simple field of climate policy. These transformational measures would need to be integrated with complementary measures to combat other environmental challenges, not to mention social and institutional ones. Generally speaking, the multiple crises require ending the growth obsession in politics and economics (Wiedmann et al. 2020), reducing the human overshoot in resource consumption through strong sufficiency policies, and a fair global distribution of what resources remain available for human use, in and between countries. This paper outlines what that future could look like.

1 The first scientific paper that linked CO_2 to climate warming was written by Eunice Foote in 1856. But as a woman, she wasn't even allowed to read the paper at a meeting of the American Association for the Advancement of Science. Her husband read it.

Only radical is realistic now

Consider the unprecedented weather events of the last years, from heat waves and record-smashing heat domes to flash floods and megastorms in Europe, North America, Siberia, India, and China (Watts 2021); the transition of Western Amazonia from net carbon sink to carbon emission source (Lovejoy, Nobre 2018; Gatti et al. 2021; Qin et al. 2021); the accelerated melting of the Greenland ice sheet (Boers, Rypdal 2021; Briner et al. 2020); global glacier loss (Hugonnet et al. 2021); the increasing fragility of the thermohaline circulation, better known as the Gulf Stream (Thornalley et al. 2018; Boers 2021; Lohmann, Ditlevsen 2021); or the now irreversible melting of parts of Antarctica threatening sea level rise (Joughin et al. 2014; Shepherd et al. 2019; Garbe et al. 2020; Witze 2021) and the first signs of ice fragility in the so far considered extremely stable Eastern Antarctica region. Firsts and extremes abound: rain on Greenland's highest mountain, tornados in Vancouver (Tedesco, Fettweis 2020), and 100°F/38°C days in Siberia (Blunden, Boyer 2021). Drought and heatwaves around the world have almost doubled the area where the right spark can set dry vegetation on fire and trigger an inferno, as we have seen in the USA, Russia, Brazil and Australia. The resulting damages to properties have been accounted for, but the severe health impacts go largely unnoticed, as do the horrific effects on wildlife including roughly three billion animals killed, harmed, or displaced (Kozlov 2021). None of these events can be explained without climate change, but most of them cannot be explained with current climate models either: the damage level grows faster than models expected.

Figure 2. Trends in Atmospheric CO_2 vs Global Temperature Change



Source: Scripps Institution of Oceanography and NOAA Global Monitoring Laboratory. #ShowYourStripes - Graphics and lead scientist: Ed Hawkins, National Centre for Atmospheric Science, University of Reading. Data: UK Met Office. Design by sustentio (PG).

We are also seeing an accelerating trend towards an ice-free arctic (Docquier, Koenigk 2021) – little wonder as Jacobs et al. (2021) report that the Arctic is now not warming twice as fast as the rest of the globe, as previously thought, but more than four times faster. The increasing Arctic albedo causes accelerating feedback loops, just like the methane release from thawing permafrost regions and the sea floor (Froitzheim et al. 2021), and the first active leak of sea-bed methane discovered in Antarctica with the potent greenhouse gas almost certainly escaping into the atmosphere (Thurber et al. 2020). The water levels of Latin America's second largest river, the Paraná, are the lowest they have been in 77 years, wreaking havoc on societies and economies. This is caused not only by the natural La Niña phenomenon but is emboldened by the loss of Amazon forests and the Pantanal wildfires. The low water levels then in turn create the conditions that enable new large-scale burning further South. These are examples of how tipping cascades may be starting, and it appears obvious that the climate niche in which humankind has been flourishing for millennia is rapidly disappearing (Xu et al. 2020).

Such effects were expected to occur much later, less forcefully, or both. Apparently the models have been too conservative (a trend to be observed in climate models over the last 20 years) and the earth system is more sensitive than hoped for. The 40% chance, increasing with time, that one of the next 5 years will be at least 1.5° C warmer than preindustrial levels (WMO 2021; the same report a year earlier estimated the probability half as high) shows that the climate crisis is not a thing of the future, but of our present. We are in the midst of it. We passed the point to avoid it years ago, and now only have the stark choice to either try moderating it, or let the catastrophes unfold. Moderation, however, means immediate reduction of CO_2 emission levels, as the current ones have been causing the disaster we are already experiencing. Most fossil fuel reserves must be written off as stranded assets and remain in the ground; any further exploration – as undertaken by several oil majors – is the search for unburnable fuel (IPCC 2021; Nogrady 2021). Strategies focussing on incremental improvements through efficiency and technology will wreak havoc on nature, livelihoods and societies.

