Ethics of carbon pricing – a review of the literature

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Abstract

This article contributes a systematically approached, up-to-date synthesis of the current literature on ethics and carbon pricing. This is the first study on this topic performed using PRISMA methodology. We identify 210 sources discussing the ethical arguments for and against a variety of carbon pricing instruments. By analysing the primary arguments within the debate, we offer insights for policymakers regarding the selection and design of emissions abatement policy instruments.

The review indicates that carbon pricing remains divisive in the debate about ethical policy choices to reduce greenhouse gas (GHG) emissions. However, for most price instruments, many ethical objections can be resolved with careful attention to the instrument design. Also, although careful policy design may not fully resolve all justice concerns raised, this is not necessarily a strong argument against carbon pricing as alternative mitigation instruments may leave some justice-relate concerns unresolved. The key exception is offsets, for which the literature does not offer a solid ethical defense. This result has two main implications. First, research on the ethics of carbon pricing speaks against relying on offsets to close the gap between the developing countries' needs and current climate finance flows. Instead, less controversial forms of carbon pricing — such as a carefully designed international carbon tax — may provide new and innovative sources of climate finance. Second, while many critiques of carbon pricing are focussed on the shortcomings of carbon pricing as a policy used in isolation from other tools, we call for further research on how to incorporate both pricing and non-pricing instruments into a more comprehensive climate policy.

Key Policy Insights

- Carbon taxes and emissions trading are divisive in ethics research, but careful design can resolve many objections.
- While careful policy design of carbon pricing may not fully resolve all justice objections, alternative mitigation policies may also raise ethical concerns.
- Scholars agree that offsetting is the least ethically defensible form of carbon pricing, implying that the need for climate finance in developing countries may be best addressed through other instruments.
- Further research is needed to determine the best combination of carbon pricing and non-price instruments for significant abatement and addressing justice concerns.

Key Words

Carbon pricing; Ethics; Carbon tax; Emissions trading; Climate justice

1.0 Introduction

Governments in many parts of the world are increasingly adopting carbon pricing instruments to address climate change. In the last 20 years, the number of countries with a carbon tax or emissions trading scheme (ETS) in place grew from four[1] to thirty-nine[2] (not including regional and subnational initiatives) and carbon pricing instruments have been implemented or are being considered by international organisations, such as the United Nations Framework Convention on Climate Change (UNFCCC, n.d.), the International Civil Aviation Organization (ICAO, 2023), and the International Maritime Organization (IMO, 2023). Meanwhile, leaders have called for a just and equitable carbon transition at both global and regional levels (African Union Commission, 2023; G7, 2023; Guterres, 2023). While there may not be a single universally accepted vision of what a just and equitable transition looks like, it generally involves ensuring fair distribution of the costs and benefits of climate action (and inaction), fostering inclusiveness in decision-making, and recognising the needs

[1] Sweden, Finland, Norway, Poland. See (World Bank, 2023) data from 2003.
[2] For a complete list, see (World Bank, 2023) data from 2023.

and respecting the dignity of marginalised and vulnerable groups. The ethical considerations surrounding carbon pricing are crucial in evaluation whether, and under what conditions, such pricing can meet these ethical standards.

This body of scholarship can provide guidance for policymakers who aim to achieve these ethical standards[3] by helping them determine: i) whether carbon pricing should be part of the policy mix that drives the transition; and if so, ii) how to choose among different carbon pricing instruments and design options to ensure alignment with these ethical standards. In this context, research on the ethics of carbon pricing can contribute to discussions on *instrument choice* (Goulder & Parry, 2008) and *instrument design* (Narassimhan et al., 2018). Furthermore, as the pursuit of ethical standards in decarbonising the economy becomes a point of contention or support among civil society actors, businesses, and the general public, this research on the ethics of carbon pricing also contributes to scholarship on the *political economy* of carbon pricing (Baranzini et al., 2017; Carattini et al., 2018).

Against this background, this literature review on the ethics of carbon pricing focuses on the following questions i) What are the ethical arguments in favour of and against carbon pricing as such? ii) What are the ethical arguments in favour of or against specific types of carbon pricing instruments?

A preliminary reading of the literature on ethics and carbon pricing did not uncover any systematic reviews of the subject matter, prompting further examination of the subject using a systematic approach. This study adds a comprehensive review to the literature on ethics and carbon pricing using a PRISMA[4] approach, which provides a standardised framework to ensure that a literature review is transparent, standardised and reproducible. (M.

[3] Regardless of whether they are intrinsically motivated or externally pressured.
[4] PRISMA, or Preferred Reporting Items for Systematic Reviews and Meta-Analyses is a set of guidelines for reporting findings. See Page, M. et al. (2021).

Page et al., 2021). A more systematic approach to the literature on ethics and carbon pricing is called for to better understand the debate for and against carbon pricing, and whether alternatives to carbon pricing are considered preferable under the ethical arguments outlined in the scholarship. A systematic review further elucidates why and under what circumstances carbon pricing instruments are considered ethically divisive, and whether it is carbon pricing itself that is subject to moral argument, or whether only certain pricing instruments or certain design elements of pricing instruments are controversial. Similarly, it is useful to elucidate which arguments for or against carbon pricing are considered more important in the literature.

This paper proceeds as follows: The following section describes the methodology undertaken in this review. Section 3 outlines the results of this review, describing the main arguments taken for and against carbon pricing instruments. Section 4 discusses the results of this review, and section 5 concludes this paper.

2.0 Methodology

Given that issues arising in carbon pricing are discussed across disciplines, a comprehensive search required multiple and multidisciplinary databases. Searches were run on ProQuest Social Sciences Premium Collection, Web of Science Core Collection and Scopus on 27th November 2023.[5] A second search was run which added search terms on 22nd March 2024.[6] For a full description of the search process, see Appendix 2.Searches were run on the three databases checking the article titles, abstracts and keywords for the search terms.[7] All results were downloaded and reviewed as per Figure 1: PRISMA analysis (M. Page et al., 2021). The eligibility criteria are as follows:

[5] ProQuest is a platform of many databases; for a full list of databases included from ProQuest, refer to Appendix 1: Databases Included in ProQuest Search.
[6] The added search terms were offsetting, offset credit, carbon credit, equit* (equity, equitable).
[7] See Appendix 2 for exact search terms used for replicability.

Inclusion Criteria: Carbon pricing can be used as both a regulatory instrument implemented by public institutions (governments, supranational organisations — such as the European Union, or international organisations) or as a voluntary instrument adopted by private entities (i.e., voluntary offsetting). For this review, articles were included which focus on carbon pricing instruments designed and implemented by public institutions. This review focuses on the ethical dimensions of carbon pricing, so papers are included which discuss the ethics of carbon pricing to a significant extent. Only articles written in English were included.

Exclusion Criteria: Sources which did not consider the ethics of carbon pricing to a significant extent were excluded. Since this paper examines public sector carbon pricing policies, sources which only discuss voluntary mechanisms were excluded.

The selected sources were analysed using qualitative content analysis. Widely used in the social sciences discipline, qualitative content analysis is used to systematically identify themes or patterns in qualitative data (Schreier, 2012). In adherence to qualitative content analysis, the data were subjected to three rounds of coding, beginning with the identification of recurring themes, proceeding to the more precise categorisation of themes within a structured framework, and concluding with the refinement and analysis of themes into the arguments presented in the findings below.

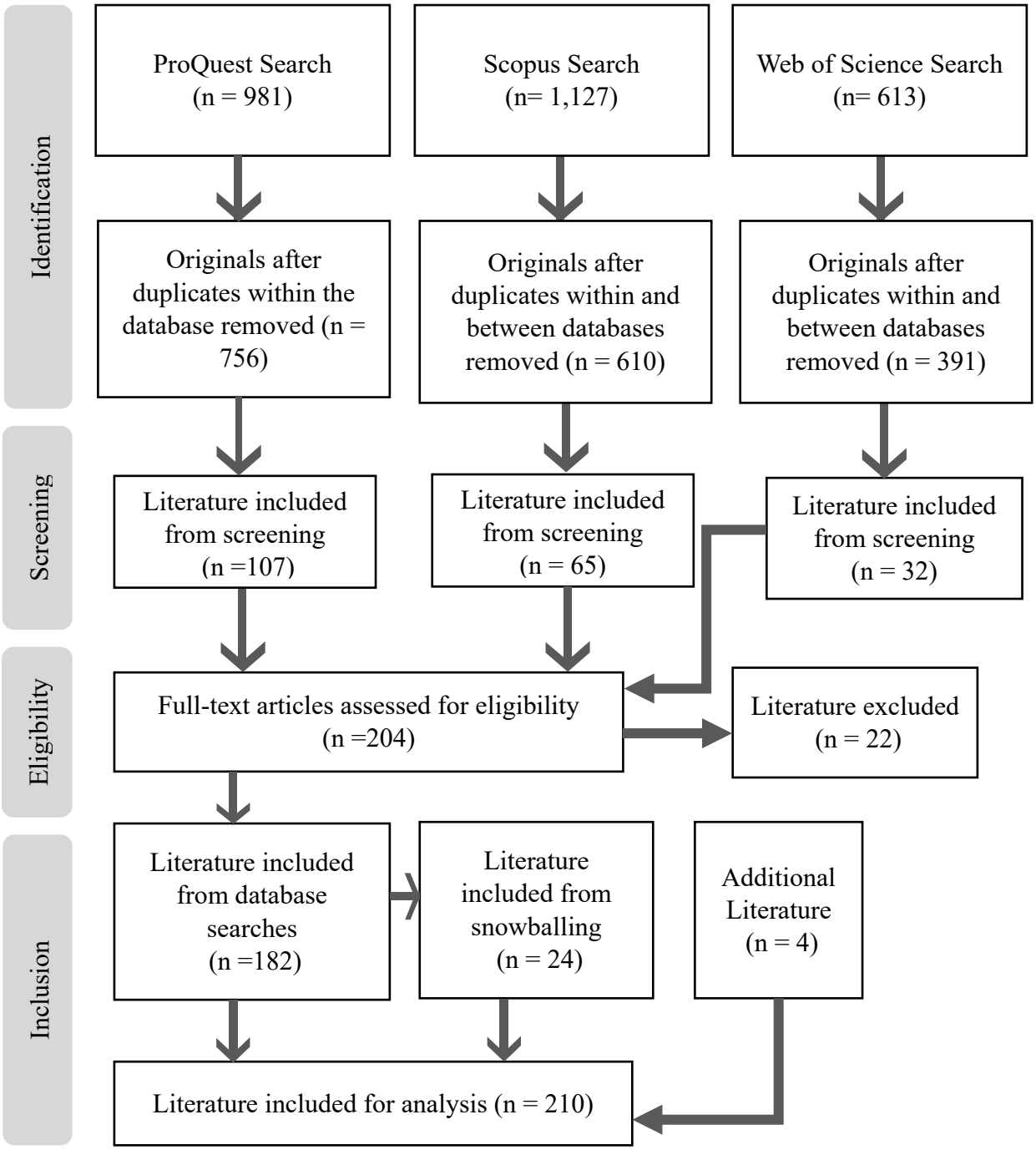

Figure 1: PRISMA Analysis

3.0 Results

3.1 Existing literature reviews

Eight existing literature reviews on the ethics of carbon pricing were considered. These reviews differ from the one conducted here along three dimensions.

