Routledge
Taylor & Francis Group

Ethics, Policy & Environment

ISSN: (Print) (Online) Journal homepage: https://www.tandfonline.com/loi/cepe21

Consumption-Based Emissions Accounting and Historical Emissions

Olle Torpman

To cite this article: Olle Torpman (2022) Consumption-Based Emissions Accounting and Historical Emissions, Ethics, Policy & Environment, 25:3, 354-366, DOI: 10.1080/21550085.2022.2058296

To link to this article: https://doi.org/10.1080/21550085.2022.2058296

Published online: 01 Apr 2022.

ETHICS, POLICY & ENVIRONMENT
2022, VOL. 25, NO. 3, 354–366
https://doi.org/10.1080/21550085.2022.2058296

Routledge
Taylor & Francis Group

Consumption-Based Emissions Accounting and Historical Emissions

Olle Torpman

Swedish University of Agricultural Sciences, Uppsala, Sweden; Department of Philosophy, Stockholm University, Stockholm, Sweden; Institute for Futures Studies, Stockholm, Sweden

ABSTRACT

This paper argues that, unlike the production-based emissions accounting (on which emissions are attributed to producers of goods and services), the consumption-based emissions accounting (on which emissions are attributed to consumers of these goods and services) can solve the problem of historical emissions. This problem concerns the question of how to assign remedial responsibility for emissions that were made by people who are now dead. Since historical emissions are embedded in the goods consumed by present consumers, and since present consumers can (unlike past producers) do something about their emissions, a consumption-based accounting can contribute to solving the climate crisis.

KEYWORDS

Historical emissions; consumption-based accounting; climate ethics; remedial responsibility

1. Introduction

Human induced climate change stems from humans' emissions of greenhouse gases. Such emissions are made when we produce and use goods and services, such as electricity, housing, food, and transportation. One ethically interesting question is on whose books these emissions should be put. Should the responsibility for emissions be attributed to those whose productions give rise to the emissions, or to those who consume the products? This question is relevant for several reasons. First, it has implications for how to calculate individuals' as well as nations' carbon footprints. Second, it has implications for how the costs of climate change mitigation and adaptation should be divided between people. Third, it influences what is a just distribution of emissions permits, since those who have emitted more in the past should plausibly receive fewer permits to emit in the future.[1]

On the one hand, it might seem appropriate to assign responsibility for emissions to the *producers* of those goods and services whose productions generate the emissions – i.e. to those who burn the coal to produce electricity, those who farm the animals for meat production, those who produce the cement for bridge and house construction, those who cut the forests for land use and furniture production, and so on. This corresponds to an accounting method that is called *the production-based emissions accounting*. What speaks

CONTACT Olle Torpman olle.torpman@iffs.se Institute for Futures Studies, Hollandargatan 13, 111 36 Stockholm, Sweden

in favour of this approach is that the producers appear to be causally responsible for the fact that the emissions take place. Without production of any goods or services, no emissions would be generated.

On the other hand, it might seem just as appropriate to assign responsibility for emissions to the *consumers* of all those goods and services whose productions generate the emissions – i.e. to those who use the electricity to heat and illuminate their homes, those who eat the meat, those who use the bridges, those who buy the furniture, and so on. This corresponds to an accounting method that is called *the consumption-based emissions accounting*. What speaks in favour of this approach is that it is unlikely that producers would give rise to any emissions at all, if there were no consumer demand in the first place. In that sense, consumers may also be regarded as causally contributing to the related emissions.[2]

In climate ethics, there is a debate over which of these accounting methods is most appropriate.[3] Besides the issue of causal responsibility, questions regarding effectiveness, political feasibility, technological feasibility, and justice are also considered relevant as to which emissions accounting method is most appropriate.[4] Although the production-based accounting has been widely used by the international community – including the IPCC – many climate ethicists argue that the consumption-based accounting is morally preferable. For instance, it is argued to be fairer since it does not credit people in poor countries for the emissions that are due to products that are in the end consumed by people in rich countries. Moreover, the consumption-based accounting is argued to be advantageous for the reason that it does not allow (rich) nations to escape responsibility for emissions by offshoring production to other (poorer) nations.[5]

My aim in this paper is to offer an additional argument in favour of consumption-based emissions accounting, by showing that it can provide an intuitive answer to a separate problem discussed in the climate ethics literature: The problem of historical emissions. This problem concerns the question of how to assign remedial responsibility for the emissions that have already been made by people in the past.[6] While the production-based accounting attributes remedial responsibility for all historical emissions to the past people who produced these emissions, I argue that the consumption-based accounting attributes remedial responsibility for historical emissions to present consumers of the goods and services that stem from these past productions.

