

CLIMATE JUSTICE AND CARBON PRICING

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1. Introduction

Nations have come together to debate what should be done about the risks posed by climate change to our environment, economies and societies¹. Market-based approaches feature prominently around climate roundtables and progressively become an important aspect of mitigation policies. The two principal market-based policy instruments are the carbon tax and the cap-and-trade system (Stiglitz 2006, Weitzman 2013). They have two features in common: efficiency (achieving emissions reduction at a lower cost) and distributive implications (they generate revenues) (Olmstead and Stavins 2010, Bowen 2011). Both approaches involve putting a price on carbon. The core justification for pricing carbon rests on the economic analysis of ‘negative externalities’: situations where the effects of the production and consumption of goods and services impose costs on others, which are not reflected in the price charged for these goods and services (Bowen 2011).

The literature on economic instruments to address greenhouse gas (GHG) emissions dates back to the 1970’s. Yet, the existing literature lacks materials that integrate the ethical and the distributive components of market-based instruments. This absence is salient, considering that the distribution of burdens in the emissions reduction effort between countries is among the key obstacles to implementing an international agreement.

In order to bridge this gap, this paper aims to model a theory of climate justice in practice. It aims at observing how theoretical considerations of climate justice applied to climate policy could result in an action-guiding theory of climate justice. This paper focuses on one particular case that connects climate justice and climate economics. It addresses the following question: to what extent can market-based instruments for climate change mitigation (MBIs) respond to requirements of justice? Or in other words, do regional carbon-pricing policies need to be aligned with principles of global climate justice? Distributing the agents’ share of the burden in emissions reduction is an important step in the architecture of climate agreements (Bell 2008, Posner and Sunstein 2008, Miller 2009, Posner and Weishbach 2010, Caney 2012, Shue 2014).

The contribution of this paper is twofold. Firstly, it is to provide a sound normative foundation for carbon pricing mechanisms around the notions of a ‘right to energy’ and the ‘polluters pay principle’. I argue that MBIs help to expose and relax the trade-off between

¹ This paper benefited from invaluable comments from participants at the second ESRC Seminar Series on Climate Ethics and Climate Economics, held at the University of Nottingham, 13-14 April 2016.

efficiency and fairness in climate policy debates. Secondly, it is to identify the normative elements from theories of climate justice that should constrain the design of MBIs so that these become instruments of justice. This paper aims to pave the way for a design of MBIs that balances requirements of climate ethics with the emissions reduction potential and the social co-benefits of different alternatives. I will argue that, once we consider jointly emissions reduction targets, efficiency and fairness, the best course of action is to design MBIs so as to invest and provide incentives to lower the price of green alternatives, in order to assist developing populations in their climate change mitigation effort, and fund the transition to a low-carbon economy. In sum, I argue that non-ideal theorizing allows for all-things-considered-type judgments.

This paper proceeds as follows. Firstly, in sections 7.2-7.4, I will outline a broad-brush portrait of theories of climate justice. I will situate climate change mitigation in this context and contrast the view championed in this paper – ‘a sectorial approach’ – with other approaches to climate justice (holistic, atomist, integrationist and isolationist). Secondly, in sections 7.5-7.6, I will explain the basics of carbon pricing mechanisms. In sections 7.7-7.9, I will argue that carbon pricing is a strategy that allows balancing the imperatives from climate justice (for the effort to mitigate climate change to be fair), climate economics (for the effort to be cost effective) and climate science (for it to reach the emissions reduction objectives and respect our planetary boundaries).

Basically there are three steps to my argument where I will raise ethical considerations: at the level of the normative foundations of MBIs, at the level of solving the internal problems of justice it raises, and at the level of its potential to solve external problems of justice. Understanding how to balance questions in practice should inform us how to write a better theory.

A few preliminary remarks are warranted. It is important to note that MBIs are normally only one initiative within a larger emissions reduction strategy. MBIs only contribute to the reduction of part of a nation’s GHG emissions. Secondly, my goal is to explore how principles of climate justice are realized in practice. It is not to develop solutions. I wish to point out ethical questions that could guide the design of MBIs. Thirdly, this paper should allow us to better capture how to make progress in the climate justice debate by adopting a sectorial approach. This paper is a sectorial contribution to the climate justice debate. It is sectorial in the sense that it looks at one specific case where considerations of climate justice arise. It aims at balancing questions of climate justice at the level of climate policy. I want to see what form these take in the context of climate policy, within the context of one policy in particular.

This particular policy was not chosen randomly. Many prominent scholars working on climate economics and climate ethics issues agree that we should put a price on carbon (Stern, Nordhaus, Stiglitz, Weitzman, Dessler, Caney, Hepburn). And many market-based schemes are currently being implemented or are already in advanced stages of implementation e.g. the Western Climate Initiative (WCI, between California and the province of Quebec), the Regional Greenhouse Gas Initiative (RGGI in the Northeastern United States) and the European Union

Emissions Trading Scheme (EU ETS). Finally, given its many distributive aspects, it seemed like a fruitful ground upon which to make progress in the climate justice debate.

I leave aside here discussions about the social cost of carbon. Economic theories would bring into play here notions such as the social discount rate and the social cost of carbon needed to make the exercise of determining how much we value our emissions reduction effort more quantifiable (Broome 2012, Rezai 2016). I consider that using the inputs from the timetable of emissions reduction to determine what the price of carbon should be to be sufficiently rigorous.

2. Climate change

Anthropogenic climate change is the result of the accumulation of greenhouse gases in the atmosphere. This is explained by several factors. The amount of fossil fuels used in industrial production, electricity generation and transportation has increased dramatically since the industrial revolution. The absorptive capacity of the planet has decreased substantially, notably because of deforestation.

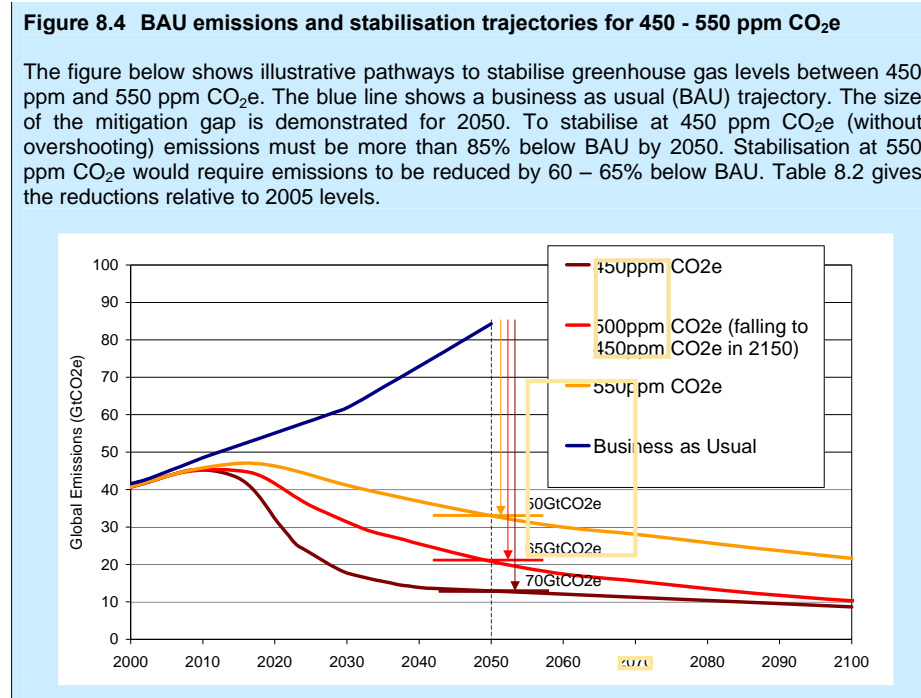
This has global consequences, because the pollution released in any part of the planet will have an effect on the atmosphere that is globally shared. It is a problem of global justice since actions in one place have repercussions for others anywhere in the planet. And this has consequences over time. GHG's such as CO₂ stay in the atmosphere for decades. This thus raises questions such as the extent to which future generations have rights against current people.