Firstly, most of the existing reviews consider specific types of carbon pricing or their applications to a sector. Dirix et al. (2015) Page (2013) and Coelho (2015) focus on emissions trading. Mintz-Woo (2024) focuses on carbon taxes. Kamminga (2019), Mintz-Woo (2022), Monios (2022), and Abplanalp (2010) discuss carbon pricing more broadly. However, Monios (2022) focuses on how different forms of carbon pricing apply to the maritime sector. Our review differs from most of the above because its scope is not confined to carbon taxes or emissions trading, but it includes also regulatory forms of offsetting. This is useful because whether carbon pricing as such is morally objectionable or whether only certain types of carbon pricing are morally objectionable should be clarified in the debate. While Kamminga (2019), Mintz-Woo (2022), and Abplanalp (2010) also consider different types of carbon pricing, they differ along the two other dimensions discussed below.

The second dimension on which the reviews differ is ethical lenses considered. Abplanalp (2010) considers different types of carbon pricing from the lens of environmental ethics. Kamminga (2019) considers different types of carbon pricing but focuses on the implicit Protestant foundation of carbon pricing criticisms. This review differs from Abplanalp and Kamminga's in that it accounts for a broader set of ethical lenses and considers the distribution of different ethical arguments that have been made in favour of and against carbon pricing. Considering the distribution of different ethical arguments in the literature is helpful from a policymaking perspective because it demonstrates the extent to which carbon pricing is considered a morally objectionable or desirable policy instrument.

Finally, the previous literature reviews differ on the extent to which they take a systematic approach. Mintz-Woo's (2022) review considers different types of carbon pricing and uses a similar ethical lens to this review but conducts a narrative literature review. [8]

[8] A narrative or traditional literature review relies on the researcher's expertise and knowledge of the field to identify, select, and analyse relevant studies. This type of review is characterised by a more informal methodology, and by broader and more flexible inclusion criteria. See (Jesson et al., 2011).

While narrative reviews are helpful to synthesise areas of conceptual knowledge or to understand the scope or context in which a study is set, a systematic approach is more rigorous and ensures that the body of evidence which is used to inform decision-making about the use of carbon pricing as an emissions reductions policy tool is balanced and complete (Tranfield et al., 2003). With the exception of Coelho (2015), all of the reviews discussed above are narrative literature reviews. Coelho's review takes a more systematic approach in that it uses key search terms, searches multiple databases and selects sources from the search results using inclusion and exclusion criteria (Coelho, 2015). In the review, Coelho (2015) does not refer to any set of systematic reporting guidelines. Of course, (Coelho, 2015) also has a narrower focus on emissions trading (see above), and does not capture the literature published in the last eight years. The review conducted here follows a more systematic approach to reviewing the literature on ethics and carbon pricing than the aforementioned sources. It uses the PRISMA guidelines for reporting findings (M. Page et al., 2021).[9] In adherence with the PRISMA guidelines (M. Page et al., 2021), a research librarian was consulted in development of the study protocol. While the first author independently conducted the initial screening of sources, all authors regularly convened throughout the process to discuss the search methodology, screening process, and selection criteria.

3.2 Types of carbon pricing discussed in the literature

Of the literature reviewed, some authors discuss carbon pricing and market-based measures in a general sense while others discuss either one instrument or some combination of carbon taxation, emissions trading measures and offsetting (please see Appendix 4 for a discussion of these instruments).[10] Some authors argue that all or some of these instruments

[9] The PRISMA guidelines are a 27-item checklist for researchers to explain how sources in a study are identified, selected and evaluated. The guidelines are designed to ensure that studies are transparent, accurate and eliminate researcher bias. See Page, M. et al. (2021).

[10] In addition to the common types of carbon pricing which are the focus of this paper, the literature review captured six sources which discuss Carbon Border Adjustment Mechanisms. These sources discuss the trade-off between equal competitiveness for domestic firms under a CBAM and rights to development for developing countries. The common but differentiated responsibilities (CBDR) principle and

are not ethically permissible, or that a non-price GHG instrument would be preferable (against instrument, in Table 1). Others argue that some or all these instruments are ethically permissible, or that the arguments against these instruments do not convincingly preclude the use of carbon pricing instruments (in favour of instrument). Some authors are very critical of specific instruments but would support their use if they were adjusted to fulfil certain conditions (conditional). Finally, some authors do not take any stance for or against carbon pricing instruments (unspecified). For a complete list of which sources argue in favour of or against the different instruments, see Appendix 5.

Number of sources arguing in favour or against different instruments				
	Carbon Tax	Emissions Trading	Offsetting	Carbon Pricing (instrument not specified)
In favour of instrument	65	61	9	3
Against instrument	8	26	34	2
Conditional	12	19	21	0
Unspecified	11	17	13	0

Table 1: Number of sources arguing in favour or against different instruments

As evident in the table above, there is some variation in the relative acceptability of different instruments amongst the authors. Offsetting is subject to objections in most of the articles that cover this topic; it is also the only instrument for which sources "against" are more than the combined sources in "favour" and "conditional". Carbon taxes have the highest number of sources in support and the lowest against. The arguments for and against carbon pricing presented in sections 3.3 and 3.4 can apply to all forms of carbon pricing discussed in this paper. However, there are some ethical arguments which apply to specific carbon pricing instruments and not others. Some authors are against emissions trading but in favour of taxation (Coelho, 2015; Dash & Mukherjee, 2020; Drury et al., 1999; Lohmann, 2006; Ockenfels et al., 2020; Spash, 2010) or vice versa (Hahnel, 2012; Tirumalachetty &

rights to free trade are also discussed. See (Böhringer et al., 2012; Deane & Brockett, 2023; Eckersley, 2010; Eicke et al., 2021; Perdana & Vielle, 2022; Ren et al., 2023).

Kockelman, 2011). Others are in favour of emissions trading but object to the use of offsetting under an emissions trading scheme (Caney, 2010; Dirix et al., 2013, 2015; Kaswan, 2011; E. A. Page, 2012). The arguments in favour of or against specific instruments are discussed further in section 3.5.

3.3 Arguments in the debate

A reading of the sources shows five main arguments against carbon pricing. There are six arguments in favour of carbon pricing. The table below shows the distribution of arguments across the literature.[11] The sources identified are either making an argument in favour or against carbon pricing, or simply describing the arguments advanced by others. Since the proponents of carbon pricing are describing the ethical arguments against carbon pricing before responding, there are necessarily more sources which reference the arguments against carbon pricing.

Many of the ethical arguments below made in favour of carbon pricing are responding to critics of carbon pricing, rather than advancing independent arguments in favour of carbon pricing. Independent arguments in favour of carbon pricing, which do not appear to a great extent in the literature reviewed here, include arguments of effectiveness, cost-effectiveness, efficiency, and in the case of a carbon tax, administrative ease of implementation (Baranzini et al., 2017; Carattini et al., 2018; Rabe, 2018; Stiglitz et al., 2017). While important points, these reasons for implementing carbon pricing instruments discuss ethical dimensions of carbon pricing to a lesser extent. This review includes papers which discuss the ethical dimensions of carbon pricing to a significant extent. As such the independent arguments in support of a carbon pricing, such as effectiveness and economic efficiency, are not discussed at length in the papers reviewed here.

[11] For a complete list of references for the distribution of arguments in favour of and against carbon pricing, see Appendix 6: References for Ranking of Arguments.

Arguments Against Carbon Pricing (ranked in frequency of appearance)	**No. of Sources**
Distributive justice objections	122
Procedural justice objections	63
Carbon pricing results in moral hazard	49
Recognition justice objections	48
Carbon pricing commodifies the environment and non-human animals	39
Arguments in Favour of Carbon Pricing (ranked in frequency of appearance)	
Distributive justice objections can be corrected through policy design	128
Procedural justice objections can be corrected through policy design	37
Recognition justice objections can be corrected through policy design	37
Moral hazard arguments are unconvincing	17
The argument that carbon pricing commodifies the environment and non-human animals is unconvincing	16
Carbon pricing is not more morally objectionable than existing policy alternatives	13

Table 2: Distribution of arguments for and against carbon pricing (a list of sources for these arguments can be found in Appendix 6)

3.4 Ethical arguments for and against carbon pricing

3.4.1 Distributive justice arguments

Distributive justice is defined in the context of climate justice as the fair allocation of the benefits and burdens associated with climate change (Caney, 2006; Garvey, 2008; Shue, 2014).

The most common objection to carbon pricing in the literature is that marginalised groups are negatively impacted by carbon pricing (Bubna-Litic & Chalifour, 2012; Chalifour, 2010; Farber, 2011, 2012; Mayer et al., 2021). Aydos (2020) and Farber (2011) argue that, in many industrialised countries, carbon pricing can be regressive because low-income households spend a larger portion of their budgets on heating and electricity, so they will be more negatively impacted by rising energy prices.

In cases where carbon pricing is found to be regressive, scholarship has highlighted ways to mitigate regressive impacts of carbon pricing or make carbon pricing progressive. According to Caney and Hepburn (2011), revenues raised through carbon taxes and the auction of emissions allowances can be used to mitigate the regressive impacts of carbon prices on low-income households and prevent an unequal distribution of wealth. Scholarship has suggested several methods for revenue distribution, such as equal per capita distribution to all households, lump-sums targeted at vulnerable households, reinvestment in public and clean energy infrastructure (retrofits, green transportation, etc.), reduction in other taxes (labour, income, VAT, corporate tax) or redistribution of revenues from developed to developing countries (Bubna-Litic & Chalifour, 2012; Corvino, 2023; Fredriksson et al., 2021; García-Muros et al., 2022; Ivanova et al., 2020; Jorgenson et al., 2018; Mercer-Blackman et al., 2023; Sayegh, 2019; van Schalkwyk, 2012).

Several empirical studies have found an equity-efficiency trade-off between revenue recycling options wherein lump-sum transfers are considered more effective in reducing

regressiveness, while reducing distortionary taxes is considered more efficient (Antosiewicz et al., 2022; Goulder et al., 2019; Grottera et al., 2017; Hänsel et al., 2021; Jorgenson et al., 2018). Other studies find that a mix of different revenue uses can balance or reduce the trade-off between equity and efficiency (Caron et al., 2018; Fredriksson et al., 2021; García-Muros et al., 2022). Others suggest a luxury tax reduces regressive impacts without sacrificing efficiency (Oswald, 2022; Oswald et al., 2023). Which recycling options sufficiently address equity and efficiency concerns differs based on the country or region studied (Caron et al., 2018; Kaufman & Krause, 2016; Klenert et al., 2018).

3.4.2 Procedural justice arguments

Procedural justice is defined in the context of climate justice as fairness, transparency and inclusivity of decision-making processes related to climate change (de Ridder et al., 2023; Suiseeya & Caplow, 2013). It emphasises the importance of allowing all relevant stakeholders, including marginalised and vulnerable groups, to participate in the development of policies and agreements that address climate issues (de Ridder et al., 2023; Suiseeya & Caplow, 2013).