Hence being radical is the only way to be realistic: we are in a climate emergency and have already wasted all the time we had available for moderate and incremental improvements. The remaining carbon budget is limited and it is shrinking by the hour (Ripple et al. 2021; Pihl et al. 2021).

As always when the issue is the distribution of scarce resources (and the right to emit is seriously limited), two options dominate the discussion. One is the supposed efficiency of markets, and the use of taxes to increase incentives to decouple increasing economic activity and pollution – this is the green growth model. Unfortunately, hundreds of studies have shown that a permanent decoupling sufficient to address the climate crisis has not occurred anywhere, and is unlikely to do so in future (Pihl et al. 2021; Wiedenhofer et al. 2020; Haberl et al. 2020; Parrique et al. 2019). In particular, the popular demand for "internalising external cost" is doubly flawed. On the one hand, it is impossible to precisely calculate the external cost, as proven by Baumol and Oates more than 50 years ago now (Baumol, Oates 1971). Even if the impossible had been done, it is illusionary that markets would then deliver a solution addressing the multiple social and environmental challenges threatening the human ecological niche. We are then left with the other option: limiting the total emissions by legal and administrative means, regardless if the economic impact is only partly or fully compensated by efficiency improvements. Given the social insensitivity of markets and the increasing intra- and international polarisation of wealth, it is rather obvious that the social justice component of the SDGs requires integrating the latter option with an effective social distribution policy in a social-environmental transformation of society and its economy (Kemp et al. 2018; Hausknost 2020; Scoones et al. 2020).

This is where international carbon rationing comes in, an admittedly disputed (that is, by those advocating market solutions and betting on efficiency gains) but effective and thus urgently needed step to disaster mitigation and global catastrophe minimisation (Rogelj et al.2019). The result would be a significant reduction of carbon-emissions causing consumption imposed on nations or blocs where 85% of the global upper class (defined as owning a net wealth between US$100,000 and US$1 million) are located, with rich people from poorer countries expected to make up about a third of the consumer class by 2030 (Euromonitor 2018).

Obviously allocation decisions would affect not only fossil fuels, but a wide range of carbon intensive products, from steel to cement and fertilisers, and the products containing them. Reducing consumption of these products, also known as dematerialisation and long overdue, has trickle-down effects in reducing emissions from transporting, refining, transforming, delivering and discarding the more than 92 billion tons of materials humanity is consuming each year. These activities currently require most of the total primary energy use (Watari et al. 2021; IEA 2021), contribute about a quarter to global greenhouse gas emissions and are the drivers behind about 90% of biodiversity loss (UNEP IRP 2019). Furthermore, key resources are running short, including some metals required for renewable energy production (IEA 2021). In particular, the rare metals and minerals which require extremely high inputs of energy per ton of material in mining and refining will be permanently limited, in particular those mined as by-products mass material mining. They will become unaffordable for most purposes when demand soars while mass material mining declines, and the full-cost burden falls upon them (Sovacool et al. 2020; Elshkaki 2021). This insight provides an opportunity to readjust the baseless development plans of the Green Economy or Economy 4.0, as it is often called in Europe, which assume an increase in the consumption of such materials, for some by a factor of 60 or more (Watari et al. 2021), far beyond any foreseeable availability of these materials. Absolute shortages, which cannot be overcome by paying a bit more for the desired materials, are beyond the horizon of economic thinking and modelling so far.

Resistance by those benefitting from the status quo is to be expected, as one key result would be ending their unjustified privileges. However, ending overconsumption and transgression of the planetary boundaries is exactly what the climate, and sustainable development more generally, requires right now (Alfredsson et al. 2018; Wiedmann et al. 2020; Castano Garcia et al. 2021). While those privileged still nurture the illusion they might escape a societal collapse caused by deteriorating environmental conditions and defend their unsustainable lifestyles, the majority of people realise that change is inevitable and are open to social innovations (Krüger,

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Pellicer-Sifres 2020; Ziegler et al. 2022). However, any transformation will only be acceptable if it includes enhanced social and environmental justice, enforced by civil society and – in functioning democracies – by the will of the majority. Developing this will of the majority requires a well-informed public. Current media and social media that reflect elite interest (Wetts 2020) will have to change course to maintain their social licence to operate. In the end, it is to be hoped the interest in safeguarding the wellbeing and livelihoods of the many will trump protecting the privileges of elites.

