

Carbon Trading: Unethical, Unjust and Ineffective?

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Abstract

Cap-and-trade systems for greenhouse gas emissions are an important part of the climate change policies of the EU, Japan, New Zealand, among others, as well as China (soon) and Australia (potentially). However, concerns have been raised on a variety of ethical grounds about the use of markets to reduce emissions. For example, some people worry that emissions trading allows the wealthy to evade their responsibilities. Others are concerned that it puts a price on the natural environment. Concerns have also been raised about the distributional justice of emissions trading. Finally, some commentators have questioned the actual effectiveness of emissions trading in reducing emissions. This paper considers these three categories of objections — ethics, justice and effectiveness — through the lens of moral philosophy and economics. It is concluded that only the objections based on distributional justice can be sustained. This points to reform of the carbon market system, rather than its elimination.

Keywords: carbon markets, emissions trading, ethics, justice, efficiency, commodification, carbon pricing, climate change

1. Introduction

The design of climate-change policy involves underappreciated ethical dimensions. Greenhouse gas emissions might be reduced by

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44 several main approaches, each of which raise different considerations
45 of ethics and justice. For instance, governments might provide infor-
46 mation about the science and economics of climate change, price
47 greenhouse gas emissions through a ‘carbon tax’, subsidise clean
48 technology, establish a ‘cap-and-trade scheme’ in which a limit is
49 placed on total emissions which declines over time (e.g. as per
50 notions of ‘contraction and convergence’), and/or implement
51 ‘command-and-control’ regulation requiring firms and individuals
52 to take certain action, such using specific cleaner technologies.
53 These approaches have various levels of effectiveness (that is, of suc-
54 cessfully reducing emissions) and of efficiency (in terms of reducing
55 emissions at least cost). They also have distributional implications (in
56 that there will inevitably be losers and winners). Implementing
57 climate-change policies is also likely to, and indeed will need to,
58 change our relationship with the natural environment.

59 This paper focuses on cap-and-trade systems, which are argued by
60 some to be a vital component of the attempt to prevent ‘dangerous
61 anthropogenic forcing’¹ and dangerous temperature increases.²
62 Indeed, greenhouse gas emissions trading was provided for by
63 Article 17 of the Kyoto Protocol.³ Many environmentalists support
64 a cap-and-trade system because it is the only policy that places an
65 absolute limit on the level of emissions. This allows emissions to
66 fall over time consistent with the notion of “contraction and conver-
67 gence”, for instance.⁴ Other policies such as carbon taxes might, with
68 luck, achieve the same effect of controlling and reducing emissions,
69 but they do not provide the level of guarantee provided by a cap-
70 and-trade system. Unless emissions are reduced, moreover,
71 business-as-usual economic activity will increase the concentrations
72 of greenhouse gases in the atmosphere, leading to temperature in-
73 creases of perhaps four degrees Celsius by the end of the century,
74 and serious risks of dangerous changes in precipitation and climate.

75 Several cap-and-trade systems for greenhouse gases have been
76 implemented around the world. The most notable is the EU

78
79 ¹ United Nations Framework Convention on Climate Change
80 (UNFCCC): 1992, Article 2, text available at <http://www.unfccc.int>.

81 ² We focus on carbon dioxide emissions given their sheer volume and
82 contribution to climate change but we should note, of course, that carbon
83 dioxide is not the only greenhouse gas.

84 ³ Cameron Hepburn, ‘Carbon trading: a review of the Kyoto mechan-
85 isms’, *Annual Review of Environment and Resources*, **32** (2007), 375–393.

86 ⁴ Aubrey Meyer, ‘Contraction and Convergence: The global solution to
climate change’ *Schumacher Briefing* 5, 2000, Foxhole, UK: Green Books Ltd.

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87 Emissions Trading Scheme (EU ETS), which came into effect on 1
88 January 2005 and is now in its second phase (2008–2012).⁵ Other
89 countries are establishing emissions trading, and some countries
90 such as Australia are engaging in vigorous debates about the merits
91 of emissions trading schemes compared with other approaches. The
92 USA passed legislation in the House of Representatives which
93 would cap emissions, with the cap reducing to 80% below 2005
94 levels by 2050, but passage of the legislation through the Senate
95 was blocked. China has recently announced it will pilot carbon
96 trading in five provinces and eight large cities in the coming years.⁶
97 Long before the implementation of cap-and-trade systems for redu-
98 cing greenhouse gas emissions, there were other kinds of environ-
99 mental trading schemes. Perhaps the best known is the trading
100 scheme for sulphur dioxide (SO₂) in the USA under Title IV of
101 the 1990 amendments to the Clean Air Act, which has successfully
102 reduced acid rain at low cost.⁷

103 As cap-and-trade systems to limit carbon dioxide pollution have ac-
104 tually been implemented, so too have criticisms emerged. The most ag-
105 gressive criticisms of cap-and-trade emerge from climate-change
106 sceptics, who would prefer to see no government response to climate
107 change, and who consider cap-and-trade the most likely policy to
108 succeed in passing through the relevant legislatures. More sober criti-
109 cisms include arguments that emissions trading is inherently ethically
110 objectionable. For instance, Michael Sandel argued that:

111 “turning pollution into a commodity to be bought and sold
112 removes the moral stigma that is properly associated with
113 it...[and] may undermine the sense of shared responsibility
114 that increased global cooperation requires”.⁸

115 The merit of such criticisms can depend upon the specific form of
116 emissions trading under consideration. Trading within a cap-and-
117 trade system could occur between countries (e.g. as occurs under
118

119
120 ⁵ For an overview of the EU ETS see the special issue of *Climate Policy*,
121 vol.6 no.1 (2006).

122 ⁶ Global Times, ‘Five provinces, eight cities selected for gas-emission
123 cut off’, 11 August 2010. [http://business.globaltimes.cn/china-economy/
124 2010-08/562368.html](http://business.globaltimes.cn/china-economy/2010-08/562368.html)

125 ⁷ Robert N Stavins, ‘What Can We Learn from the Grand Policy
126 Experiment? Lessons from SO₂ Allowance Trading’. *Journal of Economic
127 Perspectives* 12:3 (1998), 69–88.

128 ⁸ Michael Sandel ‘Should we Buy the Right to Pollute?’ in *Public
129 Philosophy: Essays on Morality in Politics* (Cambridge: Massachusetts:
Harvard University Press, 2005), 94 & 95.

130 the Kyoto Protocol), between firms (e.g. as occurs in the EU ETS),
131 or potentially even between individuals. The implications for the
132 sense of shared responsibility vary in each case. Furthermore,
133 policy choices about the allocation of tradable allowances, whether
134 given away to regulated entities for free or else sold, affect the
135 justice of an emissions trading scheme.

136 This paper examines various ethical and moral objections to emis-
137 sions trading. We examine these considerations in relation to a
138 simple emissions trading scheme (ETS), rather than with respect to
139 ‘add-on’ policies like carbon offsetting. While carbon offsets are
140 beyond the ambit of this paper, we simply note here that offsets have
141 two important moral virtues, — namely minimising waste and
142 transferring climate finance to poorer countries to help them reduce
143 emissions — but they also face challenges of “asymmetric information”
144 which opens the way to potential gaming and fraud. By considering its
145 moral virtues, Section 2 examines why emissions trading might be
146 thought to be a suitable policy response to climate change. Section 3
147 reviews and elaborates on a general taxonomy of ethical reasons for
148 caution in the use of markets, engaging with the literature on the
149 moral limits to markets. Section 4 employs this taxonomy to assess
150 the view that carbon trading is unethical. Section 5 examines the
151 notion that carbon trading may lead to unjust outcomes, and section
152 6 reviews arguments that carbon trading has not so far been effective
153 at reducing emissions. Policy implications are suggested in the
154 conclusion (section 7).

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157 **2. The moral virtues of cap-and-trade**

158

159 *2.1 Ensuring environmental protection*

160

161 Cap-and-trade systems for pollution control can guarantee that pol-
162 lution will be limited to the quantity specified by the ‘cap’, if it is suit-
163 ably enforced.⁹ The pollution cap is reduced from one period (often
164 several years) to the next, thereby reducing total emissions over time.
165 In the EU, for instance, the cap in the 2008–2012 period was set so
166 that emissions would be reduced by 5% compared with 1990 levels,
167 and the cap for the next period (2012–2020) has been set to reduce
168

169 ⁹ Enforcement requires independently verified measurements of emis-
170 sions (with sensors or flowmeters) or independent calculations of those
171 emissions based on the measured output produced and its emissions inten-
172 sity, coupled with spot checks by verification agencies.

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173 emissions by at least 20% compared with 1990 levels, although the
174 EU commission is currently contemplating tightening the cap to a
175 30% reduction by 2020, a position which has the support of the
176 United Kingdom, France and Germany, among others.

177 In this way, cap-and-trade systems provide policymakers and en-
178 vironmentalists with the certainty that a given emissions target will
179 be met. Other policies, such as carbon taxes, subsidies or specific
180 regulations, can make good progress towards reducing emissions,
181 provided they are designed and enforced appropriately, but do not
182 provide the same confidence as cap-and-trade systems. Cap-and-
183 trade systems, like taxes, also provide a price signal. When the total
184 level of emissions (and thus permits allocated) is fixed below
185 business-as-usual levels, the permits become 'scarce' and trade with
186 a positive price. Regulated entities can trade permits amongst them-
187 selves, establishing a 'carbon price'. This price fluctuates with time,
188 providing information about whether it is cheaper for companies to
189 reduce emissions internally, or whether it is cheaper to purchase al-
190 lowances from another firm which has reduced its emissions below
191 its allocation.

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194 *2.2 Minimising waste*

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196 Cap-and-trade schemes therefore ensure that the cheapest short-run
197 sources of abatement are undertaken first, because firms have an in-
198 centive to reduce their emissions whenever they can do this for less
199 than the market price. There will be many different ways firms can
200 economise on their emissions. The market price ensures that firms
201 are rewarded if they do make reductions and penalised if they
202 don't. Just as the 'cap' supports environmental integrity, the 'trade'
203 supports minimum cost. This is true too of carbon taxes, which pro-
204 vides a similar economic incentive for firms to seek out abatement op-
205 portunities in a manner which minimises waste.