2. Preliminaries

I will start by making some preliminaries that are crucial to the argument. First, it should be noted that emissions-accounting methods can be considered in different ways. For instance, they could be considered as merely *conceptual* accounts, thus saying something only about who counts as an 'emitter' or 'polluter'. As such, the emissions-accounting methods may be used for bookkeeping purposes. However, they could alternatively be understood as *normative* accounts, thus saying something also about who bears responsibility for emissions. Since we are here interested in responsibility for emissions, I shall understand the emissions-accounting methods as normative.[7]

There are different ways in which 'responsibility' could be understood. For instance, it could be understood either (i) in *causal* terms, where an agent is responsible for an outcome if and only if the outcome would not have been realized without the agent's

intervention; (ii) in *moral* terms, where an agent is responsible for an outcome if and only if she is blameworthy for that outcome; or (iii) in *remedial* terms, where an agent is responsible for an outcome if and only if she is liable to solve, or pay the costs for, the problems that are due to this outcome. In this paper, I will focus on the notion of remedial responsibility – about who should pay the 'social costs' of historical emissions.

Indeed, the problem of historical emissions *is* a problem exactly about remedial responsibility. It is not merely an empirical problem about *who* emitted *how much* or *when* – it is rather a normative problem about the forward-looking duty to do something about the historical emissions. I stipulate that 'historical emissions' are emissions made by people who are now dead. I qualify these as emissions made between year 1750, marking the beginning of the industrial era, and 1990. I choose 1990 since it marks the year of the first IPCC report, after which emitters could no longer be considered excusably ignorant, while keeping in mind that the problem of allocating responsibility to the dead is a separate problem from that of excusable ignorance.[8]

For an answer to the problem of historical emissions to be intuitively plausible, I assume that it will have to meet the following conditions (the first being theoretical, the second being practical):

(i) It provides a theoretically backed-up identification of the relevant duty-bearers, in the sense that it explains *why* the identified agents are the relevant duty-bearers; and
(ii) It provides a practicable recommendation, in the sense that the identified duty-bearers *could* do something about the problem at issue.[9]

As this means, I regard these conditions as *jointly sufficient* for an answer to the problem of historical emissions to be intuitively plausible. In other words, I take it that a 'solution' to the problem of historical emissions would be a solution only if it satisfies these conditions. As I will argue below, the answer given by the consumption-based accounting meets both of these conditions, while the answer given by the production-based accounting does not.

However, I do not think that the emissions-accounting methods as such provide sufficient conditions for remedial responsibility for emissions. Reasonably, some additional conditions apply. On the plausible assumption that 'ought' implies 'can', an *avoidability condition* requires that an agent must in some sense be capable of avoiding an outcome in order to be remedially responsible for that outcome. Moreover, a *foreseeability condition* requires that the agent must also in some sense be capable of foreseeing an outcome in order to be remedially responsible for that outcome. In any case, I will assume that an emissions-accounting method is a necessary component of a complete account of remedial responsibility for emissions.

One might think that since no present consumer can foresee or avoid emissions that have already been made in the past, no present consumer could fulfill the conditions for being remedially responsible for historical emissions. Hence, the argument I am presenting below – that the consumption-based emissions accounting can provide an intuitive answer to the problem of historical emissions – would make no sense. In the present context, however, the conditions for remedial responsibility are supposed to apply directly to present people's *consumption* of things rather than to their ancestors'

production of these things. And, it is neither unavoidable for present people to consume these things, nor unforeseeable to them that these things embody historical emissions.[10] Hence, the conditions at issue do not rule out the argument I will be giving.

3. The Argument

The argument consists of two premises and one conclusion. The first premise says that the things that are consumed at present were to a significant extent produced by people who are no longer around. The second premise says that the past production of these things yielded emissions. The conclusion, following from these premises, is that many of the things that are consumed in the present embody emissions made in the past. With the consumption-based emissions accounting plugged in to this conclusion, the remedial responsibility for historical emissions is assigned to present people in proportion to the extent they consume goods and services that are due to emitting productions in the past.

Regarding the first premise, it might seem as if most of the things we consume today are made by our contemporaries. But that is not generally the case. For instance, the current infrastructures of modern societies are to a large extent due to past activities of the industrialization. When people nowadays use roads, bridges, railways, hospitals, schools, factories, and so on, they use facilities that were produced by others before them. It is not uncommon that the houses we live in, for instance, were built before we were born.