Institutions matter

This leads us to the question of how to distribute the scarce sink capacities of the atmosphere. The climate system – like the atmosphere, space, or the deep sea – does not belong to anybody but can be considered the common heritage of humankind. And as according to the Universal Declaration of Human Rights all humans are born equal, they are entitled to an equal share of this heritage. Consequently, fair sharing requires that the remaining carbon budget should be distributed amongst countries according to their population, probably best based on the population projections for 2050 as this is the climate target year and just one generation away, i.e. the minimum time required to non-violently influence population development. Based on understanding the character of both natural sources and sinks as a common heritage of humankind, allocating them as equal entitlements per capita is also an established demand for natural resources in general (e.g. Spangenberg 1995) and for emission allowances in particular (e.g. Byrne et al. 1998; Akenji et al. 2021). In a globalised, trade-intensive world this must obviously cover the carbon embedded in traded goods, leading to a carbon balance composed of domestic emissions and the net emissions embodied in trade (i.e. the calculation must be based on consumption by inhabitants). However, assessing the life cycle-wide emissions from domestic consumption is not enough for two reasons. First, the apparently objective calculation of a net carbon balance is based on the assumption that the effects of exports cancel out the effects of imports, which is only plausible with the narrowest possible focus. Beyond that, exports can cause or stimulate additional carbon emissions, and do not diminish environmental and social damages resulting from imports but add environmental and social challenges of their own. Second, a focus only on consumption ignores the benefits the importing countries (mostly affluent countries focussed on refining industries) gain from processing imported raw material or interim products, assembling them and selling them to the world with substantial value added (Samaniego et al. 2017; Dorninger et al. 2021). Jobs and wages, profit and taxes accrue to the processing country and should be taken into account when discussing international collaboration for climate adaptation, including financial transfers (Martinez Alier 2002).

However, such a move to carbon rationing needs to be administered internationally as well. While individual countries or trading blocs like the EU can take initiatives, a global move would require a legal base in an international convention. The United Nation Conference on Environment and Development (UNCED) in Rio de Janeiro in 1992 adopted the Climate, the Biodiversity and the Desertification Conventions, but the follow-up World Summit on Sustainable Development (WSSD) in Johannesburg in 2002 had almost no impacts and the next iteration, the United Nations Conference on Sustainable Development (UNCSD) held again in Rio in 2012, achieved little beyond initiating the SDGs. The 30th anniversary in 2022 is being ignored and the tradition of decadal stocktaking and visioning conferences interrupted, but hopefully by the time of a Rio+40 summit 2032 the world could celebrate a Global Resource Convention and the work of a Carbon Allocation Authority.

Legally such an import limiting regime would most probably be possible even under the WTO regulations, as long as the standards set are non-discriminatory. However, the dispute settlement mechanism foreseen in many free trade agreements offers companies (foreign, or domestic through foreign subsidiaries) the opportunity to demand compensation for being hindered from continuing their polluting but lucrative activities. An international Convention would minimise this risk. Between EU member states such arbitration processes have been ruled illegal by the European Court of Justice, but beyond that they are an obstacle of increasing relevance. As with the abolition of dispute settlement mechanisms, the EU tradable permission system for

