



# **Ecological modernization and the governance of carbon: a critical analysis**

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# Ecological Modernisation and the governance of carbon: a critical analysis

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## Abstract

In this paper, we use insights derived from a critical evaluation of ecological modernisation (EM) theories to examine the origins and influence of new, market based, forms of carbon governance. Focusing on two key examples of these, namely emissions trading in Europe and the global market in offsets, we argue that EM theories can help us both to understand the processes through which the seemingly intractable problem of climate change has, over a relatively short period of time, been reframed as an opportunity to construct a new carbon economy and to anticipate some of the tensions, contradictions and limits of such an approach. We then explore the governance dimensions of these novel market mechanisms. We explore, in turn, the *political drivers* of these new forms of carbon governance: how they came to be 'naturalized' as preferred policy options. We then look at *how they work*: how decisions are made and which actors are enrolled in the process of governing to lend it authority, legitimacy and effectiveness. We then discuss *whether, to what extent and for whom* they work. We highlight a series of (un)-intended consequences that flow from these practices and modes of governing. These include accountability and legitimacy deficits, participation gaps and uneven spatial and social development. We conclude by discussing the significance of these observations both for debates on climate change and the governance of carbon and for theories of EM.

**Key words:** carbon markets, Clean Development Mechanism (CDM), ecological modernisation, ETS, governance

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## 1. Introduction

Ecological modernisation (EM) theories are centrally concerned with the relationship between environment and economy and with social capacities to recognise and respond to existing and emergent environmental problems (see Gouldson *et al.* 2008, Mol *et al.* 2009). EM theories therefore seek to describe, and in some cases to promote, the processes of framing and learning that might allow modern societies to mediate the relationship between environment and economy more effectively.

EM theories have helped to describe the ways in which environmental problems come to be framed as issues that are politically, economically and technologically solvable within the context of existing institutions and power structures and continued economic growth (Murphy and Gouldson 2000). This faith in science and technology, in governments and policy and in markets and economic growth creates a political space within which institutional learning and policy reform can more readily take place because it avoids triggering opposition from mainstream actors and established vested interests (Giddens 2009).

Within this paper, we argue that there are clear parallels between EM theories and contemporary mainstream debates on climate change. Consequently, an exploration of critical perspectives on EM theories can help us both to understand the processes through which the seemingly intractable problem of climate change has, over a relatively short period of time, been reframed as an opportunity to construct a new carbon economy and to anticipate some of the tensions, contradictions and limits of such an approach.

The paper is structured in the following way. In the next section, we examine key features of EM theories. We argue that although the processes of framing and learning that are at the heart of EM make 'wicked' (Rittel and Webber 1973) environmental problems such as climate change more tractable, they fail to consider the extent to which climate change can be dealt with without a change in social values or in society-nature relations. We also argue that they are blind to the procedural and distributional justice implications of this framing of the problem and ignore the structural causes and consequences of a growth logic that may ultimately be fundamentally incompatible with dealing with climate change.

We then apply insights from EM theories to two cases that exemplify the emergence of market-based approaches to climate change; emissions trading and the market in offsets. In each case, we explore the governance dimensions of these novel market mechanisms. We explore, the *political drivers* of these new forms of carbon governance: how neo-liberal approaches to climate governance came to be 'naturalized' as preferred policy options. We then look at *how they work*: how decisions are made and which actors are enrolled in governing processes to lend authority, legitimacy and effectiveness. Next, we discuss *whether, to what extent and for whom* they work. We then highlight a series of (un)-intended consequences that flow from these practices and modes of governing that derive from the patterns of delegated authority and forms of valuation upon which they depend. These include accountability and legitimacy deficits, participation gaps and uneven spatial and social development. Finally, we reflect on the ways in which current attachment to these approaches may serve to exclude and neglect adequate consideration of other ways of addressing climate change which may be equally or more effective, but do less to reinforce the power of dominant interests. We conclude by discussing the significance of these observations for debates on climate change, carbon governance and theories of EM.

## 2. Ecological modernisation and the governance of carbon

As with many forms of modernism, EM is essentially optimistic about the future. EM theories are interested in the processes of reflexive modernisation that allow societies to recognise and respond to emergent environmental problems (Beck 1995, Lash *et al.* 1996, Christoff 1996). They are concerned with the discourses through which environment-economy relations are framed and re-framed (Hajer 1995), notably as being mutually supportive rather than antagonistic (Gouldson and Murphy, 1996). They have also been used as a basis for prescribing new ways of mediating the relationship between environment and economy (Jänicke *et al.* 1989, Simonis 1989, Mol 1995). Clearly this belief that progress can be made without questioning the basis of modern life has made EM politically attractive, at least in the mainstream.