One key prerequisite to frame the ethics and economics debate is to be clear on what the constraint from climate science is. The evaluation of the severity of the threat posed by climate change has been associated in the scientific literature with discussions of temperature increase, facilitating understanding of the problem. Nations have agreed in Paris in 2015 to keep climate change under a 2°C average increase in comparison with preindustrial levels, with an effort to trying to keep it under 1.5°C (UNFCCC 2015). This reflects the aim of avoiding catastrophic climate change – i.e. droughts, floods, biodiversity reduction, ocean acidification, among other grave dangers – associated with a more than 2°C increase in temperature. The likelihood of exceeding temperature levels is given in terms of concentration of GHG in the atmosphere, expressed in the form of CO₂e. Consensus scientific estimates suggest that at concentrations of 450ppm of CO₂e in the atmosphere, there is a 78% chance of exceeding a 2°C rise. It seems that at the very least we should aim to keep carbon concentrations under 450ppm.

The best estimate of carbon concentration today is that we reached the 400ppm mark in 2015, with 2ppm annual increase. According to the IPCC, the concentration was 391ppm in 2011 (IPCC 2013). That means that carbon emissions have to be curbed very soon for the world to be carbon neutral before it reaches the 450ppm mark. This is best expressed in terms of stabilization trajectories (Stern 2007, see graph below). The implication of this is that if the stabilization

trajectories of some climate justice proposals do not allow reaching the emissions reduction objective imposed by the scientific constraints, they should be discarded on that basis.

Figure 7.1 BAU emissions and stabilisation trajectories



Source: Stern (2007:205)

3. Climate justice and two distinctions

In order to introduce what I believe to be the central constraint from climate justice, it is warranted to give a little context to the methodology of the position defended in this paper. To do so, I will begin by reviewing two distinctions put forward by Simon Caney.

Simon Caney (2012) argues that issues of climate justice are too closely connected with wider concerns of global justice to be dealt with in isolation (Caney 2012). To consider these intersections seriously would be to adopt what he calls a method of integration. Consider the description of the field of climate justice by Steven Gardiner. For Steven Gardiner, climate change is a perfect moral storm, for it combines three major challenges that make it very difficult for agents to do the right thing (Gardiner 2011). We can postpone the challenge to future generations (the intergenerational storm). The fragmentation of agency mean that we can only address this

challenge in a collective effort (the global storm). And we do not possess a moral theory capable of guiding our political institutions (the theoretical storm). In Caney's words, to know what a distribution of GHGs entails, one must start with an account of distributive justice that includes a principle of what is owed to all persons, a principle of intergenerational justice and a principle of responsibility for historic injustices.

For Caney, the method of integration can be understood in a maximalist or a minimalist way (following Caney's account). That is, one might wish to determine what the principle of global justice requires in a perfectly egalitarian way (as well as the other two principles) in order to determine how emissions should be distributed. Alternatively, one may endorse a minimalist position and hold that global and intergenerational justice require that the basic needs of all current and future generations are met. Caney's argument for integration is compatible with the two (Caney 2012: 292). Note in passing that issues of climate justice intersect with global justice and intergenerational justice, but also with institutional design and action under uncertainty (Zellentin 2015: 1). As with other questions of political philosophy, it involves discussions such as about individual, corporate and national responsibilities, or the contribution of non-ideal theorizing.

The contrasting view is what he calls the isolationist approach. According to the latter, given the complex web of intersections just mentioned (global justice, intergenerational justice, action under uncertainty), it would be practically impossible to make progress in the climate justice debate if each contribution had to consider every single intersection. According to isolationists, an integrationist approach would place unrealistic demands on a theory of climate justice.

The second distinction concerns the relation between three strategies of climate policy or components of climate action, that is: mitigation, adaptation and compensation. To mitigate climate change means to reduce its scope and magnitude, such as by reducing polluting activities. To adapt to climate change means to reduce its impact on human populations. This can imply for instance providing assistance to climate refugees. And to compensate means to provide assistance for past and present harms, but also to adapt and to mitigate (Caney 2012, Dessler 2012).

A holistic approach is one that considers these different strategies jointly. The atomistic approach maintains that we should pursue these strategies individually. A holistic approach has the intuitive appeal of stressing the importance of the different aspects of our response to climate change, and not only mitigation. For instance, it allows for questions such as, should the duties of one country with regards to mitigation be alleviated if this country did more than its fair share with regards to adaptation?

Integrationists and holistic positions of climate justice have indeed voiced how important it is to balance different questions within the climate justice debate, and even across fields, namely climate justice and global justice. Questions that are normally considered together are, for instance, should the burdens to mitigate climate change be distributed according to the states' capacity to act, or according to its historical responsibility, or according to a balance of the two? Another example: if a country takes very seriously its duty to host climate refugees, does its duty to reduce

its emissions lessen? We can balance questions of climate justice with questions of global justice: for instance, should we distribute the burdens to mitigate climate change as a part of the global justice duty to assist? Or in other words, should we know what our duties of global justice are before determining our duties of climate justice? Balancing questions in abstract does have some appeal. We would potentially find one distributive principle that would allow us to determine to what extent each individual country is responsible for reducing its polluting emissions.

In this research, I will not argue for or against any of these positions. I adopt what I called above a 'sectorial approach'. The methodology of the sectorial approach is characterized by the focus on the normative aspects of one strategy to address climate change individually (e.g. one single policy, or one strategy such as adaptation or mitigation). Yet, a sectorial contribution is not hermetic. For instance, it does not exclude that global justice considerations can gain normative relevance in a climate justice debate. Importantly, I argue that the isolationist position does not map into what I called so far 'sectorial approaches'. That is because the method of isolation aims at distributing 'emissions rights' without including considerations of global justice, whereas the sectorial approach does not argue that distribution of 'emissions rights' is what is at stake and admits that there are morally relevant connections between global justice and climate justice. The sectorial contribution I put forward has the characteristics of (a) not relying on the distribution of GHGs emissions as a 'focal variable' and (b) structuring the duties 'not to harm' and 'a capacity principle for responsibility.'

Also, my concern here is less to reject integrationist, isolationist, holistic or atomistic positions than to provide a strong case for sectorial approaches. I reject however the primacy of maximalist integrationism, just as I rejected the primacy of ideal theory. My view only takes the minimalist stance that the basic needs of all persons current and future must be met. The extent to which this minimalist global justice position affects the normative work in a sectorial approach will be clarified below. Moreover, a sectorial contribution allows to show that neither atomist and holistic approaches are right. The atomist approach is wrong in claiming that contributions should focus on mitigation, adaptation and compensation individually. Morally relevant problems can be addressed when considering these strategies jointly.