Scholarship identifies several procedural justice objections to carbon pricing. Some argue that carbon tax rates or emissions caps are often politically determined by those with the most power and capital (who may be high emitters) and the preferences of these influential groups are heavily reflected in carbon pricing policies; meanwhile, marginal actors arguably do not have enough power to advance their concerns about policy design (de Ridder et al., 2023; Lohmann, 2005, 2006; Pearse, 2014; Slocum, 2018; Suiseeya & Caplow, 2013). In addition, Page (2012) observes that the technical nature of carbon pricing reduces the transparency and accessibility of the process to non-experts. In his view, the complexity of banking, borrowing, and accounting in emissions trading hinders public participation in

carbon markets, and exchanges of carbon credits only take place between legal agents under the scheme, such as industries, brokers or investors (E. A. Page, 2012). Even carbon taxes, which are less administratively complex, have been criticised for not allowing enough direct participation for citizens to express their preferences (Driscoll, 2021). Under a carbon price, citizens can only be said to take part in the policy by publicly supporting or opposing the choice to increase costs in energy, transportation or consumer products (E. A. Page, 2012).

Some argue that properly designed carbon prices can address procedural justice concerns to make policies more transparent and equitable (Caney & Hepburn, 2011; Dirix et al., 2016a; Sayegh, 2019). Measures have been suggested to incorporate bottom-up approaches into emissions abatement policy, which would allow greater participation from the public (Dirix et al., 2013; Sayegh, 2019). According to Sayegh (2019), improved communications to the public about the progress of emissions reductions and the circumstances of carbon trading can give the public adequate information to support or object to emissions trading even if they cannot participate in the technical aspects of a carbon market. Moreover, Ivanova et al. (2020) indicate that assessment models which measure policy dimensions such as fuel choice, behavioural heterogeneity, informal economies, supply shortages, performance of the power sector, the use of traditional biofuels, or the urban–rural divide will improve transparency on how costs and benefits are distributed under different carbon pricing instruments and complementary policies. According to Ivanova et al. (2020), these policy dimensions are especially relevant in developing countries, particularly if they allow energy models to be linked to alternative development pathways.

3.4.3 Recognition justice arguments

The idea of ‘recognition justice’ goes beyond narrow conceptions of distributive or procedural justice in that it stresses the importance of recognising and respecting individual

persons and groups. The development of this idea is significantly influenced by Honneth's book on the pivotal role of recognition in social conflicts, the development of identities and justice (German original 1992 & translation 1995). In Honneth's conception 'recognition' ('Anerkennung' in German) can take the form of love, rights and solidarity, which are instrumental for the development of self-confidence, self-respect and self-esteem. Disrespect ('Mißachtung' in German) —the opposite of recognition— can take the form of abuse, rape, denial of rights, exclusion, denigration or insult, which can threaten physical and social integrity as well as honour and dignity (Honneth, 1995, pp. 92–130).

In the context of climate justice, Benjaminsen et. al (2022, p. 3) define recognition justice as requiring that the "knowledge, interests, priorities, and livelihoods," particularly of those who are marginalised, are respected in climate discourse, narratives and policy development. If distributive justice refers to "who gets what" in climate policy (Benjaminsen et al., 2022, p. 2) and procedural justice refers to "who decides and how" (Benjaminsen et al., 2022, p. 2), then recognition is concerned with "who is given respect (or not)" in the climate policy process and its outcomes (Benjaminsen et al., 2022, p. 4).

According to Espinosa-Flor (2022), some countries and economic agents have greater influence and financial capacity to pay higher taxes, lobby for exemptions or accumulate more emissions allowances, leaving poorer or more marginalised actors with only subsistence emissions remaining in the global carbon budget; by hoarding emissions rights to more powerful actors, the interests and priorities of less powerful groups are not sufficiently respected. Additionally, Turhan and Gündoğan (2019) argue that attempts in Türkiye to develop a carbon market were driven by pressures from more powerful international actors, to the detriment of development priorities and justice concerns within Türkiye.

However, pricing instruments can be designed to improve recognition justice. Under emissions trading, some argue for auctioning rather than freely allocating emissions

allowances or allowing grandfathering (Aydos et al., 2020; Dirix et al., 2016a; Nakamatte, 2007), while others have proposed limiting banking or borrowing permits (Coelho, 2015; Nakamatte, 2007). These design elements under an emissions trading scheme prevent more powerful actors from gaining favourable treatment. In addition, Bubna-Litic and Chalifour (2012) argue that Indigenous groups have a different pattern of fuel use than other households and existing policies of revenue redistribution under a carbon tax are insufficient for Indigenous groups. The authors find that income-tax credits and corporate tax credits do not benefit Indigenous households, while reinvestment of revenues into climate change mitigation or job reskilling may be of greater benefit to Indigenous households (Bubna-Litic & Chalifour, 2012). By more carefully considering revenue uses under a carbon tax or ETS, policymakers can overcome recognition justice objections.

Another recognition justice concern is the spatial distribution of co-pollutants under a carbon price. Critics contend that carbon prices create pollution hotspots at dirtier plants, many of which are based near low-income communities, and many of which are composed of ethnic or racial minorities (Anderson et al., 2018; Drury et al., 1999; Finley-Brook & Holloman, 2016; Grainger & Ruangmas, 2018; Pastor et al., 2013). Critics argue that under a carbon price, high-emitting industries will reduce emissions in the cleaner plants first because it is more cost-efficient, leaving dirtier plants to continue polluting; in theory, these dirtier plants will continue to produce GHG emissions, along with dangerous unregulated co-pollutants which have negative health impacts on nearby communities (Anderson et al., 2018; Drury et al., 1999; Grainger & Ruangmas, 2018; Pastor et al., 2013). Anderson et al. (2018), Bachram (2004) and Cushing et al. (2018) have argued that co-pollution under a carbon price is a recognition justice issue because the disadvantage that many ethnic and racial minority groups face, particularly in the United States, forces them to live in areas with higher levels of pollution.

Many studies on carbon pricing and localised co-pollutants have been undertaken since the 1990s (Anderson et al., 2018; Corburn, 2001; Drury et al., 1999; Farber, 2011; Grainger & Ruangmas, 2018; Hernandez-Cortes & Rosas-López, 2022; Pastor et al., 2013; Ringquist, 2011). While the issue of co-pollutants remains contentious, several studies show that co-pollutant impacts on vulnerable communities do not occur at a scale which has been theorised by critics (Bennear, 2022; Corburn, 2001; Farber, 2011, 2012; Hernandez-Cortes & Rosas-López, 2022; Ringquist, 2011). In addition, Farber, Kaswan and Pastor et al. (Farber, 2012; 2011; 2013) have argued that, in the event that a carbon price is found to cause localised co-pollution, emissions trading can be restricted in certain geographic areas, the direct regulation of co-pollutants can be increased in areas of concern, or the revenues from carbon pricing can be used to fund environmental protections or public health programs in vulnerable communities.

3.4.4 Moral hazard arguments

Pricing carbon is alleged to result in moral hazard because it delays moral change and subverts attempts to change moral attitudes (Coelho, 2015; Drury et al., 1999; Sandel, 2012). For instance, a carbon tax or emissions-trading credit may confer upon buyers a right-to-pollute; under this objection, if emitters have paid a tax or purchased a carbon credit, they may feel morally justified in continuing to emit harmful GHGs into the atmosphere (Abplanalp, 2010; Coelho, 2015; Espinosa-Flor, 2022; Lohmann, 2006). A similar objection is made that carbon pricing results in a tragedy of the commons; under this argument, the absorptive capacity of the atmosphere is considered to be held in common and should not be bought and sold into private ownership through emissions trading (Coelho, 2015; Espinosa-Flor, 2022). It is thought that once actors have purchased an emissions allowance, they now own a portion of unpolluted atmosphere into which they can emit GHGs (Coelho, 2015;

Espinosa-Flor, 2022). Furthermore, Kamminga (2019, p. 65) has noted the criticism that because carbon pricing emphasises market efficiency and competitive fairness, it downplays the "vice of wastefulness". Since carbon pricing does not make a distinction between luxury emissions and subsistence emissions, excessive emissions behaviour is not stigmatised in a way that motivates behaviour change (Kamminga, 2019). In this way, selling emissions allowances has been likened to the sale of indulgences by the Catholic Church in medieval times (Bührs, 2010; Goodin, 1994). In sum, critics of carbon pricing believe that command-and-control instruments send a stronger moral signal that continuing to emit GHGs is wrong.

Meanwhile, Caney & Hepburn (2011), Page (2011a) and Sayegh (2019) have concluded that the right to pollute argument is invalid because GHG emissions are dissimilar to other forms of pollution. In the case of littering or dumping of toxic materials, individuals have no right to do so, and littering policies seek to prevent *any* pollution, while emissions reduction policies seek a *relative* level of pollution that does not overwhelm the atmosphere's absorptive capacity (E. A. Page, 2011a). In this view, carbon pricing does not confer a right to pollute, but rather attempts to reconcile the right to energy access with the harm that non-renewable energy use causes (Sayegh, 2019).

Caney & Hepburn (Caney & Hepburn, 2011), Dirix et al. (2016b) and Page (2011b) have also considered the argument that carbon pricing privatises rights to the atmosphere, which should be held as a global commons right. Caney & Hepburn (Caney & Hepburn, 2011), Dirix et al. (2016a) and Page (2011b) have noted that this objection ignores the concept of usufruct rights. If the atmosphere is a global common, and a carbon price grants a temporary and limited right to emit GHGs into the atmosphere to prevent catastrophic harm, then no global commons rights are being violated (Caney & Hepburn, 2011; Dirix et al., 2016b; E. A. Page, 2011b). Page (2011b) compares carbon pricing to conservation measures

like a fish and game licenses, which allow license holders to extract a limited number of resources from the land in a way that protects the ecological integrity of protected areas.

3.4.5 Carbon pricing commodifies the environment and non-human animals

The final argument against carbon pricing is that it does not reflect the intrinsic value of nature in addition to its economic usefulness. Coelho (2015) and Lohmann (2006) argue that pricing carbon is done through the valuation of nature in market terms, and does not account for non-economic measures of nature's value, such as biodiversity or the relationship between people and nature. Carbon pricing is arguably unethical because it is putting a price on something that is considered priceless (i.e., the climate or the natural world), or too valuable to be expressed in market terms (Goodin, 1994). Furthermore, Abplanalp (2010) refers to the argument that carbon pricing is anthropocentric; it costs GHG emissions in terms of the atmosphere's value to people, as opposed to the atmosphere's value to non-human species who are under threat.

Meanwhile, several authors have consider the inappropriate commodification argument unconvincing (Caney, 2010; Dirix et al., 2016a; Hahnel, 2012; Ott & Sachs, 2000; E. A. Page, 2011a). Caney (2010) and Dirix et al. (2016a) argue that the market is not assigning a value to nature per se, but rather attaching a price relative to the context in order to protect something which is agreed to have value; this is compared to the way that national parks charge entry fees to protected forests without presuming that these fees ascribe a value to the forests. According to Caney (2010), a carbon price can be a reliable instrument for protecting something that has value, even if the market cannot estimate that thing's true value. In addition, Caney (2010) argues that if a market-based instrument does not adequately protect the asset being priced, then it is objectionable, but carbon pricing instruments are not objectionable in and of themselves.

3.4.6 Carbon pricing is not more morally objectionable than existing policy alternatives

Some argue that ethical objections to carbon pricing also apply to alternative emissions reduction policies. For instance, Mintz-Woo (2022)and Posner & Sunstein (2008) have noted that the same power dynamics that make it politically difficult to implement *any* kind of emissions abatement measures (either a carbon price or direct regulation) also make it difficult to adopt an instrument that penalises wealthy emitters and protects the vulnerable.