However, climate change, as a classically ‘wicked’ environmental problem (Rittel and Webber 1973), has challenged the optimism of EM. Such problems are systemic or structural in their origin, operate across multiple scales, occur over long periods of time and will have imperfectly known causes and unexpected consequences (see Berkhout and Gouldson 2003). Capacities first to recognise and then to respond to such problems clearly take some time to emerge. Whilst obviously not uncontested, the accumulation of scientific evidence on climate change over many years has strengthened capacities for problem recognition. But the social response has lagged behind the scientific recognition, partly because of a widespread reluctance to accept the ‘inconvenient’ evidence, and then because of uncertainty about how to respond to a problem where the causes and the consequences are systemic in their nature.

For a period, then, the optimism of the modernists seemed to falter. However, in recent years a substantial degree of technological and economic optimism has emerged. Technologically, authors such as Pacala and Socolow (2004) have claimed that ‘humanity can solve the carbon and climate problem in the first half of this century simply by scaling up what we already know how to do’. Economically, Stern’s (2006) claim that the costs of tackling climate change are both relatively affordable and much lower than the costs of not acting have changed the political landscape by making it economically possible and economically necessary to act on climate change. This combination of technological and economic optimism - coupled with claims that tackling climate change could have social, economic, environmental and geo-political co-benefits - has in turn made it politically viable for many governments to set ambitious targets for decarbonisation.

However, this has happened in a context where state capacities to intervene in the economy have become more limited (see Gouldson and Bebbington 2007). Globalisation and liberalisation have meant that the political capital needed to intervene escalates significantly if interventions have any negative impacts on economic competitiveness - and such interventions may lead not to the management but merely to the displacement of economic activities through phenomena such as carbon leakage. EM theory would suggest that these limits have led to innovation and policy learning - particularly through a transition away from traditional state-centred forms of intervention and towards more neo-liberal and de-centred forms of governance that include a greater emphasis on markets as key delivery mechanisms for environmental governance (Gouldson and Bebbington 2007).

This ‘governance turn’ has thus been associated with a shift away from the ‘controller’ state with its reliance on the hierarchical application of rules and regulations towards the ‘facilitator’ or ‘enabler’ state (Black 2002). Rather than regulating economic activity directly, the facilitator or enabler state seeks to create conditions that allow economic or social actors to govern particular activities. These changes have been

reflected in the range of environmental policy instruments that are used in many settings, with experiments with economic and information based instruments and an increased emphasis on voluntary approaches and different forms of self-regulation. Within these decentred approaches, authority and responsibility are dispersed within broader networks - and so governance becomes a multi-level, multi-actor phenomena which is complex and fragmented, with new patterns of interaction emerging as a variety of economic and social actors are enlisted to 'do the governing' (Black 2002, Bulkeley and Newell 2010).

These developments - the creation of a weight of scientific evidence, the associated increases in social awareness and concern, the gradual reframing of a wicked problem as a technologically, economically and politically tractable problem, experiments with new forms of governance that enable action within the constraints of globalisation and liberalisation - are manifestations of the transformations that are at the heart of processes of EM (Mol and Sonnenfeld 2009). As Hajer (1996) notes, such processes can be interpreted either optimistically as institutional learning - where rational, and responsive institutions learn, adapt and produce meaningful change - or pessimistically as a technocratic project that produces nothing more than a temporary fix to the longer-term structural conflict between environment and economy.

Of these two interpretations, critical perspectives on EM hold that it should be seen as a technocratic project for a number of reasons. Firstly, EM has been criticised for having little to say either on issues of social justice - both in its processual and its distributional forms - or on society-nature relations (Gouldson and Murphy 1997, Fisher and Freudenberg 2001). Secondly, it has been criticised for being spatially contingent, not least because it is based on values and assumptions about institutional capacities that are seen by many to be peculiar to Northern Europe (Sonnenfeld and Mol 2009), and because developed countries attempts at EM often serve to relocate the problems to industrializing and developing countries (Pepper 1998). Thirdly, it has been criticised for creating a hegemony that empowers and legitimises pragmatists who are willing to compromise in their search for politically viable ways forward, whilst simultaneously marginalising and disempowering the radicals who hold that such compromises will merely prolong the life of an economic system that needs deeper and more fundamental change if it is to become sustainable (Gibbs 2009). The extent of this hegemony may mean that debates can seem essentially de-politicised as, to be viable, solutions must accept the logic of EM. And fourthly, it has been criticised for focusing on the industrial but not the capitalistic aspects of development, and thereby for overlooking the structural limits of continued economic growth (Mol 2001). Critical perspectives would therefore suggest that the processes of EM would seem to have social, spatial, distributional, political and structural limits.

In the following sections, we apply insights from the conceptual discussion above to two empirical cases; emissions trading and the market for offsets. In each case we consider the political drivers that have led to their emergence and institutionalisation, the ways in which they work and the critical questions relating to whether, to what extent and for whom they work. We conclude by discussing the wider implications of these cases for broader debates on climate change and the governance of carbon and for theories of EM.