Even modern technology stems from the productions conducted by past people, since without the past industrialization this technology and knowledge would not exist today. Although modern service providers – such as Spotify, Uber, Facebook, Google – are created by our contemporaries, these services would not have been possible if our ancestors had not previously taken certain steps of the industrial revolution. Whatever goods or services we have ourselves produced recently, we did not start from scratch. Even if some of the final products (e.g. buildings) we consume are made by present people, the components (e.g. building blocks) were made by our predecessors. Thus, the things that we now consume are (to a greater or lesser extent) dependent on productions of people in the past.[11] Only non-artificial (i.e. natural) resources – e.g. the water in the oceans, or the oxygen in the air – can be consumed without any prior production.

Of course, there is a question of *how much* of present goods and services are attributable to productions in the past. This, however, is not a problem in principle, but only in practice. And, it is practically possible to calculate and determine at least some rough numbers regarding these proportions. I will get back to this in the next section.

Regarding the second premise, it is quite obvious that the production of things in the past caused emissions. Around half of all emissions made since 1750, marking the beginning of the industrial era, were made before 1990.[12] Indeed, it is the industrial revolution that has given rise to human induced climate change, through the use of fossil fuels. Given that yesterday's production methods were less energy efficient than today's production methods, it is moreover clear that the production of things in the past yielded more emissions of greenhouse gases than similar production methods yield today.

From these two premises – (i) that many of the goods and services that present people consume were produced in the past, and (ii) that the past production of these things caused emissions – it follows that the things that are consumed by

present people embody historical emissions. On the consumption-based emissions accounting, the remedial responsibility for these emissions are (at least to some extent) attributed to present consumers. Since this answer provides a theoretically backed-up identification of some relevant duty-bearers (i.e. it explains *why* those identified are remedially responsible), it meets condition (i) from the previous section. Since the identified duty-bearers are alive and could do something about these emissions, this answer meets condition (ii) as well. Consequently, the consumption-based emissions accounting gives an intuitive answer to the problem of historical emissions.

It is interesting to note that the consumption-based accounting implies that later generations will be responsible for the emissions we now make, in proportion to the extent they consume the products that embody these emissions. Hence, the consumption-based accounting incentivizes people of the present generation to produce long-lasting goods, since doing so will spread out the remedial responsibility for our production-related emissions to the future people who could continue using these things after us.

4. Objections

This section brings up, and responds to, some objections that can be raised against the argument presented above, or against the consumption-based emissions accounting when applied to the case of historical emissions.

4.1. Objection #1: The Consumption-Based Accounting is Impracticable in the Case of Historical Emissions

As hinted at in the previous section, one might worry that the consumption-based emissions accounting is impracticable in the case of historical emissions. First, there are questions regarding the exact extent to which the things that present people now consume were produced in the past, and questions regarding how much emissions were caused by these productions in the past and how much of these past emissions can be attributed to present consumers. Second, one might question whether present people can really make corrections for emissions that were made in the past.

What concerns the first issue, consider the following example for clarification. Suppose that a particular apartment house was built in year 1850. Suppose furthermore that the total amount of emissions that were caused by the initial construction of that apartment house was 2000 tons of greenhouse gases. Let us assume that, without further maintenance, it is habitable for a total of 200 years, meaning that each year corresponds to 10 tons of greenhouse gas emissions. If we assume that the apartment house can host 100 persons living there simultaneously, we get that the associated emissions would be .1 ton per person and year for living in that apartment house.

By doing the same sort of calculation for all goods and services that people use, we will get the total annual amounts of consumption-based emissions for every person. Just as with the apartment house, the total annual amount of emissions per person will involve some amounts of historical emissions. By subtracting all

present emissions – say, those made after 1990 – we would get the amount of historical emissions that the consumption-based accounting attributes to each individual. The same sorts of calculations can of course be made for collectives of people, such as nations or firms.

Sure, if we do not know exactly for how long various products will last, or how much emissions were made when producing them, or exactly how many people will use them, then we would not be capable of answering exactly how to divide the historical emissions embodied in those products. The consumption-based accounting would thus be indeterminate with respect to historical emissions. But as the example above suggests, it is possible to make at least rough estimates regarding the relevant numbers – and so to an extent that lets us say something substantially about how to attribute remedial responsibility to present people for historical emissions on the basis of a consumption-based emissions accounting.