In addition, some argue that even if problems remain after carbon pricing instruments are designed to mitigate justice concerns, there are no viable policy alternatives that overcome all the ethical objections highlighted by critics of carbon pricing (Alvarado & Garreta, 2021; Klinsky, 2015; E. A. Page, 2011b; Povitkina et al., 2021). Alvarado & Garreta (2021) and Page (2011b) have argued that direct regulation policies are not any more transparent or accessible to the public than carbon pricing, and regulators are not any more or less accountable to the public than the administrators of carbon taxes or emissions trading. Alvarado & Garreta (2021) and Klinksy (2015) have stressed that it is not any more likely that stakeholders with less negotiating power will be able to ensure their interests are represented using direct regulation, or that industry lobbies will not be able to press for subsidies or less stringent regulations.

3.5 Ethical arguments specific to certain carbon pricing instruments

The ethical arguments for and against carbon pricing described above apply to all forms of carbon pricing. However, there are some ethical arguments which apply to specific instruments.

3.5.1 Carbon tax versus emissions trading

While carbon taxes and emissions trading can be designed to operate in many of the same

ways, there are several ethical arguments that carbon taxes are more acceptable. Carbon taxes are also preferred because they provide fewer loopholes for emitters to avoid their mitigation responsibilities (Dash & Mukherjee, 2020; Mintz-Woo, 2023; Mintz-Woo, 2022; Nakamatte, 2007; Sovacool, 2011). Nakamatte (2007) has described objections under the common but differentiated responsibilities principle (CBDR), wherein the level of flexibility granted under emissions trading schemes (banking, borrowing, offsetting, grandfathering) allows developed countries to shirk their leadership responsibilities as first-movers in emissions abatement relative to their level of responsibility for and capacity to mitigate climate change. A carbon tax could be designed to provide tax exemptions or tax rebates to polluters similarly to a emissions trading instrument, but, according to Dash and Mukherjee (2020), it is more often emissions trading instruments which are taken to task for grandfathering emissions allowances to big polluters, allowing borrowing of emissions allowances above the cap, or allowing offsetting of emissions reductions.

Meanwhile, Tirumalachetty & Kockelman (2011) describe circumstances in which emissions trading is more ethically advantageous. For instance, an empirical study conducted of US households concludes that at a national level, an emissions trading scheme is advantageous because a greater portion of emissions reductions come from high-income households under an ETS, while welfare loss as a share of income is found to be higher for low-income households under a carbon tax. Additionally, Boyce (2023) argues that an ideal carbon price would be designed as a emissions trading instrument with a rising floor price. In this case, the cap ensures a limit on emissions while the floor price acts as a baseline tax on emissions (Boyce et al., 2023).

3.5.2 Offsetting

Offsetting has been proposed as a method of transferring more climate finance from

developed to developing countries and as a way to encourage leadership in emissions mitigation in developed countries by making emissions reductions more cost-effective (Anger et al., 2012; Forsheit, 1997; Hultman & Kammen, 2007; Hwang & Kim, 2011; Kaswan, 2008; Lee et al., 2015; Nakamatte, 2007; Ott & Sachs, 2000; Watt, 2017)

However, offsetting is ethically controversial on several points. Firstly, the valuation of offsets depends on hypothetical concepts of equivalence, additionality and permanence (Broderick, 2011; Hyams & Fawcett, 2013; Lohmann, 2006; Pearse, 2014). Offset credits are purchased on the assumption that the GHG emissions absorbed by activities in one location are equivalent to emissions being made by unrelated activities in another location (Hyams & Fawcett, 2013; E. A. Page, 2011a). Moreover, those estimating the value of offset credits must determine whether an offsetting programme is additional to abatement activities that would have already taken place, and that the abatement efforts are permanent and will not be reversed (for example, if a replanted forest is cut down at a later date) (Hyams & Fawcett, 2013; Pearse, 2014). Critics also argue that offsetting encourages gaming of the crediting system, using such tactics as clearing existing forests and re-planting with fast growing plantations to count them as CDM or REDD+[12] projects (Sovacool, 2011; Vlachou & Konstantinidis, 2010). In sum, the use of carbon credits may not represent a genuine effort to reduce GHG emissions.

Moreover, offsetting is subject to recognition justice objections. Using offsetting, wealthy industrialised countries can displace or postpone responsibility for reducing carbon emissions by purchasing credits from developing countries, who tend to emit less now but may be forced to pay higher prices for emissions credits later as they develop (Aldred, 2012). In one example, wealthy emitters from developed countries may continue to practice

[12] REDD+ stands for 'reducing emissions from deforestation and forest degradation in developing countries'. REDD+ is a framework defined by the UNFCCC under which developing countries can receive carbon offset payments for deforestation reduction projects that meet a set of standards defined in REDD+. See (UNFCCC, 2023b)

"wasteful self-indulgence" by driving high-emitting luxury cars, but assuage their guilt for not switching to low-carbon alternatives by paying to plant trees in Brazil (Kamminga, 2019, p. 62). Furthermore, critics point to well-documented instances of carbon credit projects which devalue or conflict with local forms of knowledge and land use practices, displace Indigenous groups and threaten their traditional ways of life or conservation practices (Bachram, 2004; Brown et al., 2023; Hahnel, 2012; Klinsky, 2015; Saunders et al., 2013)

Offsetting also subject to procedural justice objections. Some have argued that, in countries where offset programmes take place, host communities accrue few benefits from crediting projects and have difficulty protecting their interests against the priorities of more powerful actors (Horn, 2023; Mathur et al., 2014; Suiseeya & Caplow, 2013; Xu & Zhang, 2022). Evidence from evaluations of existing REDD+ and CDM projects have found that host communities lack the technical capacity and normative influence to participate in important decision-making processes (Boyd & Goodman, 2011; Xu & Zhang, 2022).

Some studies show offset projects can be better designed to empower local communities or Indigenous groups (Mathur et al., 2014; Suiseeya & Caplow, 2013). Offset programmes which are designed with local development as the primary objective or which emphasise local capacity building and respect local power relations are found to be more procedurally just (Mathur et al., 2014). Other authors argue for stronger local safeguards and monitoring practices, and more robust and institutionalised property, land tenure and usufruct rights (Atela et al., 2015; Boyd & Goodman, 2011; Cox, 2013; Finley-Brook & Thomas, 2011; Suiseeya & Caplow, 2013).

4.0 Discussion

4.1 The ethics of carbon pricing, offsets, and climate finance

Although offsetting has been proposed as a method of increasing climate finance to

developing countries and increasing low-cost abatement, offsets have been criticised far more extensively in the literature than other instruments, as demonstrated in Table 1 above. Furthermore, while some arguments have been made that offsets could be designed to be more fair to Indigenous peoples and local communities, the scholarship has not resolved objections of equivalence, additionality, permanence and has only been able to resolve recognition justice objections to a limited extent (see Section 3.5.2).

The few responses to the many criticisms of offsets have implications for the design of international climate finance architecture. Currently, many developing countries, including many least developed and climate vulnerable countries, support the development of international markets for carbon credits as a source of climate finance (e.g. African Union, 2023; Ong, 2023; Talbot Wright, 2023). As recently argued by President Ajay Banga (2023) of the World Bank, in the absence of significant upscaling of alternative sources of international public climate finance, these markets remain the sole option for helping to close the gap between current climate finance needs and flows.

Therefore, the research in section 3.5.2 on the ethical objections to offsetting supports the urgent need for developed countries to at least meet their climate finance pledges, such as the USD100-billion-a-year by 2020 pledge which they have so far failed to meet (IPCC, 2022). Research indicates that the current climate finance needs in developing countries amounts to trillions of US dollars per year (World Bank Group, 2020). Thus, even if the developed countries' pledges were met, climate finance needs in developing countries are unlikely to be fully addressed (IPCC, 2022). Therefore, additional sources of climate finance need to be identified and mobilised. Here, less ethically controversial forms of carbon pricing could play a role. The recent Taskforce on International Taxation (President of France, 2023) as well as ongoing IMO negotiations on a GHG pricing instrument for international shipping are relevant developments in this regard (Dominioni et al., 2023; Dominioni & Englert,

2022). However, it remains unclear whether these additional sources of climate finance will become available and what their size will be.

4.2 The ethics of carbon pricing and instrument design

The review indicates that instrument design can be crucial for the ethicality of carbon pricing as it can address some of the potential ethical problems. For example, while carbon pricing is often criticised for being regressive, existing empirical research shows this can often be addressed with adequate use of a relatively small share of carbon revenues, thereby addressing distributive justice concerns (Dominioni & Heine, 2019). Similarly, procedural justice concerns can be addressed, at least partially, through adequate stakeholder engagement (Dirix et al., 2016a; Ivanova et al., 2020). Moreover, reducing free allowances or exemptions or introducing escalating carbon taxes can help address recognition justice concerns (Dirix et al., 2013, 2016a). This has implications for scholarship on the ethics of carbon pricing and instrument choice, and more specifically, research that compares the ethics of carbon pricing with that of other climate change mitigation policies.

Some of the scholarship is formulated as a comparison between carbon pricing (or a specific type of carbon pricing, such as carbon taxes) and another GHG instrument and the conclusions reached are then formulated in generic terms as "for or against" one of these instruments. However, the critiques included in these articles often focus on some potential features of a carbon pricing instrument — not one of its necessary components. For instance, Huwe and Frick (2022) recently put forward a critique of carbon pricing that is largely based on criticisms of using the social cost of carbon as the base for setting the carbon price level. However, the social cost of carbon is only one of many potential benchmark levels for setting a carbon price (Parry et al., 2022). Thus, the critique of carbon pricing in Huwe and Frick (2022) applies primarily to instruments that set the carbon price using this metric, and it is

unclear how many of the 73 carbon pricing instruments implemented today use the social cost of carbon as the benchmark price level. Similarly, Wood et al. (2023) criticise carbon taxes because of their regressive effects. As discussed above, this is not a necessary effect of carbon taxes, and where they do occur, they can often be addressed with adequate instrument design. The arguments that follow some of these analyses do not adequately account for the partiality of the analysis.

Moreover, the scholarship indicates that many recognition justice concerns may be addressed through instrument choice and instrument design. Minimising the use of offset credits would protect Indigenous groups and developing countries from exploitation which occurs under carbon offset projects and ensure that polluters are not displacing their abatement responsibilities on other countries by purchasing offset credits. However, in absence of offsets, the case for developed countries to at least meet their climate finance commitments to help Indigenous groups and climate vulnerable countries protect and preserve the ecosystems upon which their cultures and ways of life depend becomes even stronger.

Similarly, the literature above indicates that emissions trading systems are more objectionable than carbon tax instruments under recognition justice principles. The number of objections in the literature to emissions trading systems is much higher than objections to carbon taxes (see Table 1) and the scholarship discussed in Section 3.4.6 argues that emissions trading systems are more likely than carbon taxes to be poorly designed with loopholes that well-resourced actors can exploit (Coelho, 2015; Dash & Mukherjee, 2020; Espinosa-Flor, 2022; Nakamatte, 2007). This suggests that carbon taxes are preferable to emissions trading systems in countries where recognition justice issues are of particular concern.

Going forward, we call for the development of research on the ethics of carbon pricing that is more attentive to instrument design as this can help in understanding whether and under what conditions carbon pricing meets certain ethical standards, such as considerations of distributive, procedural and recognition justice. In turn, this can better guide policymakers in choosing GHG reduction policies. Ideally, this scholarship would focus on describing in some level of detail a carbon pricing instrument (and an alternative GHG policy) and then carry out an ethical analysis that is specific to the instrument or the comparison with an alternative GHG policy. Since the design of carbon pricing instruments has evolved rapidly in recent years, this could become a vibrant strand of research.