### **3. Carbon governance through the EU ETS**

The EU's 2008 climate and energy package encompasses a range of targets and initiatives on energy efficiency, renewable energy and carbon capture and storage. However, its undoubted flagship is the EU ETS, a multi-sector and multi-country cap-and-trade scheme which has been the EU's primary instrument for regulating carbon

emissions from large energy and industrial installations since 2005. Sectors covered by the scheme account for around 45 percent of total EU carbon emissions. We begin by examining the drivers for the adoption of this carbon market, and then review its organisation focusing on interactions between its regulatory and trading dimensions before discussing its effectiveness as a governance mechanism for reducing carbon emissions.

### *(i) Political Drivers*

Significant scholarly attention has been directed towards explaining the EU's move from the international community's major objector to flexibility mechanisms to its leading proponent and practitioner (Bailey 2007; Skjærseth and Wettestad 2008; 2009). Explanations offered include: pressure to show international leadership following the USA's withdrawal from the Kyoto Protocol in 2001 (Schreurs and Tiberghien 2007); growing maturity of internal debates on emissions trading; dialogue with US officials on the US sulphur dioxide trading scheme; and the influence of advocacy groups like the UK Emissions Trading Group, which had been instrumental in designing the UK's domestic trading scheme. However, Voß (2007) argues that pivotal to these deliberations was the Commission's reframing of emissions trading from a tactical device for diluting binding emissions-reduction commitments to one that promoted effective and cost-efficient action to reduce carbon emissions without jeopardising the competitiveness of European industry.

Thus reframed in accordance with principles of EM, emissions trading compared favourably not just against 'command-and-control' regulation (which was seen as expensive and problematic to introduce in the EU context) but also on environmental grounds against its main rival, carbon taxes, because the latter created carbon prices but could not guarantee abatement levels. Emissions trading also circumvented state concerns about ceding tax-raising powers to the EU that had derailed proposals for an EU carbon-energy tax during the 1990s and addressed potential trade distortions that may arise if states adopted different national schemes (Zito 2000). It also appealed to industry concerns about compliance costs and maintaining a level playing field in the Single Market, and to the finance industry, which realised that the trading and banking of emissions allowances provided a potentially lucrative future market (Voß 2007).

Support for emissions trading was not unequivocal, however, especially in Germany and the UK, because of clashes with national measures. Yet one interesting feature of the debate was how few major parties expressed outright opposition to emissions trading. Germany and the UK both accepted a mandatory scheme once they gained concessions for key sectors. Some 2004 accession states, notably Poland, Hungary, Latvia and Lithuania, complained about their inability to influence the scheme prior to their accession but did not oppose its introduction. While the European Parliament tabled over 80 amendments to the directive, again its focus was on securing its preferred outcomes rather than questioning whether the scheme should proceed. Even environmental NGOs like Greenpeace and WWF that originally accused emissions trading of rewarding past pollution ended up hailing it as an important achievement (Ellerman and Buchner 2007).

### *(ii) Organising and maintaining the EU ETS*

While the broad appeal of emissions trading created critical momentum for the EU ETS, negotiating the details of the scheme exposed multiple tensions between, on the one hand, the need to standardise the scheme, and on the other, member states' desire to defend their autonomy, competitiveness and the commercial interests of industry sectors affected by the scheme (Bailey and Maresh 2009). The need to maintain the

support of the member states and industry groups forced the Commission to accept a relatively decentralised scheme that allowed member states to develop national allocation plans (NAPs) rather than being subject to an EU-wide emissions cap (Kruger *et al.* 2007; Wettestad 2009a). This gave states significant latitude in how they distributed their Kyoto emissions targets between sectors included and exempted from the scheme and led to most over-allocating allowances during the scheme's first phase (2005-7). This reduced the pressure on firms to cut emissions and triggered a collapse in allowance prices. Another concession allowed the member states to allocate the majority of allowances free of charge rather than by auctioning, giving many energy utilities windfall profits. Other dispensations included exemptions for the aluminium and aviation sectors and the exclusion of the five non-carbon greenhouse gases from the first two trading periods. Finally, the linking directive, which allows target installations to acquire a proportion of their allowances from the Kyoto flexibility mechanisms, provided a further safety valve for companies concerned about the costs of reducing their own emissions.

Despite these difficulties, the directive gave the Commission new legal powers to set guidelines, oversee NAPs, and propose reforms to the scheme. More generally, the tribulations of Phase I clarified to all parties the practical actions needed to maintain the market. It also created a degree of policy 'lock-in', in that all parties understood that failure to reform the scheme meant defaulting against international commitments and/or the search for a new policy instrument. The Commission began to assert its new powers during Phase II (2008-12) by requiring revisions to the majority of NAPs because of inconsistencies with Kyoto targets (Brunner 2008). It also initiated a major review of the scheme in 2006, which resulted in proposals for major reforms for Phase III (2013-2020) as part of a revised directive adopted in April 2009.