206 In contrast, government will rarely know where the cheapest
207 sources of abatement are to be found, because opportunities to
208 reduce emissions are often at the operational level of individual
209 firms. Even if government had access to data on individual oper-
210 ational decisions (which it generally does not), it would be a
211 mammoth task to attempt to specify the 'optimal' actions for each
212 firm. If government does attempt to do this, it will doubtless make
213 mistakes. If it doesn't, and instead applies a uniform regulatory stan-
214 dard, this is likely to be wasteful, because one firm can often comply
215 more cheaply than another.

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216 To take an example, suppose that firm A and B are both required to
217 reduce emissions by 1 million tonnes of CO₂. If firm A can reduce
218 emissions for £10/tonne, while for Firm B it costs £20/tonne,
219 then £10 million is wasted if trade between Firm A and Firm B is pre-
220 vented. These wasted funds might have been used to develop new
221 low-carbon technologies and products, increased staff wages, been
222 passed onto shareholders or simply given to charity. Trade creates
223 these benefits by minimising waste.

224

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226 *2.3 Maintaining liberty*

227

228 A final moral virtue of economic instruments, including both carbon
229 trading and taxes, is that these policies allow regulated entities
230 (whether countries, firms or individuals) the liberty to reduce their
231 emissions using the methods they see fit. In the (relatively unlikely)
232 event that government actually knew more cost-effective ways to
233 reduce emissions than individuals, there would still be value in allow-
234 ing individuals to make their own choices, and indeed to make (and
235 learn from) their own mistakes. Regulatory approaches which stipu-
236 late the specific actions to be taken deny people this liberty and
237 deny them the creativity to arrive at different and original ways of
238 cutting back on emissions or other ways which, even if they are
239 more expensive, may be preferred by the individuals concerned.

240 There is a further benefit from allowing this liberty. If environ-
241 mental groups take the view that the cap is not tight enough, they
242 can purchase allowances and then retire them, thus preventing
243 firms from using them to pollute. In this way, non-governmental
244 organisations can voluntarily choose to tighten the cap. Indeed, in
245 the EU ETS this is precisely what occurs, and there are various
246 non-profit and indeed for-profit organisations that offer individuals
247 the opportunity to force companies to reduce emissions by more
248 than the government limits.

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251 **3. A general taxonomy**

252

253 We have seen that moral virtues attach to carbon trading. This is one
254 of the reasons why legislatures around the world have introduced
255 such systems as a means of controlling emissions. Yet there are
256 important moral arguments against emissions trading, and in order
257 to give a comprehensive account of such arguments, we present in
258 this section a taxonomy of the kinds of reasons that one might have

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259 for thinking that certain goods or services should not be traded. In
260 section 4, we draw on this taxonomy to examine several different argu-
261 ments against emissions trading. By doing so we hope to provide as
262 systematic an account as possible of the different reasons one might
263 have for rejecting emissions trading.

264 Our taxonomy draws on an account developed by Judith Andre in
265 her instructive analysis of Michael Walzer's well known but rather
266 unsystematic discussion of goods that should not be transferred for
267 money.¹⁰ Andre seeks to provide a more rigorous categorisation of
268 the different kinds of reasons that can be given for thinking that
269 certain burdens or benefits should not be bought and sold.¹¹
270 Drawing on her work, we distinguish between five types of case
271 where trading a benefit or a burden is morally problematic.

272 First, there are goods which 'by their nature cannot be owned'.¹²
273 Well-known examples might include love, friendship, respect and
274 admiration.

275 Second, there are some things that it is possible to own but which
276 we think it would be wrong to own.¹³ Again there are well-known
277 examples. It is possible to own human beings but, of course, we
278 now think that this is an indefensible practice, as this fails to
279 respect the dignity and moral standing we attach to other human
280 beings.

281 A third case where a trade in goods or services is problematic arises
282 when it is impossible to alienate a good or a responsibility.¹⁴ First,
283 consider goods. There are goods which a person can possess but
284 which he or she conceptually cannot transfer to others. An example
285 would be an honour (such as the Nobel prize).¹⁵ This honour
286 belongs to the person awarded it and she cannot bestow it on
287 someone else. It is not possible to alienate it. The same can be said
288 of academic qualifications. People can only acquire these in a
289 certain kind of way. For example, they must have been admitted
290 onto the course in question, complied with the regulations, and
291 passed the relevant examinations. The pedigree matters and this
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294 ¹⁰ Michael Walzer *Spheres of Justice: A Defence of Pluralism and*
295 *Equality* (Oxford: Basil Blackwell, 1983), 100–103.

296 ¹¹ Judith Andre 'Blocked Exchanges: A Taxonomy' in *Pluralism,*
297 *Justice, and Equality* (Oxford: Oxford University Press, 1995) edited by
298 David Miller and Michael Walzer, 171–196.

299 ¹² Andre 'Blocked Exchanges', 175: cf 175–176.

300 ¹³ Andre 'Blocked Exchanges', 176: cf 176–178

301 ¹⁴ Andre 'Blocked Exchanges', 178–179.

¹⁵ Andre 'Blocked Exchanges', 179.

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302 entails that it is not possible simply to transfer the good to others.
303 Consider now responsibilities: there are some responsibilities which
304 only the original duty bearer can honour and which it is not possible
305 for others to honour. For a clear example of this kind of responsibil-
306 ity, suppose that a spouse has a duty of sexual fidelity to their partner.
307 In such a case, this is a responsibility that they alone can honour.
308 Compliance with that duty requires that particular person to person-
309 ally discharge the duty. They cannot outsource that obligation to
310 others in some way (though others can, of course, assist them in
311 their performance of the duty).

312 In addition to the first three categories, there are also cases where it
313 is possible to alienate a good or a responsibility but we might think
314 that it is wrong to alienate such a benefit or a burden to other
315 people.¹⁶ Again we can distinguish between two cases here. The
316 first is when someone alienates a responsibility to someone else but
317 we think it is wrong for him or to do so. Machiavelli, for example,
318 argued that it would be wrong for citizens to delegate the responsibil-
319 ity to protect their state or fight their wars to others, notably mercen-
320 aries. In his view, citizens should defend the state themselves.¹⁷
321 Another example would be someone who seeks to alienate a civic res-
322 ponsibility (like doing jury service) to someone else. One might
323 think that this is their job: they should do it and should not pass it
324 on to others. We shall refer to these as ‘non-delegable duties’.
325 These are duties one can alienate but should not. A second kind of
326 case involves alienating a ‘benefit’. To take one example, some like
327 John Stuart Mill, hold that people should not be allowed to alienate
328 their own liberty.¹⁸ They have inalienable rights. Another case is
329 voting rights. It is widely held that it is wrong to transfer this
330 benefit to others.¹⁹

331 Let us turn finally to a fifth category. This fifth type of argument
332 maintains that certain goods (or responsibilities) should not be ali-
333 enated for money.²⁰ It does not object to someone exchanging a
334 good or service but it does object to someone exchanging it for
335

336 ¹⁶ Andre ‘Blocked Exchanges’, 179–180.

337 ¹⁷ Machiavelli *The Discourses* (Middlesex: Penguin, [1531] 1970) edited
338 with an introduction by Bernard Crick, Book 1, Discourse 43, 218.

339 ¹⁸ John Stuart Mill, *On Liberty* (Middlesex: Penguin, (1859) 1974, 173.

340 ¹⁹ The case of voting rights has an extra complication for one might
341 think that although it is a benefit to the citizen it also comes with a duty
342 too (for example, to cast it in the public interest) and that this duty in part
343 explains why it should not be transferred.

344 ²⁰ Andre ‘Blocked Exchanges’, 180–187.

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345 financial gain. Consider, for example, prostitution. Some, for
346 example, would argue that whilst there is nothing wrong with
347 having sex *per se*, and indeed sex as part of a loving relationship is nor-
348 mally considered to be good, it would be wrong to exchange sexual
349 favours for money. Some argue along similar lines against commer-
350 cial surrogate motherhood.

351 We can sum up the preceding discussion with the following table.²¹

352

353

354 4. Five ethical arguments against emissions trading

355

356 Having presented this taxonomy of the kinds of objections one might
357 make to trading in general, we now turn to examine the case against
358 trading allowances to emit greenhouse gases.²² Not all of the cat-
359 egories outlined in the previous section lend themselves to a critique
360 of emissions trading. In particular, we set aside the first and third
361 type of argument. There do not seem to be any reasons why one
362 cannot own an emissions allowance (so the first kind of argument
363 does not apply) and one can easily transfer this good to others (so
364 the third kind of argument does not apply).

365 We shall therefore focus on arguments 2, 4 and 5. More precisely,
366 we shall consider one type 2 argument, two type 4 arguments, and
367 two type 5 arguments.

368 Before beginning the normative analysis it is worth distinguishing
369 between two separate questions. The first question is whether it is
370 permissible for states and other political institutions to set up emis-
371 sions trading schemes. Let us call this the *institutional question*. The
372 second question is whether it is ethically appropriate for individuals
373 to buy or sell emissions permits. Let us call this the *individual ques-*
374 *tion*. These two questions are importantly different. One might, for
375 example, argue that it is appropriate for the state to allow this kind
376 of trading even if one thinks that such trading is immoral. On a
377

378 ²¹ This table captures, we hope, the logical possibilities but it obviously
379 does not describe all the kinds of issues that might arise under the various
380 headings. For excellent discussion of the kinds of issues that arise and the
381 relevant normative consideration see Debra Satz, *Why Some Things*
382 *Should Not Be for Sale: The Moral Limits of Markets* (New York: Oxford
383 University Press, 2010).

384 ²² For an excellent discussion of arguments against markets in permits
385 'to pollute' see Robert Goodin 'Selling Environmental Indulgences', *Kyklos*
386 47:4 (1994), 573–596. For a contrary view and response see Wilfred
387 Beckerman and Joanna Pasek 'The Morality of Market Mechanisms to
Control Pollution', *World Economy* 4:3 (2003), 191–207.