4.3 The limitations of instrument design in resolving ethical concerns

When considering the policy design suggestions to resolve distributive justice concerns, it appears that arguments for progressive revenue recycling or luxury emissions address regressiveness objections to some extent. However, there may be limits to the use of revenue recycling to resolve all distributive justice concerns, since there are aspects of inequality in society which go beyond income levels. Non-income differences between households, such as rural v. urban households, endowments in energy efficient infrastructure, or differences in cultural styles of living may not be sufficiently accounted for in a revenue recycling scheme that focusses on income levels, and there may be limitations in the availability of data to target revenue schemes for groups who are impacted by non-income factors (Hänsel et al., 2021). These concerns do not show that carbon pricing is impermissible, but indicate that more careful consideration of potential distributional impacts and market fluctuations is necessary, as are more carefully targeted tools to implement revenue recycling equitably (such as more household-specific lump-sum transfers).

In addition, while scholarship has provided policy design recommendations to mitigate procedural justice concerns, the design features suggested may not successfully overcome all these concerns. Given the technical complexity of carbon pricing instruments, there are limits to the level of public participation and transparency that can be achieved under these instruments. Similarly, improved design of stakeholder consultation processes may not be able to overcome the normative weight of more powerful actors in the policymaking process, such as industry lobbies or wealthier more developed countries. As such, there are limits to the extent to which a carefully designed carbon price can overcome procedural justice concerns. Nonetheless, this is not necessarily a strong argument against the use of carbon pricing instruments, as noted in section 3.4.6 above, there are limits to the extent to which alternative policies such as direct regulation can overcome similar procedural justice concerns.

4.4 The ethics of carbon pricing and climate effectiveness

The effectiveness of carbon pricing in driving GHG emissions abatements is more discussed in the academic and policy debate. Green (2021) reviews several ex-post evaluations of carbon pricing instruments implemented since 1990 and finds that carbon pricing has limited impacts on emissions reductions. In response to this analysis, a systematic review of ex-post studies finds significantly larger effects on emissions reductions, with significant variations across carbon pricing instruments (Döbbeling-Hildebrandt et al., 2024). Others debate the effectiveness of carbon pricing to deliver specific mitigation outcomes, such as investment into and adoption of low carbon technologies. For instance, Lilliestam et al. (2021, 2022) and Verbruggen (2021) argue that carbon pricing does not result in significant adoption of or investment in low carbon technologies, while Van den Bergh and Savin (2021) contest this argument. Overall, there is a need for research that sheds new light on the circumstances under which carbon pricing delivers significant emissions abatements.

It would be correct to say one could make a consequentialist argument in favour (or against) carbon pricing based on its effectiveness, but we have found this is largely not the case in the literature reviewed here. This gap is likely due to the largely technical nature of the topic, where many of the sophisticated analyses of effectiveness appear in discussions of economics and engineering, rather than ethics. However, it is important to bring these practical points to the attention of scholars of carbon pricing ethics. An instrument that does not meet its stated goal could be considered questionable or even unethical. In this respect, it is important to stress that historically the adoption of carbon pricing instruments has not always been motivated by climate mitigation concerns. In some countries, carbon pricing instruments have been put in place primarily to create fiscal space (Skovgaard et al., 2019). However, when implemented for climate reasons, an ethical carbon pricing instrument needs to deliver adequate emissions reductions. A failure on this front would speak in favour of adopting other policies to address climate change *instead* of carbon pricing.

Furthermore, when assessing the effectiveness of carbon pricing it should also be noted that none of the arguments in favour of carbon pricing reviewed here advocate for carbon pricing as a 'silver bullet' that will effectively reduce emissions without any further government intervention. This is an important distinction since Espinosa-Flor (2022), Lohmann (2005, 2006) and Slocum (2018) object to the use of carbon pricing as though it would operate in isolation from other policy instruments. It is true that historically, some economic scholarship has promoted carbon pricing as a 'backbone' or 'cornerstone' of emissions abatement policy, and some economists have considered complementary policies unnecessary with carbon prices (Huwe & Frick, 2022; Stern, 2022). However, some authors reviewed for this study have proposed the use of command-and-control regulations alongside carbon pricing (Boyce et al., 2023; de Ridder et al., 2023; Goulder & Parry, 2008; Kaswan, 2011; Klinsky, 2015) in order to resolve certain justice objections, while others have

proposed that carbon pricing needs to be accompanied by direct investment in sustainable infrastructure, and research and development of green technologies (Boroumand et al., 2022; de Ridder et al., 2023; Hasan et al., 2022; Klinsky, 2015; Sayegh, 2019). As such, arguments for or against carbon pricing as a singular instrument for effective emissions abatement should be retired in the scholarship because climate policy design has progressed beyond this in recent years. When considering further research on the circumstances under which carbon pricing delivers significant emissions abatements, research should also be conducted on what combination of carbon price and non-price instruments delivers the most significant abatement and best addresses other ethical concerns.

5.0 Research limitations and conclusion

This review presents a systematic, thorough, up-to-date synthesis to the current body of literature on the intersection of ethics and carbon pricing. By analysing the primary arguments within the debate, it offers valuable insights for policymakers regarding the selection and design of emission abatement policy instruments: This paper highlights that many critiques of carbon pricing are focussed on potential features of carbon pricing rather than essential features, such as the use of offsetting, grandfathered allowances, or calculations of the social cost of carbon. Also, although careful policy design may not fully resolve all justice concerns raised, this is not necessarily a strong argument against carbon pricing as a mitigation instrument from a justice perspective. Other mitigation instruments are also likely to leave some justice concerns unresolved (e.g., related to procedural justice). The review indicates that offsetting is the least ethically defensible form of carbon pricing. This suggests the use of other forms of carbon pricing to address developing countries' needs for climate finance. We highlight that while many critiques of carbon pricing are focussed on the shortcomings of carbon pricing as a policy used in isolation from other tools, the literature includes suggestions

for how to incorporate both pricing and non-pricing instruments into a more comprehensive climate policy.

Moreover, we call for further research in several areas. Firstly, there is a need for future research focussed on how instrument design of carbon pricing and complementary policies meets different ethical requirements, for policymakers to better understand whether and under what conditions different instruments meet different goals. Secondly, we call for further debate and development of a comprehensive ethical framework that can be used to evaluate carbon pricing and alternative climate policies.

We acknowledge that there are some limits to the review at hand. For instance, we have not conducted a review of voluntary carbon pricing instruments, implicit pricing instruments, or carbon border adjustment mechanisms. A systematic review of these instruments represents an area for further research. Moreover, while this paper discusses various types of revenue recycling and the equity-efficiency trade-off, the literature would benefit from a systematic review focussed on the pros and cons of different combinations of revenue recycling methods. We further recognise that this review focuses on papers which consider the ethical dimensions of carbon pricing to a significant extent. As such, this paper does not include existing papers discussing the effectiveness, efficiency or political (un)feasibility of carbon pricing (Baranzini et al., 2017; Carattini et al., 2018; Rabe, 2018; Stiglitz et al., 2017).

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Appendix 1: Databases included in ProQuest search

Coronavirus Research Database

Dissertations & Theses @ Dublin City University

Ebook Central

Education Collection

European Newsstream

International Bibliography of the Social Sciences (IBSS)

Library & Information Science Collection

Linguistics Collection

Literature Online

Philosopher's Index

Politics Collection

ProQuest Dissertations & Theses A&I

ProQuest Historical Newspapers: The Irish Times and The Weekly Irish Times

ProQuest Historical Newspapers: The Times of India

Publicly Available Content Database

Social Science Database

Sociology Collection

Appendix 2: PRISMA Process

The search string below captures the different terms used to refer to carbon pricing and to capture the ethical terms used to analyse the ethics of carbon pricing.

Rationale	Search Terms
Referring to Carbon Pricing	(1) Carbon Pric* (carbon price, carbon prices, carbon pricing) (2) Carbon tax* (carbon tax, carbon taxes) (3) Cap-and-trade, cap and trade (4) Emissions trading (5) Market-based measures (6) Quantity instrument (7) Price instrument (8) Offsetting, offset credit, carbon credit
Referring to ethical approaches or considerations	(1) Ethic*(ethic, ethics, ethical, ethically) (2) Human Right*(human right, human rights) (3) Justice (4) Moral (5) Utilitarian* (utilitarian, utilitarians, utilitarianism) (6) Consequentialis*(consequentialist, consequentialists, consequentialism) (7) Equit* (equity, equitable)

Table 3: Search Terms

For an exact replication of how these search terms were used, please see below:

Proquest:
abstract(("carbon price" OR "carbon prices" OR "carbon pricing" OR "carbon tax" OR "carbon taxes" OR "cap-and-trade" OR "cap and trade" OR "emissions trading" OR "market-based measures" OR "quantity instrument" OR "price instrument" OR "offsetting" OR "offset credit" OR "carbon credit")) AND abstract(ethic* OR (human right*) OR equit* OR Justice OR moral OR utilitarian* OR consequentialis*) AND la.exact("English")

Web of Science:
AB=(("carbon price" OR "carbon prices" OR "carbon pricing" OR "carbon tax" OR "carbon taxes" OR "cap-and-trade" OR "cap and trade" OR "emissions trading" OR "market-based measures" OR "quantity instrument" OR "price instrument" OR "offsetting" OR "offset credit" OR "carbon credit") AND (ethic* OR (human right*) OR equit* OR Justice OR moral OR utilitarian* OR consequentialis*))

Scopus:
TITLE-ABS-KEY (("carbon price" OR "carbon prices" OR "carbon pricing" OR "carbon tax" OR "carbon taxes" OR "cap-and-trade" OR "cap and trade" OR "emissions trading" OR "market-based measures" OR "quantity instrument" OR "price instrument" OR "offsetting" OR "offset credit" OR "carbon credit")) AND TITLE-ABS-KEY (ethic* OR ("human

right*") OR equit* OR justice OR moral OR utilitarian* OR consequentialis*) AND (LIMIT-TO (LANGUAGE , "English"))

182 original sources were selected using the eligibility criteria. Using the backward snowballing method, reviewing the bibliographies of the selected sources to identify further documents, 24 additional sources were selected. Finally, 4 additional sources were added that did not appear in the search but were known to be relevant to the researchers from supplementary reading about ethics and carbon pricing.[13] This brought the total number of relevant sources to 210. A complete list of the 210 articles is presented in Appendix 3.

[13] (Davidson, 2021; Dirix et al., 2016b; Ivanova et al., 2020; Sayegh, 2020)

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Appendix 4: Types of carbon pricing discussed in the literature

The types of carbon pricing considered for this review are carbon taxes, emissions trading schemes, and offsetting schemes allowed for compliance under an emissions trading scheme, a carbon tax, or under the Kyoto Protocol Clean Development Mechanism (CDM).[14,] A carbon tax charges a set price per tonne of GHGs emitted by regulated entities into the atmosphere or the GHG content of fuels (World Bank, 2023b). Under a simple form of carbon tax, the price is set and remains certain, but the level of emissions remains uncertain if firms are willing to pay to emit GHGs (World Bank, 2023b). Emissions trading schemes can take the form of cap-and-trade and baseline-and-credit approaches (World Bank, 2023a). A cap-and-trade scheme limits the amount of GHG emissions covered firms are allowed to emit (World Bank, 2023a). Firms must surrender units of emissions, usually worth one tonne of GHGs per unit, and these units can be traded between firms. Under baseline and credit, entities that reduce GHG emissions more than the baseline earn credits, that can be sold to underperforming regulated entities (OECD, 2024). A carbon offset or offset credit is a way for polluters to compensate for their polluting activities. In theory, an offset credit reduces or mitigates the impact of emitting a tonne of GHGs by reducing or removing a tonne of GHGs from the atmosphere through a separate project. Offsetting is often done via voluntary markets, which are not discussed in this paper, but they are also a feature of some governmentally regulated carbon pricing instruments.

