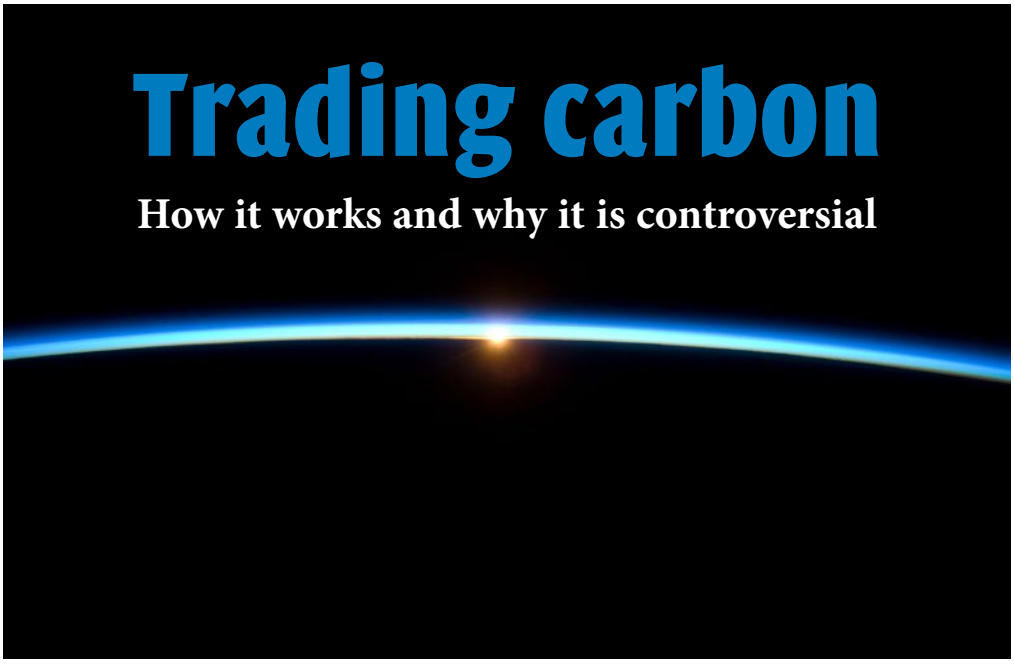
Trading carbon

How it works and why it is controversial



Jutta Kill / Saskia Ozinga / Steven Pavett / Richard Wainwright

A publication by FERN

www.fern.org

FERN would like to thank Duncan Brack, Marcello Calazans, Michelle Chan, Rodger O'Connell, Mark Gregory, Justin Kenrick, Larry Lohmann, Yann Louvel, Winnie Overbeek, Payal Parekh, Oscar Reyes, Leendert van der Waal and Harriet Williams for their valuable comments. None of the reviewers can be held accountable for any possible mistakes.

Authors: Jutta Kill, Saskia Ozinga, Steven Pavett and Richard Wainwright
Editor: Ed Fenton
Editorial consultant: Kieran Cooke
Illustrations: Christopher Mackenzie
Designer: Daan van Beek
Printed: Macula, Boskoop, the Netherlands
Photo front page: NASA. Earth's atmosphere and the setting sun photographed by a crew member on the International Space Station.

ISBN: 978-1-906607-10-4
August 2010

FERN works to achieve greater environmental and social justice, focusing on forests and forest peoples' rights in the policies and practices of the European Union.

FERN office UK, 1C Fosseway Business Centre, Stratford Road, Moreton in Marsh, GL56 9NQ, UK
FERN office Brussels, Rue d'Edimbourg, 26, 1050 Bruxelles, Belgium

www.fern.org

This guide has been produced with financial support from the JMG Foundation, DG Environment of the European Commission and the CS Mott Foundation.
The views expressed in this guide do not imply the expression of any opinion whatsoever on the part of any of the donors or reviewers.

Contents

Acronyms

AAU	Assigned Amount Unit
BERR	Business Enterprise and Regulatory Reform
CCE	Chicago Climate Exchange
CDM	Clean Development Mechanism
CER	certified emissions reduction
CITL	Community Independent Transaction Log
CMIA	Carbon Markets and Investors Association
CO_2e	carbon dioxide equivalent
DNA	Designated National Authority
DOE	Designated Operational Entity
EBITDA	Earnings Before Interest, Taxation, Depreciation and Amortisation
ECX	European Climate Exchange
EPA	Environmental Protection Agency
ERPA	Emissions Reduction Purchase Agreement
ERU	Emissions Reduction Unit
ESD	Effort Sharing Decision
ETS	Emissions Trading Scheme
EUA	European Union Allowance
FoE	Friends of the Earth
FSA	Financial Services Authority
GFV	gross fair value
GHG	greenhouse gas
GNV	gross nominal value
GWP	global warming potential
HFC	hydrofluorocarbon
ICE	Intercontinental Exchange
IETA	International Emissions Trading Association
IPCC	Intergovernmental Panel on Climate Change
IPPC	International Pollution Prevention and Control Directive
ITL	International Transfer Log
JI	Joint Implementation
LCPD	Large Combustion Plants Directive
NAP	national allocation plan

NGO	non-governmental organisation
OECD	Organisation for Economic Cooperation and Development
OTC	over the counter
PCF	Prototype Carbon Fund
PDD	Project Design Document
RECLAIM	Regional Clean Air Incentives Market
REDD	Reducing Emissions from Deforestation and Forest Degradation
RGGI	Regional Greenhouse Gas Initiative
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
VER	verified emissions reduction
WCI	Western Climate Initiative
WMO	World Meteorological Organization

Introduction

In the drive to tackle climate change, carbon trading has become the policy instrument of choice among governments. It is also a central element of the UNFCCC's Kyoto Protocol. National or regional carbon trading schemes are now operational in Europe, the USA, New Zealand and elsewhere.

Yet carbon trading remains highly controversial. Some see it as a dangerous distraction and a false solution to the problem of climate change. Unfortunately the subject is characterised by jargon, abstract concepts, mathematical formulae and technical detail, making it hard for most people to understand its implications and assess its merits or otherwise. This guide attempts to unravel some of this complexity.

To put it simply, carbon trading is the process of buying and selling of quotas that allow the holder of the quota to emit the equivalent of one tonne of CO_2. So if a company's or a country's emissions are lower than its quota, it can sell its surplus. If it exceeds its limits, on the other hand, it will have to buy additional quota on the market or cut its production.

This report deals with each of the three basic components – cap and trade, carbon offsets and trading transactions – which underpin the trade in carbon quotas.

Chapter 1 explains how the concept of carbon trading came about.

Chapter 2 explains the theory of cap and trade – also sometimes referred to as emissions trading – and looks at how the Kyoto Protocol set in motion the widespread use of carbon trading schemes. It also examines the European Union's Emissions Trading Scheme (ETS).

Chapter 3 explains the theory behind carbon offsets, including case studies of specific offset projects that are linked either to the Kyoto Protocol's Clean Development Mechanism (CDM) or voluntary carbon offset schemes.

Chapter 4 describes the financial aspects of carbon trading. It explains how the carbon market changed as it matured, and how new interest groups and increasingly complex financial arrangements shape the carbon market today. There is a section explaining the key financial terms, and showing how their use has influenced the carbon market. The chapter also explores how complex financial instruments and new actors make prices more volatile, lead to greater speculation in the carbon market, and increasingly delink the development of the carbon market from its original objective of providing an effective cost-management tool for companies required to reduce greenhouse gas emissions.

The glossary explains the key concepts and terms in plain English.

Although at FERN we have our own opinion on why carbon trading does nothing to avert climate change, we believe it is important for readers to make up their own minds. At the end of Chapters 2 and 3, therefore, we present some of the arguments used by proponents of carbon trading, followed by counter-arguments. The discussion points we have selected cannot be exhaustive, but we hope we have tackled the main areas. We welcome discussion on other arguments which readers feel should have been included. We hope the guide will be useful both to those who want to understand carbon trading purely as a mechanism, and to those who want to strengthen their arguments against.

August 2010

The origins of carbon trading

Time is running out.

Chapter 1

The origins of carbon trading

In the late 1960s an economist at the University of Chicago, Ronald Coase, began promoting the idea of 'pollution trading'. Coase believed that pollution should be seen as part of the cost of production. He believed that if pollution was priced as part of the process of production, market forces would eventually deter businesses from polluting the environment because it would become less and less cost-effective for them to do so. *'People don't pollute because they like polluting,'* said Coase. *'They do it because it's a cheaper way of producing something else.'*[1]

Other economists developed this theory. J.H. Dales of the University of Toronto, and Thomas Crocker of the University of Wisconsin, suggested that although prices and pollution levels should largely be controlled by the market, overall pollution limits would have to be set by governments. So pollution trading was seen as a way of making it as cost-effective as possible for businesses to comply with an emissions target set by the state.[2]

In 1976, the US Environmental Protection Agency (EPA) applied the concept of pollution trading to reduce the level of certain air pollutants. Companies were to be granted permission to build polluting factories in certain regions only if the company guaranteed to reduce pollution by a greater amount elsewhere.[3] However, the scheme was not a success. Pollution levels did not drop: they were just spread over a wider area.[4]

See Case study 1: The US sulphur trading scheme

In 1990, with the passing of the US Clean Air Act Amendments, a nationwide sulphur dioxide trading system was set up by the US government with the aim of combating the problem of acid rain. Under this system, emissions permits were given out free of charge to the major polluters. The US sulphur trading scheme is often held up as a model for the design

1 Coase RH (1988) *The Firm, The Market and the Law.* University of Chicago Press, p. 155
2 For additional information on the application of pollution trading schemes, see Lohmann L (2006) *Carbon Trading: A Critical Conversation on Climate Change, Privatisation and Power. Development Dialogue 48.* www.thecornerhouse.org.uk/subject/climate
3 Reitze AW (2001) *Air Pollution Control Law: Compliance and Enforcement.* Environmental Law Institute, pp 79-80.
4 Ibid, p.83

See Case study 1 for a comparison

of carbon trading programmes, though many believe that the schemes are not comparable.[5] While sulphur emissions fell, they also fell – often faster and more effectively – in other countries where conventional performance regulation was used.[6]

During the negotiations on the Kyoto Protocol under the UNFCCC, the USA – in addition to objecting to significant cuts in greenhouse gas emissions – insisted on the trading of carbon allocations being a key element of the international climate treaty. And while the USA never ratified the Kyoto Protocol, the legacy of its negotiating position has made carbon trading the central pillar of international climate policy.