I will mention one worry however with a position that primarily focusses on distributing emissions, i.e. one that adopt a strictly 'burden-sharing justice position' and does not pay sufficient attention to a 'harm-avoidance position', in Caney's words (Caney 2014). The main problem with views that focussed solely on the distribution of rights and duties is the risk of losing sight of what is really urgent: to avoid catastrophic harm posed by unchecked climate change. These positions run the risk of not being sensitive to what we should do. In short, they do not take into consideration stabilization trajectories that avoid catastrophic climate change. For instance, whether we should allow for offsetting climate change mitigation duties by fulfilling other duties of global justice should depend on whether this would have unintended consequences that can jeopardize the mitigation effort and therefore place an even more awesome burden on adaptation duties in the future. Another example is that, by balancing together different global justice issues – say the fair

distribution of resources, the fair compensation for our colonial past, or compensation for some of the unfair rules of a globalized economy – could result in industrialized former-colonial nations being asked to bear all the burdens of climate justice. This is unlikely to result in any climate action being undertaken in the near future, or ever.

Finally, perhaps this discussion between the two distinctions seen above is linked with another way to frame the debate. One may oppose the choice to develop our theory of climate justice so as to be theoretically sound within a theory of global justice, or do it so as to make it relevant for political decision-making (Zellentin 2015: 12). Again, I think this distinction is too strong. Instead, I say that understanding how to make it relevant for political decision-making is a necessary step in making it theoretically sound. A strong reading of an integrationist view might seem to be pushing towards pursuing the first objective of making it conceptually sound before anything else. Here, I try to show that there are reasons to believe the second provides valuable inputs to the formulation of the first.

4. Climate justice: distributing rights and duties

That said, in order to strengthen my normative framework, I will clarify how my position is grounded on the right to energy as opposed to the ‘first wave’ of climate justice contributions that were based on a right to emit. In this sectorial contribution, I will have to bite the bullet that I would not know beforehand what would be required by other principles of global justice. I do not know how this proposal would fare in relation to other rights, but I expect it will have a positive effect on fulfilling rights to subsistence, health and a clean environment. Moreover, I will clarify how my position aims to link the duty not to harm with the compensation to poorer nations. I think this gives a strong link between one specific harm and its associated compensation. Relatedly, although I will not determine the exact portion of historical responsibility for past emissions, MBIs implemented in rich countries would compensate for part of that.

When looking at climate justice through the lens of distributive justice, the truly abstract way to formulate what is the goal of distributive climate justice is to ensure the patterns of distribution of a scarce good, including the benefits delivered by the good and the burdens in maintaining the pattern of distribution, are fairly shared by all parties (McKinnon 377). In the case of climate justice, as in a few other cases, these claims are intergenerational as well as intra-generational. Because a portion of CO₂ emitted stays for decades in the atmosphere, and people not yet born can suffer the consequences of CO₂, it is plausible that we do indeed have duties of justice to future generations. But what is the fair distribution of emissions allocation today, given historical responsibility for past emissions and considering the rights of future generations?

The way the debate developed so far was that the good to be distributed was the emissions allocation. This implied the right to emit. Rights to emit had to be evenly distributed. Given the

carbon budget still available to avoid catastrophic climate change, we could determine how much we all still have available. The first wave of climate justice proposals was fairly straightforward on this (Singer 2004, Jamieson 2005, Vanderheiden 2008). Broadly, they supported the view according to which the way to proceed is to calculate the per capita allocation of emissions by taking the total carbon budget still available and divide it by the number of people alive today. This reasoning has obvious and considerable problems. Firstly, it is insensitive to the rights and duties of future generations. Secondly, it does not help much in taking us away from carbon intensive production. This view argues that people alive today would use the entirety of the carbon available, but it remains silent about what future generations should do. To make this line of reasoning more plausible, we might feel compelled to include future generations. Perhaps we would have to divide the allocation of emissions between a very large number of people in future generations, because these generation matter from a moral standpoint. This would definitively allocate negative emissions to the present generation and urge us out of a carbon-based economy. Any plausible argument based on the right to emit must say that present generations have no right to use all the carbon budget.

What was quickly pointed out is that all countries have not emitted equally in the past. Some nations have emitted much more than others and citizens in these nations today benefit from past emissions (when considering the wealth it created). Therefore, on this view, we should also factor in historical responsibilities for past emissions. Not all egalitarian views of climate justice agree with this (Caney 2012: 262 provides a thorough account of different versions of the 'equal per capita view on the distribution of emissions').

With regards to the burdens to respond to the climate challenge, we should distinguish between distribution mitigation and adaptation related duties. Here, one notion often invoked is the capacity principle based on the 'ability to pay': some countries have greater abilities to cope with these costs. This is a particular form of the more general principle coined by Miller as 'the principle of *capacity*': "remedial responsibilities ought to be assigned according to the capacity of each agent to discharge them" (Miller 2001: 460). Governments of these countries should assist developing nations in mitigating and adapting with the consequences of climate change. Developing countries should not bear the cost of mitigating climate change, given they emitted less in the past and, often in the present, and they currently have a lesser capacity to intervene effectively.

However, given that the currency of distribution is the right to emit this normally means that people in developing countries should have a greater share of emissions allocation, a problem we already faced. What is at stake with this position is whether, when moving to the non-ideal world, there would still be a chance of succeeding in keeping the CO₂ concentration in the atmosphere below the required threshold to keep the temperature increase from the preindustrial below 2°C. The planetary boundaries defining a safe operating space are very clear about it and political philosophy like other disciplines has to take this as a hard constraint.

Balancing principles and values in abstraction is an arduous task. Instead, this paper will show that the specific practical trade-offs are sufficiently complex for us not to consider the abstract treatment of these questions in priority. Moreover, it will propose a reading of distribution that does not presuppose a right to emit. Quite on the contrary, it will show that assuming that what has to be distributed is a right to emit is considerably problematic.

Beginning with the practice of climate change mitigation has its appeals. Firstly, we get to work out ethical aspects of actual climate policy. Secondly, it allows us to build a theory based on imperatives and recommendations from other disciplines that should constrain our own philosophical proposals. These two advantages suggest that there are chances of making our theory relevant for political decision-making, without losing the conceptual rigour of philosophical work.

It remains certain that that the more fair the distribution of the burdens is, the more effective they will be: the more states see others doing their part the more they are likely to do theirs. Although, we might not have a perfect principle of justice to distribute the responsibilities to mitigate climate change, there are ways to make the effort more just. As mentioned and as I will clarify below, sub-global initiatives can be undertaken without a perfectly coordinated global movement. I will look at only one tool of climate policy that takes seriously the need to mitigate climate change and that has the power to contribute to climate justice.

5. Normative grounds for pricing carbon

A sensible place to start our practical enquiry of climate justice is to think about how rights and duties relate to carbon pricing. Our first task is to understand what imperatives can be deduced from a moral standpoint. I only mentioned so far the climate science constraint. This section will focus on the climate ethics constraint.