388 **Table 1:** Arguments against trading certain burdens and
 389 benefits

390 Type	Description	Illustrative Examples
391 1	Goods which cannot be owned	Love, friendship
392 2	Goods which should not be owned	Persons
393 3	Goods and responsibilities that cannot be 394 alienated	Honours
395 4	Goods and responsibilities that should not 396 be alienated	Civic responsibilities, votes
397 5	Goods and responsibilities that should not 398 be alienated for money	Sex

399

400

401 liberal conception of the role of the state, the duty of the state is to
 402 treat people justly and respect their rights. This can include granting
 403 persons rights to do things which one believes to be immoral. For
 404 example, one might think – at the institutional level – that persons
 405 should be allowed to sell sexual services for money and yet also
 406 think – at the individual level – that persons ought not do so.

407 Our concern is primarily with the first type of question. The argu-
 408 ments from environmental outcomes, waste minimization and liberty
 409 give us *prima facie* reasons to endorse such a scheme. Our view is
 410 quite compatible with the view that persons are under a moral obli-
 411 gation to reduce their emissions, not to use energy wastefully and
 412 unnecessarily and, more generally to adopt an ethic of frugality of
 413 the sort advanced by David Wiggins in his paper.²³ Let us now con-
 414 sider five anti-market arguments to see whether the reasons in favour
 415 of emissions trading can be outweighed.
 416

417

418 *Argument A: Owning what should not be owned*

419 One argument that might be made against emissions trading is that it
 420 involves owning a kind of good that, while it is possible to own it,
 421 should not be owned.²⁴ Emissions trading assumes that humans
 422 have property rights in the natural world. It might be argued that
 423 this is undesirable. The natural world (or perhaps, more plausibly,
 424 particular features of the natural world like the Earth’s atmosphere)
 425 should not be treated as people’s private property. Anti-commodifi-
 426 cation arguments are familiar, and in many cases, have force. For
 427

428 ²³ Wiggins ‘A Reasonable Frugality’ this volume.

429 ²⁴ For this line of reasoning see also Goodin ‘Selling Environmental
 430 Indulgences’, 578–579.

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431 example, as noted above, we surely think that humans should not be
432 owned. However, these types of arguments are unpersuasive in the
433 context of emissions trading.

434 One central problem with the argument is that emissions trading
435 does not rely on the assumption that persons own the atmosphere.²⁵
436 Emissions trading involves a right to use up some natural resource but
437 a ‘use right’ is not the same as a ‘property right’.²⁶ An example might
438 bring out the point. Consider someone who purchases a permit to
439 camp on a certain plot of land. He or she does not, thereby, gain a
440 private property right in the land. Rather they have a ‘use right’ – a
441 right to use that piece of land for a fixed period of time. Emissions
442 permits can be understood in a similar way. They entail a right to
443 use, for a period of time, a certain proportion of the absorptive
444 capacity of the atmosphere. After some time (maybe several
445 hundred years in the case of greenhouse gases) the impact of the
446 emission of greenhouse gases, like the impact of the camper, will
447 effectively disappear.

448 Further evidence for the claim that emissions trading does not
449 assume that persons own the atmosphere can be found once we
450 note that emissions trading is quite compatible with the idea of stew-
451 ards-ship. It is often said that humanity should act as ‘stewards’ or
452 ‘trustees’ of the natural world rather than as private owners of it.²⁷
453 The concept of stewardship or trusteeship (we use the two inter-
454 changeably) might be said to include three components. First,
455 those who are trustees of some particular designated natural resources
456 may have a right to use that resource (*use rights*). Second, however,
457

458 ²⁵ For further discussion see Caney ‘Markets, Morality and Climate
459 Change: What, if anything, is Wrong with Emissions Trading?’, *New*
460 *Political Economy* 15:2 (2010), 204–205. See also Caney ‘Justice, Morality
461 and Carbon Trading’, *Ragion Pratica* 32 (2009) for a discussion of this
462 and other anti-market arguments.

463 ²⁶ Hermann E. Ott and Wolfgang Sachs ‘The Ethics of International
464 Emissions Trading’ in *Ethics, Equity and International Negotiations on*
465 *Climate Change* (Cheltenham: Edward Elgar, 2002) edited by Luiz
466 Pinguelli-Rosa and Mohan Munasinghe, 171.

467 ²⁷ For example, Brian Barry writes that “those alive at any time are cus-
468 todians rather than owners of the planet, and ought to pass it on in at least no
469 worse shape than they found it in”, ‘Justice Between Generations’ in *Liberty*
470 *and Justice: Essays in Political Theory Volume 2* (Oxford: Clarendon, 1991),
471 258. For discussion of the concepts of ‘stewardship’ and ‘trusteeship’ see
472 Robin Attfield *Environmental Ethics* (Cambridge: Polity, 2003) chapter 2
473 and Attfield *The Ethics of the Global Environment* (Edinburgh: Edinburgh
University Press, 1999) chapter 3.

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474 those who hold the natural resources in trust are not entitled to
475 destroy the natural resources (*no right to destroy*). As Tony Honoré
476 notes in his seminal analysis of ownership,²⁸ the right to destroy is
477 one of the key eleven ‘incidents’ of private property, so this second
478 feature distinguishes trusteeship from ownership. A third, and
479 related, component can best be explicated by using a distinction
480 coined by John Passmore in his seminal *Man’s Responsibility for*
481 *Nature*. Passmore distinguishes between ‘conservation’, which he
482 defines as “the saving of natural resources for later consumption”²⁹,
483 and ‘preservation’, which he defines as “the attempt to maintain in
484 their present condition such areas of the earth’s surface as do not
485 yet bear the obvious marks of man’s handiwork and to protect from
486 the risk of extinction those species of living beings which man has
487 not yet destroyed”.³⁰ Utilising this distinction one might say that a
488 third aspect of stewardship includes duties to conserve and/or pre-
489 serve certain resources and features of the natural world for those
490 who follow them (*duty to conserve or preserve*).

491 Now emissions trading is compatible with this ideal. Someone com-
492 mitted to the ideal of stewardship may think that we are stewards of
493 Earth’s climate and, therefore, may not destroy it and indeed must con-
494 serve or preserve it for future generations (thereby complying with the
495 second and third features of ‘stewardship’). However, she may also
496 quite consistently think that, within limits specified by the duty not
497 to destroy, humans and non-human animals may use the absorptive
498 capacity of the atmosphere (thereby conforming to the first feature of
499 stewardship). This requires setting a budget specifying a safe level of
500 emissions. With this in mind the proponent of a stewardship approach
501 must then consider what policy instruments – including carbon taxes or
502 emissions markets or regulations – would best protect this atmosphere.
503 She might then quite consistently propose an emissions trading scheme
504 for those permissible emissions. Emissions trading is, thus, not reliant
505 on the private ownership of Earth’s atmosphere and is fully compatible
506 with a commitment to global stewardship.

507 Before we turn to consider a second argument against emissions
508 trading we should, however, note an objection that might be levelled
509 against our response to the first argument.³¹ A critic might reply that
510

511 ²⁸ Tony Honoré ‘Ownership’ in *Making Law Bind: Essays Legal and*
512 *Philosophical* (Oxford: Clarendon Press, 1987), pp.161–192 at 170.

513 ²⁹ John Passmore *Man’s Responsibility for Nature: Ecological Problems*
514 *and Western Traditions* (London: Duckworth, 1974), 73.

515 ³⁰ Passmore *Man’s Responsibility for Nature*, 101.

516 ³¹ We are grateful to Luc Bovens for raising this objection.

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517 though we are correct that emissions trading does not require the
518 'ownership rights' over the natural world, our appeal to 'use rights'
519 over the natural world is not sufficient to exonerate emissions
520 trading, for use rights can be morally problematic too. Consider,
521 for example, a form of slavery in which persons do not have full own-
522 ership relations over others (and so may not destroy them) but they
523 can 'use' those others as they see fit and without their consent.
524 Suppose, for example, that they can (i) require them to work for no
525 pay and control what they do and when they do it, and that they
526 can (ii) sell or lend these persons to others for their use. (Let us
527 term this slavery*.) Consider, similarly, a system of marriage in
528 which men have 'use rights' over their wives (and so may have sex
529 with their wives without their consent), and may (like Michael
530 Henchard in Thomas Hardy's *The Mayor of Casterbridge*) sell their
531 wife at an auction, but may not destroy them (and so strictly speaking
532 does not own them in Honoré's sense). (Let us term this marriage*.)
533 It follows from these examples that a system of 'use rights' can be
534 deeply morally unacceptable too.³²

535 In reply: we agree that some kinds of use right are morally indefen-
536 sible. Clearly slavery* and marriage* are objectionable. Two points,
537 however, can be made. First, the problem with both of these insti-
538 tutions is that the 'use rights' involved in both slavery* and marriage*
539 directly violate the fundamental and basic rights that all persons have
540 over themselves. This explains why these kinds of use rights are
541 morally unacceptable. By contrast, we see no reason to think that
542 the natural world possesses an analogous right that would preclude
543 human beings from having use rights over it. To challenge our posi-
544 tion the critic would have to provide an argument that establishes
545 both (i) that Nature can be a right-holder, and, moreover, (ii) that
546 the rights that it possesses disallow persons from using it in anyway
547 whatsoever without its consent (whatever that would mean). This
548 seems to us a tall order and we are unaware of any argument that
549 could establish this. Second, not only do we lack any reason to
550 deny humans some use rights over the natural world, we also have
551 positive reason to ascribe such use rights to persons. To withhold
552 from persons any use rights over the natural world (unlike denying
553 people use rights over other human beings without the latter's
554 consent) would have catastrophic effects. It would deny people the
555

556 ³² Note, incidentally, that this argument does not object solely or even
557 primarily to the 'trading' of permits. Rather its concern seems to be with a
558 system which distributes 'rights to use the atmosphere' whether or not they
559 are tradeable.

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560 land they need to live on, food to eat, water to drink, energy for heat
561 and so on. It is, in effect, to call for the end of human life on earth.
562 We, of course, place a limit on how much persons can use the
563 natural world but see no reason to withhold from them any
564 use rights at all, and plenty of reason to affirm such restricted use
565 rights (including use rights over the atmosphere).

566
567 *Argument B: Alienating responsibilities that one should perform oneself*
568 Having considered a type 2 argument, and having argued that type 1
569 and type 3 arguments do not apply to the trading of permits to emit
570 greenhouse gases, let us consider a type 4 argument. These, recall,
571 maintain that certain goods (such as one's liberty or voting rights)
572 and certain responsibilities (such as one's civic responsibilities)
573 should not be alienated.