What concerns the second issue (about whether present people could really do something about the historical emissions for which they are assigned remedial responsibility), it should be acknowledged that present people cannot have historical emission undone, of course. However, remedying historical emissions does not require taking these emissions back, or have them undone. It only requires paying a proportionate part of the costs for the problems that the past emissions have caused. There are several ways to do this. We could either (i) pay for measures aimed at mitigating climate change (e.g. through investment in development of renewable energy sources, or in activities that absorbs emissions already made), (ii) pay for measures aimed at helping people to adapt to unmitigated climate change, or (iii) pay compensation to those who are nevertheless, and unjustly, affected by unmitigated climate change. It is therefore not the case that the consumption-based emissions accounting is impracticable in any sense that makes it inappropriate as an account for how to attribute remedial responsibility for historical emissions.

Still, it should be acknowledged that the amount of historical emissions that the consumption-based accounting covers is limited. For one reason, consumption-based accounting will only cover the emissions of production in the past leading up to present consumption, which means that it will not cover the past emissions for the products that have not yet been consumed. Also, the consumption-based accounting will not cover emissions related to consumption in the past. In other words, it will ascribe remedial responsibility for a substantial amount of historical emissions to people who are now dead, since these people actually consumed a substantial amount of what was produced in the past. Take, for instance, the greenhouse gases emitted by people driving cars in 1950.

Even if it is true that the consumption-based accounting cannot deal with *all* historical emissions, it attributes a non-negligible amount of the remedial responsibility for these emissions to present people, since these emissions can be tied to goods and services that are consumed by present people. Moreover, as compared to the production-based accounting, it sidesteps the question of whether (or to what extent) the past producers were justifiably ignorant about the emissions caused by their productions. Even if they did not back then know about their contribution to

climate change, we know about it now when we use their products. At the very least, therefore, the consumption-based accounting is capable of dealing with a larger amount of historical emissions than the production-based accounting.

4.2. Objection #2: The Argument is Based on Faulty Assumptions Regarding the Notion of Consumption

Another objection to the consumption-based emissions accounting in the case of historical emissions is that there seems to be a difference between first-hand and second-hand consumption, as it were. One might argue that when I buy a new smartphone, for instance, the consumption-based emissions accounting attributes *all* the emissions that are due to the production of that smartphone to *me*. Hence, there will be no historical emissions to inherit for someone who buys that smartphone second-hand from me, since my first-hand consumption has 'washed it free' from emissions, so to speak. The same would be true of many other products, such as the apartment house in the case above. As this implies, no historical emissions will be attributed to present people for using things that have already been used by others before them.

However, this understanding of the consumption-based accounting is implausible. The reason is that it equates 'consumption' with 'purchase'. But just because I have purchased a smartphone on Monday does not mean that it is already consumed before Tuesday. Instead, 'consumption' should be understood as 'use', where a product is fully consumed once it cannot be (or is not) used anymore. This corresponds to the distinction in economics between 'costs' and 'payment', where the costs for a good or service does not arise immediately with the payment for that good or service, but in proportion to the utilization of that good or service. While purchasing or buying a product is (typically) a one-time event, consuming that same product is (typically) a gradual process. Thus, a more plausible understanding of 'consumption' implies that the consumption-based emissions accounting does *not* attribute all emissions of a product to the first-hand consumer of that product.

There are at least two questions to raise here. First, what if a first-hand consumer of a product *internalizes* all the external (i.e. social) costs related to the emissions of that product, e.g. via emissions offsetting? Then, of course, there would be no emissions left to inherit for any second-hand consumer of that same product. However, since it is typically *not* the case that first-hand consumers completely offset the emissions embodied in the things they consume, it is typically *not* the case that there are no historical emissions left for second-hand consumers of those products to inherit. Still, this is a contingent assumption. If a first-hand consumer actually offsets all emissions embodied in the products she consumes, she then can ask for compensation for the offsetting costs if selling these products further to second-hand users. In such a case, the second-hand user does not incur responsibility for historical emissions, while the production emissions are still covered by the first-hand user.

The second question is: What if someone buys a smartphone and then never uses it? Would such a person avoid being credited with the emissions related to that smartphone? No. Just because using is not equal to buying does not mean that buying is not an instance of using (or, in effect, consumption). Indeed, buying is one type of using. If you

buy something and then never use it before you through it away, then you are the one and only consumer of that thing. Hence the consumption-based accounting would attribute all emissions for that thing to you.