> **'It is not an exaggeration to brand the mechanisms of the Kyoto Protocol as "Made in the USA".'**[7]
>
> Michael Zammit Cutajar, former Executive Secretary of the UNFCCC, 2004.

The idea of carbon trading caught on, not just in boardrooms, banks and the higher echelons of government, but also among NGOs. The message was that the market recognises no borders and is infinitely adaptable, able to respond quickly to changing circumstances.

Some pioneers of pollution trading, however, have expressed doubts that carbon trading can have a role reducing greenhouse gas emissions and tackling climate change. Thomas Crocker has declared himself *'sceptical that cap and trade is the most effective way to go about regulating carbon'*.[8] Since there are so many structurally different emissions sources, Crocker does not believe that the problem can be addressed under a single pollution trading scheme, and states that *'it is not clear … how you would enforce a permit system internationally.'*[9]

5 http://www.youtube.com/user/CarbonFees#play/all
6 The US is a signatory to the Convention on Long-Range Transboundary Air Pollution but never signed its protocol on Further Reduction of Sulphur Emissions (see http://www.unece.org/env/lrtap/fsulf_h1.htm). The protocol was signed in 1994, a year before utilities in the US were subjected to a cap on SO_2 emissions. Annex II of the protocol shows the reduction commitments of the individual OECD countries.
7 Reflections on the Kyoto Protocol – looking back to see ahead. International Review of Environmental Strategies 5: 61-70
8 Reitze AW (2001) Air Pollution Control Law: Compliance and Enforcement. Environmental Law Institute
9 Ibid.

Case study 1

The US sulphur trading scheme

The US Environmental Protection Agency's (EPA) Acid Rain Program was an initiative to reduce overall atmospheric levels of sulphur dioxide and nitrous oxides, which cause acid rain. It targeted coal-burning power plants, limiting their overall sulphur dioxide emissions and eventually allowing them to buy and sell emission permits.

The allowance system was created as part of the 1990 US Clean Air Act Amendments which set a decreasing cap on sulphur dioxide emissions for each of the following years, aiming to reduce overall emissions to 50 per cent of 1980 levels.

The programme is often hailed as a success, and is cited as a forerunner for carbon trading. People point to statistics which show that sulphur dioxide emissions have dropped by 40 per cent, reaching the programme's long-term goal ahead of the 2010 statutory deadline; and the EPA estimates that by 2010, the overall cost of complying with the programme will amount to US$1-2 billion a year, just a quarter of what was originally predicted.

Yet while emissions decreased across the USA, they decreased more in US states and other countries that had not implemented the sulphur trading scheme. Countries like Germany, which used standard performance legislation to reduce the release of sulphur dioxide, cut emissions much faster than the USA. And in the USA, a large part of the emissions cuts had already occurred before the trading scheme was up and running.

Disagreement over its effectiveness aside, there are clear differences between the sulphur trading scheme and carbon trading:

See Chapter 3

- **The sulphur trading scheme did not allow for offsetting. All carbon trading schemes allow for a considerable amount of emissions reductions to be achieved through the use of offsetting.**
- **Sulphur trading applied to only one relatively uniform industry, which consisted entirely of electricity producers using high-sulphur coal for energy production. By contrast, today's carbon trading regimes group together very different industries in very different jurisdictions, and encompass six different greenhouse gases.**

See Box 2 for problems measuring different GHG

- **The changes in technology required for sulphur removal were relatively minor compared to those required to tackle climate change. Industries**

↘

↘

that took part in the sulphur dioxide trading scheme did not stop burning coal, they just switched to low-sulphur coal and emissions scrubbers.

- **The sulphur trading scheme was introduced into the Clean Air legislation only once the technology was available to monitor sulphur dioxide emissions with smokestack monitors, and direct, real-time measuring of emissions became possible. CO_2 and the other five greenhouse gases are released almost everywhere on the globe by literally thousands of different processes. Direct real time measuring of GHG emissions is either not available or not in use. Therefore these emissions are not measured but calculated using a variety of conversion factors and proxies.**

Further information

- **Two EPA lawyers explain the differences between the sulphur and carbon trading schemes: http://www.youtube.com/watch?v=uSNQzSjb38g**
- **Driesen DM (2003) Markets are not magic. *Environmental Forum*. Nov/ Dec: 18-27.**
- **Ellerman D et al. (2003) *Emissions Trading in the US: Experience, Lessons and Considerations for Greenhouse Gases*. Pew Center on Global Climate Change.**
- **Driesen DM (1998) Is emissions trading an economic incentive program? Replacing the command and control/economic incentive dichotomy. *Washington and Lee Law Review* 55.**
- **US EPA data on the Acid Rain Programme: www.epa.gov/airmarkets/ progress/interactivemapping.html**
- **European Environment Agency (2008) *Air Pollution from Electricity-Generating Large Combustion Plants*. EEA Technical Report no. 4/2008 for an update on sulphur dioxide reductions in the EU.**

Cap and trade

A cap puts a limit on emissions. It is only the cap that leads to emission reductions, not the offsetting or the trading.

Chapter 2

Cap and trade

This chapter describes cap and trade schemes. In carbon trading, however, cap and trade is intertwined with carbon offsetting. Offsets are a part of all existing carbon trading schemes. By examining both the theory behind cap and trade, and how cap and trade schemes have so far worked in reality, we highlight where the application in practice has deviated from the theoretical concept. The concluding section assesses the implications of this, and discusses some of the most common arguments in favour of cap and trade. The theory and realities of carbon offsets are described in Chapter 3.

The concept

In a cap and trade scheme, a government or intergovernmental body sets an overall legal limit on emissions (the cap) over a specific period of time, and grants a fixed number of permits to those releasing the emissions. The polluting entity must hold enough permits to cover the emissions it releases. If one polluter does not use all its permits, it can trade them with another entity that has already used up all its permits and needs more to continue emitting without exceeding the legal limit. In the case of carbon trading, the entities that are being capped at present are the large industrial producers of the six greenhouse gases: industrialised countries (in the case of the Kyoto Protocol) or companies (in the case of the EU's or other regional emissions trading schemes). Each permit in a carbon trading scheme is considered equivalent to one tonne of carbon dioxide equivalent (CO_2e). Such permits presuppose that the global warming potential of the other greenhouse gases can be calculated and converted to a multiple of the value that was assigned to carbon dioxide, which is one.

See Box 2 for different GHG and CO_2e

Key components

The cap

In any cap and trade scheme, it is the cap which determines the scheme's level of ambition, while the trading component is intended to make

compliance with the cap more cost-effective for the participating entities. In addition to the setting of the cap, the distribution of the permits and the monitoring of compliance all determine whether the 'cap and trade' scheme will achieve what it was developed for.

See also page 19

Box 1

Climate change and the cap

Carbon trading is currently the central pillar of international climate change policy. In such cap and trade schemes, it is the level of the cap which determines how many emissions are allowed. It also determines what contribution those countries whose emissions have been capped will make towards the UNFCCC's stated aim of avoiding dangerous climate change and keeping global warming below 2°C. The level of the cap within countries or regions determines how much the largest polluting industries contribute to achieving these national or regional emission targets.

The Intergovernmental Panel on Climate Change (IPCC) recommends that greenhouse gas concentrations in the atmosphere peak by 2015 and are then reduced by up to 85 per cent by 2050 to stabilise at 445-490 ppm CO_2e. Even then, their estimation is that we will have a small chance of not overshooting 2° of warming.[10] Many low-lying island states and countries most vulnerable to climate change are calling for a return as quickly as possible from the current 380 ppm CO_2 (430 ppm CO_2e) to a maximum concentration of 350 ppm CO_2, to limit average temperature rises to 1-1.5°C. Beyond these levels, climate change will pose a threat to their existence. It is clear that the caps pledged as of January 2010 by industrialised countries in the post-2012 UN climate treaty negotiations are insufficient to bring concentrations to anywhere near the 450ppm mark, let alone the lower levels called for.