574 This kind of argument has been applied in a number of different ways
575 to emissions trading. One common variant of this approach argues that
576 creating a system with emissions trading is objectionable because it
577 allows people to alienate responsibilities that it is inappropriate for
578 them to alienate. This argument – what might be termed the
579 *Collective Sacrifice Argument* – appeals to what we earlier termed
580 'non-delegable duties'. If we focus on the distribution of emissions
581 within a state, the claim is that each citizen should 'do their bit' and
582 should not delegate their tasks to others. They themselves should con-
583 strain their own emissions and not pay for someone else to lower their
584 emissions. At the international level, this argument would hold that
585 each state should shoulder 'its' burden and that high-emitting countries
586 should not pay others to discharge 'their' duty.³³

587 Note that this argument does not claim that those who purchase
588 permits to emit greenhouse gases are not making a sacrifice. Clearly
589

590
591 ³³ Michael Sandel has given this kind of argument. See 'Should we Buy
592 the Right to Pollute?', 95. Sandel's argument against emissions trading is a
593 part of a more general civic republican concern about the role of markets and
594 the way they encroach into many domains in human life. See Michael J.
595 Sandel *Justice: What's the Right Thing to do?* (London: Penguin Books,
596 2009), 84–91 and his discussion of "republican citizenship" in Sandel
597 'What Money Can't Buy: The Moral Limits of Markets', *The Tanner*
598 *Lectures on Human Values* delivered at Brasenose College, Oxford, May 11
599 and 12, 1998, 107ff. This is available at: <http://www.tannerlectures.utah.edu/lectures/documents/sandel00.pdf> (last accessed on 8 September
600 2010). See also his first Reith Lecture ('Markets and Morals') at <http://www.bbc.co.uk/programmes/b00kt7rg> (last accessed on 8 September
601 2010).

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603 they are. The complaint is that they are not making the *right kind* of
604 sacrifice. Paying a financial burden is not the way to discharge one's
605 duty. One must discharge one's duty by keeping one's emissions
606 within a pre-specified limit.

607 The idea of a shared sacrifice is a powerful one. However, this ar-
608 gument only has force against certain kinds of systems of emissions
609 trading.³⁴ For example, if the government were to allocate permits
610 to individuals and require them to control their own emissions as a
611 matter of public duty, it would then be problematic to allow some
612 people to pay to be exempted from this particular sacrifice. This
613 would be akin to having a system of national military service and
614 then allowing some to pay for others to substitute for them in dischar-
615 ging their public duty. However, it is crucial to note that emissions
616 trading schemes do not necessarily have this character. An emissions
617 trading scheme which allocates permits to firms, who either reduce
618 their emissions or trade with other firms who have done so, can
619 protect the environment without creating an individual civic respon-
620 sibility to reduce emissions. Emissions trading need not involve the
621 creation of civic duties, only to then allow *individuals* to escape
622 their own *duty* by paying a sum of money. They can instead be a
623 system which does not directly ascribe responsibilities to reduce
624 emissions to its citizens, but which nevertheless achieves the collec-
625 tive environmental objective.

626 At this point a proponent of the *Collective Sacrifice Argument* may,
627 of course, reply that we ought to address the challenge of reducing
628 greenhouse gas emissions by creating a system of civic responsibil-
629 ities. They might argue that we should adopt the same kind of
630 approach that is normally adopted during in wartime – one in
631 which there is rationing and a ban on trading. However, it is far
632 from clear why this is the best way to deal with emissions reductions.
633 In very many cases we allocate responsibilities to the state rather than
634 to each individual citizen. For example, we often require government
635 to remove household waste (rather than call for a system in which
636 everyone takes their own waste to the rubbish tip) and we expect gov-
637 ernments to provide an army to defend us (rather than have a military
638 force entirely constituted by compulsory national service) and we
639 then pay for the state to perform these tasks. Furthermore, in other
640 cases, we might rely on other individuals to perform various tasks
641 (e.g. look after our children). We discharge our responsibilities by
642 paying the money that is required, rather than personally performing
643

644 ³⁴ For further discussion see Caney 'Markets, Morality and Climate
645 Change', 208.

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646 those responsibilities. But if we accept that kind of reasoning in these
647 other cases, why should we insist that the task of emissions reduction
648 must not be done in this kind of way? As Jeremy Waldron writes,
649 “[w]artime conscription – together perhaps with jury service – is vir-
650 tually the only example of the state’s discharging its functions by ex-
651 acting service rather than money from its citizens. Since the dawn of
652 the modern era, states have relied for the most part on cash rather than
653 in-kind contributions.”³⁵

654 At this point one final point might be made: a proponent of the
655 *Collective Sacrifice Argument* might argue that our analysis of the
656 *Collective Sacrifice Argument* overlooks an important distinction
657 between two kinds of case.³⁶ They might reason as follows.
658 Consider, first, a case where, say, two agents (A and B) are emitting
659 greenhouse gases and it is much more expensive for A to reduce emis-
660 sions than B. In such a case it seems reasonable to allow A to perform
661 her duty by paying B to reduce emissions on A’s behalf. Consider,
662 however, a case where A and B both have exactly the same costs of re-
663 ducing emissions. Suppose, however, that A does not feel like redu-
664 cing her emissions and so would like to pay B instead. This, it
665 might be argued, brings out the moral appeal of the *Collective*
666 *Sacrifice Argument*. When applied to emissions trading, the
667 thought might be that it is acceptable for a rich western country to
668 pay China to reduce its emissions more cheaply by switching to
669 more efficient technologies already in use in the west, but that it
670 would be wrong for a rich western country, because it can’t really
671 be bothered, to pay the Chinese to reduce emissions by, for instance,
672 not using a technology that westerners still continue to use.

673 Two points can be made in reply. First, it is not clear why it would
674 be wrong for countries to express different attitudes to the way in
675 which they bear their burden of reducing emissions, provided that
676 all countries do indeed bear this burden. To give an analogy: consider
677 two neighbours. Why would it be wrong for one to pay the other for
678 the use of the other’s front drive if the other consents to it and thinks
679 the sum is a reasonable one? One neighbour no longer has the use of
680

681 ³⁵ Jeremy Waldron, ‘Money and Complex Equality’ in *Pluralism,*
682 *Justice, and Equality* (Oxford: Oxford University Press, 1995) edited by
683 David Miller and Michael Walzer, 152. Waldron’s statement may overstate
684 the exceptional nature of in-kind contributions. The challenge, nonetheless,
685 remains: we need an argument for the claim that we must discharge our
686 environmental duty in an in-kind form when there are other possibilities.

687 ³⁶ We are grateful to Luc Bovens for raising the objection presented in
688 this paragraph and the example we use to illustrate it.

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689 their front drive, and perhaps would find this inconvenient, but by
690 foregoing the use of one resource (the front drive) but they simul-
691 taneously gain the use of another one (the money) in its stead.

692 Second, it is arguable that this kind of argument, and, moreover,
693 the ‘West v China’ example given above, gains whatever intuitive
694 appeal it has because it invokes separate extraneous factors –
695 namely the respective wealth of the contracting parties and the fair-
696 ness of the distribution of emission permits. That is, it might seem
697 problematic for the wealthy to pay the poor to forego a good that
698 the wealthy continue to enjoy. It is noticeable, for example, that the
699 example that Sandel employs to illustrate the *Collective Sacrifice*
700 *Argument* involves a rich family (“[t]he family in the mansion on
701 the hill”) paying its poorer neighbours to do some work for them.³⁷
702 This, however, cannot give us reason to reject emissions trading
703 *tout court*. Rather it draws our attention rather to ensuring that
704 there is a fair distribution of resources, including a fair share of emis-
705 sions permits (an issue we discuss below in section 5).

706

707 *Argument C: Emissions trading and the vulnerable*

708 Consider now a third argument. Like the preceding argument it
709 maintains that emissions trading involves alienating what should
710 not be alienated (a type 4 argument). However, unlike the previous
711 argument it focuses not on the person buying extra permits but on
712 those who sell the permits. It maintains that to create a system in
713 which permits to emit greenhouse gases were traded would allow
714 trades which are disadvantageous to the most vulnerable and, as
715 such, should not be allowed.

716 One can distinguish between two versions of this argument, what
717 might be called the *Paternalist Argument* and the *Unreliable Trustees*
718 *Argument*. The *Paternalist Argument* maintains that allowing persons
719 to trade emissions may be undesirable because people will make poor
720 judgements about their own interests and so they should be protected
721 from themselves.³⁸ This argument is hard to sustain. Though there
722

723

724 ³⁷ Sandel ‘Should we Buy the Right to Pollute’, 95. See also Goodin’s
725 discussion of the related, but distinct, argument that it is wrong to have a
726 scheme that allows “some but not all” to be exempt from some burden or
727 to enjoy some benefit, ‘Selling Environmental Indulgences’, 584–585.
728 How objectionable we find such schemes will depend heavily on whether
729 the allocation of the scarce good is fair.

729 ³⁸ James Tobin defends restrictions on trade for this reason: ‘On
730 Limiting the Domain of Inequality’, *Journal of Law and Economics*, 13:2
731 (1970), 266.

732 may be cases where a degree of paternalism is justified, it is not at all
733 clear why: (a) we should assume that adults will make dire choices
734 about their energy needs, and (b) even if they do it is not at all clear
735 why the value of self-determination would be outweighed here.
736 Furthermore, (c) the argument has no force against emissions
737 trading between companies, as in the EU ETS. For paternalism to
738 be justified there must be a case for protecting an actor (in this
739 case, a company) from its own decisions. This can be plausible – in
740 restrictive conditions – when that actor has an independent moral
741 value and when protecting their well-being is of great importance
742 and when they are likely to make errors in judgement. However, com-
743 panies – unlike persons – do not have fundamental moral status; their
744 importance stems from their contribution to consumers, owners,
745 shareholders and employees. It is thus it is hard to see why we
746 should prevent a company from making poor decisions about how
747 many emissions permits to purchase or sell.³⁹

748 A more plausible argument is what we have termed the *Unreliable*
749 *Trustees Argument*. This argument runs as follows: there are cases
750 where it is either impossible or undesirable to allocate permits to
751 emit greenhouse gases to certain groups of people, and we therefore
752 have reason to create trustees to care for their interests. However,
753 these trustees are sometimes unreliable (either because they are not
754 motivated to care for those in their trust or because they are some-
755 times incompetent). Given this, rather than distribute money to
756 these unreliable trustees to care for those in their charge (which
757 they might spend inappropriately) there is a case for placing limits
758 on how the trustees can use the resources allocated to them.