Here it is important to note that two types of emissions can be distinguished: the emissions of producing a product, and the emissions of further usage of that product. If you buy a car, for instance, you are responsible for the emissions that were necessary to produce the car, plus the emission that are a result of your mileage. As this moreover means, you are responsible for the emissions it took to produce the car even if you would never drive it.

So, the objection at issue does not undermine the argument that the consumption-based emissions accounting can answer the problem of historical emissions.

4.3. Objection #3: The Production-Based Accounting Can Also Answer the Problem of Historical Emissions

A third objection to my argument would be that the production-based emissions accounting is *also* capable of answering the question of historical emissions, and that there is therefore nothing virtuous about the consumption-based accounting in this regard. There are at least two ways in which this could be argued.

First, the production-based emissions accounting implies that it is the *past* producers that are remedially responsible for the historical emissions. And this identifies (correctly or not) some relevant duty-bearers, meaning that it meets condition (i) as presented in section 2. However, this answer fails to meet condition (ii), for the reason that the past people are not alive today and hence cannot make any remedies for their historical emissions. Consequently, the production-based emissions accounting fails to provide an intuitive answer to the problem of historical emissions. The consumption-based emissions accounting, on the other hand, does not fail in this regard, since it assigns a significant amount of the remedial responsibility for these emissions to people who are alive today and can do something about it.

Second, however, one might argue that the most appropriate understanding of the production-based accounting is a *territory-based* understanding, on which emissions are attributed to the particular nation states on whose respective territories the production of emissions-generating goods and services take place.[13] Since nation states are existent over longer periods of times than individual people, this implies that the production-based accounting answers the problem of historical emissions by attributing remedial responsibility for those emissions to the present people of those nation states.

But, this solution to the problem of historical emissions is not due to any intrinsic feature of the production-based accounting. Rather, it is due to a *collectivist* reading of remedial responsibility that it employs. On a collectivist reading of remedial responsibility, any emissions accounting method would be capable of solving the problem of historical emissions – since collectives are existing over longer time periods, stretching through several generations. This suggests that the problem of historical emissions would not even arise on a collectivist reading of moral responsibility. Nevertheless, the collectivist reading of remedial responsibility is problematic. For one reason, it rejects the plausible assumption that justice is owed to particular people, as it implies that some individuals (e.g. present people of a certain nation) are to be disadvantaged for the harmful actions of other individuals (e.g. past people of that nation).[14]

The consumption-based accounting, on the other hand, does not rely on any collectivist reading of remedial responsibility. Instead, it solves the problem of historical emissions while retaining an individualist notion of remedial responsibility. Therefore, the production-based emissions accounting is inferior to the consumption-based emissions accounting in the case of historical emissions.

4.4. Objection #4: Other Principles are Already Doing the Job of the Consumption-Based Accounting

In relation to the previous argument, one might argue that we do not need the consumption-based accounting to solve the problem of historical emissions, since other climate-relevant principles are already in place to do that job. One such principle, with similar implications as those of the consumption-based accounting, is the *Beneficiary Pays Principle* (BPP). According to this principle, an agent is remedially responsible for historical emissions to the extent she has benefitted from the activities that caused these emissions. Another such principle is the *Ability to Pay Principle* (APP), according to which an agent is remedially responsible for emissions in proportion to her ability to remedy these emissions. On a consumption-based interpretation of 'polluter', a third principle with similar implications would be the *Polluter Pays Principle* (PPP), according to which an agent is remedially responsible for emissions in proportion to the extent she gave rise to them. As this means, all these principles answer the problem of historical emissions.

I have two replies here, as to why we still need the consumption-based emissions accounting. Take BPP and APP first. Although these principles are capable of attributing responsibility for the past emissions to people who could do something about them (i.e. the present rich), it is not clear *why* these people are the relevant duty bearers. Both these principles have a hard time explaining this. Although capability is a necessary condition for remedial responsibility ('ought' implies 'can'), it is certainly not sufficient. For that reason, the answers to the problem of historical emissions, as provided by these principles, would in any case fail to meet condition (i) from section 2.

When it comes to PPP, it seems capable of meeting condition (i), since it is quite clear *why* polluters should pay. However, it is capable of attributing responsibility for the past emissions to people who could do something about them, *only given* a consumption-based interpretation of 'polluter'. On a production-based interpretation, PPP would attribute responsibility for historical emissions to people who are now dead. This indicates that the debate over emissions accounting methods is relevant after all, and that there is a role for the consumption-based emissions accounting to play. Interestingly, the case for consumption-based accounting would thus provide an indirect argument in favour of PPP, since PPP's inability to account for historical emission has been one of the main objections against it.