Setting the level of the cap

The objective of the UNFCCC (confirmed at the UN climate conference in Copenhagen in December 2009) is to avoid dangerous climate change. While there is still some debate about what the maximum temperature rise can be if this objective is to be achieved, the UN climate conferences have agreed to limit the average global rise to a maximum of 2°C.[11] Current

10 IPPC; Climate change 2007; Synthesis report.
11 http://unfccc.int/resource/docs/2009/cop15/eng/11a01.pdf#page=3

projections suggest that global greenhouse gas emissions would have to peak by 2015 and then sharply decrease. Many analysts argue that to achieve such a drastic turnaround in emissions, governments need to focus on making structural changes to energy production, power grids and transport systems. Many governments have, however, decided to use carbon trading as the key instrument to halt climate change, often claiming that trading itself will help reduce emissions. This disregards the fact that the reduction is set by the cap, while the trade is only a cost-management tool, which does not itself reduce emissions. Setting a global carbon cap is complex. It involves governments assessing the costs and risks of not reducing emissions, and weighing these against the costs and risks of implementing the cap, in both the short and long term.

> **'Given that carbon markets, unlike any other, are formed by regulation, the exact detail of the regulatory design will have a profound effect on the success or otherwise of the cap and trade mechanism.'**[12]
>
> Imtiaz Ahmad, executive director, carbon trading, Morgan Stanley.

The straightforward theoretical approach to setting the cap would be to:

1. decide on the policy objective, e.g. keeping global warming below 2°C (and capping greenhouse gas concentrations at a maximum of 450 parts per million CO_2e) or keeping global warming below 1.5°C (capping them at a much lower level);
2. determine how much can still be emitted before concentrations pass that policy objective.

Yet this is not how greenhouse gas emissions caps were set. In the context of the Kyoto Protocol, the cap was set by industrialised countries collectively allocating themselves permits for 95 per cent of the emissions they had been releasing before any limits were in place. In other words, the setting of the cap was not connected to the policy objective, for which a much lower cap would have to have been set. Case study 3 explains how the cap was set in the case of the EU Emissions Trading Scheme (EU ETS).

Distribution of permits

Once a cap has been set, it must be decided who will be covered, and how to distribute the permits. This is one of the most contentious aspects of any

12 Carbon Market Europe 12 June 2009 www.pointcarbon.com

programme that limits the release of a polluting substance. It is particularly so when the substance being limited is the key motor of economies, as is the case with fossil fuels, the main source of greenhouse gas emissions.

In cap and trade schemes, two main questions arise: *who* will be covered by the cap, and *how* to decide on the number of permits. Two further issues are *whether* to provide all permits up front or in instalments, and at *what* price to issue them.

The decision of who will be covered has far-reaching implications which are not always immediately obvious. Should the scheme cover economic units, or should participants be chosen on the basis of their geographical location? Under the Kyoto Protocol, geographical location was chosen as the deciding factor: but now China and other exporting countries in the global South are arguing that a large proportion of their emissions comes from the manufacture of products that will be consumed in other countries covered by the Kyoto Protocol cap, and that emissions ought to be accounted for by the consumer rather than the producer.

See also page 34

See also page 11

On the question of how to decide how many permits to give, cap and trade theorists such as J.H. Dales based their concepts on the assumption that permits would be auctioned,[13] in which case the question of how many permits to allocate becomes less significant since each entity will bid for the amount of permits it requires at a price determined by the highest bid at auction (presumably with some limit on the maximum amount that could be bought by any one entity). However, all existing carbon cap and trade schemes – including the Kyoto Protocol, the EU ETS and also the US sulphur trading scheme – have initially distributed the permits free of charge. Permits have always been allocated according to the level of emissions in the past (a process referred to as 'grandfathering'), along with much behind-the-scenes bargaining between the entity requiring the permits and the authority handing them out.[14]

See Case study 2

Under the Kyoto Protocol, targets were developed mainly according to the feasibility criterion. Initial allocations for individual industrialised countries

13 Robert Stavins of Harvard University notes that *'auction revenue may be used in ways that reduce the costs of the existing tax system or fund other socially beneficial policies. Free allocations to the private sector forego such opportunities'* (http://belfercenter.ksg.harvard.edu/analysis/stavins/?p=108). And economists Peter Cramton and Suzi Kerr (2002) point out that the *'enormous rents at stake mean that interest groups will continue to seek changes in allocation over time'*. (Tradeable carbon permit auctions: how and why to auction not grandfather. *Energy Policy* 30: 333-45.)

14 There is a substantial volume of academic literature on how 'rent-seeking' influences the design and implementation of cap and trade schemes. Rent-seeking is a process by which companies seek to extract *'uncompensated value from others through manipulation of the economic environment rather than through trade and the production of added wealth'*. http://en.wikipedia.org/wiki/Rent_seeking

were based on historic emissions levels in each country, resulting in some countries being granted significantly larger allowances than they required for covering their emissions at the time. This was especially true for Russia and Eastern Europe, where emissions dropped significantly due to the collapse of economic output. Kyoto Protocol allocations ranged from 8 per cent below what a country's emissions had been in 1990, to allowing countries an increase of up to 10 per cent above 1990 emissions volumes. All permits were allocated to countries at the beginning of the Kyoto Protocol's first commitment period, 1 January 2008, and countries will have to account for the use of their permits and balance their permit accounts by 31 December 2012. On the question of the price to be paid for each permit, industrialised countries handed them to themselves free of charge.

'When a market is created through political action rather than emerging spontaneously from the needs of buyers and sellers, business will seek to influence market design for commercial advantage.'

John Kay, Financial Times, 9 May 2006.

For the EU ETS, each Member State decided on the contribution that the high-emitting industry sectors in their country should make towards achieving their Kyoto Protocol targets, and the cap was determined accordingly. The proposed allocation was then submitted for approval to the European Commission in the form of national allocation plans (NAPs). The EU ETS is being phased in over a period of three stages. For Phases I (2005-07) and II (2008-12), the Member States themselves allocated the permits to the various entities covered by the EU ETS in their country; in Phase III this process is to be changed, with central allocation by the European Commission.

See Case study 3

With regard to payment for the permits, *'In Phase I and II of the ETS, allowances have largely cost companies nothing as most have been allocated for free'*.[15] This process of issuance through 'grandfathering' has been widely criticised for allowing the same industries and countries that have been most to blame for increasing greenhouse gas concentrations in the atmosphere to obtain new assets in the form of carbon permits free of charge.[16] [17] In the EU ETS, this free allocation resulted in huge windfall profits for some

15 What are the implications of the new EU Emissions Trading Scheme for European companies? Standard & Poor's Credit Week, 23 Sept. 2009, p. 18.

16 For an analysis of the socio-political consequences of this form of free allocation of carbon permits, see Lohman L (2006) Carbon Trading. Critical Conversation about Climate Change, Power and Privatisation. pp 73-94.

17 For a discussion of how companies that are part of the EU ETS used their permits by selling them to raise cash that was not available, or available only at substantially higher interest rates, during the credit crunch, see Chapter 4.

of Europe's largest emitters of greenhouse gases. It is estimated that the ten companies benefiting most from free permits will have gained € 3.2 billion in the period 2008-2012. Energy utilities increased electricity prices to cover the potential cost of permits, despite having received them largely for free, and cement and steel manufacturers sold their surplus permits.[18]

'Free allocations of carbon credits tend to create market distortions. Therefore, allowances should be auctioned to covered entities so that prices are determined on the basis of fundamental supply and demand.'[19]

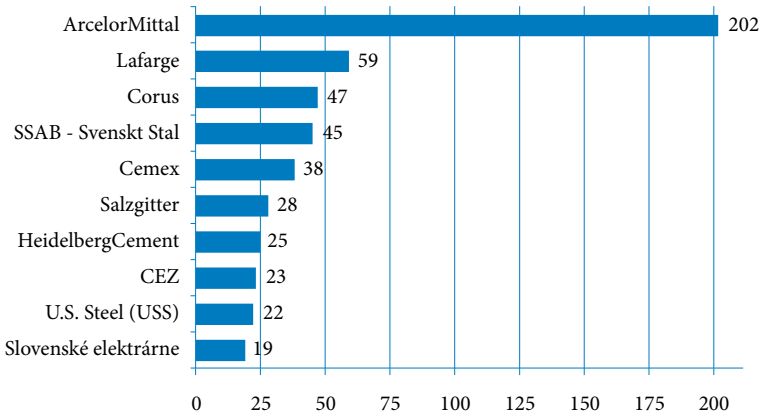
Deutsche Bank

Monitoring and verifying compliance with a cap

Once a cap is set, and the available permits have been allocated, the regulatory body responsible for the cap and trade scheme must ensure that the cap is being complied with. This comes down to ensuring that entities with self-interest in continuing to pollute do not find ways to emit more greenhouse gases than they are allowed to, for example by underreporting their emissions.[20]

Chart 1

Value of spare permits held in 2008 by the ten most profiting companies (millions Euro)



Source: Pearson, Anne (2010), The Carbon Rich List

18 Pearson, Anne (2010): The Carbon Rich List. The companies profiting from the EU Emissions Trading Scheme. Sandbag report February 2010.
19 Deutsche Bank Report Global Climate Change Policy Tracker: An Investor's Assessment, October 2009
20 Drury RT et al. (1999) Pollution trading and environmental injustice: Los Angeles' failed experiment in air quality policy. Duke Environmental Law and Policy Forum 45.