The instruments discussed in the literature can be applied at either the domestic or international level. While it is not the remit of this paper to discuss differences in arguments between international and domestic trade instruments, generally speaking, carbon taxes and emissions trading schemes are applied domestically, with the exception of the EU ETS,

[14] The Clean Development Mechanism (CDM) is a mechanism defined in Article 12 of the Kyoto Protocol which allows developed countries to purchase offset credits from developing countries in exchange for implementing emissions reductions projects in those countries. See (UNFCCC, 2023a)

which as a regional instrument, could be considered international. Carbon offsets applied under a regulatory instrument are most commonly applied under emissions trading schemes as international or domestic offset credits. Further, as noted above, offsets may applied internationally under the Kyoto Protocol CDM. In rare cases, offsets may be purchased under a carbon tax, as with the South African carbon tax. Domestic offset credits are also sold under voluntary instruments, which are not discussed in this paper.

Appendix 5: Sources in favour of or against specific carbon pricing instruments

Position of different sources on carbon tax	
Pollution Trading and Environmental Injustice	For
Carbon trading-a critical conversation on climate change, privatisation and power	For
Instrument Choice in Environmental Policy	For
The Distributional Impact of Environmental Policy: The Case of Carbon Tax and Energy Pricing Reform in Indonesia	For
A Feminist Perspective on Carbon Taxes	Conditional
Background Environmental Justice	Conditional
Carbon Tax and Equity : The Importance of Policy Design	For
Carbon taxes vs tradable permits: Efficiency and equity effects for a small open economy	For
Carbon Trading: How it Works and Why it Fails	Unspecified
Climate change: the political economy of Kyoto flexible mechanisms	Unspecified
Reducing fuel subsidy or taxing carbon? Comparing the two instruments from the economy, environment, and equity perspectives for Indonesia	For
The Brave new world of carbon trading	For
Carbon trading: unethical, unjust and ineffective?	For
Climate change mitigation and intergenerational justice	Unspecified
Emissions Trading and Social Justice	For
An International Comparision of Environmental Tax with an Emphasis on South Africa	Conditional
Are carbon prices fair to vulnerable communities?	Conditional
Left Clouds Over Climate Change Policy	Against
Tax mix change to reduce greenhouse gas emissions	For
The Ethics of Emissions Trading	Unspecified
The welfare implications of carbon taxes and carbon caps: A look at U.S. households	Against
Clean energy policy: Taxing carbon and the illusion of the equity objective	Against
Climate Hope - Implementing and Exit Strategy	For
What Climate Policy Can a Utilitarian Justify?	For
Carbon Trading for Climate Justice	Unspecified
Climate Justice, Vulnerability and Protection	For
Ten reasons why carbon markets will not bring about radical emissions reduction	Conditional
The High Cost of Cost Efficiency	For
Empowering Energy Justice	For
Putting a Price on Carbon: Ensuring Equity	For
Impacts of carbon pricing on income inequality in Brazil	For
What Factors Drive Inequalities in Carbon Tax Incidence? Decomposing Socioeconomic Inequalities in Carbon Tax Incidence in Ireland	For
Carbon Pricing: Effectiveness and Equity	For
Climate Politics and Race in the Pacific Northwest	Conditional
Distributional implications of a national CO2 tax in the US across incomes classes and regions: a multi-model overview	For
Making carbon pricing work for citizens	For

The welfare consequences of taxing carbon	For
Canada's Carbon Tax and the TMX Controversy	For
Impacts of a carbon tax across US household income groups: What are the equity-efficiency trade-offs?	For
Internalizing Negative Externalities of Carbon Emissions for Climate Justice	For
Poverty and distributional effects of carbon pricing in low- and middle-income countries – A global comparative analysis	For
Pricing Carbon for Climate Justice	For
Salvation or Commodification? The Role of Money and Markets in Global Ecological Preservation	Against
The Impact of a Carbon Tax on Inequality	For
Beyond the social cost of carbon: Negative emission technologies as a means for biophysically setting the price of carbon	Conditional
Climate mitigation policies and actions: access and allocation issues	Unspecified
Climate, Jobs, and Inequity: Models of Worker Mobility and Distribution Under Carbon Pricing	For
Eroding Environmental Justice	For
Moral duties, compliance and polycentric climate governance	For
Pricing externalities and moral behaviour	For
The Unfair Burdens argument against carbon pricing	Conditional
Approaches to energy transitions Carbon pricing managed decline and or green new deal	Against
Carbon Pricing in Peru - Justice Post Covid	For
Carbon Pricing Under Uncertainty	For
Climate action with revenue recycling has benefits for poverty, inequality and well-being	For
Distributional Impacts of Carbon Pricing in Low and Middle-Income Countries	For
Fairness, Effectiveness and Needs Satisfaction	For
How Fairness Principles in the Climate Debate Relate to Theories of Distributive Justice	For
Optimal Carbon Taxation and Horizontal Equity: A Welfare-Theoretic Approach with Application to German Household Data	For
Populism and Carbon Tax Justice: Yellow Vest Movement in France	Unspecified
Protecting the Poor with a carbon tax and equal per capita dividend	For
What to Climate Change Winners Owe and To Whom	Unspecified
When standards have better distributional consequences than carbon taxes	Conditional
Why are Carbon Taxes unfair	Conditional
A fair and progressive carbon price for a sustainable economy	For
A right to pollute versus a duty to mitigate: on the basis of emissions trading and carbon markets	Unspecified
Carbon Pricing Ethics	For
Distributional effects of emission pricing in a carbon-intensive economy: The case of Poland	For
Economic Instruments	For
Energy Justice, Decarbonization, and the Clean Energy Transformation	Conditional
Far from Optimal Carbon Pricing	Against
Inequality, (Re)Distribution and Luxury-Taxation of International Household Energy and Carbon Footprints	For
The Moral Limits of Market Based Mechanisms	Against

Toward a just energy transition: A distributional analysis of low-carbon policies in the USA	For
Understanding Road Transport Emissions Reduction Policies Using Multi-criteria Analysis	For
What do we know about the employment impacts of climate policies? A review of the ex post literature	For
Are Carbon Taxes Good for South Asia?	For
Carbon Tax as Climate Intervention in South Africa	For
Carbon tax salience counteracts price effects through moral licensing	Unspecified
Implementation of carbon pricing in an aging world calls for targeted protection schemes	For
Luxury-focused carbon taxation improves fairness of climate policy	For
Opportunities for Imposing Carbon Tax Through the Aceh Qanun in the Perspective of Inter-generational Justice	For
Procedural climate justice: Conceptualizing a polycentric solution to a global problem	Unspecified
Pursuing a Just Energy Transition in the Canadian Legal System	For
Rationing and Climate Change Mitigation	Against
Rethinking the equity and efficiency of carbon tax: A novel perspective	For
The forward-looking polluter pays principle for a just climate transition	For
The Price is Not Right	Conditional
The Routledge Handbook of Applied Climate Change Ethics	For
Towards an equitable transition in the decarbonization of international maritime transport: Exemptions or carbon revenues?	For
Carbon Pricing is not Unjust	For
Carbon Tax Ethics	For
Coordinating social equity and emissions: Challenges in carbon tax policy	For
Efficiency–equity trade-off in the Irish carbon tax: A CGE investigation of mixed revenue recycling schemes	For
How socially just are taxes on air travel and 'frequent flyer levies'?	For
Unemployment, Labour Mobility and Climate Policy	For
Position of different sources on emissions trading	
International emissions trading: Equity issues in the search for market-based solutions to global environmental degradation	For
Ethical Influences on Evolution of US Air Pollution Control	Unspecified
Can the Market be Fair and Efficient	Conditional
Pollution Trading and Environmental Injustice	Against
Emissions Trading Systems and Environmental Justice	Unspecified
Ethical aspects of emissions trading	Unspecified
Selling pollution and safeguarding lives: international justice, emissions trading and the Kyoto Protocol	Against
Climate fraud and carbon colonialism: The new trade in greenhouse gases	Against
Marketing and Making Carbon Dumps	Against
Carbon trading-a critical conversation on climate change, privatisation and power	Against
Ethical Emissions Trading and the Law	Conditional
Achieving cost-effectiveness and equity: Analysis of the international emissions trading system	For

Emissions Trading and the Polluter-Pays Principle: Do Polluters Pay under Grandfathering?	For
Environmental Justice and Domestic Climate Change Policy	For
Instrument Choice in Environmental Policy	For
Justice and Climate Change	For
Justice and climate change: The unpersuasive case for per capita allocations of emissions rights	For
Justice in a Warming World	For
Background Environmental Justice	Conditional
Carbon taxes vs tradable permits: Efficiency and equity effects for a small open economy	Unspecified
Carbon Trading: How it Works and Why it Fails	Against
Climate Justice inside and outside UNFCCC	Unspecified
Emissions trading, equity, and sustainability: the case for allocating entitlements to “individuals-in-community	For
Markets, Morality and Climate Change: What, if Anything, is Wrong with Emissions Trading?	For
The Brave new world of carbon trading	Against
The politics of carbon leakage and fairness of border measures	Conditional
Business as Usual? Instituting Markets for Carbon Credits	Against
Carbon trading: unethical, unjust and ineffective?	For
Cashing in on Climate Change	Conditional
Climate change mitigation and intergenerational justice	Unspecified
Cosmopolitanism, climate change, and greenhouse emissions trading	For
Emissions Trading and Environmental Justice US Acid Rain Programme	For
Emissions Trading and Social Justice	For
Four Problems with Carbon Markets	Against
Reconciling Justice and Efficiency in a Cap and Trade System	For
Trading Equity for Efficiency in Environmental Protection?	For
A sectoral approach balancing global efficiency and equity	For
Achieving additional emission reductions under a cap-and-trade scheme	Conditional
An International Comparision of Environmental Tax with an Emphasis on South Africa	Unspecified
Are carbon prices fair to vulnerable communities?	Conditional
Greening Capitalism? A Marxist Critique of Carbon Markets	Against
Left Clouds Over Climate Change Policy	For
Pollution Markets and Social Equity	For
Tax mix change to reduce greenhouse gas emissions	For
The Ethics of Emissions Trading	Against
The Hidden Costs of Carbon Commodification	Conditional
The welfare implications of carbon taxes and carbon caps: A look at U.S. households	For
Unilateral climate policy design: Efficiency and equity implications of alternative instruments to reduce carbon leakage	For
Virtuous carbon	For
What do emissions markets deliver and to whom? Evidence from Southern California's NO X trading program	For
Climate Hope - Implementing and Exit Strategy	For
Risky Business: Cap-and-Trade, Public Health, and Environmental Justice	For