More importantly, the problem of historical emissions consists of two parts: one *corrective* question about how to divide the costs for the climate effects of unmitigated emissions, and one *distributive* question about how to divide the remaining carbon budget in view of the emissions already made.[15] And principles such as the BPP, APP, and PPP can answer only the corrective question about how the costs for dealing with the effects of climate change should be divided. They cannot provide an answer to the

distributive question about how to fairly divide the atmosphere's capacity to absorb greenhouse gases.[16] In answering the distributive question, we need to know how to attribute emissions (historical as well as contemporary). And this knowledge can be provided only with the help of emissions accounting methods. Hence, the corrective principles – i.e. BPP, APP, and PPP – cannot replace the consumption-based emissions accounting.

4.5. Objection #5: The Consumption-Based Accounting Implies Too Counterintuitive Implications[17]

Another worry regarding the consumption-based accounting, unveiled by the case of historical emissions, is that it might yield counterintuitive recommendations – or even recommendations that are counterproductive with respect to climate change mitigation.

For instance, I claimed in section 3 that the consumption-based accounting gives us incentives to produce long-lasting goods, since doing so will spread out the remedial responsibility for our production-related emissions to future people who would continue to use these things after us. At a closer look, however, it seems that this will in effect give us a disincentive to clean up production methods – precisely because the responsibility will be dispersed over a longer time if we can increase the lifespan of products. As it seems, increasing the lifespan of products is cheaper than cleaning up production methods. For example, some problems reducing the lifespan of technological equipment (e.g. microwaves, washing machines) have to do with software issues or parts that wear out. Of course, we should solve these issues, but it would be bad to continue producing the raw materials needed (e.g. steel) with coal-powered energy. And we do not want to saddle future generations with responsibility for the emissions resulting from our dirty production methods.

Even though it is true that, by producing long-lasting consumer goods, the consumption-based emissions accounting would give us less incentive to improve production methods, it does not follow that it incentivizes us to do nothing about these production methods. In fact, to produce long-lasting goods *and* to improve production methods would decrease our emissions even further. This would not only provide us a safer climate, but also a larger carbon budget to spend on more important things than dirty production methods. The right response to the objection is, therefore, to insist that consumption-based accounting gives us reason to do both.

Still, the implication that the responsibility will be dispersed over a longer time is problematic for another reason: It disregards the fact that it matters *when* emissions are emitted. The earlier greenhouse gases are emitted, the more damage they can do to the climate system. This implies that the sooner we can prevent them from entering the climate system, the less damage they can do. Since consumption-based emissions accounting spreads responsibility over time, it gives us no incentive to postpone the emissions (or prepone the preventions of them).

In response to this, it should be noted that the aim of the emissions-accounting methods is simply to provide an answer to the question about on whose books emissions (historical and contemporary) should be put. As this moreover implies, they do not aim to tell us exactly *how* we should remedy the emissions which are

put on our books, nor *when* we should remedy those emissions. These are separate questions to be answered with reference to other considerations (or principles), with which the emissions-accounting methods will be compatible. With that said, the fact that the consumption-based emissions accounting is silent on this issue does not mean that it is irrelevant.

A separate objection, which also points out that the consumption-based accounting will sometimes yield counterintuitive recommendations, is that it cannot ascertain that its recommendations will be fair. For one reason, it will assign remedial responsibility for historical emissions to people to who are poor. For example, it will require a poor single mother to pay for the emissions of the car (production of car and usage) which she needs to drive her kids to school. As this unveils, the consumption-based emission accounting seems insensitive to the fact that people have different needs and capabilities.

I agree that the division of climate burdens should be sensitive to such differences between people. However, it is hard to see how a production-based emissions accounting would fare better in this respect. Indeed, many producers are also poor, and often poorer than consumers. More importantly, as I mentioned in section 2, no emissions accounting method provides a sufficient condition for remedial responsibility, since further conditions – such as foreseeability and avoidability, etc. – apply. The consumption-based emissions accounting will thus work in conjunction with such conditions. In terms of the avoidability condition (as implied by the principle that 'ought' implies 'can'), this means that consumers who are poor, and typically have fewer options and less capabilities, will actually be less (remedially) responsible for their (historical) emissions – even on a consumption-based emissions accounting.