Despite the unquestionable successes of these strengthening efforts, industry groups and member states continued to lobby for (and gain) concessions, some of which may have significant implications for the scheme in the future (Wettestad 2009b). Among these was the inclusion of provisions enabling energy-intensive sectors that are vulnerable and exposed to international competition to continue receiving free allowances during Phase III. 164 sectors - including most steel, non-ferrous metal, cement and oil-refining installations - have since been identified as falling into this category, the free issue of allowances to which may produce a downward effect on prices in the short-to-medium term (European Commission 2009a). The powers of the Commission to shape the NAPs put forward by member states (in particular to specify emissions caps) have also been challenged and at least temporarily curtailed in the European Court of Justice (Court of First Instance 2009).

Alongside the contested but steady strengthening of the EU ETS's regulatory framework, equally important to the regime's maintenance is the monitoring and control of the market itself and the activities of the various target sectors and intermediaries that have joined the market to provide trading services or to speculate on the value of allowances. Here again, aspects of the scheme's design have proven problematic, with a number of questionable market practices emerging. These include:

- *Carousel fraud*: where bogus traders open accounts in a national registry, buy allowances in another member state without paying VAT (because of exemptions for goods moving between jurisdictions), before selling them on a spot exchange, charging VAT, and disappearing without paying VAT to the authorities;
- *Phishing fraud*: where installations' identities are stolen from on-line registries to gain access to allowances;



- *Gaming practices*: these include *strip-and-swap* deals, where traders swap EU allowances for CDM credits, giving clients additional profits from price differentials between the credits and themselves additional commission - and *fuel switching*, where large energy utilities buy allowances and announce a switch to a high-carbon energy source to profit from increases in allowance prices caused by the announcement.

Convery (2009) argues that such practices have a minimal effect on the wider market and that smoking guns like windfall profits from over-allocations provide good opportunities to strengthen the scheme. VAT fraud alone is nevertheless reported to account for around €5 billion annually, and prompted the Commission to submit urgent proposals to address the problem (Ainsworth 2009). More broadly, the cases indicate the multitude of opportunities that exist for market actors to boost profits within a shadow economy running in parallel to, but with different objectives to, mainstream carbon trading.

### *(iii) Environmental and political effects of the EU ETS*

Unlike the broader social and environmental goals of carbon-offset mechanisms like the CDM, the primary purpose of the EU ETS is to reduce carbon emissions from power producers and energy-intensive industries. Accordingly, this section focuses on the emissions reductions achieved so far by the scheme and on its wider political implications. This is not to make light of the social and distributional issues that underpinned many disputes during the EU ETS negotiations, but reflects the fact that emissions reduction is the ultimate benchmark against which the success or failure of the EU ETS will be decided.

While the full effects of the EU ETS on emissions will only be revealed as allowance scarcity increases during Phases II and III, Phase I of the scheme was widely recognised as being ineffectual as a result of the mass over-allocation of allowances. However, a 3.06% reduction in emissions among ETS sectors was recorded between 2007 and 2008. The European Commission (2009b) noted that although this was partly caused by the economic slowdown, it also reflected measures undertaken in response to the price signal created by the scheme and was significant in the context of 0.8% GDP growth. A further 11.2% fall was recorded in 2009, with reductions exceeding 30% in some sectors (Reuters 2010). However, the data also show a 3.6% over-allocation of free allowances compared with actual emissions across the scheme for 2009, suggesting that recessionary effects rather than caps have so far been the main driver of emissions cuts.

However one interprets these data, the EU ETS has had a transformative effect on climate politics within the EU. The EU's central task in the aftermath of the Kyoto negotiations was to find a practical strategy to show that EU leadership on climate change would not be economically ruinous in the absence of similar commitments by other major countries. By reframing emissions trading from a tactical device to dilute emissions commitments to an effective and efficient instrument for reconciling environmental protection with economic growth, the Commission was able to build a strategic coalition for the creation of an EU climate-governance regime (Voß 2007).

While this reframing of emissions trading as a practical device for realising the ambitions of EM could be considered as a major breakthrough, our account also reveals the immense difficulties the EU has encountered in creating and maintaining the EU ETS. At the heart of these difficulties is a fundamental tension between the regulatory and territorial logics of emissions trading (Bailey and Maresh 2009); between the willingness of key actors to subscribe, in principle, to the idea that there are

technologically and economically viable responses to climate change, and to accept, in practice, the political, economic and geographical realities of devising a market-based carbon regime.

Each stage of the regime-building process has required mediation between competing state and industry interests, and the Commission's ingenuity in strengthening the scheme itself testifies to the learning capacities of EM. At the same time, these mediation efforts have led to a raft of unforeseen consequences that hindered the effectiveness of the EU ETS during its early years. Such problems are not exclusive to market-based forms of environmental governance (Kruger *et al.* 2007); however, the dispersal of agency inherent in emissions trading, where everyone has some control but no-one has full control or accountability for achieving policy goals, has created a multitude of opportunities for target sectors and intermediaries to pursue rent-seeking behaviour that has compounded the unintended outcomes produced by the EU ETS negotiations.