The importance of reliable monitoring of emissions has been demonstrated in two pollution trading programmes in the USA. The US sulphur trading scheme was only introduced into the US Clean Air Act once direct and reliable independent monitoring equipment was widely available.[21] In contrast, the RECLAIM programme in Los Angeles[22] relied on emission factors as a proxy for emissions rather than direct, real-time measurement, and the margin of error in reporting emissions was as much as 50-100 per cent, while refineries underreported their tanker emissions by a factor ranging from 10 to 1000.[23]

'[T]he urge to cheat, especially with wildly fluctuating prices of carbon per tonne, will be great. For example, highly sophisticated meters and other equipment will need to be installed at companies that claim to be reducing carbon dioxide emissions.'[24]

All existing carbon cap and trade schemes rely on 'measuring' by proxy, using conversion factors rather than direct measurement of the actual emission. While the technology to remove real emissions may theoretically be available for some types of factories today, it is considered too expensive for widespread application across countries and sectors – and it is certainly not being used comprehensively for monitoring the emissions levels against which compliance with the Kyoto Protocol and related schemes will be assessed.

In addition, for the Kyoto Protocol (and from Phase III the EU ETS as well), a trading regime has been established in which six different greenhouse gases – each affecting the climate in different ways, to different degrees and for different time periods – are treated as if they were equivalent. Although scientists try to aggregate all the gases into one category of 'carbon dioxide equivalent', it is widely acknowledged that this is fraught with problems.

See Box 2

21 Cole D (2002) Pollution and Property: Comparing Ownership Institutions for Environmental Protection. Cambridge University Press.

22 For more detail on the Regional Clean Air Incentives Market (RECLAIM) in Los Angeles, see Lohman L (2006), Carbon trading, a critical conversation on climate change, privatisation and power, page 85.

23 Drury RT et al. (1999) Pollution trading and environmental injustice: Los Angeles' failed experiment in air quality policy. Duke Environmental Law and Policy Forum 45.

24 http://blog.finetik.com/2009/05/08/a-new-growth-industry-carbonfraud//

Box 2

The difficulty of measuring greenhouse gases

Table 1

The Kyoto Protocol greenhouse gases

Greenhouse gas	Pre-industrial concentrations*	2008 concentrations	Human source	GWP 100 years
Carbon dioxide (CO_2)	278 ppm	365 ppm	Fossil fuel combustion, land use changes, cement production	1
Methane (CH_4)	700 ppb	1745 ppb	Fossil fuels; rice paddies; waste dumps; livestock	25
Nitrous oxide (N_2O)	270 ppb	314 ppb	Fertiliser; industrial processes; fossil fuel combustion	298
Hydrofluorocarbons (e.g. HFC-23)	0	14 ppt	Liquid coolants	14,800**
Perfluorocarbons (e.g. CF_4)	0	80 ppt	Refrigerant; electronics industry and aluminium industry	6,500
Sulphur hexafluoride (SF_6)	0	4.2 ppt	Insulator in electronics and magnesium industry	22,800

* ppm, parts per million by volume; ppb, parts per billion by volume; ppt, parts per trillion by volume.
** This figure was changed in 2007 from 11,700 to 14,800.[25]

This table lists the main greenhouse gases which contribute to global warming and which are covered under the Kyoto Protocol. Different gases have different impacts on global warming. The global warming potential (GWP) is an index which attempts to make these different impacts comparable by calculating the global warming impact over a period of 100 years of the different gases in comparison to CO_2.

The six different greenhouse gases each affect the climate in different ways, to different degrees and for different time periods. Yet for the purposes of the accounting system, they have to be treated as if they were equivalent. The Kyoto Protocol, as well as the emissions trading schemes that were triggered by the protocol, assume that it is possible to calculate equivalences between the different gases that are capped.

↘

25 Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change.

Scientists have tried to aggregate all the gases into one category of 'carbon dioxide equivalent', but it is widely acknowledged that this is fraught with difficulties. The corrections made to the conversion values for HFC-23 highlight the range of error involved in these equivalency calculations. Originally scientists set the carbon dioxide equivalence figure for the greenhouse gas HFC-23 at 11,700, meaning that one tonne of HFC-23 is 11,700 times more damaging to the climate than carbon dioxide. In 2007 the GWP for HFC-23 was revised up to 14,800. The error band of this new estimate is still ± 5000, an indication of how uncertain these equivalence conversions are.[26] The practical effects of this oversimplification are considerable: HFC-23 destruction is the largest single offset credit-earner in the Kyoto Protocol's CDM, accounting for 67 per cent of the offset credits generated in 2005 and 34 per cent of those generated in 2006.[27] Revisions therefore significantly affect the calculated volumes of carbon offsets that a project can sell.

See Chapter 3

Determining equivalences for the six different GHGs introduces significant margins of error, which are further exacerbated by inaccuracies in trying to measure emissions. According to one survey, these errors are in the range of ±10-30 per cent.[28] Another survey puts uncertainties about overall greenhouse gas emissions in selected industrialised countries at between 4 and 21 per cent.[29] IPCC guidelines on how to calculate and account for greenhouse gases suggest that uncertainties for carbon dioxide are up to 10 per cent for electricity generation, 10 per cent for industrial processes including cement and fertiliser production, and up to 60 per cent for land use change and forestry. For methane the margins of error are even higher, and for nitrous dioxide they are 50 per cent for industrial processes.[30] Given the small reduction commitments in the first commitment period of the Kyoto Protocol, the cumulative effect of these different sources of error – and uncertainty over the quantity of emissions released – means that the size of the reduction target falls inside the margin of error of the measuring of these different greenhouse gases.

26 MacKenzie D (2009) Making things the same: gases, emissions rights and the politics of carbon markets. Accounting, Organizations and Society 34: 440-55; see also Lohmann L (2009) Toward a different debate in environmental accounting. The cases of carbon and cost-benefit. Accounting, Organizations and Society 34: 499-534.
27 UN RISOE database and World Bank (2007) State and Trends of the Carbon Market 2007. Washington DC.
28 Michael Obersteiner et al. (2002) Quantifying a fully verifiable Kyoto. World Resource Review 14: 542.
29 Monni S (2004) Uncertainties in the Finnish Greenhouse Gas Emissions Inventory. Environmental Science and Policy 7: 87-98.
30 IPCC Guidelines for National Greenhouse Gas Inventories. Reporting Instructions.

↘

Nilsson concluded that given the uncertainties (of GHG emission inventories) in place, most of the so-called Annex I countries of the Kyoto Protocol will not be able to verify their Kyoto target emissions at the country level. This is due to the fact that the reductions of emissions are small during the commitment period and the uncertainties of the net emissions are large.[31]

Carousel fraud. The EU ETS was the victim of carousel fraud in 2008 and 2009. This resulted in losses of approximately €5 billion from the tax revenues of several Member States. It is estimated that in some countries, up to 90 per cent of the whole market volume was caused by fraudulent activities.[32]

Carousel fraud is the theft of Value Added Tax (VAT) from a government by organised crime groups who exploit the way VAT is treated within the EU Member States.

31 Michael Obersteiner, Matthias Jonas and Sten Nilsson, The Political and Economic Costs of a Fully Verifiable Kyoto Protocol. IIASA Interim Report IR-00-062

32 http://www.europol.europa.eu/index.asp?page=news&news=pr091209.htm

Monitoring of greenhouse gas emissions is further complicated by the fact that under both the Kyoto Protocol and the EU ETS, the covered entities themselves largely report their own emissions, though there is some independent verification.

Article 14 of the EU ETS Directive requires Member States to ensure that companies covered by the EU ETS scheme monitor and report their greenhouse gas emissions in accordance with guidelines published by the European Commission.[33] Monitoring and reporting of an installation's emissions is carried out mainly through assessment of fuel purchases and use of emissions factors; continuous monitoring and third-party verification are allowed but rarely used. The guidelines mandate that all self-reported emissions must be verified by an independent third party.

Little is currently known about the effectiveness of these monitoring and verification procedures. Procedures for Kyoto Protocol target verification will only be tested in full after the end of the first commitment period in 2012. In the case of the EU ETS, however, a report by the Dutch Court of Auditors suggests that staffing shortages and close cooperation between verifiers and auditors make the system less robust than is desirable.

'By way of preparation for its supervisory activities, the [Dutch Emissions Authority] NEa developed a supervision strategy. We found that the NEa's organisation of its supervision had departed from this strategy on several points. … In the first trading period (2005-07), for example, all companies had to be visited at least once and in-depth investigations had to be carried out at three-five per cent of the companies each year (i.e. about ten to fifteen companies each year). In-depth investigations had to be carried out at ten per cent of the complex companies every year. Our audit found that the NEa had planned fewer in-depth investigations for 2005 and 2006 than recommended in the supervision strategy. … In 2005 and 2006, the NEa initiated relatively few follow-up actions. In 2005 there had been a total of four, whereas it had carried out a total of 131 visits during that year. On average, three-quarters of the visits had led to agreements being made with the companies.'[34]

33 For the guidelines and details about monitoring and verification under the EU ETS, see the European Commission website http://ec.europa.eu/environment/climat/emission/mrg_en.htm

34 Algemene Rekenkamer (2007) The European Emissions Trading Scheme and its Implementation in the Netherlands. pp 76-77.

Registries

See Box 4 for the difference between permits and credits

Registries or transaction logs are another part of the monitoring system. While the trading of permits and offset credits takes place directly between entities – over the counter (OTC) or on exchanges – their movement is tracked in these registries or transaction logs. For example, countries have accounts in the UNFCCC registry, and each entity covered by the ETS has an account in a national registry. These are administered at the national level by the Member States and at EU level through the Community Independent Transaction Log (CITL), which records the issuance, transfer, cancellation, retirement and banking of allowances that take place in the national registries. At the dates specified in the legislation, the entities must have enough permits or credits in their registry accounts to cover their emissions. In the case of the Kyoto Protocol, Annex I countries must have fulfilled their first commitment period obligations to reduce GHGs by 2012. Compliance of parties to the Kyoto Protocol with their emission targets will then be determined in 2014, once inventory data for the five-year commitment period 2008-12 has been assessed by the UNFCCC.