As mentioned, the first wave of theories of climate justice is premised on the idea that we should distribute the right to emit GHGs fairly. The fact is that any distribution of emissions will have to be reduced substantially very soon. But the imperative from political philosophy is that this should not plunge more people into poverty and provide the means to take people out from poverty (whether there is an economic imperative of Pareto optimality is something I leave aside). People have basic rights, among which we find a right to subsist, which cannot be met without development. Yet, and this is central, the right to subsist can be met by way of low-carbon development (Shue 1994, Shue 1995, Shue 2014). For Henry Shue (2014), the question of climate justice is how can we achieve the greatest possible emissions reduction without plunging more people into poverty (Shue 2014). In my view, the principle of climate justice is that we should achieve the greatest possible emissions reduction while not preventing people from lifting themselves out of poverty. My view is less minimalistic than Shue's in this respect.

Regarding rights and the benefits of the distribution, Henry Shue rightly pointed out that what matters is not really that people have a right to emit, but rather that people have their energy needs met. He argues that instead of distributing emissions, we should make sure developing

populations have access to clean energy (Shue 2014). That has an implication of tremendous consequences. The fact that we need to pollute to meet these needs is contingent. People's energy needs could be met by non-carbon based energy production.

I consider this to be central: in order to move forward in the climate justice debate, it is better to argue for a right to energy, not emissions. Emissions are polluting. Energy need not be. Instead of giving people the right to pollute as a matter of fairness, we will assist them to develop in a less polluting way, as a matter of ecological consciousness and distributive fairness. The solution is thus a practical one: to reduce poverty by allowing for access to clean energy.

This movement is crucial. If we combine the imperatives from climate justice and climate science, it is urgent that (a) we secure individual rights to subsistence with particular attention to the poor (b) by achieving a low or zero carbon development society. The question of climate justice is thus not how to distribute emissions but rather how to ensure individual rights to energy are met through low carbon development (Shue 2014).

Therefore, I will ground my account of MBIs on a right to energy, and not on a right to pollute. This theoretical solution has a practical consequence: to reduce poverty by arguing for access to clean energy. Today, clean energy must be subsidized for it to become an even more viable alternative. Carbon pricing is a tool to do so. The design of MBIs must be so as to respect individual rights to energy, to not prevent people from having these rights fulfilled and to help fulfilling these rights.

I will now discuss the duties aspect of the question. In the climate justice debate we can distinguish between two types of duties – the duty not to harm and the duty based on the ability to pay (to prevent suffering) (Caney 2014). Henri Shue defends a harm avoidance perspective. In one sense, this means to avoid actions that result in suffering. In another sense, it means compensating for harms previously caused, or in other words, the polluters-pay principle. We should see that MBIs are based on the duty not to harm in the first place, for they are sensitive to the idea of paying for harms caused. Yet, they open the door to the duty based in the ability to pay in a second step (between nations). In fact, in the case of MBIs, the polluters pay principle in which these instruments are based generate revenues that could be used according to the 'ability to pay principle'. In sum, MBIs structure the two duties.

That is, when thinking about justice in practice in this context, market-based instruments for climate change mitigation allow us to link a mitigation strategy with another strategy of climate justice: compensation. Compensation normally connects to the question as to how we can link duties with the outcomes of specific actions (Zellentin 2015: 8). This implies showing that there is wrongful loss and establishing who is responsible for counteracting it. The last sections of this paper cast light on how to think about compensation.

The key factor is that MBIs are a way to put into effect the duty not to harm. They make agents pay for the harm done – that is, all agents involved in polluting activities. That means that emissions reductions will be achieved by minimizing the number of polluters left out of the reduction effort (whether this will be translated strictly in terms of carbon prices or of more general

reduction strategies has to be shown). Moreover, this does not prevent being sensitive to past injustices and to agents' abilities to pay. MBIs generate revenues and these revenues will be available for redistribution. In this second stage of the design of the policy, there is the possibility to model it such as to make it sensitive to considerations of justice. At this stage, developed countries should help poorer populations having their rights to energy met without compromising the global emissions reductions effort. Nonetheless, I will show in the last two sections of this paper that these are not the only considerations of justice that arise in the context of putting this policy in play.

In other words, all moral duties that can be connected to the design of MBIs are not only 'allocative' in nature. There is another level of debate beyond allocation. There are also corrective duties (I assume allocation and correction fit under the label of distributive duty). Corrective duties ensure that wrongs are repaired (McKinnon 2011, McKinnon 2015: 377). They connect those causing wrongful harm with the people they harm such as to generate compensation claims by the latter (see Adam 2011; as to whether we need to factor uncertainty in here is a question I leave aside).

Corrective duties aim at repairing the wrongs done. Normally, any party suffering wrongful harm has a rectification claim that has to be met by the one harming. Usually, this is done through compensation, which regularly take place in the context of climate change (Hunter 2007). And corrective compensatory justice can also have an intergenerational scope. Normally, there is no liability before the causation of harm. But in the case of climate change, the liability under corrective justice should also respond to the imposition of impermissible risk (McKinnon 2011, McKinnon 2015). In this case, an agent imposing risk should be *ipso facto* liable for providing the means for compensation.

There is widespread scientific agreement that CO₂ emissions create impermissible risks for future people and some present people in at risk areas. These risks will likely mature into harms (*Ibid*). Therefore, present generations have a compensatory duty to future people. This is the intergenerational element.

The intra-generational compensation comes from the fact that a number of developed and newly industrialized countries are polluting far more than developing countries. Yet, future people in these developing countries will also suffer (in many cases even more) from the effects of climate change. This is not only about the harm that we will cause but also that we might even prevent future people from acting ethically for they will have no means to think about their future generations. This is what Caney would call a 'second order responsibility' of 'enablement' (Caney 2014: 137)

This normative assessment of MBIs assigns a duty not to harm *ex ante* and a corrective duty *ex post*. By arguing for compensatory distribution *ex post* we can make sure the distribution of burdens *ex ante* does not prevent the emissions reduction effort from reaching its target.

The idea of compensating for the harms done can thus be linked to the polluter pays principle (and ultimately to the idea of internalizing externalities) in the context of an institutional design of climate policy. Interpreting these principles within real world parameters is relevant in the context

of this paper. Just like interpreting the question of the allocation of rights, the allocation of duties also requires practical context. For this climate policy in particular, there is a way to balance between moral principles that relaxes the tension between achieving emissions reduction objectives and distributing the effort to do so fairly.

In sum, by suggesting we do not need to know how to distribute emissions rights fairly before investigating the practical aspects of MBIs, this paper proposes to reverse the structure of the climate justice argument. In climate justice contributions, such as Jamieson's, Vanderheiden's, Singer's, and Miller's, the intuition is to first distribute emissions rights between nations, and second, ask countries with emissions reduction targets to reduce their emissions. A better structure, one proper to the sectorial approach I put forward here, one that would have better chances of respecting the climate science constraint, would first assign all countries emissions reduction targets (by asking all countries to submit emissions reductions guidelines according to their own strategies), and second, find a compensatory distributive mechanism that takes into account considerations of justice.

The main difference between the strategies of 'first wave' climate justice and this sectorial contribution is that one champions distribution *ex ante* and the other *ex post*. The second strategy is concerned with not having developing and newly industrialized countries to follow the fossil fuel-based industrialization process of developed countries in the name of justice. For this reason, we must envisage the prospects of ex post distribution. Indeed, one important issue with the first strategy is that, as Henry Shue points out, based on any plausible stabilization trajectory, it would be physically impossible to reach reduction objectives if developing and newly industrialized countries do not commit fully to reducing emissions. The second strategy is a viable and attractive solution to knowing which tools will allow us to tackle climate change efficiently while making sure this will be done fairly. In my view, we may distribute rights beforehand, but we must distribute duties ex post.