759 It may be helpful to give some concrete illustrations of this kind of
760 reasoning. One example is provided by James Tobin who makes an
761 *Unreliable Trustees Argument* when he defends allocating educational
762 vouchers (rather than money) to parents.⁴⁰ This is a form of non-trad-
763 able good; it can only be used for one purpose and cannot be sold for
764 profit. The case for vouchers is that these are the best way to ensure
765 that children receive the goods we want them to receive. Now
766 someone may argue on similar grounds that emissions trading may
767 be morally problematic in cases where one has to use trustees, but
768 cannot be sufficiently confident that they will use any permits allo-
769 cated to them for the benefit of their charges. Henry Shue appears
770 to endorse this kind of reasoning and argues that states should not
771

772 ³⁹ We are grateful to Luc Bovens for pressing us on this point.

773 ⁴⁰ James Tobin 'On Limiting the Domain of Inequality', p.271. He
774 makes the same point in a discussion of food vouchers (p.268).

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775 be allowed to sell all of their emission rights because that would risk
776 harming their citizens. Some emissions, he claims, should be re-
777 garded as “inalienable”.⁴¹

778 Note, however, that Shue does not claim that this rules out all
779 emissions trading.⁴² At most, it would entail that emissions trading
780 be impermissible where that would jeopardise vital energy and
781 other needs. It thus does not give us any reason to condemn an emis-
782 sions trading scheme in the European community or within states
783 that one can assume will take a responsible approach to the emissions
784 needs of their own population. It comes into play only in countries
785 which distribute the emission rights (or the proceeds of selling emis-
786 sions rights) in such an egregiously unjust way that interfering with
787 sovereignty is unwarranted.⁴³ Thus it might, for example, apply in
788 a regime that withholds emissions necessary for a decent standard
789 of living from its citizens.⁴⁴

790
791 ⁴¹ See Henry Shue ‘Subsistence Emissions and Luxury Emissions’,
792 *Law and Policy* 15:1 (1993), 58, and Shue ‘Climate’ in *A Companion to*
793 *Environmental Philosophy* (Oxford: Blackwell, 2001) edited by Dale
794 Jamieson, 455–456. This kind of argument is also endorsed by Hyams ‘A
795 Just Response to Climate Change: Personal Carbon Allowances and the
796 Normal-Functioning Approach’, *Journal of Social Philosophy* 40:2 (2009),
797 p.244. See also pp.243–244 for further discussion where Hyams discusses
798 what we term the *Paternalism* and the *Unreliable Trustee Arguments*.
799 Hyams appears to think that Shue’s claims are a paternalistic claim about
800 whether to prevent individuals from selling their own emission rights.
801 Shue, however, is not discussing individual carbon permits and rejecting
802 them for being paternalistic. His point rather is about the dangers of
803 letting states sell all ‘their’ emissions permits, thereby jeopardising the
804 needs of their citizens. See also Shue ‘Equity and Social Considerations
805 related to Climate Change’, Papers presented at the IPCC Working
806 Group III Workshop on Equity and Social Considerations Related to
807 Climate Change, Nairobi, Kenya 18–22 July (1994) especially 389.

807 ⁴² Shue ‘Subsistence Emissions and Luxury Emissions’, p.58 and
808 ‘Climate’ 455.

809 ⁴³ On the moral limits of state sovereignty see Simon Caney *Justice*
810 *Beyond Borders: A Global Political Theory* (Oxford: Oxford University
811 Press, 2005), chapters 5.

812 ⁴⁴ What about states that do not deny their subjects the emissions
813 needed for a decent standard of living but which nonetheless distribute
814 them unjustly? This raises a number of complex issues that we cannot
815 hope to resolve here. Much depends on factors such as (i) whether emissions
816 trading with this unjust state improves or worsens the condition of the un-
817 justly treated within that state at all, (ii) whether withholding trade incenti-
818 vises the unjust government to engage in reform or whether, by contrast,

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818 *Argument D: Putting a price on the natural world?*

819 Having considered two type-4 arguments, let us turn now to a type-5
820 argument. Some may object to emissions trading on the grounds that
821 it puts a price on carbon dioxide emissions. They may argue that what
822 is objectionable about emissions trading is not that it allows people to
823 alienate their responsibilities or exchange benefits, but rather that
824 emissions trading puts a monetary value on carbon dioxide (and
825 other greenhouse gases). This, they may object, is an inappropriate
826 attitude to take to the natural world, because its value simply
827 cannot be captured in monetary terms.

828 A defender of emissions trading can, however, reply that emissions
829 trading does not necessarily involve any expression of the value of the
830 natural world. One might, for example, quite consistently adhere to
831 both of the following tenets:

- 832 (a) the natural world is of intrinsic value and its value cannot be
833 captured by monetary estimates, and
834 (b) the most efficacious way of protecting the natural world in-
835 volves setting strict limits on the extent to which humans
836 emit greenhouse gases and then allocating the remaining legit-
837 imate emissions through the operation of an emissions trading
838 scheme.
839

840 To hold that market mechanisms are an effective way of protecting
841 the natural world does not entail anything about why the natural
842 world has value. Emissions trading here is simply a means to an
843 end and is not in any way a statement about why the natural world
844 has value.⁴⁵

845 This point might be put in another way: it is often said (and we
846 endorse the claim) that political actors should ‘put a price on
847 carbon’. Cap and Trade schemes are obviously one way (though
848 not the only one) of putting a price on carbon. It is, however, crucially
849 important to be clear on what this does and does not entail. On the
850 one hand it clearly entails that to emit a certain quantity of greenhouse
851 gases will cost a certain amount of money and hence these emissions
852 permits have a price tag. However, putting a price on (a) emissions
853

854
855 engaging in trade is a more effective way of encouraging improvements, and
856 (iii) how much weight we accord to self-determination as compared with se-
857 curing an internally just distributions. See, further, Caney *Justice Beyond*
858 *Borders*, chapter 5 and 7.

859 ⁴⁵ For further discussion see Caney ‘Markets, Morality and Climate
860 Change’, 206.

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861 permits does **not** entail putting a price on (b) the protection of the
862 earth's atmosphere. Emissions trading schemes, thus, put a price
863 on the use of a certain amount of the absorptive capacity of the atmo-
864 sphere; they do not thereby put a price on the maintenance of a climate
865 that is hospitable to human and non-human life. To give an analogy
866 one might think that some ancient ruins are of great intrinsic value
867 and therefore must be protected. And one might think that the best
868 and fairest way of achieving this is to regulate access to these vulner-
869 able ruins and to charge people if they wish to visit them. In doing so
870 the scheme will put a price on 'visiting the ruins'. But by doing so it
871 does not thereby put a price on 'the protection of the ruins'. The same
872 is true of emissions trading schemes. To put a price on one thing (the
873 right to use the atmosphere) is not to put a price on another thing (the
874 preservation of our climate system).

875
876 *Argument E: Does emissions trading convert what ought to be*
877 *a fine into a fee?*

878 Let us turn now to a fifth argument against emissions trading. Like
879 the preceding argument, this argument also makes a type 5 objection.
880 It runs as follows: emissions trading grants people permission to
881 pollute so long as they pay a financial fee but, so the argument
882 runs, this is profoundly mistaken. Emitting greenhouse gases is a
883 wrong that should be fined: it is not something that one should be
884 allowed to do if one pays a fee. The core idea is nicely captured by
885 Sandel in a short critique of emissions trading. Sandel writes:
886

887 "The distinction between a fine and a fee for despoiling the
888 environment is not one we should give up too easily. Suppose
889 there were a \$100 fine for throwing a beer can into the Grand
890 Canyon, and a wealthy hiker decided to pay \$100 for the conven-
891 ience. Would there be nothing wrong in his treating the fine as if
892 it were simply an expensive dumping charge?"⁴⁶

893 Sandel's answer is 'no'. It would be wrong in this case to treat the
894 "fine" as if it were a "fee". Similarly it would be wrong for an able
895 bodied person to park in a disabled car parking space with a view
896 simply to paying the ensuing fine and treating the latter as a reason-
897 able price to pay for the privilege.⁴⁷ Sandel then applies this kind of
898 thinking to greenhouse gas emissions.⁴⁸ Persons should restrict
899

900 ⁴⁶ Sandel 'Should we Buy the Right to Pollute?', 94.

901 ⁴⁷ Sandel 'Should we Buy the Right to Pollute?', 95.

902 ⁴⁸ Sandel 'Should we Buy the Right to Pollute?', 94–95. See also
903 Goodin 'Selling Environmental Indulgences', 581–583.

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904 themselves to a fixed quota and for any of them to exceed their indi-
905 vidual quota is a crime that should be punished with a fine, not an
906 option which they can pay for (as would be the case with a fee). Let
907 us term this the *Fines/Fee Argument*.⁴⁹

908 Sandel's argument is, however, unpersuasive. It applies to cases
909 where an individual act brings about a wrong (as it does in the
910 hiker case and the car parking case), but it does not apply to cases
911 where a wrong is only caused by a large number of individual
912 actions when they hit a certain threshold. Sandel's claim that it
913 would be wrong for the hiker to treat the \$100 as a fee rather than a
914 fine is plausible. But one cannot move from this example to conclude
915 that emissions trading is similarly inappropriate. If one individual
916 throws a single beer can, then she despoils the environment.
917 However, if one individual purchases allowances so that she can
918 emit more than her quota (however that is defined) then that in
919 itself does not necessarily constitute a wrong if others, in line with
920 the terms of the transaction, emit correspondingly less than their
921 quota. A system of fees is not necessarily inappropriate.⁵⁰ Allowing
922 people to exchange emissions permits for money is not therefore a
923 case of wrongfully alienating responsibilities for money.