See Chapter 4

Consequences of non-compliance

How far companies or governments will go to comply with the cap depends partly on the severity of the penalties for non-compliance. Different carbon trading schemes have different incentives and penalties, including restrictions on trade, steeper reduction requirements for future commitment periods, and fines. Countries that miss their Kyoto Protocol target will be suspended from selling permits under the emissions trading provisions until the Compliance Committee reinstates their right to trade. There is much disagreement over the mechanism's effectiveness, however: some see it as a unique contribution to environmental efforts internationally, while others argue that it offers little incentive for compliance.[35] With the EU ETS, meanwhile, the penalty for non-compliance is € 100 per tonne of CO_2e, with permits currently priced at around € 15. But considering the financial turnover and size of some of the companies involved in the EU ETS, it seems unlikely that the penalties provide much of a deterrent.

35 Hovi J, Kallbekken S (2004) The Price of Non-Compliance with the Kyoto Protocol. The Remarkable Case of Norway. CICERO Working Paper 2004:07.

Box 3

Upstream versus downstream monitoring

Almost all proposals in the international climate policy debate are based on the assumption that in order to tackle climate change, there must be an internationally agreed cap on greenhouse gas emissions.[36] Therefore questions about the setting of the cap, the distribution of allowances and monitoring will be important even where trading is not included (i.e. where there is just a cap, without the trade as a cost-management tool). Some of the problems with monitoring and verification might be avoided with an 'upstream' rather than a 'downstream' system of monitoring – i.e. measuring the amounts of fossil fuels coming out of the ground rather than the amounts being burned at all the many factories and other fossil-fuel emissions sources spread over a very wide area.[37]

The trade

The 'trade' component of any cap and trade scheme is a cost-management tool. It allows at least some of the entities affected by the cap to achieve their reduction commitment more cheaply. While it will not be possible for the trade component to make up for a cap set at an inappropriate level, the structure of the trading component is important to many participants for economic reasons. Those who advocate that trading is able to trigger structural low-carbon investment incentives point out that the structure of the trading component will determine investment incentives, and will thus influence the kind of energy infrastructure that companies and governments will invest in, as well as how soon the transition to low-carbon economies can take place. The main structural aspects that determine the costs and incentives provided by the 'trade' component are (1) how the pollution allowances are distributed, (2) whether the allowances have a use-by date, (3) whether extra allowances can be imported from outside the scheme without breaching the cap, and (4) who is allowed to trade.

The question of how allowances are distributed has already been covered. As to whether permits and offset credits linked to the Kyoto Protocol will be usable beyond 2012, this depends on the continuation of the Kyoto

36 Proposals to 'cap-and-tax' or 'cap-and-dividend' have been proposed in the USA as alternatives to the prevailing cap and trade model. For more detail see http://www.capanddividend.org and http://www.carbonfees.org/home/

37 See Grist blog postings, Gar Lipow, for a more detailed discussion. http://www.grist.org/article/tax-or-auction-permits-upstream and 'Why pricing emissions is the least important policy' at http://www.grist.org/member/1598

Protocol after the end of its first commitment period in 2012. In the EU ETS, permits did have a use-by date (31 December 2007) during Phase I of the scheme. This meant that surplus permits lost their value on that date and, combined with the over-allocation of permits in the first phase, the price of these permits crashed once it became obvious that more permits had been issued than the entities needed to cover their emissions during Phase I. Permits and offset credits not used during Phase II of the EU ETS, however, can be carried over into Phase III (2013-20), irrespective of whether there is an international climate treaty beyond 2012. Some analysts expect that a large volume of allowances will be carried over into Phase III. Due to a combination of continued over-allocation at the start of Phase II and the economic downturn since 2008, companies may 'bank' up to 700 million Phase II surplus permits – equivalent to 14 times the reduction claimed by the EU in 2008. If entities also use their full allowance of offset credit purchases during Phase II, they may be able to carry over an additional 900 million offset credits. In all, this may add up to 40 per cent of the Phase III reduction effort achieved solely through the carry-over of surplus permits and credits from Phase II.[38]

See Chapter 3 and Box 4

All existing and planned carbon trading schemes allow for the purchase of extra allowances from outside the scheme. These extra allowances are currently in the form of offset credits. As regards who is allowed to trade, one key difference between permits issued under the Kyoto Protocol and those issued under other carbon trading schemes relates to who is allowed to trade. Under the emissions trading component of the Kyoto Protocol, only those countries that were allocated permits – and thus have compliance targets – are allowed to trade these permits among themselves.[39] Carbon trading schemes such as the EU ETS, by contrast, allow trading with entities not covered by the cap, thus allowing brokerages, investment banks etc. to buy and sell permits. How this difference is affecting the evolution and price developments in the carbon market is discussed in Chapter 4.

See Case studies 2 and 3

Annex 2 provides a list of the different types of units – permits and offset credits – that can be traded in the different schemes. Each of these units is defined as equivalent to 1 tonne of carbon dioxide (CO_2e).

38 Pearson A, Worthington B (2009) EU ETS S.O.S.: Why the Flagship 'EU Emissions Trading Policy' Needs Rescuing. Sandbag, London. p. 4.

39 The case is different with Kyoto Protocol offset credits, which can be traded by others too.

Box 4

Permits and credits

Permits **are pollution units given to emitters under a cap and trade scheme. They are issued by a relevant authority, usually a governmental body. In the case of carbon permits, they are effectively a licence to emit a certain amount of greenhouse gases. The UNFCCC issues Assigned Amount Units (AAUs), and the EU issues European Union Allowances (EUAs). There is often confusion around the term 'permit'; some people call them allowances, while others use 'permit' to describe both allowances and offset credits (see below). In this guide we make a distinction between permits and credits.**

See Annex 2

Credits **are the units which describe claimed emission reductions generated by carbon offset projects. In the regulated carbon market they are issued by a relevant authority (such as the board of the Kyoto Protocol's CDM). In the voluntary market they are issued by the offset companies themselves. Under the Kyoto Protocol's CDM, credits are known as certified emissions reductions (CERs), in the voluntary offset market they are known as verified emissions reductions (VERs).**

See Chapter 4

All existing regulated cap and trade schemes include trading of both permits and offset credits, and they currently command different prices.

Box 5

The economic theory behind cap and trade in pictures

Imagine two companies covered by an emissions cap, each emitting three units of a greenhouse gas.

A government regulation limits greenhouse gas emissions from six units to four, thereby setting an overall cap of four units. Each company is given two permits. Company A finds that it would cost € 5 to reduce its emissions by one unit but company B finds that the equivalent reduction would cost them € 11.

The total cost for both companies would therefore be € 5 + € 11 = € 16. If company A were to reduce its emissions by two units instead of just one, however, and company B does not reduce its emissions at all, the cost would only be € 5 + € 5 = € 10 for the same volume of reduction. By selling a permit to company B for € 10, company A recovers the expenses for making both the emissions reduction it would have had to make to comply with the regulation as well as the cost of the extra reduction made to trade with company B. By buying a permit from company A, company B saves € 1 compared to making its own reductions.

Thus the total cost of reduction under a cap without any trade would be € 16, whereas under a cap and trade scheme the total cost of compliance for the companies involved has been reduced to € 10. Both the trade and non-trade scenarios result in the same reduction of emissions, but the trade version is achieved at a lower short-term cost to the companies.

Case study 2

The Kyoto Protocol[40]

In the Kyoto Protocol, countries fall into two categories: those with an obligation to comply with an emissions target set under the protocol, and those without. Countries with a target are mainly the industrialised countries[41] which have been responsible for the biggest increases in greenhouse gas emissions into the atmosphere. They are also referred to as 'Annex 1 countries', because they are listed in Annex 1 to the Kyoto Protocol. For most industrialised countries the targets require reductions, though some countries (Spain, Iceland and Australia) can increase their emissions under the targets set. The Kyoto Protocol does not include targets for 'developing' countries, because of their smaller contribution to the increase in greenhouse gas emissions in the past. Each industrialised country listed in Annex 1 and that has signed the Kyoto Protocol has to report to the UNFCCC Secretariat on its progress towards compliance with the target annually, and at the end of the first commitment period of the Kyoto Protocol (31 December 2012) must submit accounts showing

40 Many books and guides have been written about the Kyoto Protocol. For more detail on how it was negotiated and how its different trading mechanisms work in detail, see the UNFCCC website www.unfccc.int. For a critical analysis of the Kyoto Protocol, see Lohmann L (2006) Carbon Trading. A Critical Conversation about Climate Change, Privatisation and Power, www.thecornerhouse.org.uk/subject/climate

41 The main exception being the USA, which did not sign up to the Kyoto Protocol.

↘

that the country's emissions are in balance with the permits and offset credits in its Kyoto Protocol account.