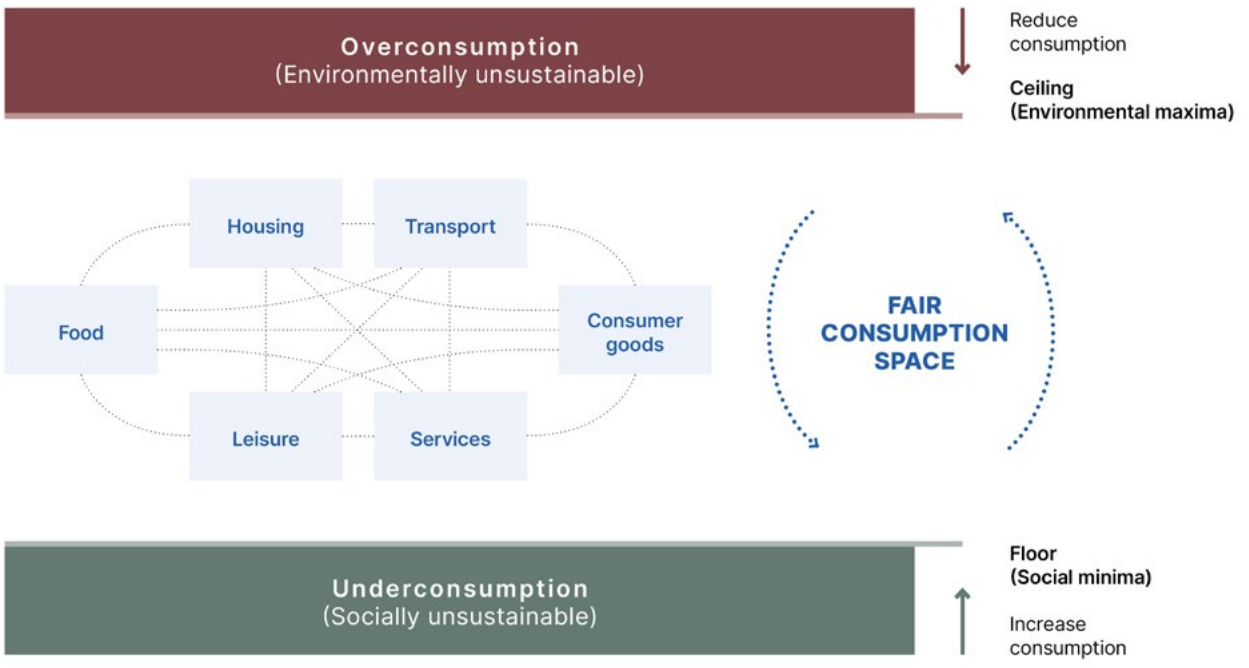
Given the social insensitivity of markets and the increasing intra- and international polarisation of wealth, it is rather obvious that the social justice component of the SDGs requires carbon limits and market efficiency to be integrated with an effective social distribution policy.

CO_2 emissions, combined with the planned Carbon Border Adjustment Mechanism, already offers important building blocks for a carbon rationing regime. Similarly, the Chinese and the Californian emission trading systems have important experiences to offer.

The ethical principle of the right to equal shares of global carbon sinks has been the starting point of this argumentation. However, the current situation in and between nations is obviously different. An equal allocation of rights will cause surplus entitlements for some (i.e. entitlements going beyond the current requirements, which are largely based on the social and physical infrastructure of a country), and shortcomings for other nations or blocs (with resource demanding infrastructures). Applying trade mechanisms established since the Kyoto Protocol to these emission rights is a matter of political will, not of technical or legal difficulties. Countries with the highest per capita emissions, like some Gulf monarchies and other oil producing countries, Canada, Australia, the USA, Korea, Taiwan, the EU and even China would have to try buying certificates from poorer countries (Worldometer 2022) not as an infinite solution, but as start of a conversion process in terms of resource use. A Carbon Allocation Authority or trading platform could help here as well, as in bilateral negotiations the poor tend to sell cheap, not least due to arm twisting by powerful nations. The current South-North monetary flows would be reversed (important given the prevailing unequal exchange, Dorninger et al. 2021), and the finances for strong sustainable development including climate adaptation and damage repair could come in sight at least. Simultaneously, such a regime would provide incentives for poorer countries not to pursue the usual emission intensive development path, as this would diminish the permit income. Open access to technology for renewable energy and energy efficiency should be one element of what a carbon managing authority would have to offer its clients, far beyond the current unsustainable state of technology in the industrialised and post-industrial countries of the Global North. This should include not only technical but also social innovations (Ziegler et al. 2022) and support to achieve the socio-economic conditions (Vogel et al. 2021) required to satisfy human needs with minimum energy (Millward-Hopkins et al. 2020).

Hopefully by the time of a Rio+40 summit in 2032 the world could celebrate a Global Resource Convention and the work of a Carbon Allocation Authority.