What is perhaps equally striking, however, is the restricted nature of debates among those at the core of EU climate policy on the appropriateness of emissions trading as a lynchpin of the EU's climate strategy (Castree 2010). Those that have taken place have been dominated by the same political and economic elites that created the scheme and have focused mainly on the mechanics and distributional economics of emissions trading and on positive framings of market-based instruments. These foci have limited the opportunity for alternative ways of reducing energy and industrial emissions - such as greater direct investment or those focusing on behavioural changes - to gain real traction in mainstream EU policy (Bailey and Wilson 2009). The growing interest of other countries (especially the USA) in emissions trading as a means of regulating energy and industrial emissions as a result of the EU ETS has had a similar effect at the international level (Skjærseth and Wettestad 2008).

#### **4. Carbon governance through the market for offsets**

The development of carbon offset markets has emerged as an increasingly critical component of climate governance in general, and the carbon economy in particular. We have seen the rapid development of offsets overseen by the Kyoto Protocol's Clean Development Mechanism (CDM) within what is known as the compliance market alongside the spectacular growth of a voluntary market in offsets for companies and individuals. While the economic slump dampened activity in 2008, the global value of primary offset transactions has grown to US\$7.2 billion in 2008, over ten-fold growth from 2004, largely due to the CDM. The CDM accounts for 90% of offset-project transaction volumes and value and therefore provides the main focus here. Joint Implementation (JI), the mechanism supporting offset projects within developed-country parties to the Kyoto Protocol, accounts for another 5% and voluntary offsets for the remaining 5%. In contrast to declines in primary transactions for both JI and CDM, the voluntary market continued to post double-digit growth in 2008 (Capoor and Ambrosi 2009). The ability of both compliance and voluntary offset markets to continue on this trajectory will depend on their ability to enrol the support of powerful government and industry backers and to manage criticisms from carbon traders and project developers about their efficiency and governance and from opponents of carbon markets who question their credibility and effectiveness.

While both markets have distinct origins and history, they raise similar governance challenges and engage many of the same actors in overlapping policy networks. What is interesting politically, and in terms of EM, is that a political constituency around offsets has been created; traders, intermediaries, project developers and accountants who have an interest in safeguarding the credibility of offset markets and seeing them

succeed over other ways of responding to climate change which are perceived to be less business friendly (Newell & Paterson 2010). This is important to understanding the role of specific issue-based and policy networks in sustaining wider coalitions that seek to protect their political influence and market share and, ultimately, the legitimacy of neo-liberal responses to climate change.

#### *(i) Political Drivers*

The history and evolution of these markets is revealing of their dynamics and relationship to neo-liberalism. The CDM has been described as the ‘Kyoto surprise’ because of the rapid and seemingly haphazard way in which it emerged (Werksman 1998). The CDM was a product of an eleventh-hour negotiation at Kyoto in 1997. Very much a creation of political necessity drawing on Brazilian proposals concerning a Clean Development Fund, its details were worked out in informal contact groups in the final days of Kyoto, spearheaded by the Brazilian delegation with US support. Much of the detail of how it would work was left to the meeting in Marrakesh in 2001, where accords were approved on the rules and modalities of its operation.

At a deeper level, the political and commercial drivers for flexible market-based approaches, particularly mechanisms like the CDM which opened up a global market in lowest-cost emissions reductions, included the desire to avoid imposing costs on powerful nations and sectors that feared loss of competitive advantage if emissions cuts were required of them but not of their emerging competitors in countries such as India and China. This logic underpinned the US’s rejection of the Kyoto Protocol supported by an aggressive lobbying campaign by many US companies and was embodied in the Byrd-Hagel Senate resolution that prevented the US from ratifying a treaty that did not include binding emissions cuts for leading developing countries.

The voluntary market meanwhile was set up to meet a growing demand by businesses and individuals concerned about their carbon footprint. It tapped into the rise of climate change as an issue of corporate social responsibility and the pressure on firms to account for and reduce their emissions even if through offset purchases rather than their own abatement efforts (Begg *et al.* 2005). Ridiculed by activists as being equivalent to the ‘indulgences’ of the middle ages, when the rich could pay poorer people to go to prison on their behalf (Smith 2007), the creation of the markets has led to attempts to differentiate offsets which deliver cuts *and* social benefits from those which do neither. Indeed, various private standards and certification schemes have been created to address some of the concerns that greeted the first wave of offset projects (Newell and Paterson 2010).

#### *(ii) Organising and maintaining offset markets*

The way offset markets have been organized encapsulates the EM logic of reconciling growth and environmental protection in that innovators and project developers are emboldened and enabled to search for the least-cost way of producing emissions reductions irrespective of the ethical and political dilemmas around, for example, emissions necessary for survival as opposed to luxury consumption around which critics of carbon markets draw clear distinctions (Agarwal 2000). They rest on the premise that a tonne of carbon saved is equivalent wherever the reduction occurs.