One of the possible policies and measures for achieving these targets – and the one that has received most attention – is the option for countries covered by the Kyoto Protocol cap to trade surplus allocations among themselves. Article 17 of the Kyoto Protocol defines the rules for this type of emissions trading. This option is complemented by a provision to further increase emissions beyond the cap, while claiming to stay within it, in the form of carbon offsets, generated mainly through the Clean Development Mechanism (CDM). This is looked at in more detail in Chapter 3.

To stay within the emissions limits negotiated under the Kyoto Protocol, many industrialised countries assigned emissions targets to large emitters within their countries, such as power plants and other energy-intensive industries. Non-trading policies and measures were put forward to encourage emissions reductions in other sectors. These measures are often a mixture of regulations to incentivise innovation, best available technology use and energy efficiency, together with financial incentives and regulations to establish carbon trading for high-emitting industries.

Notably, emissions from aviation and shipping were excluded from national Kyoto Protocol targets, because of disagreement over how these should be allocated. The allocation question highlights the importance of the decision on who is covered by the cap. If, as in the Kyoto Protocol, inclusion under the cap is decided on a geographic basis, and a company with a limit moves production to a country without a target (e.g. China or Brazil) and then ships the goods back, it can still claim to have reduced its emissions. This process of moving emissions to an area where they are not accounted for is often referred to as 'carbon leakage'. Because the Kyoto Protocol sets out

↘

'Our energy footprint has decreased over the last few decades and that's largely because we've exported our industry.' 'The UK's true energy footprint is twice as big as on paper.'[42]

Professor David MacKay

42 http://www.guardian.co.uk/environment/2009/oct/01/carbon-emissions-david-mackay

to control production of greenhouse gases rather than the consumption of emission-intensive goods, there is no mechanism to prevent such leakage. China argues, for instance, that even though it is now the world's largest emitter of greenhouse gases, a quarter of its emissions are the result of production for nations with targets under the Kyoto Protocol. The inclusion of carbon sinks in emissions accounting under the Kyoto Protocol, in the form of carbon absorbed from the atmosphere and stored in trees and soils and other biomass, has also been controversial due to the lack of permanence of such storage and technicians' ability (or inability) to measure such stocks accurately. There is further controversy over the choice of base year (1990), which for former USSR countries resulted in the allocation of permits far in excess of their actual emissions, which dropped dramatically after 1990 due to the rapid decline of their industrial activity.

> 'The scientific uncertainties in measuring carbon movements into and out of ecosystems are just too great. … By opening up the whole of the biosphere to actions under the Kyoto Protocol, governments have made it completely unverifiable.'[43]
>
> *Sten Nilsson of the International Institute for Applied Systems Analysis (IIASA)*

See Annex 2

In the Kyoto Protocol, permits allocated to industrialised countries with emissions targets are called Assigned Amount Units (AAUs). Trading of AAUs is allowed between countries that have been issued them under the Kyoto Protocol. Other entities cannot trade these AAUs,[44] but consultancies are often involved in brokering such AAU trading between countries. This is in contrast to the EU ETS and other regional emissions trading schemes in which brokers, investment banks and other financial actors can buy and sell permits even though they are not directly covered by the target. Trading of AAUs is an important yet controversial source of permits for countries which find it difficult to meet their reduction targets.

See Chapter 4

Other units can be traded under the Kyoto Protocol: CDM offset credits and Joint Implementation (JI) offset credits. In the CDM, these offset

43 Quoted by Fred Pearce in 'Smokescreen exposed', New Scientist, 26 Aug. 2000
44 An exception is New Zealand where entities covered in the domestic scheme receive AAUs from the government.

↘

credits are generated in countries without a cap on emissions; in the JI mechanism, they are generated by offset projects within a capped country. CDM offsets thus allow countries with a Kyoto target to emit beyond their cap as long as they pay a project in an uncapped country to reduce 'extra' emissions. Chapter 3 discusses why it is not straightforward to establish what an 'extra' reduction is, how these offsets differ from permits, and why this matters for carbon trading schemes that treat both as if they were the same.

See Annex 2 for a full list of tradeable units

Other carbon trading schemes

See page 12

While the USA never ratified the Kyoto Protocol – even though the agreement was heavily influenced by its insistence on the inclusion of carbon trading – various regional carbon trading schemes have recently been developed in the USA, including the Regional Greenhouse Gas Initiative (RGGI) in the north-eastern states, and the Western Climate Initiative (WCI), which links a number of western US states and Canadian provinces with a cap and trade scheme in California. Among the options discussed since 2009 for national US climate legislation are proposals for a cap and trade scheme. This would be much like the EU ETS but would allow even more carbon offsets and possibly only include utility companies. It would also have a 'safety valve' that would allow additional offset credits in the scheme if carbon permit prices rose above a predetermined price,[45] effectively setting a ceiling on the price of carbon. This is of concern to many because the price limit is significantly lower than what is widely seen as necessary for a transition to a low carbon economy.[46] National carbon trading schemes are also in operation or being discussed in Japan, Australia and New Zealand, in relation to their Kyoto Protocol targets. In Brazil and China, discussions about establishing national or regional carbon trading schemes similar to the EU ETS have also begun.

45 The exact carbon permit price which will trigger the 'safety valve' is yet to be determined along with many other details as the proposals are at early stages of the legislative process. The value discussed is around $20.

46 IPCC Working Group III, Chapter 3: Issues related to mitigation in the long-term context. p. 205.

Case study 3

Carbon trading in practice – the EU Emissions Trading Scheme[47]

Under the Kyoto Protocol, the fifteen countries which were Member States of the EU when the protocol was agreed (EU-15) are committed to reducing their collective greenhouse gas emissions in the period 2008-12 to eight per cent below 1990 levels, the reference year of the Kyoto Protocol. This collective commitment has been translated into differentiated national emissions targets for each EU-15 Member State. In 2009, the EU committed to a reduction target of 20 per cent below 1990 levels by 2020. One of the main policies setting out how the EU intends to meet its 2020 target is the EU Emissions Trading Scheme (EU ETS).[48]

The EU ETS was launched on 1 January 2005. It includes elements from carbon dioxide emissions trading schemes which originated in the UK and in Denmark and which merged into the EU-wide scheme in early 2005.[49] The EU ETS sets targets for emissions from energy-intensive industrial sectors such as the energy, cement, pulp and paper industries,[50] and it consists of three phases.

Phase I ran from January 2005 till the end of 2007. During this period the only controlled gas was CO_2. The objective of Phase I was a tentative one-two per cent reduction, although there was considerable uncertainty about the level of emissions actually being released by the industries covered by the EU ETS. Each Member State was given control of the allocation of their permits after it had drawn up a national allocation plan (NAP), which had to show that the Member State was setting the overall EU ETS cap in line with its Kyoto Protocol reduction target. Permits were generally given to the participating emitters at no charge. The number of permits issued was based on previous emissions levels, 'a practice called grandfathering'. It was believed that subsequent trading of permits would establish the correct price. Member States were allowed to sell a maximum of five per cent of permits by auction, but only Denmark chose to exercise this option to the full.

47 For more detail on the ETS, the sectors covered, the changes adopted between different phases etc., see among others 'When the cap does not fit – cap and trade and the failure of the EU Emissions Trading Scheme.' In: Gilbertson T., Reyes O. (2009) Carbon Trading – How it Works and Why it Fails. DHF Critical Currents 7, 31-51.

48 http://ec.europa.eu/environment/climat/emission/index_en.htm

49 Gilbertson and Reyes (2009) op. cit., p. 28 ff.

50 For a full list of sectors covered by the EU ETS see the European Commission's website on the EU ETS: http://europa.eu/rapid/pressReleasesAction.do?reference=MEMO/06/2&format=HTML&aged=0&language=EN&guiLanguage=en

The problem with grandfathering was that domestic industries in each Member State lobbied their governments for the maximum allocations possible, which led to an over-allocation of permits: more permits were given out than the industries actually required. As a result, at the end of Phase I, total emissions from within the industry sectors covered by the EU ETS had increased by 1.9 per cent.[51]

Another effect of over-allocation was that when, in April 2006, it became clear that companies participating in the EU ETS had been granted significantly more permits than they needed to cover their 2005 emissions, the price of permits collapsed. With permits losing their validity at the end of Phase I (i.e. no carry-over or 'banking' was allowed between Phase I and II), their price in the carbon market dropped from a high of around € 30 to just € 1. Not all participants were equally successful at bargaining for a generous allocation or equally well equipped for trading; hospitals and universities did less well than energy companies whose core business is trading and which knew how to play this new asset market. As a consequence, by 2012 the estimated 230 million surplus EUA permits, worth up to € 3 billion at a price of € 13 per tonne,[52] will have resulted in significant financial gains for some of the largest polluters. For example, power generators that had successfully overestimated their permit requirements received record windfall profits because they passed on hypothetical costs for permit purchases to their customers.