Figure 3. A fair Consumption Space for Sustainable Lifestyles



*Source: Akenji et. al. 2021, **1.5-Degree Lifestyles: Towards A Fair Consumption Space for All**. Hot or Cool Institute, Berlin.*

Rationing at the border

Rationing – while strongly influencing prices through market mechanisms – does not generate revenue for the state or bloc introducing it, but border payments do. The Carbon Border Adjustment Mechanism suggested by the European Commission will be charging imported goods according to the CO_2 emitted during their production, resulting in income for the public purse. Stede et al. (2021) estimate that, depending on the mode of implementation, up to € 20 billion per year could be generated. The revenues will be partly needed to compensate exporters, but due to the negative trade balance in terms of embodied resources, a significant surplus income for the EU authorities can be expected. Since the market stabilisation effect is reached by skimming off the price advantage resulting from less ambitious climate targets, the money is disposable, following politically set priorities. As long as the suggested, rationing-based permission trading system does not exist, the Border adjustment income is the most plausible stand-in for financing adjustment processes in countries affected by the new regime (UNCTAD 2021).

In particular, voices from the Global South have criticised the planned Carbon Border Adjustment Mechanism as discriminatory to their exports, in particular the BRICS countries and some ASEAN states, of which many are major exporters with large industrial bases (EIAS 2021). Indeed, exporters with the lowest carbon productivity will be hit hardest – but that is a stimulus that is part of the overall approach and a necessary condition for the success of the EU climate policy and decarbonisation plans. As effectively mitigating the climate crisis is in the global common interest, and most essential for the Global South, however, the question should not be one of exemptions weakening the performance alongside with the incentives, but how to support the transition to a low carbon production system in the Global South.

To answer this question, three groups of exporters have to be differentiated:

- For companies that moved to the South to avoid increasingly strict regulations (compliance and hence pollution is much cheaper and damage cost are lower in many parts of the South[2]), while exporting their products for instance to Europe, it just means that the standards they tried to undercut will catch up with them. This would upend the abuse of the South as pollution paradise and production waste dump. This is not insignificant, as a significant share of the affluent countries' emission reduction has been achieved through relocation (Schütz et al. 2003; KGM et al. 2019), and with tightening rules more is to be expected without a Carbon Border Adjustment Mechanism.

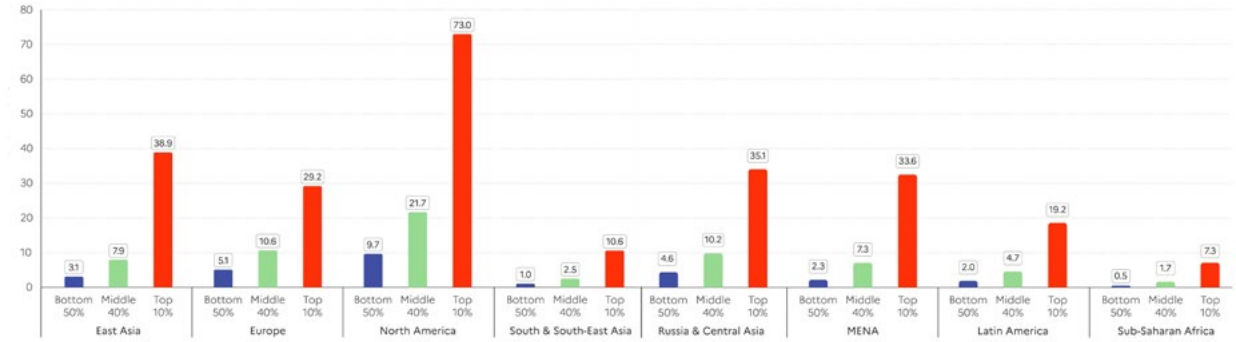
- For small farmers trading through cooperatives, for SMEs and other local businesses, support is necessary. Here the surplus income from the Carbon Border Adjustment Mechanism comes in handily – instead of using it as a windfall profit for the EU budget, it should be spent on a Climate Adaptation Fund for production systems, in particular smallholders and SMEs, helping them to keep step with the emerging EU legislation. Financing cooperation – including but not limited to technology transfer – would be a useful and legitimising way of spending the funds.

- For all agricultural goods, lowering carbon intensity can be achieved by employing agroecology measures, reducing fertiliser and pesticide use, and improving crop composition. As an important co-benefit, such a move would significantly reduce the pressures driving the loss of biodiversity while creating jobs and improving the quality of water streams above and below ground. This way, a Carbon Border Adjustment would contribute to a series of SDGs simultaneously, and would support the sustainable and climate-adjusted development of national economies.