Let me conclude this reasoning by pointing to two caveats about abstract weighting of principles. Consider, in the context of the allocation of duties, seeking balance between the 'polluters pay principle' and the 'ability to pay principle'. Firstly, we know factoring in historical responsibilities is one component in the polluters pay principle. As mentioned, if this is done *ex ante*, those who contributed the most to the problem should bear the greatest burdens in addressing it. If we take the polluters pay principle in isolation, we will have to consider whether the current cohort in the anthropocene is responsible for the harm done by past generations (Rosen *et al.*). This problem can be potentially solved by adopting a 'beneficiary pays' perspective, where although we do not need to claim that present people in affluent countries are responsible for past harms in the climate context, we can argue that they are benefiting from it. This could be a satisfactory answer to factor in historical emissions, but it is not a determining argument to effect the distribution *ex ante*. Secondly, however, if we interpret the ability to pay principle so as to claim, regardless of past responsibility, people who have benefited from past pollution should be

required to contribute more to addressing the problem, we have to determine the causal relation between pollution and actual wellbeing by distinguishing it from other causes (such as labour). This is perhaps a problem about over-determination in backwards looking perspectives. Yet, just because finding the ultimate principle that balances between these considerations in abstraction is not easy does not mean it should not be tried. However, if the practical solution allows us to distribute rights and duties in a fair but not perfectly just way, and at the same time is more likely to put us on a path to achieve meaningful emissions reductions, proponents of an ideal theory methodology would have the burden of proof to demonstrate why their approach should be favoured.

Moreover, even by adopting a strictly present looking position, generations of people living in affluent countries are responsible for the pollution they emitted far more than the living generations of people in developing countries. And, present people in some developing countries like Brazil, Indonesia, China and India also bear an important responsibility. We should not see in this picture that, without looking at emission of past generations, we can see which countries are the most responsible for the pollution of current generations on a per capita and on an absolute basis. And this is relevant because of the path of emissions and industrialization of these countries. With the economic growth and the production these living generations experienced, it is paramount to take into account how much they are likely to pollute in the near future, for in some cases emissions in recent years will be significant.

Finally, I wish to put aside some concerns that have been raised from a philosophical perspective in the literature. Mainly, the argument that carbon permits are just another way to tell the rich that as long as they pay they can keep polluting, is not sound. This argument is flawed for various reasons (Caney and Hepburn 2011 provide a thorough discussion on this point). Briefly, firstly, putting a price on carbon directs production and consumption away from carbon intensive goods. Secondly, in a cap and trade system, there is a cap on emissions. Fewer permits are emitted each year. GHG emissions are set to diminish every year.

6. The economics of pricing carbon

With some of the normative underpinnings for MBIs in place, I now present an overview of carbon pricing instruments from an environmental economics standpoint. The core justification for pricing carbon rests on the economic analysis of 'negative externalities': the situations where the effects of the production and consumption of goods and services impose costs on others, which are not reflected on the price charged for these goods and services (Bowen 2011). Because the costs of emission are not imposed on the emitter, the polluter has no incentive to make any effort to reduce it. When a price reflects the cost of emitting pollution, i.e. when it internalizes the negative externality, it directs investment and consumption away from polluting activities. Moreover, carbon-pricing mechanisms allow us to cut emissions efficiently, precisely because they

allow agents to cut the emissions where it is less expensive for them to do so (Stern 2007, Dessler 2012, Aldy and Pizer 2015).

As mentioned, market-based approaches feature importantly around climate roundtables and are increasingly an important aspect of mitigation policies. These approaches are in place under initiatives such as the Western Climate Initiative (WCI, between California and the province of Quebec), the Regional Greenhouse Gas Initiative (RGGI in the North-eastern United States) and the European Union Emissions Trading Scheme (EU ETS). The two principal market-based policy instruments – the carbon tax and the cap-and-trade system (Stiglitz 2006, Weitzman 2013) – have two features in common: efficiency (economic, achieving emissions reduction at the lesser cost, and administrative companies know what emissions to cut) and distributive implications (they generate revenues) (Olmstead and Stavins 2010, Bowen 2011) and both approaches involve putting a price on carbon. For the purposes of discussion, I will focus more on Cap-and-Trade mechanisms than in Carbon Taxes. There have been many Cap-and-Trade programmes being implemented or recently implemented, and they are large in scope. It is important to review the factors explaining why MBIs are more efficient than regular control and command approaches (CCA).

MBIs are advertised as more administratively and economically efficient than CCA. It is more administratively efficient because the government does not have to develop control standards for each facility: “The facilities themselves, with their internal knowledge of industry operations, make the critical decisions about whether and how to reduce emissions.” (Kaswan 2014: 237). I use the term administratively efficiency here to refer to efficiency in the decision-making procedures to determine the way to achieve the emissions reductions.

Secondly, they are also touted as more economically efficient, in the sense of cost effectiveness, than CCA. That is because it reduces the aggregate emissions at the lowest industry cost taken globally (Dessler 2012). Indeed, CCA require all facilities to do the necessary adjustments to reduce emissions to the same amount, even if some plants could reduce at a lower cost than others. Cap-and-trade programs allow plants that could reduce emissions at a lower cost to sell permits to those with more expensive marginal reductions costs (see table 7.1 below). For the firms, MBIs reduce the costs to comply with emissions reduction targets. For society, that means that fewer resources are devoted to achieving climate objectives².

Contrasting with the question of climate justice, the question of environmental economics is how can we achieve the greatest possible emissions reduction at the least possible cost. MBIs are an instrument to achieve this objective, precisely because they cut the cheapest emissions. Normally, MBI will charge a price for a ton of carbon, which normally increases every year or every so often. Fewer permits are emitted every year, so that the reduction is progressively increased.

² I present here MBIs as they would ideally function. I assume for the purposes of this paper that these instruments work from an administrative and economic standpoint, as mentioned above. I will only present potential problems with these instruments as they relate to justice considerations.

An initial cap on emissions is established and the implementing agency will distribute permits summing to the cap to companies. Each company can choose “to reduce emissions to meet its allowance allocation, or to reduce emissions by more than the allocation and sell the remainder, or maintain existing emissions and buy allowances to make up the difference between the number distributed and actual emissions” (Kaswan 2014: 237). All companies must demonstrate annually that they had enough permits to cover emissions.

The logic behind these instruments is that companies will cut emissions until the marginal cost of cutting another ton of carbon equals the price of the permit. In principle, MBIs respect the environmental economics constraint. Consider table 7.1. Table 7.1 models a power Plant A that emits 10 tons of CO₂ into the atmosphere. Imagine the carbon permit price is £4 for a ton of carbon. Now look at column 3. The marginal cost to cut the first ton of carbon is £1. The second ton costs £2, the third £3, the fourth £4. That is, for the first three tons, the price for not emitting them is less than the price of the permit. Company A will thus cut these three tons, and probably the fourth one, if they can cut it for the same price as buying the permit. Consider now Plant B and its associated marginal cost for emission reductions (it is probably an older plant). The marginal costs to cutting emissions are given by columns 3 and 5 for Plants A and B respectively. Plants A and B emit 10 tons of CO₂ each, or 20 in total. Now, say that the government wants to reduce emissions by 6 tons of carbon.