924 In sum, none of the five ethical arguments against climate change
925 are seen to be compelling. First, emissions trading does not rely upon
926 the private ownership of Earth's atmosphere and is compatible with a
927 commitment to global stewardship. Second, the *Collective Sacrifice*
928 *Argument* is unpersuasive because trading between firms and/or
929 states can protect the environmental without creating civic duties;
930 environmental goals and stewardship can be achieved by allocating
931 the responsibility to states, rather than to individual citizens. The
932 *Paternalistic Argument* is not applicable to emissions trading
933 between firms, and there is no particular reason to think it would
934 be persuasive even if trading took place between individuals.
935 Third, the *Unreliable Trustees Argument* might entail that emissions
936 trading be impermissible with corrupt states where this might jeopardize
937 vital energy and other needs. However, it is not an argument
938 against emissions trading per se and does not rule out emissions
939 trading such as the EU ETS or systems in other well-governed
940

941 ⁴⁹ For an interesting study of how people may treat what are intended as
942 fines as if they were fees see Uri Gneezy and Aldo Rustichini's well-known
943 paper 'A Fine is a Price', *Journal of Legal Studies* 29:1 (2000), 1–17.

944 ⁵⁰ On this point see Caney 'Justice, Morality and Carbon Trading', 210.
945 This point is also made by Hyams 'A Just Response to Climate Change',
946 243.

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947 countries. Fourth, while emissions trading puts a price on carbon
948 dioxide emissions, this is not an expression of the value of the
949 natural environment. Fifth, Sandels' *Fines/Fee Argument* is unper-
950 suasive because each individual tonne of carbon dioxide emitted
951 does not constitute a moral wrong — it is the aggregate damage
952 that is problematic. An emissions trading or a system of taxes is
953 able to prevent this damage, without the need to criminalise the
954 activity of emitting and impose a system of fines.

955

956

957 **5. The (distributive) justice of emissions trading**

958

959 Section 4 considered the five strongest arguments for the claim that it
960 would be intrinsically objectionable to create a system of emissions
961 trading, and found them to be relatively weak. However, even if there
962 is nothing intrinsically unethical about trading emissions permits,
963 this does not necessarily imply that emissions trading will lead to just
964 outcomes. In this section, we consider the impacts of emissions
965 trading on distributive justice and the distribution of wealth. In focuss-
966 ing on this issue we are not assuming that distributive justice is the only
967 relevant consideration in determining whether a policy is just. It is,
968 however, an important consideration and it is the focus of this section.

969 We start from the assumption that, other things being equal, a
970 more equal distribution of wealth is preferable to a less equal distri-
971 bution. In general, market systems have a tendency at best to perpet-
972 uate existing distributions of wealth, and at worst to exacerbate
973 wealth differences between rich and poor. Market economies
974 involve greater uncertainty than planned economies, and the skilled
975 and the fortunate are the beneficiaries, while the unskilled and the
976 unlucky tend to suffer bad outcomes. While market economies tend
977 to generate aggregate wealth and promote liberty, they can and do
978 lead to highly unequal outcomes.

979 As with markets generally, environmental markets should not
980 necessarily be expected to promote distributive justice or reduce in-
981 equality. Other things being equal, one might therefore expect the
982 move to emissions trading to generate more unequal outcomes.
983 However, the distributional consequences of an individual ETS are
984 a function of the specific rules for allocating permits. Indeed, there
985 is no reason in principle for an ETS to lead to more unequal distri-
986 bution of wealth. It will depend on how the scheme is designed.
987 The key point is this: whatever account of distributive justice one
988 favours, the ETS can be designed to deliver a just outcome, either
989 by specifying the allocation of permits in line with this favoured

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990 principle or by auctioning the permits and then distributing the revenues in line with this favoured principle.

992 In practice, two considerations will determine whether an ETS
993 exacerbates or reduces inequality: first, the impact of increasing the
994 cost of emitting pollution on different segments of the population
995 and second, the transfers of wealth involved in the sale or free allocation of emissions allowances.

997 Controlling pollution directly or indirectly leads to an increase in
998 the cost of pollution so that individuals and firms produce less of
999 it. The evidence available strongly suggests that controlling carbon
1000 dioxide emissions is regressive, which is to say that the impacts are
1001 worse for low-income households (as a proportion of their income)
1002 than high-income households. This effect can be neutralised or reversed
1003 if the policy (whether emissions trading or taxes or otherwise)
1004 raises government revenue which is recycled to compensate poorer
1005 households.⁵¹ In Australia, for instance, the Garnaut Review notes
1006 that roughly 10 per cent of income is spent on transport fuel, gas
1007 and electricity by low-income households, while high-income households
1008 spend only 5 per cent on these goods.⁵² Pricing pollution thus
1009 hits poorer people relatively harder. Further, poorer households
1010 often rent, rather than own, their accommodation, which further
1011 constrains their ability to respond by adopting low-emissions substitutes,
1012 such as insulation, efficient space heating, hot water systems and
1013 cooking appliances. Similar effects are found in other countries.

1014 For emissions trading to avoid regressive impacts, allowances must
1015 be sold to firms with a portion of the revenues directed to provide
1016 compensation to poorer households. This compensation could be a
1017

1018 ⁵¹ On the regressivity of carbon taxes, see James M. Poterba 'Tax Policy
1019 to Combat Global Warming: On Designing a Carbon Tax' in Rudiger
1020 Dornbusch and James M. Poterba (eds.) *Global Warming: Economic
1021 Policy Responses*. MIT Press, Cambridge, MA, 1991 and Gilbert E.
1022 Metcalf, 'A Distributional Analysis of Green Tax Reforms', *National Tax
1023 Journal* **52** (1999), 665–681. But for the opposite conclusion see Thomas
1024 Sterner, 'Fuel taxes: An important instrument for climate policy', *Energy
1025 Policy* **35** (2007), 3194–3202. On the distributional consequences of
1026 command and control policies, see Leonard P. Gianessi, Henry M. Peskin
1027 and Edward N. Wolff 'The Distributional Effects of Uniform Air
1028 Pollution Policy in the United States', *Quarterly Journal of Economics*, **93**
1029 (1979), 281–301 and David H. Robison, 'Who Pays for Industrial
1030 Pollution Abatement?' *Review of Economics and Statistics* **67** (1985),
1031 702–706.

1032 ⁵² Ross Garnaut, *The Garnaut Climate Change Review*, Cambridge:
Cambridge University Press, 2008, ch 16.

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1033 function of the costs required to adjust to a low-carbon economy, or
1034 could simply be given to low-income households through the tax
1035 system.

1036 In addition to the fact that pollution control increases the price of
1037 pollution, a second consideration is that pollution policies transfer
1038 wealth from some individuals to other individuals, depending upon
1039 the particular policy and how it is implemented. For instance,
1040 carbon taxes on industrial firms normally transfer wealth from their
1041 shareholders back to the government. Carbon taxes need not have a
1042 regressive effect, provided the government doesn't give the funds
1043 back to the same firms, or earmark the funds for particular pet pro-
1044 grammes (which often occurs in practice for political reasons). If
1045 funds are used to reform and reduce the burden of taxation on the
1046 poor, the impact of carbon taxes could be progressive. Similarly, auc-
1047 tioned permits under a cap-and-trade scheme transfer wealth from
1048 firms to governments, and again provided these funds are used sensi-
1049 bly, the effect need not be regressive and could be progressive.

1050 However, for the most part – for the political reasons discussed
1051 above – governments have not auctioned off permits or used tax rev-
1052 enues for progressive reforms of the tax system. Rather, as in the EU
1053 ETS, the vast majority of “European allowances”, or EUAs, have
1054 been given to firms for free, rather than auctioned.⁵³ This has
1055 created windfall profits for firms, because (a) the emissions trading
1056 scheme creates a price which increases marginal costs of all units of
1057 production, which is often largely passed on to consumers in the
1058 form of higher goods prices, depending on the market structure;
1059 but (b) the firms are given most of the EUAs for free. In other
1060 words, marginal costs of production on all units increase, because
1061 firms need to retire a permit for every unit of production.
1062 However, firms (a) pass the cost increase onto consumers in the
1063 form of higher prices, and (b) they are compensated by government
1064 for the cost increase by being granted permits — which are a substan-
1065 tial financial asset — for free.⁵⁴ Thus, the EU ETS has created
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1067 ⁵³ Cameron Hepburn, Michael Grubb, Karsten Neuhoff, Felix
1068 Matthes, and Max Tse., ‘Auctioning of EU ETS Phase II allowances:
1069 how and why?’ *Climate Policy*, 6:1 (2006), 135–158.

1070 ⁵⁴ See Robin Smale, Murray Hartley, Cameron Hepburn, John Ward,
1071 and Michael Grubb, ‘The impact of CO₂ emissions trading on firm profits
1072 and market prices’, *Climate Policy*, 6:1 (2006), 31–48 and Cameron
1073 Hepburn, John K.-H. Quah, Robert A. Ritz. ‘Emissions trading and
1074 profit-neutral grandfathering’, *Economics Papers* 2008-W12, Economics
1075 Group, Nuffield College, University of Oxford.

1076 large-scale wealth transfers from taxpayers to firms, who have reaped
1077 substantial windfall profits. Rather than support suppliers, custo-
1078 mers, or employees, these windfalls have largely been retained by
1079 shareholders, who are wealthier than the average taxpayer. The con-
1080 sequence is that it seems almost certain that the EU ETS has been sig-
1081 nificantly regressive. Similarly, in the USA, Parry argues that the free
1082 allocation of permits to industry would be regressive, redistributing
1083 income from poorer to richer households.⁵⁵

1084 The conclusion is that climate-change policies are likely to create
1085 regressive impacts without other compensatory measures, and the
1086 EU ETS is certainly no exception so far. However, the design of
1087 the EU ETS has been improving as policymakers have learned
1088 from their mistakes. For instance, in the third phase of the system
1089 (2013–2020), the cap is much tighter (at least 20% and possibly
1090 30% reductions from 1990 levels), and the proportion of EUAs sold
1091 at auction will increase substantially. However, even with these
1092 effects, it would seem that the EU ETS is likely to remain a regressive
1093 way of reducing emissions, at least until 2020. A policy that puts a
1094 price on emissions will only be progressive if it also raises significant
1095 amounts of government revenue to compensate low-income house-
1096 holds. As this has apparently been too difficult for politicians to
1097 achieve so far, we conclude that emissions trading as currently
1098 implemented has had negative consequences for distributive justice.