Income from the Carbon Border Adjustment Mechanism should be spent on a Climate Adaptation Fund for production systems, in particular on smallholders and SMEs

2 Which is why the then World Bank Chief Economist Lawrence Summer called them "under-polluted" in an internal memo, https://en.wikipedia.org/wiki/Summers_memo

Figure 4. Per capita emissions across the world, 2019



Source: Chancel, L., Piketty, T., Saez, E., Zucman, G. et al., World Inequality Report 2022, World Inequality Lab. This report has a dedicated website. Explore it: wir2022.wid.world

Targeting the source of carbon rationing

Emissions are strongly correlated to income, with the highest income groups producing the highest carbon load. In the last decade, the emissions of the upper income decentile have been rising, while those of the lower income strata have been sinking. This is despite the fact that the carbon intensity of each additional €1,000 of income tends to decrease, which explains the higher CO_2/€ income values of lower income households. Hence efforts supporting a more equitable distribution of wealth should be considered as accompanying measures when designing allocation mechanisms at the national, or in the case of the EU, the trading bloc level. How should permits be allocated, and where should the measurement take place? First of all, emission rights should not be allocated to final consumers. There are systemic, political and practical reasons for this suggestion.

Systemically, carbon rationing for consumers has been suggested in two variants, with tradable or non-tradable consumption permits. The former is a contradiction in terms: rationing replaces the market allocation system by a system based on equity, turning a market good into a merit good with the allocations the only currency to get hold of it. This is allocated according to need, not purchasing power backed demand, giving for instance more of certain types of food to young mothers with toddlers, or to physically hardworking people. Trading permits on markets corrupts the system (remember the privatisation of the Soviet industries, with equal shares allocated to everybody – trading them was the basis for oligarchs to emerge). If trading is permitted, the emerging market would be a buyers' market, where they have the strongest influence on the price if not regulated as there would be many fewer rich buyers than poor or lower middle-class sellers, and the poor tend to sell cheap and the intended justice improvement is lost. Besides this, tradable emission rights would turn all citizens into merchants and traders (although with differing success undermining the initially equitable distribution), and neighbours into competitors, a commodification replacing social with economic relations. As on the international level, a clearinghouse Carbon Authority could help here as well, by setting a price which cannot be negotiated down by buyers. If regulated, however, it is no longer a market but an allocation bureaucracy, and the limited improvement as compared to existing social security and redistribution systems could be achieved in a more effective, efficient, and more socially balanced way by updating those systems.

However, non-tradable permits will not work as well, although for different practical and political reasons. Domestic final consumers are households (as state consumption also serves household needs), but their influence on emissions is limited: about four-fifths of all emissions are determined by existing physical or legal and informal infrastructures, and not at the disposal of household members (Spangenberg, Lorek 2002). Think of the size of housing for heating, the distance to work and shops for commuting and travel, public transport as a potential alternative to private cars, and the like – none of this is easy to change, and impossible to do so in a short term adaptation to rationing, in particular as the demand for "ration-adjusted" conditions of living would become a general one, while the supply of such conditions remains necessarily uneven and insufficient. Therefore, even in the long run, equal amounts of energy allocation will imply different levels of need satisfaction. For instance, people in older, not well insulated housing, may suffer from energy poverty (i.e. it is often but not always the rich which exhibit higher consumption demands, but they can afford black market purchases if they need to).

At the same time, a continually updated individual need assessment is not only technically impossible, but would cause rows over who defines what a need is (people tend to have different ideas about that) – the riots across Europe and the USA in response to COVID-19 regulations give a first taste of potential developments. Beyond this, imagine the high probability of black markets when trading is banned. This will become an enforcement nightmare.

Technically, substance flows – including but not limited to energy intensive ones - are best measured at the input side of the economy, where their number as well as the number of entry gates is limited. Some figures, based on estimates for the German economy[3] illustrate this (Spangenberg et al. 1999):

- Whereas the number of materials entering our economic systems is limited to 50 – 100 abiotic substances including energy carriers (materials like limestone, crude oil, or hard coal are counted as one substance each; substances without economic value are excluded), output control has to handle about 100,000 substances from the chemical industry alone, each of which interacts in various ways with the ecosphere and the other substances emitted.