In a CCA approach, if we have two plants, it means each plant would have to cut emissions by 3 tons. That means: Plant A will cut 3, which will cost £6 in total. Plant B will also cut 3 tons, which will cost £12 in total. The total cost of cutting 6 tons of carbon in a CCA approach in this case is £18.

In a carbon market, the government will only issue permits for 14 tons of CO₂ that year. Say one permit is for one ton and each costs £4, Plants A and B will buy (or will be given) 7 permits each. The price of the permit is £4 and the Plants have to cut emissions by 6 tons together. They each have to buy permits for their emissions. Company A can cut four tons for less than the price of the permits. It only needs 6 permits of one ton each. It will cost Plant A £10 to do so, but it will have one permit to sell. Company B can only cut 2 tons for less than 4£. It will cost Plant B £6 to cut its two tons. But it will need 8 permits. Company A will have the incentive to sell one of its 7 permits to company B. That is, under this model, the same 6 tons of CO₂ will not be emitted. But the total cost for achieving this emissions reduction is £16. Under this model, achieving the same emissions reduction will cost £2 less than in the CCA model.

Table 1. Cost of reducing emissions for Plants A and B

		Plant A Cost in £		Plant B Cost in £	
Emissions reduced	Tons of carbon emitted	Marginal	Total	Marginal	Total
0	10	-	-	-	-
1	9	1	1	2	2
2	8	2	3	4	6
3	7	3	6	6	12
4	6	4	10	8	20
5	5	5	15	10	30
6	4	6	21	12	42
7	3	7	28	14	56
8	2	8	36	16	72
9	1	9	45	18	90

Source, Dessler (2012).

It is in this sense that MBIs are economically efficient. This is a way to cut the cheap emissions. It does not exclude the possibility that more expensive emissions reduction can be achieved by another policy. But for this portion of the emissions reductions effort, we should expect to observe an economically efficient way of cutting emissions.

7. Internal Problems of Justice with Market-Based Instruments

This paper addresses some important trade-offs between fairness and emissions reduction at the global level. The frame of the debate relates to the structuring in the distribution of the duties in the *ex ante* and *ex post* stages. However, the implementation of MBIs involves internal issues of policy that must be addressed for it not to be the cause of justice. Carbon-pricing policies have internal justice-based constraints and in this context trade-offs between efficiency and fairness arise. This section will address two trade-offs that are particular to the implementation of the policy. Then, I will raise another problem at this end of this section.

Firstly, from a domestic standpoint, there is one important tension between pursuing economic efficiency and distributing fairly the burdens of reducing emissions. Indeed, polluting facilities are often located closer to poorer populations. Considering emissions are traded freely, it is possible that the plants located closer to poorer communities will reduce emissions less than other plants, therefore having less benefits of reducing emissions of pollutants and co-pollutants. In other words, there are no guarantees that poor communities will not be bearing all the costs in living in polluted areas.

Similarly, another problem concerns emission offsetting and polluted zones, which I only mention briefly here. If affluent countries purchase international offsets permits, like offsets from

planting trees in other countries, the poorer communities in these countries could suffer from pollution-associated problems (Kaswan 2014: 244). Again, if we associate emissions offsetting with market-based mechanisms, there are no guarantees that polluted areas will experience less pollution in the short or mid-term. The design of MBIs must be sensitive to these two points.

A second important problem tension between MBIs and distributive goals concerns administrative efficiency. There is a trade-off between administrative efficiency of MBIs and participatory democracy. That is because MBIs are designed to maximize private autonomy and administrative efficiency. Public involvement in auctions and trading is minimized.

In a cap-and-trade program, government entities would set the emissions cap, but they would not design a system of industry-specific requirements through a public rule-making process. At the individual facility level, the public would continue to have a role in initial siting decisions. But since there is no opportunity for public participation in private allowance trading decisions, the public would not have any input into subsequent changes in GHG emissions unless those changes were substantial enough to trigger co-pollutant regulatory proceedings (Kaswan 2014: 244)

Cap-and-trade programmes are administratively efficient, but come at the cost of governmental and public involvement. I will address the two problems mentioned in this section, starting with the second.

In response to the first point, I should remind that MBIs should be seen as a complement, as a constituent part of, a more overarching climate initiative. They normally complement a regulatory system instead of replacing it (Kaswan 2014: 246). That opens the door for more political participation, notably by setting related or non-related regulatory standards. One example of a related regulatory standard that could be required on the grounds of political participation is the demand that facilities themselves install continuous emissions monitoring systems that facilitate government overview and enforcement of the MBI programmes. This was observed in the Acid Rain Program, from 1995, which has proven to be very administratively efficient. (*Ibid.*). That could avoid a time-consuming administrative process of monitoring. Another regulatory standard that could be demanded by public participation is an information campaign to smaller companies that are unaware of technological alternatives available to them.

I want to raise the idea that controlling bodies have to press companies, industries, to find mechanisms (about the number of permits, quantity of emissions, publishing of results) to facilitate monitoring. That is meant to allow easy access from the public about how the trading and the emissions reduction are going. I have two ideas in mind. I did not want to suggest that the public had a say in auctions and trading, except perhaps in cases where emissions reductions were not observed in very polluted and poor areas. This is one potential case for public intervention. Secondly, I think that appropriate monitoring could facilitate combining emissions trading with other strategies.

Secondly, there is another element of design of MBIs that could help balance efficiency and fairness. In order to reduce the fairness problem of having more polluting facilities in poorer areas, within and across nations, we could envisage distributing fewer allowances for facilities in already polluted areas than in less polluted areas. “If allowances were auctioned, facilities in polluted areas could be allowed to purchase only a certain percentage of their baseline emissions.” (Kaswan 2014: 249). Alternatively, instead of making fewer permits available, a higher price could be asked for allowances. This could create a negative incentive to reduce polluting emissions, but no guarantee. These are questions of design, that might affect efficiency negatively, but this negative effect could be outweighed by the benefits of making already polluted areas less polluted.

It is worth noting nonetheless that another positive effect of reducing the costs of mitigation is that there will be more resources to help poorer populations cope with the costs of climate objectives. “As the Intergovernmental Panel on Climate Change (IPCC) has noted, residents of developing countries are likely to be more adversely impacted by climate change’s consequences than those in the industrialized world. ... if economically efficient policies lead to higher reduction goals, they could mitigate the climate change impacts on the globe’s most vulnerable regions and communities.” (Kaswan 2014: 239-40). But the different trade-offs involved in this kind of reasoning of justice in practice are highly complex and the rest of this paper is dedicated to it.

Now, there is a third problem that is internal to the implementation of MBIs. It is worth noting that the increase in the costs of carbon emissions is likely to be reflected all the way on the consumer chain. It is possible thus that it has a regressive effect, having a disproportionately greater impact on poor populations (Caney and Hepburn 2011). One could argue that with MBIs lowering the overall cost of emissions reduction will soften the impact of the price increase of carbon goods on the most vulnerable. Alternatively, one may argue that the revenues generated by MBIs should be used to compensate poorer populations for the price increase of carbon intensive goods. This trade-off is similar to the trade-offs that are central to the next section.