See Chart 1, page 22

Phase II coincides exactly with the first commitment period of the Kyoto Protocol (January 2008 to December 2012). Again the only controlled gas is CO_2 (although France, the Netherlands and now Norway[53] have opted to include NO_2), and again permits were allocated by Member States in NAPs. 2005 was set as the base year against which emissions changes are measured. Business-as-usual emissions for 2005 were set at 2177 $MtCO_2$. The object of Phase II is to reduce emissions by 4.3 per cent to 2083 $MtCO_2$ per annum.

Under the legislation for Phase II, a greater quantity of permit auctioning was envisaged – up to ten per cent – but this was left to the discretion of the Member States. The result is that only Germany (nine per cent)

51 http://www.internationalprofs.org/iesc/index.php?option=com_content&view=article&id=118:eu-ets&catid=908:eu-ets&Itemid=88

52 http://www.sandbag.org.uk/files/sandbag.org.uk/carbon_fat_cats_march2010.pdf

53 While not part of the European Union, Norway uses the EU ETS to regulate emissions from its high-emitting industry sectors.

and the UK (seven per cent) have declared an intention to auction anything like this quantity, with most making no commitment to do so. From Phase II, the 'Linking Directive' – which links the EU ETS with the Kyoto Protocol's flexible mechanisms – allows companies to start using CDM or JI credits (see Chapter 3) up to a limit of 11 per cent of a Member State's total allowance.[54] [55] This will effectively allow emissions within the EU ETS to increase during Phase II.[56] The price of EU ETS permits in Phase II has fluctuated almost as dramatically as in Phase I, falling from over €30 to less than €10. This time the fall has been attributed to the reduction in industrial activity following the global 'credit crunch' of 2008-09. In September 2009 the EU ETS permit price was around €14-15. This greater resilience in price, despite the fact that permits were once again over-allocated, is due to the fact that this time permits can be banked through to the next phase. Many expect that power companies, which in Phase II continued to receive their permits free of charge, will gain windfall profits between €23 and €71 billion during Phase II because of the continuation of the practice of passing on non-existent costs for permit purchases to the consumer.[57]

The EU operations of ArcelorMittal, the world's largest steel company, are covered by the EU ETS. The company's operations have received significantly more permits than they needed to cover their operations. The company is likely to have made over €2 billion in profits from trading EU ETS permits between 2005 and 2008, with over €500 million of the profits accrued in 2008 alone.

Sources: D. Leloup (2009) Analysis of Acrelor Mittal EU ETS Data.

54 The ETS directive extends the rights to use these credits for the third trading period and allows a limited additional quantity to be used in such a way that the overall use of credits is limited to 50% of the EU-wide reductions over the period 2008-20. For existing installations this will represent a total level of access of approximately 1.6 billion credits over the period 2008-20. In practice, this means that existing operators will be able to use credits up to a minimum of 11% of their allocation during the period 2008-12. http://europa.eu/rapid/pressReleasesAction.do?reference=MEMO/08/796&format=HTML&aged=0&language=EN&guiLanguage=en

55 See http://sandbag.org.uk/carbondata/cers for an interactive map of the CDM offset projects companies covered by the EU ETS bought offset credits from to cover part of their 2009 emissions.

56 For a description of the impact of the Linking Directive on the EU ETS see the UK National Audit Office report on the ETS, p58 59 available at http://www.nao.org.uk//idoc.ashx?docId=BA234E01-C494-4AB4-898B-812A0FE1C4F5&version=-1

57 WWF (2008) EU ETS Phase II – The potential and scale of windfall profits in the power sector. March 2008. http://assets.panda.org/downloads/point_carbon_wwf_windfall_profits_mar08_final_report_I.pdf and National Audit Office (2009) European Union Emissions Trading Scheme. NAO London. March 2009.

↘

Chapter 4 gives more detail on how, during the financial credit crisis of 2008-09, some companies used their EU ETS allowances to raise cash that was otherwise hard to obtain due to the unavailability of bank credits and lack of liquidity in the banking sector – giving them a significant business advantage not available to businesses outside the EU ETS, such as the renewable energy industry.

Phase III will run from January 2013 until the end of 2020. The final emissions target has been set at 1720 $MtCO_2e$, 14 per cent below 2005 levels (and equivalent to 21 per cent below 1990 levels, but see the qualifications below regarding the use of offset credits). The legislation for Phase III makes modifications to the existing rules of the EU ETS and introduces some new ones:

- **in line with the Kyoto Protocol, several carbon equivalent gases will be introduced**
- **50 per cent of the reduction between the beginning of Phase II and the end of Phase III can be accounted for by imported offset credits from the CDM or JI**
- **NAPs will be coordinated by the European Commission from 2013 onwards**
- **auctioning has been increased, though the exact level has still not been fixed. Intense lobbying by manufacturing industries – claiming they would move production outside the EU if auctioning was introduced in the EU ETS in isolation from other trade blocks doing the same – is likely to result in around three-quarters of manufacturing companies covered by the EU ETS continuing to receive free permits in Phase III. When it introduced plans to increase auctioning in Phase III, the Commission envisaged that 100 per cent of allocations would be auctioned by 2027.[58]**

As well as these changes, a 'price trigger' has been introduced. This means that if the price of permits exceeds three times the average price of the previous two years, the Commission will call a meeting of Member States to decide how to limit the price. Some commentators have expressed concern that there is no provision for such a meeting if, by contrast, the permits drop below a set price. Others have expressed concern that such a price trigger will keep prices too low to actually incentivise investment

↘

58 http://www.europeanvoice.com/article/2008/12/summit-approves-climate-change-package/63418.aspx

in low-carbon technology that goes beyond end-of-pipe technology investments.

Due to a combination of continued over-allocation at the start of Phase II, and the economic downturn since 2008, companies may 'bank' up to 700 million surplus Phase II permits and carry them over to Phase III. This would be equivalent to 14 times the reduction claimed by the EU in 2008. If entities also use their full allowance of offset credit purchases during Phase II, they may be able to carry over an additional 900 million offset credits. This may add up to 40 per cent of the Phase III reduction effort being achieved solely through the carry-over of surplus permits and credits from Phase II[60] – and would substantially reduce the requirement to cut emissions within the EU.

> One market observer told Point Carbon: 'The obvious thing to say now is that the caps must be corrected in the second phase, but what has happened recently makes us realise that if regulators are off with their estimates, prices will be either very high or very low. I am not sure that something with such an inherently unstable price is an incentive for people to invest. It is a fundamental flaw in the scheme.'[59]

Monitoring and verification of emissions in the EU ETS

Article 14 of the EU ETS Directive requires Member States to ensure that companies covered by the EU ETS scheme monitor and report their greenhouse gas emissions in accordance with guidelines published by the European Commission.[61] Imre Csikós, MOBilisation for the Environment[62], explains:

'Emissions are generally not measured directly, but determined by calculation based on fuel consumption, specified emission factors, and the thermal efficiencies for combustion units and on output and other chemical and engineering estimates for process emissions. In order to avoid undue

59 EC could come down hard on phase two NAPs.Carbon Market Europe, 12 May 2006, p.3. www.pointcarbon.com

60 Pearson A, Worthington B (2009) *EU ETS S.O.S.*: Why the Flagship 'EU Emissions Trading Policy' Needs Rescuing. London, Sandbag, p. 4.

61 For the guidelines and details about monitoring and verification under the EU ETS, see the EC website http://ec.europa.eu/environment/climat/emission/mrg_en.htm

62 MOB; www.mob.scarlet.nl

↘

costs, the specific monitoring, reporting, and verification procedures vary according to the size of the installation with higher "tier" or more accurate and more costly techniques being applied to larger installations than to smaller ones. Each Member State is responsible for certifying verifiers and more generally for ensuring compliance through the deduction of allowances from accounts in the national registry equal to the verified emissions reported for each installation.'

The summary report of a 2009 EU ETS Compliance Forum workshop hosted by the European Commission highlights gaps in consistency of the monitoring and verification process. The report mentions different Member State *'approaches on rejection of emission reports – dealing with not verified emission reports; inconsistent and/or different interpretations of the MRG [Monitoring and Reporting of Greenhouse Gas Emissions under the EU ETS] requirements; cost pressures on verifiers and the effect on the quality of the verifications; … missing professional scepticism and independence of the verifier.'*[63]

63 Outcomes and Follow-up on the 2nd Compliance Conference 3-4 Sept. 2009: 'Going forward together' – EU ETS Compliance Forum Secretariat. http://ec.europa.eu/environment/climat/emission/ets_compliance2.htm

The most frequently used arguments in favour of carbon cap and trade schemes and FERN's response

Argument 'Cap and trade is the most cost-effective way to reduce emissions'

'Those who advocate only command-and-control regulation seem to ignore all of the published data, from the experiences of academics, governments and the private sector, that highlight precisely why emissions trading is a more cost-effective approach to reducing emissions than blunt regulation. Put simply, it is better to reduce emissions in a way that results in lowest costs to society.' Abyd Karmali, Managing Director, Global Head of Carbon Markets, Merrill Lynch[64]

'Governments are relying way too much on the price of carbon to deliver everything.' 'The oil price shocks of the 1970s didn't wean us off oil, so why should we believe that a high carbon price will wean us off carbon.'[65]

Dr Jim Watson of Sussex University Energy Group

Carbon trading does not result in the lowest cost to society. The best that carbon trading can do is lower the price that certain polluting industries have to pay to comply with their present short-term reduction targets. It enables polluters to meet their reduction targets over the crucial next decade without the structural changes that will be needed for the longer-term reduction targets and the transition to a low carbon economy. Most commentators now agree that structural investment in a non-fossil fuel future has to begin now, not in ten or even two years' time. The longer the delay, the more everybody will have to pay. Professor David Driesen of the College of Law, Syracuse University, USA, argues that lowering short-term business costs *'does not increase incentives for valuable innovation'*. In short, by concentrating on short-term

64 The trouble with carbon trading: a short debate. ClimateChangeCorp: Climate News for Business, April 2009. http://www.climatechangecorp.com/content.asp?ContentID=6064; http://www.climatechangecorp.com/content.asp?ContentID=6065

65 Quoted by Jeremy Lovell, 'Carbon price is poor weapon against climate change.' Reuters, 25 Sept.2007

lowest cost for companies, the long-term cost for the economy and society is increased.