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1101 **6. The effectiveness of cap-and-trade**

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1103 The effectiveness of any climate-change policy is also an ethical matter.
1104 If climate policies are not able to reduce emissions at the appropriate
1105 rate and scale, the risks imposed upon future generations would
1106 likely be considered to contravene intergenerational justice. Previous
1107 experience with cap-and-trade systems has shown that such systems
1108 can make significant contributions to environmental protection, pro-
1109 vided that they are designed and implemented correctly.

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1111 *6.1 Is cap-and-trade politically feasible?*

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1113 One critically important question to ask of any proposed climate
1114 policy is whether it is actually politically feasible. Over the last 40
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1117 ⁵⁵ Ian W H Parry, 2004. Are emission permits regressive? *Journal of*
1118 *Environmental Economics and Management*, 47:2, 364–387.

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1119 years, climate-change policies have proven extremely difficult to put
1120 in place. Because these policies provide a global public good, every
1121 country, particularly smaller countries, have an incentive to free-
1122 ride on others' efforts. Furthermore, achieving domestic political
1123 agreement on tackling climate change is challenging because there
1124 are many powerful losers and relatively few winners (unless other
1125 nations take similar action). Furthermore, the science continues to
1126 have important uncertainties, and the costs are incurred now while
1127 the benefits accrue decades and centuries into the future. Given
1128 these perspectives, instead of asking "why has so little been
1129 achieved?"⁵⁶ some sceptical economists often find it remarkable
1130 that any action has occurred at all, and consider the real puzzle to
1131 be why anything at all has been achieved.⁵⁷

1132 Cap-and-trade systems have the virtue that they are almost the only
1133 deliberate climate-change policy to actually reduce emissions to any
1134 significant degree so far.⁵⁸ Half of the European economy is subject
1135 to the EU ETS, with a revealed price of around €10–20/tCO₂, sig-
1136 nificantly higher than any other serious direct price signal elsewhere
1137 in the world. Other cap-and-trade schemes include the Regional
1138 Greenhouse Gas Initiative in the north-eastern USA, the Western
1139 Climate Initiative in several western USA states and Canadian pro-
1140 vinces, and those adopted in the Australian state of New South
1141 Wales, Switzerland, Norway, Japan, New Zealand. As noted above,
1142 both China and India have also recently announced that they will
1143 be implementing cap-and-trade systems to reduce their absolute
1144 level of emissions.

1145 The reason why some states and regions have been able to put a price
1146 on greenhouse gas emissions with emissions trading, whereas efforts to
1147 date with carbon taxes have not been as successful, is that cap-and-trade
1148 systems are able to garner political support from a wide spectrum of rel-
1149 evant actors. Environmentalists have supported cap-and-trade systems
1150 because the cap on emissions, which gets tighter over time, is the best
1151 method of securing a good environmental outcome. Industry has
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1153 ⁵⁶ Dieter Helm, 2010. "Climate-change policy: why has so little been
1154 achieved?" in Dieter Helm and Cameron Hepburn. (eds) *The Economics
1155 and Politics of Climate Change*. Oxford: Oxford University Press.

1156 ⁵⁷ Scott Barrett. 2003. *Environment and Statecraft*, Oxford: Oxford
1157 University Press.

1158 ⁵⁸ Greenhouse gas emissions have been reduced by non-deliberate
1159 events or policies, such as the recent recession and the Montreal Protocol
1160 on Substances That Deplete the Ozone Layer (1989) to the Vienna
1161 Convention for the Protection of the Ozone Layer (1985).

1162 supported cap-and-trade ahead of direct regulation because it is cheaper
1163 and minimises the costs of compliance, and industry prefers cap-and-
1164 trade to taxes because, as discussed above, cap-and-trade allows a pro-
1165 portion of allowances to be given to firms for free. Finally, cap-and-
1166 trade systems have a natural constituency once they are up and
1167 running. The industrial firms which own the permits will see the
1168 value of that asset increase as the cap is tightened. Financial firms
1169 who trade the asset also have an interest in rising carbon prices.
1170 Unlike a carbon tax, where there is no strong constituent to support
1171 them, cap-and-trade systems have, rightly or wrongly, found support
1172 across a cross-section of environmentalists and business that make
1173 them more politically feasible.

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1176 *6.2 Defining effectiveness*

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1178 Only once a system has been implemented can its effectiveness be
1179 assessed. The effectiveness of emissions trading depends on the ques-
1180 tion which it is intended to answer. Is emissions trading intended to
1181 deliver global emission reductions of over 50% by 2050, without other
1182 policy interventions? Or is emissions trading intended to be part of a
1183 package of climate policies, so that its effectiveness is measured by
1184 whether it has made a sufficiently substantial contribution to redu-
1185 cing emissions?

1186 In addition to measuring effectiveness of emissions trading accord-
1187 ing to the appropriate objective, effectiveness must also be measured
1188 by reference to a ‘counterfactual’, namely a baseline scenario describ-
1189 ing what would have happened if the emissions trading scheme had
1190 not been introduced. Emissions trading can guarantee a specific
1191 limit on *emissions*, but it cannot guarantee a specific *reduction in emis-*
1192 *sions* compared to business-as-usual, because business-as-usual emis-
1193 sions are uncertain. For instance, a given emissions target might be
1194 achieved not because of emissions trading, but because of a severe
1195 economic recession which caused a fall in business-as-usual emis-
1196 sions. In a recession, economic activity falls and emissions fall, so
1197 the demand for permits could fall to the extent that the permit
1198 price could end up at zero. In such circumstances, it would be diffi-
1199 cult to conclude that the ETS is working to reduce emissions. In con-
1200 trast, if the price of emissions allowances is positive, then it follows
1201 that emissions trading is probably reducing emissions. The higher
1202 the allowance price, the greater the relative impact of the emissions
1203 trading scheme, and the lower the relative contribution of business-
1204 as-usual changes to reducing emissions.

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1205 6.3 Has cap-and-trade reduced emissions?

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1207 Cap-and-trade systems have been successfully used in the United
1208 States to phase out leaded gasoline in the 1980s,⁵⁹ reduce sulphur
1209 dioxide (SO₂) and nitrogen oxides (NO_x) emissions from power
1210 plants from 1995 onwards,⁶⁰ and the phase-out of chlorofluorocar-
1211 bons (CFCs).⁶¹ The leaded gasoline programme achieved environ-
1212 mental targets with an estimated cost saving of \$250 million per
1213 annum.⁶² The SO₂ programme also achieved environmental
1214 targets, saving \$1 billion per annum compared with the estimated
1215 costs of other regulatory approaches.⁶³

1216 The fact that a particular policy intervention has worked for one
1217 environmental problem does not imply that it will necessarily work
1218 for others. Climate change is a particularly vexing environmental
1219 challenge because it is international, intergenerational, based on
1220 complex and uncertain science, and involves almost every aspect of
1221 production and consumption around the world. Many economists
1222 express the view that emissions trading (or some other form of emis-
1223 sions pricing, such as international carbon taxes) is a necessary but
1224 not sufficient component of overall climate-change policy. Other pol-
1225 icies are needed because of the presence of multiple ‘market failures’.

1226 The most significant experiment with cap-and-trade systems for
1227 greenhouse gases to date began with the launch of the EU ETS in
1228 2005. In the first phase of the scheme, from 2005–2007, carbon
1229 prices rose to highs of above €30/tCO₂ and then crashed to near
1230 zero for most of 2007. Zero prices arose when it became clear in the
1231

1232 ⁵⁹ Suzi Kerr, and David Maré ‘Efficient Regulation Through
1233 Tradeable Permit Markets: The United States Lead Phasedown’,
1234 Department of Agricultural and Resource Economics, University of
1235 Maryland. Working Paper 96–06 (January); Albert L. Nichols, ‘Lead in
1236 Gasoline’, in Richard D. Morgenstern, ed., *Economic Analyses at EPA:
1237 Assessing Regulatory Impact* Resources for the Future, Washington, D.C.
1238 1997, 49–86.

1239 ⁶⁰ A. Denny Ellerman, Paul L. Joskow, Richard Schmalensee Juan-
1240 Pablo Montero, and Elizabeth M. Bailey. (2000), *Markets for Clean Air:
1241 The US Acid Rain Program*, New York, Cambridge University Press.

1242 ⁶¹ Robert N Stavins, ‘Addressing climate change with a comprehensive
1243 US cap-and-trade system’, *Oxford Review of Economic Policy* 24:2 (2008),
1244 298–321.

1244 ⁶² Albert L. Nichols, ‘Lead in Gasoline’, 49–86.

1245 ⁶³ Carlson, Curtis, Dallas Burtraw, Maureen Cropper, and Karen
1246 Palmer. 2000. ‘SO₂ Control by Electric Utilities: What are the Gains from
1247 Trade?’ *Journal of Political Economy*, 108:6 (2000), 1272–1326.

1248 third and final year of the phase that that aggregate emissions were
1249 well below the number of allowances issued. This surplus of allowan-
1250 ces implied that they were worthless. The period of zero prices in
1251 2007 was problematic for several reasons; most importantly the in-
1252 centive to continue reducing emissions was dramatically weakened.

1253 The price collapse was caused by a combination of two things.
1254 First, firms actually reduced their emissions in the first two years
1255 of the phase, motivated by high prices in the 2005 and 2006 period,
1256 so that they didn't need as many allowances in 2007. Second, regula-
1257 tors handed out too many EUAs in the first place, as a result of un-
1258 certainty about business-as-usual emissions and sustained lobbying
1259 by individual firms and EU Member States for additional allowances.
1260 What is the overall balance between these two considerations?
1261 Ellerman and Buchner review the EU ETS over 2005 and 2006,
1262 when emissions were 60 million tonnes (or 3 per cent) below the allo-
1263 cation levels.⁶⁴ After a careful econometric analysis, they conclude
1264 that, although there is considerable uncertainty, emissions were prob-
1265 ably reduced compared to business-as-usual by 50 to 100 million
1266 tCO₂ in each of those two years by the EU ETS, amounting to
1267 several percent of total emissions in the scheme. This is a considerable
1268 achievement; by comparison, the entire UK economy (which is par-
1269 tially covered by the EU ETS) emits around 500 million tCO₂ in any
1270 given year. This suggests that, even with the manifest design flaws in
1271 the first phase of the EU ETS, and in a system that had zero prices for
1272 a considerable period, significant reductions in emissions compared
1273 were achieved compared to business-as-usual.