8. Designing MBIs to become instruments of justice

I argue in this section that efficiency in emissions reduction and fairness can be pursued jointly. This is notably the case because assisting developing countries in getting access to green energy allows mitigating climate change efficiently while not imposing an unfair burden on them.

There are at least two trade-offs between fairness and efficiency in this debate; one arises domestically and the other from a global standpoint. Domestically, this trade-off takes the following form: allocating the revenues generated by market-based mechanisms to incentivise the development of existing green technologies or allocating them as a compensatory measure to lower income families who will suffer most the increase in price of carbon intensive goods (Nordhaus 2009, Aldy and Pizer 2014, Aldy and Pizer 2015). Should we invest in green technologies in order

to make them more competitive and increase the positive impact of market-based instruments on emissions reduction or should we rather compensate poorer populations? Globally, the trade-off is between using the revenues generated by MBIs to compensate poor populations that are less historically responsible for polluting emissions or investing in research and dissemination of green energy alternatives and projects.

This section will first review different alternatives that can be pursued with the revenues generated by MBIs. It will propose an analytical framework to assess these options based on its emissions reduction potential, its political traction, its economic return and a moral assessment. Every single judgment in this analytical framework requires empirical support beyond the scope of this paper. This is only an overview of different options.

This section is premised on the idea that the funds generated by MBIs are of moral significance for various reasons. For instance, they are generated by a price put on polluting activities, which means on the harmful actions of agents. They drive up the cost of goods that affect poor communities. And, as pointed out by economists, they affect powerful businesses, which have considerable political influence, which will feel the consequences of putting a price on carbon. These options are not particular to investment from MBI revenues, but the latter should be attached to one of them or a combination of them because of their particular moral significance and the particular moral relation they maintain with these options.

One first proposal is that part of the revenues of MBIs in developed countries should be directed to the Green Climate Fund (GCF). This should, say, be automatically written in to MBI designs so as to respect global climate justice constraints. The GCF aims at making funds available to less developed countries for them to pursue their own emissions reduction initiatives. The COP21 has settled that developed countries would contribute at 100 billion US\$ annually to the GCF. These funds will be used to subsidize alternative energy sources and greener products to the same poorer populations.

This would probably cost more in the short run than compensating for price increases. Yet, the effects in emissions reduction would be greatly augmented for the pricing of carbon and pollution would at the same time favour the development of clean energy and other green technologies. And some initiatives could specifically tackle these communities such as by providing green job training and financing energy efficiency improvements in less advantaged communities. This element of design seems to favour respecting the constraints from climate ethics, climate economics and climate science. It would be helpful to distinguish and propose a summary reading of this first proposal by distinguishing between its assessment from the climate perspective (in terms of emissions reduction), its political traction, its economic return and its moral assessment. The political and the economic assessment vary greatly depending on the standpoint chosen, being viewed either from a beneficiary country or a contributing country.

Climate assessment: investing in the GCF should help developing countries commit to climate objectives and get on track with emissions reduction. It is plausible that the results in terms of emissions reduction with this proposal will be positive.

Political traction: investing in the GCF should have political traction in that the idea that developing countries would be likely to increase their climate efforts is a powerful one. However, historically, providing assistance to developing countries is not a particularly popular idea.

Economic return: more studies are required to know exactly what kind of economic return can be expected from investing in the GCF. One possible positive element in this respect is that it is normally much less costly for countries to develop green economies from the start than to develop a polluting economy and then making green investments to change the form of development.

Moral assessment: this is perhaps the most straightforward of judgments for this option. Contributing to the GCF allows us to link the polluters pay principle with compensation for the harm done with two associated policies. We would link the polluters to people suffering from this pollution, more often those affected the most. The compensation for the harm done will be effected directly by helping people fulfill their right to energy. This is one way to think about climate justice in practice in the view of this paper.

A second policy option is to invest in developing and diffusing green technologies and in local climate initiatives. The motivation to invest in technological development and diffusion of green energy alternatives (in greener transportation for instance, neighborhood initiatives) is to make alternative energies cheaper in the long run and to make sure more resources are put at the disposal of fighting climate change. What is paramount in this case is to disentangle the different costs and benefits associated with this option. Recent studies indicate that the benefits of investing and diffusing green technologies have been underestimated. Insights from these studies would allow us to determine to what extent there is a trade-off between economic efficiency and emissions reduction.

Climate assessment: of the four options reviewed here, this is the one that has perhaps the greatest benefits from a climatic standpoint. The funds will directly serve the case of reducing emissions the most, not only in developing countries.

Political traction: investing in green technologies has been depicted by politicians from the beginning as something that is contrary to economic growth. The political traction of green investments is gaining more and more sympathy from public opinion in a large number of countries and communities, although perhaps not a majority in places that matter, and in political spheres. This could shift from a solid account of the economic return and especially a political understanding and dissemination of the results.

Economic return: I will return to this below, but it is paramount to take into consideration the fact that investments in green technologies drive down their cost, making the cost associated with choosing green alternatives considerably lower in the long run. There are many green alternatives today that already have important economic returns or are cost neutral (Stern 2007). There are also great savings associated with spending less on fossil fuels.

Moral assessment: besides the positive moral impact of reducing the impact of climate change, recent studies show the co-benefits of this kind of investment to be significant, in terms

of health and employment. Especially, avoiding the health related costs of pollution should be something to bear in mind (Green 2015).

A third option is to compensate poorer populations for the price increase of carbon intensive goods. This third avenue raises an important trade-off. Poorer populations will suffer from the price increase of carbon intensive goods all over the planet where MBIs are implemented. They could be compensated by the revenues generated through MBI programmes. The central problem with compensating lower income families is the opportunity costs incurred: investing in developing and diffusing green technologies have an important impact in diminishing even further polluting emissions and have profound health and economic co-benefits (Kaswan 2014, Green 2015). Moreover, this would necessarily create the desired disincentive to purchase carbon intensive goods for a portion of the population. By compensating people for the price increase, it is unclear whether people will turn away from these goods. The climate efficiency of the measure would be diminished at the benefit of more fairness (Aldy and Stavins 2011).

Climate assessment: given the opportunity cost and the potential mitigating effect on the desired disincentive, this is perhaps not the option that will maximize reductions in emissions.

Political traction: returning the money to part of the population is likely to be a popular measure. In British Columbia, Canada, the implementation of a carbon tax was done at neutral cost. All the money generated returned to the population. This is perhaps a way to draw political support to the measure.

Economic return: there is no particular economic benefit (job creation, investments) associated with this option.

Moral assessment: this targets directly the poorer populations that will be the most affected by the implementation of these measures. There is no relation between this option and fulfilling the right to energy.

A fourth option is one put forward notably by John Broome. The idea behind this option is to compensate the emitters in order to not make them the big losers of carbon pricing schemes. It is a Pareto improvement scenario in the sense that no one is made worse off by introducing this new policy (Broome 2012). It is not clear that the empirical evidence demonstrates that there are more chances of achieving the desired emissions reduction by compensating the emitters instead of using the money to make poorer countries comply, making alternative energy cheaper, barring the opportunity cost of losing money for investment in green technologies.