5. Conclusion

The climatic changes that we experience today stem partly from the emissions of our ancestors. Since these people are not alive today, they cannot themselves make remedies for their emissions. Hence, it might seem that there is no one left responsible for dealing with these historical emissions. In this paper, I have argued that the consumption-based emissions accounting can, while the production-based emissions accounting cannot, provide an intuitive solution to the problem of historical emissions. It does so by attributing remedial responsibility for the historical emissions to present consumers of things in proportion to the extent they stem from the historical productions that caused these emissions. Of course, the consumption-based accounting cannot deal with *all* historical emissions, since some of these emissions are tied to goods and services that were consumed in the past. However, it is superior to the production-based accounting, which covers a far less amount of historical emissions. Moreover, the consumption-based accounting provides an advantageous interpretation to the traditional interpretation of the Polluter Pays Principle.[18]

Notes

1. See Broome (2012, p. 70). Of course, this influence is contingent. One might think that emissions permits should be divided on the basis of needs or capacities, which would not require any information about people's past emissions.
2. See Roser and Tomlinson (2014, p. 238).

3. Note that other accounting methods are possible. For instance, a *mix-based* emissions accounting would split the attribution of emissions between producers and consumers. See Lenzen et al. (2007) and Steininger et al. (2016). In this paper, I will put this mixed approach to one side, since it does not affect the moral ordering between the production-based and the consumption-based accountings. Were we to compare the production-based approach to the mix-based approach, then the argument that I present below will speak in favour of the mix-based approach.
4. Peters (2008) and Steininger et al. (2016) provides interesting discussions on these issues.
5. See Duus-Otterström and Hjorthen (2018), Chancel and Piketty (2015), Davis and Caldeira (2010, p. 5691), Peters and Hertwich (2008), and Mittiga (2018). In this paper, I will not take a stand on whether these arguments are sound.
6. For discussions about this problem, see García-Portela (2019), Caney (2012), Gardiner et al. (2010), and Duus-Otterström (2014).
7. Note that even under a merely conceptual understanding the accounting methods could be used to answer who is responsible for emissions, given that these accountings were combined with some normative principle. I will sidestep this possibility here.
8. For a discussion about these separate issues, see Caney (2010, pp. 208–11).
9. Some might want to add a third condition requiring that the recommendation will also contribute to solving the climate problem. Since the fulfilment of such a condition would more or less follow from the fulfilment of condition (ii), and since it would not make any difference with respect to the comparison between the production-based and the consumption-based accountings, I choose to omit it here. What concerns condition (ii), I take "do something about" to mean "remedy". As will be argued in section 4, remedying historical emissions could be done in a variety of ways.
10. I follow the existing literature when I say that things "embody" emissions, by which it is meant that things come with, involve, or are attached to emissions. See for instance Peters and Hertwich (2006), and Duus-Otterström and Hjorthen (2018).
11. It is not entirely unproblematic to explain how a certain outcome is "dependent on" a previous activity, or how that dependency is relevant for responsibility. However, this is not a problem only for the consumption-based emissions accounting, but also for the so-called *Beneficiary Pays Principle*, according to which the beneficiaries of a certain past activity should pay the social costs related to this activity.
12. See data from Carbon Dioxide Information Analysis Center(CDIAC): https://cdiac.ess-dive.lbl.gov.file:///Users/olto0208/Dropbox/Filosofi/ARTIKLAR https://cdiac.ess-dive.lbl.gov.file:///Users/olto0208/Dropbox/Filosofi/ARTIKLAR FOR PUBLICERING/Consumption-Based and Hist Em/https://cdiac.ess-dive.lbl.gov.
13. Steininger et al. (2016).
14. C.f., Caney (2009, pp. 135–137), and Mittiga (2018, pp. 164–5).
15. For the distinction between corrective and distributive principles, see Vallentyne (2007, p. 549).
16. For this separate debate, see, e.g. Caney (2012) and Torpman (2019).
17. I wish to thank an anonymous reviewer for the objections brought up in this section.
18. An earlier version of this paper was presented at the department of philosophy, Stockholm University, and at the Institute for Futures Studies, in Stockholm, Sweden. I am thankful to the audiences for helpful comments. Special thanks to Orri Stefánsson, Lisa Hecht, Robert J. Hartman, Göran Duus-Otterström and two anonymous referees. I gratefully acknowledge the financial support fromRiksbankens Jubileumsfond (grant number grant number M17-0372:1).

Disclosure Statement

No potential conflict of interest was reported by the author(s).