The modes of governance that have emerged around offset markets are also indicative of neo-liberal modes of environmental governance in general. These include the nature of the actors involved and the ways they work together - often through voluntary public-private partnerships or hybrid arrangements (Streck 2004; Bäckstrand 2008), the creation of networks for the pursuit of particular policy goals in preference over a

dominant role for the state, and a basic ideological commitment to market approaches and the efficiency they are claimed to deliver (Newell and Paterson 2009). They include governance through accountancy, disclosure and audit, all necessary for the creation of a fungible and commensurate unit that can be commodified and traded and for generating trust among investors that they are buying a credible product.

In the case of offsets the boundaries of the policy network are perhaps more porous, desegregated and multi-scalar than those for the EU ETS. CDM governance spills over into, and is simultaneously defined by, other policy areas at all levels of decision-making because it covers sectors as diverse as energy, agriculture and forestry. It touches, therefore, on entrenched and powerful regimes of governance in other areas with their own actor-networks, conflicts of interests and programmes of regulation that pre-date the CDM and seek to engage it on their own terms by trading access to projects for a share of carbon finance (Newell 2009).

The breadth and range of networks of actors that have to be enrolled to make the offsets market function creates a series of mutual independencies and requires the exchange of political and other resources. The Conference and Meetings of the Parties ultimately exercises authority over the remit of the CDM. The CDM Executive Board, which reports to the Conference and Meetings of the Parties, approves methodologies and accredits Designated Operational Entities (DoEs) who are conferred the authority to assess whether projects have delivered claimed emissions reductions and therefore should be issued with Certified Emissions Reductions (CERs). With just ten members, the CDM Executive Board has to delegate significant power and authority to DoEs to approve projects and then later to verify that they have achieved the claimed emissions reductions. Given there are just 18 approved DoEs and far fewer that are approved to operate in each individual sector in which the CDM is active, DoEs inevitably end up having to approve one another's' projects. This potentially creates openings for collusion and disincentives to criticise or reject another firm's project for fear they will reciprocate (Green 2008). Nevertheless, to maintain the environmental credibility on which the system notionally rests, sanctions occasionally need to be applied. In recent months, several DoEs have had their accreditation suspended for continually proposing projects that do not fulfil the minimum approval criteria. There have also been calls to address potential conflicts of interest between members of the CDM Executive Board, the roster of experts upon which they call for guidance, and the projects they have been involved in developing but are then charged with assessing.

Apart from the multiple scales at which offset markets operate and have to be governed, there are also issues of how the markets, and the policy networks which create and maintain them, interconnect. The CDM is connected to other carbon markets, such as the EU ETS, through the linking directive which is a significant source of demand for the purchase of CERs. Likewise, the Chicago Climate Exchange which allows those companies that have committed to a voluntary emissions reduction to buy and sell carbon credits, is often the final destination for rejected CDM projects but for which demand exists on the voluntary market. It is not yet clear the extent to which a globally integrated emissions trading regime is possible, but carbon is increasingly passing through and simultaneously creating global circuits of capital. While opening up new reduction and accumulation opportunities, their connection to distant markets and dependence upon the networks which govern them to exercise quality control, over which governments or market actors often have very little control, exposes them to the political fallout that may ensue from the purchase of 'sub-prime carbon' (Friends of the Earth 2009).

On the demand side, market actors need strong signals from climate negotiators to create conditions of scarcity and to drive demand for the products they are selling. They also require of public institutions rules of conduct for predictability and credibility. At the same time, businesses often complain about the overly stringent application of additionality criteria and of delays in the approval process. They want maximum flexibility and a more harmonised and scaled-up process including further moves towards programmatic or sectoral CDM which open up many more opportunities at lower cost. There are divisions among traders between those anxious to safeguard the environmental integrity of the market on which their profitability rests and those with less at stake in terms of long-term reputation that want to maximise short-term profits. Dubbed ‘cowboy capitalists’, these actors have tended to be concentrated in the voluntary market and have prompted efforts to provide buyers of offsets with firmer guarantees of their credibility through initiatives like the Offset Quality Initiative. The balance of power among and between these actors who share common political ground but competing commercial interests and preferences, continues to shape the governance of offsets.

The shadow of regulation and intervention by public authorities, as well as criticism and negative media exposure creates an incentive for new forms of private and voluntary regulation to protect the credibility of the market as a whole and to preserve the autonomy of the network of traders and brokers to set their own forms of *modus operandi*. It requires them to address the governance problems that arise in relation to quality control, integrity, independence and credibility. For example, the ‘Climate, Community and Biodiversity’ standards aim to deliver benefits to host communities and help protect biodiversity where a strict emphasis on GHG reductions may not always guarantee this. Each of the initiatives that have been set up to address specific concerns about the integrity of offsets and their beneficiaries entail enrolling a broader network of actors in order to lend them credibility and ensure their smooth operation.