Climate assessment: there are no particular climate benefits in choosing this option. In fact, it is not impossible that there will be negative climate effects in comparison to any other option, for this will not undermine the power of companies in polluting sectors of activity.

Political traction: presumably, this would be the biggest advantage of this option. The polluters that have so much influence in political circles would not be against this measure, for their losses would be compensated. However, in Australia, the idea that big polluters were being compensated was not well received.

Economic return: all things being equal, this option will not undermine dramatically the economic capacity of polluting companies and therefore employment in these sectors will not decrease too much. In the energy sector, given that many polluting companies are not limited to fossil fuel production and operate in various fields in the energy sector, this option will potentially create the necessary incentives for these companies to shift part of their production and workforce to less polluting fields.

Moral assessment: this option is not particularly positive from a political morality point of view. Although it would be a Pareto improvement making a lot of people better off and not making anyone worse off, this measure would compensate those the most responsible for harming others in the first place.

9. Reflective equilibrium and action guidance

I will review in this last section a few practical elements from climate economic studies which should inform how we conceive justice in practice. The last section showed how much empirical evidence is required to make all things considered judgments. I am suggesting that the philosopher can contribute considerably to political debates by balancing between policy avenues and helping determine the best course of action to be undertaken.

The just course of action to be undertaken in the climate justice context has to be informed by how much more emissions reduction can be achieved by investing in green technologies in comparison to other options, by how much more needs to be invested in the GCF for developing countries to be capable of fully cooperating with the emissions reduction effort and by what options really help the plight of the most vulnerable populations of the planet.

I will now assess whether investment in development and dissemination of green alternatives is perhaps what allows relaxing the trade-off between efficiency in emissions reduction and fairness. The idea is that the investing in options that I called ‘climate efficient’, that is options that aim at maximizing reduction in GHG emissions, will relax the tension between climate efficiency and fairness if it: (a) reduces the risk of catastrophic climate change for everyone and especially vulnerable populations, (b) has important co-benefits, especially in terms of health and economic opportunities and (c) is sufficiently sensitive to fulfilling the right to energy of poorer populations.

Given that the objective of the GCF is to target developing populations specifically to fulfill their right to energy, there is an overlap between options 1 and 2 in the previous section. But the investment in the GCF is not sufficient to reduce the risk of catastrophic climate change, not only because it does not pretend to do this but also because no single policy is.

Now, there are key findings in empirical research that inform the climate justice debate. Firstly, we have indications that, generally, the national benefits of decarbonizing the economy outweigh the costs. Nations have incentives to reduce GHG emissions: the assumption that nations

have incentives to free-ride is for the most part mistaken (there is no global prisoners dilemma in this case as opposed to the case of tax competition) (Green 2015). In this context, there should be more effort made by governments to identify what economic sectors present net-beneficial gains and cost-free gains, what sectors may be net-costly, and what should be done in order in terms of international cooperation to tackle the latter (Green and Stern 2016).

If well designed, MBIs could be efficient (administratively and economically), they could be fair (by being more demanding with already polluted areas and subsidizing alternative energies) and they could achieve important emissions reduction (by the selling of permits that decrease in number every year and by making more resources available to invest in green energy and other technologies). MBIs generate revenues that could be used to curb some climate injustices. And although countries would have self-motivated interests to invest in emissions reductions, some countries should benefit from international distributive justice measures, based on 'historical responsibility' and 'ability to pay' considerations.

We must keep in mind that MBIs are implemented nationally or regionally. Domestically, poorer populations will be affected by the price increase of carbon intensive goods. Their right to energy will be compromised. They deserve compensation but indirectly, through subsidies for alternative energy sources and products, will be the most efficient way to achieve emissions reductions. Globally, one regional MBI might not undermine the right to energy but could contribute to fulfilling it. We have duties to compensate for future harm of our past emissions. Tying this to fulfilling the global poor's right to energy seems like a morally justified framework for climate justice. We have to make sure that the right to energy of poorer populations is not undermined. Also, my proposal aims to provide one source to contribute to the Green Climate Fund (GCF). The funds could be used in various ways within the aims of the GCF, but I am not specifying how to spend this money. I do not think integrationists could object part of MBI funds being transferred to the GCF.

Once we consider efficiency and fairness jointly, the best course of action is to invest in developing and diffusing sustainable energy, provided the design of MBIs is sensitive to communities living in already polluted areas. It is important to point out in this context that the current economic models underestimate the benefits of reducing fossil-fuel pollution (as they also underestimate the impacts of dangerous climate change (Stern 2016))

10. Conclusion

This paper aimed to see what normative elements from climate justice debates should be taken into account in the design of MBIs. Each of these elements would deserve a careful exploration. This paper only tried to provide a moral basis for justifying carbon-pricing mechanisms, one that could help in balancing objectives of climate science, climate justice and climate economics. MBIs could potentially be designed such as to be efficient (administratively

and economically), to be fair (such as by subsidizing alternative energies, especially those targeting poorer populations) and they could achieve important emissions reduction (by the selling of permits that decrease in number every year and by making more resources available to invest in green energy and other technologies). MBIs generate revenues that could be used to tackle climate injustices. MBIs generate revenues that could be used to curb some climate injustices. MBIs can be designed based on considerations of justice and become an instrument of justice.

The view advocated in this paper is that we understand better how to move forward on justice, when we understand the tools available that could bring about this progress. In this case, advocates of real world proposals for climate change mitigation agree on the importance of pricing carbon. And many ongoing regional agreements today have implemented a cap and trade system. We have at our disposal mechanisms that are potentially efficient and effective. The task of this paper was to point out issues that could design them so as to contribute to the realization of justice as well.

This relates to the discussions about the choice to develop our theory of climate justice for it to be theoretically sound within a theory of global justice, or do it so as to make it relevant for political decision-making (Zellentin 2005: 12). This paper shows that a sectorial approach contributes to the global justice debate and finds ways to better understand the problems that must be addressed to make justice progress. Again, I say that understanding how to make it relevant for political decision-making is a necessary step in making it theoretically sound.

Many nations already have important plans to reduce emissions. From 2020 onwards, we expect most nations to have emissions reductions guidelines following the Paris Agreement. On the practical aspect, this paper wanted to point out that it is by designing mechanisms that we understand how to implement justice, in ways that achieve the objective of reducing emissions and that are efficient administratively and economically. Importantly, this was done entirely without solving the questions of distributing the burden of emissions reduction.

On the theoretical aspect, this showed that non-ideal theory informs ideal theory. The question of compliance is not one about what to do about non-compliance with ideal principles, but rather how to favor compliance with non-ideal principles. Nations will pursue their own initiatives of emissions reduction. Developed nations will contribute to the Green Climate Fund. And all nations could pursue objectives 1 and 2. Justice will be fostered in conjunction with real world objectives, which reveals a feasible and desirable way to do it. The extent to which developed nations will contribute to the GCF will have to be determined. But none of this requires solving the debate about the distribution of emissions right, and not even the debate about sharing of the burden. This is done in a more practical and less rigid way. That is perhaps all that is needed for agreements to be signed and objectives attained.

Indeed, in the context of climate justice, we should integrate the constraint from (a) political philosophy and (b) the constraint from environmental economics. That is, we want to achieve the greatest polluting emissions reduction possible, by favoring poverty reduction and the economic development of the less developed people, and at the least possible cost to society.

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