ORCID

Olle Torpman http://orcid.org/0000-0003-4541-0970

References

Afionis, S., Sakai, M., Scott, K., Barrett, J., & Gouldson, A. (2017). Consumption-based carbon accounting: Does it have a future? *WIREs Climate Change*, *8*(1), e438. https://doi.org/10.1002/wcc.438

Broome, J. (2012). *Climate matters – Ethics in a warming world*. W.W. Norton & Co.

Caney, S. (2009). Justice and the distribution of greenhouse gas emissions. *Journal of Global Ethics*, *5* (2), 125–146. https://doi.org/10.1080/17449620903110300

Caney, S. (2010). Climate change and the duties of the advantaged. *Critical Review of International Social and Political Philosophy*, *13*(1), 203–228. https://doi.org/10.1080/13698230903326331

Caney, S. (2012). Just emissions. *Philosophy & Public Affairs*, *40*(4), 255–300. https://doi.org/10.1111/papa.12005

Chancel, L., & Piketty, T. (2015). *Carbon and inequality: From Kyoto to Paris. Trends in the global inequality of carbon emissions (1998-2013) & prospects for an equitable adaptation fund*. Paris School of Economics.

Davis, S., & Caldeira, K. (2010). Consumption-Based accounting of CO_2 emissions. *PNAS*, *107*(12), 5687–5692. https://doi.org/10.1073/pnas.0906974107

Duus-Otterström, G. (2014). The problem of past emissions and intergenerational debts. *Critical Review of International Social and Political Philosophy*, *17*(4), 448–469. https://doi.org/10.1080/13698230.2013.810395

Duus-Otterström, G., & Hjorthen, F. D. (2018). Consumption-based emissions accounting: The normative debate. *Environmental Politics*, *28*(5),866–885.

García-Portela, L. (2019). Individual compensatory duties for historical emissions and the dead-polluters objection. *Journal of Agricultural & Environmental Ethics*, *32*(4), 591–609. https://doi.org/10.1007/s10806-019-09798-9

Lenzen, M., Murray, J., Sack, F., & Wiedmann, T. (2007). Shared producer and consumer responsibility — Theory and practice. *Ecological Economics*, *61*(1), 27–42. https://doi.org/10.1016/j.ecolecon.2006.05.018

Liu, L. (2015). A critical examination of the consumption-based accounting approach. *WIREs Climate Change*, *6*(1), 1–8. https://doi.org/10.1002/wcc.325

Mittiga, R. (2018). Allocating the burdens of climate action: Consumption-based carbon accounting and the polluter-pays principle. In B. Edmondson & S. Levy (Eds.), *Transformative climates and accountable governance*. Palgrave Studies in Environmental Transformation 157–194.

Peters, G. P. (2008). From production-based to consumption-based national emission inventories. *Ecological Economics*, *65*(1), 13–23. https://doi.org/10.1016/j.ecolecon.2007.10.014

Peters, G. P., & Hertwich, E. G. (2006). Pollution embodied in trade: The Norwegian case. *Global Environmental Change*, *16*(4), 379–387. https://doi.org/10.1016/j.gloenvcha.2006.03.001

Peters, G. P., & Hertwich, E. G. (2008). Post-Kyoto greenhouse gas inventories: Production versus consumption. *Climate Change*, *86*(1–2), 51–66. https://doi.org/10.1007/s10584-007-9280-1

Roser, D., & Tomlinson, L. (2014). Trade policies and climate change: Border carbon adjustments as a tool for a just global carbon regime. *Ancilla Luris*, *75*, 223–245.

S. M. Gardiner, S. Caney, D. Jamieson, & H. Shue (Eds.). (2010). *Climate ethics – Essential readings*. Oxford University Press.

Steininger, K. W., Lininger, C., Meyer, L. H., Muñoz, P., & Schinko, T. (2016, January). Multiple carbon accounting to support just and effective climate policies. *Nature Climate Change*, *6*(1), 35–41. https://doi.org/10.1038/NCLIMATE2867

Torpman, O. (2019). The case for emissions egalitarianism. *Ethical Theory and Moral Practice*, *22*(3), 749–762. https://doi.org/10.1007/s10677-019-10016-8

Vallentyne, P. (2007). Distributive Justice. In R. E. Goodin, P. Pettit, & T. W. Pogge (Eds.), *A companion to contemporary political philosophy*, 2nd Volume Set (2nd ed.). Wiley Blackwell 548–562.