### *(iii) The environmental and political effects of offset markets*

The organisation of offset markets clearly raises questions about who wins and who loses from such responses to climate change. Just as offset markets reflect other features of neo-liberalism, they also embody its tendencies towards uneven development and the (re)production of inequality on the one hand and problems of corruption and fraud on the other.

In relation to uneven development, despite the hopes that carbon finance would generate new revenue streams for the poor, capital flows in the CDM have largely mirrored flows of foreign direct investment in the developing world, with China, India and Brazil the three largest recipients while sub-Saharan Africa continues to attract less than 2% of CDM projects. Efforts have also concentrated on the search for low-hanging fruit or the largest volume of emissions reductions for the lowest possible investment. In the CDM market, 70% of CERs in the 18 months were issued for abating gases other than CO<sub>2</sub>, in particular the destruction of industrial gases used in refrigeration (Paulsson 2009). Because of the fact CERs are weighted according to the global warming potential of a gas, this creates incentives to target cheap and easy projects aimed at removing gases such as HFCs rather than more difficult investments in renewables for example.

Moreover, the drive to capture value at minimum cost makes it rational to make minor changes to existing production processes in order to get credit (and climate finance) for emissions reductions. In the worst case, this can be a subsidy to polluting activities which affect the poor most seriously, where, for example, waste sites are given a new lease of life by receiving payment for capturing and burning methane, undermining

campaigns for their closure (Lohmann 2005). The ways in which value is apportioned also explains the lack of attention to the sustainable development benefits of projects, in terms of employment and sourcing of local materials for example, which forms the second rationale for and requirement of CDM projects, and was a condition for the support of developing countries for CDM. While CERs are awarded for quantifiable emissions reductions, the same is not true for contributions to sustainable development. To capture value associated with those contributions, other forms of private regulation have been developed in carbon markets such as the CDM Gold Standard or in relation to forestry projects the Climate, Community and Biodiversity standards and Plan Vivo initiative.

In relation to the claim that carbon markets entrench capitalism's tendency to generate corruption and fraud, activists have exposed 'climate fraud' where the same CDM project is sold to multiple buyers and double-counted, or many reported cases of failure to meet basic additionality criteria (Bachram 2004, Lohmann 2005). This requires demonstrating beyond reasonable doubt that a specified volume of emissions would not have taken place without the investment and technology associated with a CDM project.

In sum, while the high level of demand for CDM projects and the rate at which the market has expanded has been a (welcome) surprise to many, the future of the CDM remains in doubt because its fate is tied to that of the Kyoto Protocol. It is also the case that technology transfer has largely not been achieved, sustainable development benefits have not been prioritised and, as with neo-liberalism in general, there has been a tendency towards a concentration of capital in the wealthier parts of the world.

### **Concluding discussion**

Over the last decade the emerging global trade in carbon has become increasingly central to efforts to govern climate change. As Newell and Paterson argue (2009:80) 'Climate politics is increasingly conducted by, through and for markets'. The significance of existing approaches to emissions trading and the market for offsets, and the tide of political opinion favouring the further expansion of carbon markets, underscores the need for critical examination of the ideological foundations and social, environmental and spatial consequences of the new carbon economy.

The cases explored in the previous two sections - emissions trading schemes and markets for offsets - exemplify how new market-based forms of carbon governance have emerged and are evolving. Both show that a major force driving carbon markets has been their appeal to a broad community of state and non-state actors. For international bodies and governments, they offered a way of meeting commitments to cut greenhouse gases without sacrificing other policy goals; for emitting industries, they provided a 'least-worst' option for managing the risks of regulation and the commercial risks associated with climate change; and for market intermediaries and speculators, they have created new commercial opportunities. By winning the support of this range of actors, there does seem to have been a process of institutional learning that has rendered a wicked environmental problem more tractable.

But limited evidence exists yet of a consensus on the depth and types of reform that such market-based forms of governance should deliver. The main rifts within the EU ETS have been between the Commission's prioritisation of international commitments and the member states and industry groups' reluctance to pursue decarbonisation except where it does not threaten established economic-commercial interests. Similar diversity is evident in carbon offset markets, where there is consensus on the desirability of offset schemes but there is rising discord about their management. This

was clearly evident in heated exchanges at meetings in Copenhagen, between the CDM Executive Board's attempts to remain true to the mandate conferred upon it by the climate regime in terms of guaranteeing 'additional' emissions reductions and growing frustration among DoEs and project developers at inconsistent applications of rules in the CDM market which impact their profit margins. The consensus that underpins these new forms of carbon governance may therefore depend both on their ability to maintain buy-in from a wide range of actors and their inability to challenge the interests of those actors. These new forms of governance may well be efficient at channelling resources towards the easiest options for decarbonisation for a period then, and, notwithstanding the issues of corruption and fraud discussed above, they may be effective at delivering carbon emissions reduction whilst doing so. But once the easy options have dried up it is far from clear whether the consensus that underpins them and the governance arrangements that manage them are strong enough to deliver the deep and rapid cuts in carbon emissions that the science suggests are necessary. It may be that these new governance arrangements can only deliver the targets that are agreed upon by more traditional, state-centred, forms of government.