Strengthening bottom-up and top-down climate governance	Conditional
The Ethics of Emissions Trading	Conditional
What Climate Policy Can a Utilitarian Justify?	For
Carbon Trading for Climate Justice	Against
Climate Justice, Vulnerability and Protection	For
Moral Reasoning and climate change mitigation	Unspecified
Neoclassical realism and international climate change politics: Moral imperative and political constraint in international climate finance	For
Ten reasons why carbon markets will not bring about radical emissions reduction	Against
Towards an equitable cap-and-trade scheme in South Korea: based on input-output analysis of the distributional implications of carbon pricing mechanisms	For
Buying the right to do wrong - An experimental test of moral objections to trading emission permits	Unspecified
Efficiency or Equity? Simulating the Carbon Emission Permits Trading Schemes in China Based on an Inter-Regional CGE Model	For
Equity criterion for initial rights CO2 emissions allocations under emissions trading: Cooperation or conflict among nations?	Unspecified
Is the EU ETS a just climate policy?	Conditional
Justice and Boundary Setting in Greenhouse Gas Cap and Trade Policy	Conditional
The High Cost of Cost Efficiency	Against
The Protestant Dimension of Emissions Trading	Unspecified
What's wrong with trading emission rights?	For
Emissions Trading Ethics	For
Empowering Energy Justice	For
Spatializing climate justice Australia	Unspecified
Carbon Pricing: Effectiveness and Equity	For
Carbon trading, co-pollutants, and environmental equity: Evidence from California's cap-and-trade program (2011–2015)	Conditional
Climate Change Mitigation, Air Pollution, and Environmental Justice in California	Unspecified
Climate Politics and Race in the Pacific Northwest	Against
Making carbon pricing work for citizens	For
The California Cap-and-Trade Program: A Model Policy for Promoting Environmental Justice Using Accountability for Reasonableness	For
Who Wins from Emissions Trading	Against
How Will an Emissions Trading System Affect Household Income and Social Equity? A CGE-Based Case Study of China	For
Price and prejudice: the politics of carbon market establishment in Turkey	Against
Pricing Carbon for Climate Justice	For
Salvation or Commodification? The Role of Money and Markets in Global Ecological Preservation	Against
Carbon Trading & Environmental Equity: Evidence from the Regional Greenhouse Gas Initiative (2000 - 2019)	Conditional
Climate mitigation policies and actions: access and allocation issues	Unspecified
Eroding Environmental Justice	Against
I know what I must do - ETS in New Zealand	Conditional
Moral duties, compliance and polycentric climate governance	For

Pricing externalities and moral behaviour	Against
The Hidden Disequities of Carbon Trading	Against
The Unfair Burdens argument against carbon pricing	Conditional
A fair trade? Expert perceptions of equity, innovation, and public awareness in China's future Emissions Trading Scheme	For
Approaches to energy transitions Carbon pricing managed decline and or green new deal	Against
Between- and within-country distributional impacts from harmonizing carbon prices in the EU	For
Carbon Pricing Under Uncertainty	For
How Fairness Principles in the Climate Debate Relate to Theories of Distributive Justice	For
Is carbon pricing regressive? Insights from a recursive-dynamic CGE analysis with heterogeneous households for Austria	For
Pulling up the Carbon Ladder	Unspecified
What to Climate Change Winners Owe and To Whom	Unspecified
When standards have better distributional consequences than carbon taxes	Conditional
A fair and progressive carbon price for a sustainable economy	For
A right to pollute versus a duty to mitigate: on the basis of emissions trading and carbon markets	Against
Carbon Pricing Ethics	For
Economic Instruments	For
Energy Justice, Decarbonization, and the Clean Energy Transformation	Conditional
Far from Optimal Carbon Pricing	Against
Has the international climate regime promoted climate justice	Conditional
Survey Article: Trading Nature: When Are Environmental Markets (Un)desirable?	For
The Environmental Justice Dimension of the Mexican Emissions Trading System	For
The Moral Limits of Market Based Mechanisms	Against
Understanding Road Transport Emissions Reduction Policies Using Multi-criteria Analysis	For
What do we know about the employment impacts of climate policies? A review of the ex post literature	For
A Review on Emission Trading System (ETS): Policy Tool for Green Technology Transition and Humanitarian Equity	For
California’s cap-and-trade program: is it effective in advancing social, economic, and environmental equity?	For
Carbon Border Adjustments: A Legal Tool for Mitigation or a Barrier to Justice?	Unspecified
Environmental Justice and Carbon Pricing: Can They Be Reconciled	For
EU climate action through an energy poverty lens	For
Implementation of carbon pricing in an aging world calls for targeted protection schemes	For
Rationing and Climate Change Mitigation	Against
The forward-looking polluter pays principle for a just climate transition	For
The Routledge Handbook of Applied Climate Change Ethics	For
Towards an equitable transition in the decarbonization of international maritime transport: Exemptions or carbon revenues?	For
Carbon Pricing is not Unjust	For

Position of different sources on offsetting

Ethical aspects of emissions trading	Unspecified
Selling pollution and safeguarding lives: international justice, emissions trading and the Kyoto Protocol	Against
Social capital from carbon property: Creating equity for indigenous people	For
Climate fraud and carbon colonialism: The new trade in greenhouse gases	Against
Marketing and Making Carbon Dumps	Against
Carbon trading-a critical conversation on climate change, privatisation and power	Against
Achieving cost-effectiveness and equity: Analysis of the international emissions trading system	Conditional
Equitable carbon revenue distribution under an international emissions trading regime	For
The Equity and Legitimacy of Markets for Ecosystem Services	Conditional
Environmental Justice and Domestic Climate Change Policy	Conditional
Background Environmental Justice	Unspecified
Carbon Trading: How it Works and Why it Fails	Against
Climate change: the political economy of Kyoto flexible mechanisms	Against
Climate Justice inside and outside UNFCCC	Against
Markets, Morality and Climate Change: What, if Anything, is Wrong with Emissions Trading?	Against
Principles of justice in proposals and policy approaches to avoided deforestation: towards a post-Kyoto climate agreement	Against
The Brave new world of carbon trading	Against
An analysis of the FDI determinant of clean development mechanism (CDM)	Conditional
Business as Usual? Instituting Markets for Carbon Credits	Against
Emissions Trading and Social Justice	Unspecified
Four Problems with Carbon Markets	Against
Reconciling Justice and Efficiency in a Cap and Trade System	Against
Renewable energy and human rights violations: illustrative cases from indigenous territories in Panama	Conditional
The Clean Development Mechanism as ethical development?: Reconciling emissions trading and local development	Against
Towards sustainable carbon markets: Requirements for ecologically effective, economically efficient, and socially just emissions trading schemes	Against
Climate matters: Ethics in a warming world	For
Achieving additional emission reductions under a cap-and-trade scheme	Unspecified
Greening Capitalism? A Marxist Critique of Carbon Markets	Against
Left Clouds Over Climate Change Policy	For
Reduced deforestation and the carbon market: the role of market regulations and future commitments	Conditional
The Ethics of Emissions Trading	Against
The Hidden Costs of Carbon Commodification	Against
In pursuit of procedural justice: Lessons from an analysis of 56 forest carbon project designs	Conditional
Strengthening bottom-up and top-down climate governance	Against
The Ethics of Carbon Offsetting	Unspecified
The Ethics of Emissions Trading	Unspecified

Views of the Forest: Property Law and Carbon Rights	Conditional
Carbon Trading for Climate Justice	Against
Experiences of host communities with carbon market projects	Conditional
Ten reasons why carbon markets will not bring about radical emissions reduction	Against
Implementing REDD+ at the local level: Assessing the key enablers for credible mitigation and sustainable livelihood outcomes	Conditional
Implications on equity in agricultural carbon market projects: a gendered analysis of access, decision making, and outcomes	Conditional
Is the EU ETS a just climate policy?	Against
Justice and Boundary Setting in Greenhouse Gas Cap and Trade Policy	Unspecified
Offsetting dispossession? Terrestrial conservation offsets and First Nation treaty rights in Alberta, Canada	Conditional
The ethics of offsetting nature	Against
The High Cost of Cost Efficiency	Against
The Protestant Dimension of Emissions Trading	Unspecified
The true loss caused by biodiversity offsets	Against
Empowering Energy Justice	Unspecified
How much carbon offsetting and where? Implications of efficiency, effectiveness, and ethicality considerations for public opinion formation	Unspecified
Is the Clean Development Mechanism delivering benefits to the poorest communities in the developing world?	Against
On Climate Matters: Offsetting, Population, and Justice	Unspecified
Taming a Wicked Problem: Resolving Controversies in Biodiversity Offsetting	Unspecified
Which "fairness", for whom, and why? An empirical analysis of plural notions of fairness in Fairtrade Carbon Projects, using Q methodology	For
Intimate Exclusions from the REDD+ forests of Sungai Lamandau, Indonesia	Against
The Moral Economy of Carbon Offsetting: Ethics, Power and the Search for Legitimacy in a New Market	Against
Climate Politics and Race in the Pacific Northwest	Unspecified
No net loss of what, for whom?: stakeholder perspectives to Biodiversity Offsetting in England	Conditional
Fair ways to share benefits from community forests? How commodification is associated with reduced preference for equality and poverty alleviation	Against
Institutions for governing biodiversity offsetting: An analysis of rights and responsibilities	Conditional
Climate mitigation policies and actions: access and allocation issues	Unspecified
Eroding Environmental Justice	Against
The Hidden Disequities of Carbon Trading	Against
Whose voices count in biodiversity conservation? Ecological democracy in biodiversity offsetting, REDD+, and rewilding	For
Ethics and biodiversity offsetting	Conditional
The Morality of Carbon Offsets for Luxury Emissions	For
What to Climate Change Winners Owe and To Whom	Unspecified
Biodiversity Offsetting: Ethical Views within Environmental Organisations in the European Union	Conditional
Carbon Offsetting and Justice: A Kantian Response	Conditional
Energy Justice, Decarbonization, and the Clean Energy Transformation	Unspecified
Has the international climate regime promoted climate justice	Conditional

Moral Dimensions of Offsetting Luxury Emissions	Conditional
Should I Offset or Should I Do More Good?	Against
Survey Article: Trading Nature: When Are Environmental Markets (Un)desirable?	Conditional
The Moral Limits of Market Based Mechanisms	Against
Why I Should Still Offset Rather Than Do More Good	For
Brazil's Amazon Fund: A “Green Fix” between Offset Pressures and Deforestation Crisis	Against
The Routledge Handbook of Applied Climate Change Ethics	For
When solutions to the climate and biodiversity crises ignore gender, they harm society and the planet	Conditional
Position of different sources on carbon pricing (instrument not specified)	
Subsistence Emissions and Luxury Emissions	For
What Money Can't Buy	Against
Selling Environmental Indulgenes	Against
Climate mitigation policies and actions: access and allocation issues	For
What to Climate Change Winners Owe and To Whom	For