- Whereas the number of entry gates into the anthroposphere in Germany is limited to some 20,000 (extraction sites of minerals, energy carriers and water, where they enter the anthroposphere, but excluding air; for instance, an oil field is considered one entry gate), the exits are beyond any control: every smokestack, every exhaust pipe, every waste dump, every drainpipe is such an exit.

Hence for reasons of simplicity and administrative comprehensiveness, monitoring should not happen on the output side, but where resources enter the economy. In designing appropriate proactive policy measures, focusing on the inputs can provide higher regulatory efficiency with much less effort in control. On the input side, data availability is no problem, as the vast majority of direct extraction operations require a license and tax payments already, and the traded goods are covered by the Carbon Border Adjustment. What has to be monitored in addition are several dozens of substances and – for an economy like Germany – some 1,000 entry gates. On the output side there are millions of exit gates – every exhaust pipe, every chimney would have to be accounted for, and at least occasionally monitored (the manipulation tricks regarding emission levels are well known nowadays).

If for these reasons we abstain from distributing permits to final consumers but focus on distribution at the input side, i.e. to producers, well known mechanisms can be applied, making distribution easy, and potentially lucrative. There is quite some experience with auctioning for commercial, i.e. profit generating purposes (use licenses for public goods such as radio waves or the atmosphere), which would generate public incomes while incentivising technical and social innovations for low carbon lifestyles. The high cost of carbon would make high carbon content products more expensive, creating incentives for consumers to switch to cheaper alternatives (products or services), and for producers to minimise carbon use or substitute it altogether. Similarly, shorter supply chains would become more attractive, as would the use of non-fossil fuelled engines and transport vehicles (and due to the shorter supply chains, fewer of them).

However, unlike for cell phone radio waves, not all available licences should be auctioned, as selling them turns a legal entitlement or merit good into an economic object, a market good that users have to purchase. Market prices should be charged for market goods, but not beyond. Thus, while auctioning is plausible for market goods, in particular in business-to-business relations (and is reflected in the prices of consumer goods) it makes no sense for non-market agents, such as public service providers, civil society or non-profit businesses providing public goods. As they do not have the necessary financial resources to secure the share of permissions they need to fulfil their purposes, they should be served by a different allocation mechanism, i.e. by another form of rationing again with distribution mechanisms and prioritising criteria still to be elaborated. Another challenge might arise from the market mechanism: the highest bidders will probably be those who generate the most added value from what they buy, in monetary terms – which does not necessarily correspond to the best needs satisfaction for the population at large. Maybe quota or sub-caps could help, but such mechanisms are not tried and tested yet.

Substance flows are best measured at the input side of the economy, where their number as well as the number of entry gates is limited. In designing appropriate proactive policy measures, focusing on the inputs can provide higher regulatory efficiency with much less effort in control.

3 Estimates by Helmut Schütz 1997

Getting to the root

In conclusion, the term “radical” is derived from the Latin “radix”, meaning “root”. Rationing is a rational approach to address the root causes of overconsumption, and turning the proposal into politics is one of the few instruments available to us to address the climate crisis before it turns into a catastrophe. However, while the steep reductions in fossil fuel use through rationing would be a first step in addressing the climate crisis, it is only part of the broader approach society must take to address gross overconsumption of resources, sources, and sinks.

Human resource consumption is now in potentially disastrous ‘overshoot’, exploiting the ecosphere beyond ecosystems’ regenerative capacity and filling natural waste sinks to overflowing (Rees 2020a). As a consequence, there is accumulating evidence that the future environmental conditions will be far more dangerous than currently believed if the decision makers in charge in business, politics and administration do not very soon end the competitive displacement of non-human species through habitat and resource appropriation (Rees 2020b). Or, as Bradshaw et al (2021): put it, “The scale of the threats to the biosphere and all its lifeforms—including humanity—is in fact so great that it is difficult to grasp for even well-informed experts.”

Hence decolonisation of the imagination from the legacy of economic growth fetishism, and thinking out of the box regarding solutions (including enhanced transparency in international processes to avoid risks of regulatory capture and rent seeking when a bureaucracy is put in control of rationing) is required now to avoid entering a terminal phase of modern human civilisation.

Human resource consumption is now in potentially disastrous ‘overshoot’, exploiting the ecosphere beyond ecosystems’ regenerative capacity and filling natural waste sinks to overflowing.

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