1274 More recent analysis supports this view. Anderson and di Maria
1275 (2010) find that over the three trading years of the pilot phase from
1276 2005–2007, total abatement was 247 million tonnes, or just over 80
1277 million tonnes per year.⁶⁵ Consistently, a separate study by Delarue
1278 et al. (2008) found reductions in the power sector alone of 30–60
1279 million tonnes in 2005 and 20–35 million tonnes in 2006.⁶⁶

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1282 ⁶⁴ Denny Ellerman, and Barbara Buchner. 'Over-Allocation or
1283 Abatement? A Preliminary Analysis of the EU ETS Based on the
1284 2005–06 Emissions Data', *Environmental and Resource Economics*, **41**
1285 (2008), 267–287.

1286 ⁶⁵ Barry Anderson and Corrado di Maria. 'Abatement and allocation in
1287 the pilot phase', *Environmental and Resource Economics*, 2010. DOI:
1288 10.1007/s10640-010-9399-9.

1289 ⁶⁶ Erik Delarue, Kris Voorspools, William D, D'haeseleer. 'Fuel
1289 switching in the electricity sector under the EU ETS: review and prospec-
1290 tive'. *Journal of Energy Engineering*, **134**:2 (2008), 40–46.

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1291 Indeed, even though the price in the first Phase (from 2005–2007)
1292 ultimately did fall to zero, Ellerman and Buchner (2008) point out
1293 that it is unsurprising that emissions were reduced given the follow-
1294 ing three observations:⁶⁷

- 1295 1. The price of EUAs was positive and significant during the
1296 2005–2006 period, providing firms with an incentive to
1297 reduce emissions;
- 1298 2. Real output in the EU rose over those two years, and improve-
1299 ments in CO₂ intensity had been declining which implies a
1300 baseline of increasing CO₂ emissions prior to 2005; and
- 1301 3. Historical emissions data indicate a reduction in absolute emis-
1302 sions over the relevant period, allowing for plausible bias.
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6.4 Will cap-and-trade reduce emissions in future?

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Even if the EU ETS has been successful at reducing emissions to date, it must do so at much greater scale in the future if it is to provide a policy response commensurate with the scale of the challenge. There have been several changes in the design of the EU ETS between Phase 1 and the current Phase 2 (from 2008–2012), with further improvements in place for Phase 3 (from 2013–2020). Current allowance prices are around €10–20/tCO₂, significantly higher than any economy-wide carbon tax, and market participants who publish forecasts of future prices expect prices to increase substantially over the coming years. To some extent, companies take these future prices into account when making their investment decisions.

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Some of the more significant changes since Phase 1 have been as follows:

- 1322 – The EU commission has been more resistant to lobbying by
1323 firms, and has insisted on greater cuts in emissions than re-
1324 quested by EU Member States and their firms;
- 1325 – A higher proportion of EU allowances (EUAs) are being auc-
1326 tioned to firms rather than given away for free;
- 1327 – Banking of allowances is possible from Phase 2 to Phase 3. This
1328 promotes confidence that carbon market prices will not fall to
1329 zero. Indeed, prices were positive even during the recent
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⁶⁷ Denny Ellerman, and Barbara Buchner. 'Over-Allocation or Abatement? A Preliminary Analysis of the EU ETS Based on the 2005–06 Emissions Data',.

1334 financial crises and recession, which reduced output and base-
1335 line emissions. This is because the market price reflects the
1336 effort required by market participants to achieve the agreed
1337 emission reductions through to 2020.

1338 These changes suggest that emission reductions created through the
1339 2008–2012 phase are likely to be significantly greater than those in the
1340 so-called ‘learning’ phase from 2005–2007. Furthermore, emissions
1341 reductions in the 2013–2020 phase will take the European economy
1342 substantially below business-as-usual, and indeed 20–30% below
1343 emissions in 1990.

1344 **7. Conclusion**

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1348 Cap-and-trade systems for greenhouse gas emissions have been put in
1349 place in several countries over the last decade. While the evidence so
1350 far suggests that they have been successful in reducing emissions,
1351 they have been subject to increasing criticism by climate-change
1352 sceptics. Over the course of 2010, they were also tarred with the
1353 same brush of dissatisfaction addressed towards the United Nations
1354 negotiations, which failed to deliver a binding agreement at the inter-
1355 national conference in Copenhagen in December 2009, but which
1356 appears to have achieved greater progress at Cancún in December
1357 2010. In this paper we hope to have identified key ethical criteria
1358 by which one can evaluate such schemes. More specifically, we
1359 have defended four conclusions.

1360 First, we have noted in their favour that emissions trading schemes
1361 may minimize waste and recognize person’s interest in liberty.

1362 Second, we have provided a taxonomy of ethical objections to the
1363 market. Drawing on this we have examined five different attempts to
1364 show that emissions trading schemes are inherently unethical and
1365 have found each of these attempts wanting. Emissions trading
1366 schemes, so we have argued, are not committed to either ‘ownership’
1367 rights or unacceptable ‘use rights’ over the atmosphere as a whole
1368 and are compatible with an ideal of environmental stewardship
1369 (Argument A). In addition to this, while the *Collective Sacrifice*
1370 *Argument* has force in some contexts, we have no reason to apply it
1371 to this particular context (Argument B). A third argument – that one
1372 may restrict emissions trading in order to protect the vulnerable –
1373 can take two forms, but neither rule out emissions trading entirely
1374 (Argument C). Such arguments (in particular what we termed the
1375 *Unreliable Trustees Argument*) draw our attention to the important
1376 issues of who should possess the legal rights to emit greenhouse

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1377 gases and how one can best ensure that the permits (or the revenues of
1378 auctions) should reach the people entitled to them. Such concerns do
1379 not, however, undermine many emissions trading schemes
1380 (Argument D). Finally, we have argued that emissions trading
1381 schemes do not elide the distinction between a ‘fee’ and ‘fine’
1382 (Argument E). Emissions trading schemes are, thus, not in principle
1383 objectionable.

1384 Having considered these five root-and-branch critiques of emis-
1385 sions trading we then turned to two other criteria relevant to the
1386 evaluation of emissions trading schemes. The first critical issue is
1387 the effect of emissions trading schemes on the distribution of
1388 wealth. This takes us to our third conclusion which is that while
1389 cap-and-trade systems are not intrinsically unethical, they (like
1390 other policies that put a price on greenhouse gas emissions) are
1391 likely to hit poorer households harder than richer households, with
1392 unwelcome implications for distributional justice. The current EU
1393 ETS puts a price on pollution without providing adequate compen-
1394 sation for poor households and, as a result, it has had a greater impact
1395 on the poor relative to the rich. This is not a necessary outcome,⁶⁸ and
1396 in principle it is possible to design an ETS so that the revenues from
1397 auctioning permits are used to produce a progressive result. Indeed,
1398 companies in the EU ETS will have to pay for a greater proportion of
1399 their allowances over time, so there is some possibility that this
1400 problem will be resolved as the ETS matures. That said, it is unlikely
1401 that the EU ETS will be progressive for at least another decade.

1402 This leaves the final crucial consideration, namely ‘are emissions
1403 trading schemes an effective means of mitigating climate change?’.
1404 Our conclusion here is that a careful analysis of cap-and-trade
1405 systems shows that they are more effective at reducing emissions
1406 than many of their critics appear to believe. As noted above, even
1407 in the 2005–2007 learning phase of the EU ETS, discredited as
1408 having “failed” by some critics, it is estimated that 50–100 million
1409 tonnes of CO₂ a year were reduced compared to business-as-usual.
1410 The current phase (2008–2012) of the EU ETS will deliver greater
1411 reductions, notwithstanding the recession, and the reductions deliv-
1412 ered in the next phase (2013–2020) depend upon whether the EU
1413 commits to a 20% or a 30% target in the course of the next year or so.

1414 Given the moral virtues of cap-and-trade systems and the absence
1415 of compelling moral objections relative to other policy possibilities,
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1417 ⁶⁸ Indeed, research suggests that fuel taxes might not be regressive in
1418 developing countries: Thomas Sterner, ‘Fuel taxes: An important instru-
1419 ment for climate policy’, *Energy Policy* **35** (2007), 3194–3202.

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1420 we conclude that emissions trading remains a valuable policy tool
1421 with which to address climate change. Carbon taxes have some
1422 advantages over cap-and-trade,⁶⁹ but in other ways are worse, not
1423 least in the fact that they provide no guarantee of environmental out-
1424 comes, and are significantly more difficult to establish politically.
1425 Indeed, carbon taxes are likely to continue to be politically difficult,
1426 especially in the USA, to implement and maintain at a level that will
1427 achieve reductions in emissions at the necessary rate to provide a just
1428 outcome for future generations. Direct regulation is inferior to an
1429 ETS or a carbon tax because it increases costs of compliance, in-
1430 creases wastage and reduces liberty of individuals and companies to
1431 adapt to a low-carbon economy in the manner most suitable to
1432 them. In an ETS, the possibility of *trade* minimises waste, the *cap*
1433 ensures environmental integrity over time, potentially according to
1434 a gradual “contraction and convergence” pathway,⁷⁰ and the *allo-*
1435 *cation* of the permits determines the distributive justice (and political
1436 success). None of this is to suggest that a single cap-and-trade system
1437 would alone be an adequate response to climate change. Nevertheless,
1438 it is a morally valuable, rather than a morally suspect, contribution to
1439 moving at speed and at scale to the low-carbon economy required for
1440 humans to continue to flourish on Earth into the next century and
1441 beyond.

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1458 ⁶⁹ Cameron Hepburn, ‘Regulation by prices, quantities or both: A
1459 review of instrument choice’, *Oxford Review of Economic Policy* 22:2
1460 (2006), 226–247.

1461 ⁷⁰ Aubrey Meyer, ‘Contraction and Convergence: The global solution
1462 to climate change’.