Appendix 6: References distribution of arguments for and against carbon pricing

References for 'procedural justice objections'
An analysis of the FDI determinant of clean development mechanism (CDM)
Approaches to energy transitions: Carbon pricing, managed decline and or green new deal
Are Climate Change Policies Fair to Vulnerable Communities
Background environmental justice: An extension of Rawls's political liberalism
Carbon pricing ethics
Carbon Trading a critical conversation on climate change, privatisation and power
Climate change the political economy of Kyoto flexible mechanisms
Climate fraud and carbon colonialism: the new trade in greenhouse gases
Climate Justice Inside and Outside the UNFCCC
Climate Politics and Race in the Pacific Northwest
Cosmopolitanism, climate change, and greenhouse emissions trading
Emissions trading and environmental justice distributive fairness and the USA's Acid Rain Programme
Empowering Energy Justice
Environmental justice and domestic climate change policy
Eroding environmental justice can carbon emission trading stimulate green technological innovation
Ethics and biodiversity offsetting
EU climate action through an energy poverty lens
Experiences of host communities with carbon market projects towards multi-level climate justice
Far from optimal Exploring the normative premises and politics of
Has the international climate regime promoted climate justice - evidence from China
How Fairness Principles in the Climate Debate Relate to Theories of Distributive Justice
I Know What I Must Do. It's just …! Justice in Emissions Trading Design and the Recent Reforms in New Zealand
Implementing REDD at the local level
Implications on equity in agricultural carbon market projects
Institutions for governing biodiversity offsetting: An analysis of rights and responsibilities
International emissions trading equity issues in the search for market-based solutions
Intimate Exclusions from the REDD forests of Sungai Lamandau, Indonesia
Is the CDM delivering benefits to the poorest communities in the developing world
Justice and Boundary Setting in Greenhouse Gas Cap and Trade Policy
Justice in a Warming World
Markets, morality and climate change: what, if anything, is wrong with emissions trading
Moral Dimensions of Offsetting Luxury Emissions
No net loss of what, for whom stakeholder perspectives to biodiversity offsetting in England
Offsetting dispossession: Terrestrial conservation offsets
Populism and Carbon Tax Justice: The Yellow Vest Movement in France
Price and prejudice: the politics of carbon market establishment in Turkey
Principles of justice in proposals for avoided deforestation

Procedural Climate Justice

Reconciling Justice and Efficiency in Cap-and-Trade Programs

Renewable Energy and Human Rights Violations

Selling Pollution and safeguarding lives

Social capital from carbon property: creating equity for indigenous people

Spatializing Climate Justice: Justice Claim Making and Carbon Pricing Controversies in Australia

Strengthening bottom-up and top-down climate governance

Subsistence Emissions and Luxury Emissions

Ten reasons why carbon markets will not bring about radical emissions reduction

The Brave New World of Carbon Trading

The California Cap-and-Trade Program A Model Policy for Promoting Environmental Justice Using Accountability for Reasonableness

The clean development mechanism as ethical development - Reconciling emissions trading and local development

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The hidden costs of carbon commodification emissions trading political legitimacy and procedural justice

The Hidden Disequities of Carbon Trading Carbon Emissions, Air Toxics, and Environmental Justice

The High Cost of Cost Efficiency A Critique of Carbon Trading

The Moral Economy of Carbon Offsetting Ethics, Power and the Search for Legitimacy in a New Market

The Moral Limits of Market-Based Mechanisms: An Application to the International Maritime Sector

The politics of carbon leakage and the fairness of border measures

The Protestant Dimension of the Ethical Critique of Carbon Commodification

The Routledge Handbook of Applied Climate Change Ethics

Towards Sustainable Carbon Markets

Views of the forest Property law and carbon rights

When solutions to the climate and biodiversity crises ignore gender

Which fairness, for whom, and why

Whose voices count in biodiversity conservation: Ecological democracy in biodiversity offsetting

References for 'Carbon pricing results in moral hazard'

A right to pollute versus a duty to mitigate on the basis of emissions trading and carbon markets

Achieving additional emission reductions under a cap-and-trade scheme

Business as Usual Instituting Markets for Carbon Credits

Buying the Right to do wrong

Carbon pricing ethics

Carbon tax salience moral licensing

Carbon Trading - How it Works and Why it Fails

Carbon Trading: a critical conversation on climate change, privatisation and power

Carbon Trading for Climate Justice

Carbon trading unethical, unjust and ineffective?

Cashing in on climate change political theory and global emissions trading

Climate fraud and carbon colonialism: the new trade in greenhouse gases

Cosmopolitanism, climate change, and greenhouse emissions trading

Economic Instruments - Aldy

Emissions Trading Ethics

Emissions trading, equity, and sustainability the case for allocating entitlements to individuals-in-community

Eroding environmental justice can carbon emission trading stimulate green technological innovation

Ethical emissions trading and the law

Ethical influences on the evolution of the US tradable permit approach to air pollution control

Ethics and biodiversity offsetting

how much carbon offsetting and where

I Know What I Must Do. It's just ...! Justice in Emissions Trading Design and the Recent Reforms in New Zealand

International emissions trading equity issues in the search for market-based solutions

Left Clouds Over Climate Change Policy

Marketing and making carbon dumps Commodification calculation and counterfactuals in climate change mitigation

Markets, morality and climate change what, if anything, is wrong with emissions trading

Moral Dimensions of Offsetting Luxury Emissions

Pollution Markets and Social Equity Analyzing the Fairness of Cap and Trade

Pollution trading and environmental injustice Los Angeles' failed experiment in air quality policy

Selling Environmental Indulgences

Should I Offset or Should I Do More Good?

Strengthening bottom-up and top-down climate governance

Taming a Wicked Problem Resolving Controversies in Biodiversity Offsetting

Ten reasons why carbon markets will not bring about radical emissions reduction

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The ethics of carbon offsetting

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The Hidden Disequities of Carbon Trading Carbon Emissions, Air Toxics, and Environmental Justice

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The Moral Limits of Market-Based Mechanisms: An Application to the International Maritime Sector

The Protestant Dimension of the Ethical Critique of Carbon Commodification

The Routledge Handbook of Applied Climate Change Ethics

The true loss caused by biodiversity offsets

What Money Can't Buy the Moral Limits of Markets

What's Wrong with Trading Emissions Rights?

Why I Should Still Offset Rather Than Do More Good?

References for 'Recognition justice objections'

Achieving Cost-Effectiveness and Equity Analysis of the International Emissions Trading System

Approaches to energy transitions: Carbon pricing managed decline and or green new deal

Are Climate Change Policies Fair to Vulnerable Communities
Biodiversity Offsetting Ethical Views within Environmental Organisations in the European Union
Brazil's Amazon Fund A “Green Fix” between Offset Pressures and Deforestation Crisis
Carbon Border Adjustments A Legal Tool for Mitigation or a Barrier to Climate Justice
Carbon pricing ethics
Carbon tax ethics
Carbon Trading - How it Works and Why it Fails
Carbon Trading a critical conversation on climate change, privatisation and power
Carbon Trading for Climate Justice
Climate fraud and carbon colonialism: the new trade in greenhouse gases
Climate Hope - Implementing the Exit Strategy
Climate Justice Inside and Outside the UNFCCC
Climate Politics and Race in the Pacific Northwest
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Ethical influences on the evolution of the US tradable permit approach to air pollution control
EU climate action through an energy poverty lens
Far from optimal Exploring the normative premises and politics of
Four Problems with Carbon Markets
Greening Capitalism: A Marxist Critique of Carbon Markets
Inequality, (re)distribution and luxury-taxation of international
Justice and Boundary Setting in Greenhouse Gas Cap and Trade Policy
Marketing and making carbon dumps Commodification calculation and counterfactuals in climate change mitigation
Moral Dimensions of Offsetting Luxury Emissions
Offsetting dispossession: terrestrial conservation offsets
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Renewable Energy and Human Rights Violations
Social capital from carbon property: creating equity for indigenous people
The clean development mechanism as ethical development - Reconciling emissions trading and local development
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The hidden costs of carbon commodification emissions trading political legitimacy and procedural justice
The High Cost of Cost Efficiency A Critique of Carbon Trading
The Moral Economy of Carbon Offsetting Ethics, Power and the Search for Legitimacy in a New Market
The Moral Limits of Market-Based Mechanisms: An Application to the International Maritime Sector
The politics of carbon leakage and the fairness of border measures
The Price is Not Right

The Protestant Dimension of the Ethical Critique of Carbon Commodification
The Routledge Handbook of Applied Climate Change Ethics
The unfair burdens argument against carbon pricing
Views of the forest Property law and carbon rights
When solutions to the climate and biodiversity crises ignore gender
Whose voices count in biodiversity conservation: Ecological democracy in biodiversity offsetting

References for 'Carbon pricing commodifies the environment and non-human animals'

Achieving Cost-Effectiveness and Equity Analysis of the International Emissions Trading System
Approaches to energy transitions Carbon pricing managed decline and or green new deal
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Brazil's Amazon Fund A "Green Fix" between Offset Pressures and Deforestation Crisis
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Carbon Trading for Climate Justice
Carbon trading unethical, unjust and ineffective
Cashing in on climate change political theory and global emissions trading
Climate change the political economy of Kyoto flexible mechanisms
Climate fraud and carbon colonialism the new trade in greenhouse gases
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Economic Instruments - Aldy
Emissions Trading Ethics
Environmental Justice and Carbon Pricing Can They Be Reconciled
Environmental justice and domestic climate change policy
Eroding environmental justice can carbon emission trading stimulate green technological innovation
Ethical Aspects of Emissions Trading
Ethics and biodiversity offsetting
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Greening Capitalism A Marxist Critique of Carbon Markets
International emissions trading equity issues in the search for market based solutions
Left Clouds Over Climate Change Policy
Markets, morality and climate change what, if anything, is wrong with emissions trading
Moral reasoning and climate change mitigation The deontological reaction toward the market-based approach
No net loss of what, for whom stakeholder perspectives to biodiversity offsetting in england
Salvation or Commodification The Role of Money and Markets in Global Ecological Preservation
Survey Article Trading Nature When Are Environmental Markets Undesirable
Taming a Wicked Problem Resolving Controversies in Biodiversity Offsetting
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The ethics of offsetting nature
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The Moral Economy of Carbon Offsetting Ethics, Power and the Search for Legitimacy in a New Market

The Moral Limits of Market-Based Mechanisms An Application to the International Maritime Sector

The Protestant Dimension of the Ethical Critique of Carbon Commodification

The Routledge Handbook of Applied Climate Change Ethics

The true loss caused by biodiversity offsets

References for 'Distributive justice objections can be corrected through policy design'

A fair and progressive carbon price for a sustainable economy

A fair trade: expert perceptions of equity innovation and public awareness

A feminist perspective on carbon taxes

A Review on Emission Trading System (ETS) Policy Tool for Green Technology Transition and Humanitarian Equity

A sectoral approach balancing global efficiency and equity

Achieving Cost-Effectiveness and Equity Analysis of the International Emissions Trading System

An analysis of the FDI determinant of clean development mechanism (CDM)

An International Comparison of Environmental Tax with an Emphasis on South Africa

Are Carbon Taxes Good for South Asia

Are Climate Change Policies Fair to Vulnerable Communities

Background environmental justice An extension of Rawls's political liberalism

Between- and Within-Country Distributional Impacts from Harmonizing Carbon Prices in the EU

Beyond the Social Cost of Carbon

Biodiversity Offsetting Ethical Views within Environmental Organisations in the European Union

California's cap-and-trade program: is it effective in advancing social, economic, and

Can the market be fair and efficient an environmental justice critique of emissions trading

Carbon Border Adjustments: A Legal Tool for Mitigation or a Barrier to Climate Justice

Carbon Offsetting and Justice: A Kantian Response

Carbon Pricing Effectiveness and Equity

Carbon pricing ethics

Carbon Pricing in Peru - Justice in the COVID19 Context

Carbon Pricing is not Unjust

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