Another shared feature of the two carbon markets is the multi-scalar, multi-actor nature of the networks involved in their oversight and operation. Actors are generally enrolled on the basis of their expertise and capability to make carbon markets function rather than democratic representation or equity, and networks are normally concentrated in centres of political and financial power. Such a process of network formation with spatial roots but international reach has important spatial and social justice implications. It effectively excludes the majority of developed and developing country populations whose lives are affected by climate change *and* by carbon markets from participating in key decisions about what these markets should be achieving, where, and by what means. It also excludes those critical voices who do not have the political or economic resources needed to gain entry to the core policy networks and arenas. Whilst these new forms of carbon governance may offer some (perhaps temporary) benefits in terms of tractability, efficacy and efficiency, these gains may have been realised at the expense of equity, legitimacy and accountability.

A final issue concerns the degree to which the recent formation of these market-based approaches has locked corporations, countries and the wider international community into a neoliberal experiment with climate governance. The EU ETS has frequently been described as a grand policy experiment (Wettestad 2005); certainly, the investments made - both financial and political - make abandoning the scheme prior to 2020 at the earliest virtually unthinkable. Similar political and economic reserves have been expended on the CDM and proposed reforms reflect its rapid growth which has created capacity bottlenecks which need to be addressed. The tide of political opinion instead appears to be running in favour of further strengthening of ties through the linking of national and regional emissions trading schemes (Grubb 2009), in effect further globalisation and locking in of this neo-liberal/EM experiment and all its social and spatial implications and structural weaknesses. But in a context where market-based approaches have been institutionalised and legitimised, albeit conditionally, the opportunity for more radical voices to impact upon the dominant framings or governance processes seems very limited indeed.

These critiques should not be seen necessarily as an argument against carbon markets or valuing environmental resources in principle. Clearly, under-pricing of nature's services has been a major cause of their over-exploitation, and alternative proposals such as carbon taxes have their own sets of governance issues, not least concerns over sovereignty where the regional or global collection of taxation revenues is proposed. They also have to address carbon leakage in a globalised and integrated economy and

are just as susceptible to special-interest lobbying as emissions trading and offset schemes. However, even if one sets aside the structural problems of EM as an ideological and practical framing of how climate change should be managed, our review of emissions-trading and carbon-offset markets reveals a multitude of social and spatial challenges that those involved in governing carbon markets must address to maintain their credibility.

In policy terms, this is likely to require more energetic regulation of emissions caps, the criteria used for issuing carbon credits, and how schemes are linked. Key issues also relate to the transparency, accountability and legitimacy of both the processes and the outcomes of these experiments with carbon governance. Closer scrutiny of actor behaviour within carbon markets will also be needed to deter more obvious market abuses, and public and private actors involved in carbon governance will have to find new ways of arbitrating between competing sectoral and geographical interests where uneven exposure to competition and uneven access to carbon markets inhibit the ambitions of carbon market enthusiasts. Carbon markets gained much of their prominence during a period of apparently unshakable faith in markets to deliver economic prosperity, environmental protection and social provisions. It is an interesting question whether this approach would have been embraced as unequivocally in a post credit-crunch world, especially if its leading advocate, the USA, remained absent from international climate treaties. It would also be a rather academic one were it not for the path-dependency of existing and planned new carbon markets. The drift towards more directive state involvement (albeit in a context where state capacities seem more limited) in climate and energy policy suggests that a more varied set of measures combining markets, regulations, and investment programmes is likely.

With regard to EM theories, in our conceptual discussion we noted Hajer's (1996) suggestion that EM can be interpreted either as institutional learning or as a technocratic project. Much of the analysis of new forms of market-based carbon governance in this paper reinforces the critical view that EM should be seen as some of the former but much of the latter. Market-based forms of carbon governance do seem to have been based on a process of institutional learning that has rendered a wicked environmental problem more tractable. But they also display many features of a technocratic project: they focus on efficacy and efficiency but have little to say on issues of social justice; they seem to be spatially contingent and to generate uneven patterns of spatial development; and they appear to recreate a neo-liberal hegemony that empowers those pragmatists who are willing to engage whilst simultaneously disempowering its critics and locking out approaches that could lead to deeper change.

We began this paper by suggesting that EM theories are centrally concerned with social capacities to recognise and respond to existing and emergent environmental problems. We conclude by questioning whether there are social capacities to recognise and respond to the emergent limits of these new forms of carbon governance in time to avert dangerous climate change.

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