Effective implementation of a greenhouse gas cap and trade scheme also requires the ability to monitor and verify reported emissions reductions. As Daniel H. Cole points out, trading systems are 'quantification-heavy'. They cannot reduce the costs of achieving an emissions reduction goal except in the presence of an extensive, far-reaching, uniform and accurate system of measurement and monitoring. While some equipment exists, such as continuous emissions monitors for CO_2, for many operations and other greenhouse gases there is no such equipment. Although, as Marc Roberts observes, *'when economists discuss such matters as emissions trading they sometimes talk as if monitoring devices were widely available to cheaply and reliably record the amount of all pollution emissions'*, widespread adoption of such devices cannot be taken for granted. If direct and verifiable measurements are not going to be made, giving polluters pollution quotas makes little sense.[68] Thus the *'comparative efficiency of alternative environmental instruments cannot be determined in isolation from the institutional and technological circumstances in which they operate'*.[69]

'By 2015, the UK's electricity system will look remarkably similar regardless of assumptions on how the EU ETS plays out.'[66]

IPA Consultants

'ETS has done nothing to curb emissions, … is a highly regressive tax falling mostly on poor people [and] enhances the market power of generators. Have policy goals been achieved? Prices up, emissions up, profits up … so, not really.'[67]

Citigroup's Peter Atherton – January 2007

See Case study 1

As the US Clean Air Act demonstrated, it was more efficient, given the state of pollution measurement at the time to use performance regulation to reduce sulphur dioxide emissions over a cap and trade scheme which was introduced only once direct, independent real-time monitoring equipment

66 http://www.publications.parliament.uk/pa/cm200910/cmselect/cmenvaud/290/290.pdf
67 http://www.ukzn.ac.za/ccs/default.asp?5,74,5,1747
68 Cited by Cole D (2002) Pollution and Property: Comparing Ownership Institutions for Environmental Protection. Cambridge University Press. p. 54
69 Ibid, p.70.

was widely available.[70] Trying to achieve reductions through cap and trade regulation, in the absence of adequate monitoring and measurement equipment, would have been extremely expensive due to the lack of the necessary measurement technology. With technology-based regulation, on the other hand, the technology itself was the monitoring device. As Michael T. Maloney and Bruce Yandle explain: *'If the approved technique was in place, and working order documented, emission control was being accomplished.'*[71]

The lack of an adequate measurement system can only exacerbate the opportunities for dishonesty that are already inherent in carbon cap and trade schemes, where both buyers and sellers have strong incentives to conceal whether reductions have actually been made and where pollution permits are traded as equivalent to offset credits, whose reduction claims are unverifiable by design.

See Chapter 3

Some of these problems might be avoided with an 'upstream' rather than a 'downstream' system of monitoring – that is, one that measures the amounts of fossil fuels coming out of the ground rather than the amounts being burned. While measurement technology is bound to improve over time, there is *'no reason to expect that countries or corporations will reduce their greenhouse gas emissions to comply with quotas that cannot be effectively monitored and enforced'*.[72]

See Box 3

The claim that carbon trading provides the most cost-effective way of reducing greenhouse gas emissions becomes even less convincing if carbon offsets are considered. It is astonishing that companies that lobby for cost-effectiveness as the guiding principle in climate policy are willing to pay for carbon offsets generated from projects that net up to $1 billion when the cost of the purchase, installation and running of the equipment that generated the credits was just $15 million. Straight payment for the use would surely have been the more 'cost-effective' alternative.[73] Chapter 3 discusses the perverse incentives such offset mechanisms provide. In the case of French chemicals firm Rhodia, its revenue from the sale of carbon credits is already 35 times larger than from the sale of adipic acid, the

See Case study 4, page 74

70 Driesen DM (1998) 'Is emissions trading an economic incentive program? Replacing the command and control/economic incentive dichotomy.' Washington and Lee Law Review 55; Moore CA (2003) 'Marketing failure: the experience with air pollution trading in the United States.' Health and Clean Air, http://www.healthandcleanair.org/emissions/marketing_failure.pdf

71 Maloney MT, Yandle B (1994) Estimation of the cost of air pollution control regulation. Journal of Environmental Economic and Management 11: 244.

72 www.essex.ac.uk/eccc/Presentations/Lohmann.ppt

73 These are the cost and profit estimates for a CDM registered project which French chemical firm Rhodia operates in South Korea.

company's core production. Similar issues arise with CDM offset projects that eliminate refrigerant gas HFC-23 where in addition to the spectacular profit margins (installation cost of equipment costs of around € 100 million versus offset revenue of up to € 4.7 billion), the offset profits appear to have driven production of potent greenhouse gases up beyond demand, just to be able to maximise the revenue from offset credit sales.[74]

See Case study 4, page 73

Philip Luyten, environment manager at Total Petrochemicals, states that 'The EU ETS has given no extra incentives for greenhouse gas reductions or changes to the fuel mix.'

ENDS Daily 1 February 2007

With regard to effective reduction of fossil fuel emissions, the EU's Large Combustion Plants Directive (LCPD) has to date been a more effective measure, in terms of reduced carbon emissions, than any other EU climate-specific policy.[75] The directive sets a non-tradable limit on the level of sulphur dioxide, with plants that 'opt out' of the scheme required to close by 2015. This will lead to the closures of numerous oil- and coal-fired power stations and reduce the related greenhouse gas emissions.

Argument 'Global warming is a global problem, and it is a problem of quantity, so it doesn't matter where emissions are reduced – as long as they are reduced'

'The climate change problem is a problem of quantity – setting the cap and then reducing the cap is the only measure that provides policy-makers with certainty about the absolute level of emissions which will be attained.' Abyd Karmali, Managing Director, Global Head of Carbon Markets, Merrill Lynch[76]

The argument that it does not matter where emissions are reduced is made both in relation to the use of carbon offsets as well as in relation to the trading among companies with emission limits. We return to the argument in relation to offsets in Chapter 3. With regards to the claim that it does not make a difference where the emission is reduced as long as

74 Wara M, Victor D (2008) A Realistic Policy on International Carbon Offsets. PESD Working Paper no. 74

75 On the LCPD plant closures, see Harrison P (2009) 'UK and Poland top dirty coal list, closures loom.' Reuters, 12 Feb; http://planetark.org/wen/51627.

76 The trouble with carbon trading: a short debate. ClimateChangeCorp: Climate News for Business April 2009 http://www.climatechangecorp.com/content.asp?ContentID=6064 http://www.climatechangecorp.com/content.asp?ContentID=6065

there is a reduction among capped companies, the argument ignores the fact that carbon trading allows those industries who need to change most, but for whom change is most expensive, to delay investing in clean new technologies. They can just purchase permits and offset credits instead. This results in a delay to the transition to low-carbon energy infrastructure and the requisite structural changes across economies.

The argument also ignores the fact that the largest emitters of greenhouse gases are also generally large emitters of other pollutants that have health impacts, and that these polluters are often located in poor neighbourhoods. Research has shown that *'reducing locally emitted CO_2 will reduce local air pollution mortality even if CO_2 in adjacent regions is not controlled. This result contradicts the basis for all air pollution regulations worldwide, none of which considers controlling local CO_2 based on its local health impacts. It also suggests that the underlying assumption of the cap and trade policy, that CO_2 impacts are the same regardless of where emissions occur, is incorrect.'*[77] [78]

Argument 'Cap and trade' is preferable to a carbon tax because the 'cap and trade' approach sets a limit on emissions while a tax only controls the price and does not provide an absolute limit on emissions. Therefore it does not allow effective control over the total emissions that are released into the atmosphere in the way that cap and trade does'

See page 18/19

This is a largely theoretical argument because the possibility that cap and trade schemes effectively set emissions targets is not a reality today. The setting of a verifiable cap is undermined by the design flaws and measurement limitations preventing adequate verification of greenhouse gas emissions levels. Thus it is doubtful whether any carbon cap and trade scheme operating today actually provides such an absolute limit on emissions. A carbon tax would need to be accompanied by other measures and policies, and if this was the case and the tax revenue would be dedicated to financing the transition to low-carbon economies, it could be more effective than a cap and trade scheme because it is easier to monitor. Such a tax-and regulate approach is also closer to the 'polluter pays' principle than

77 Jacobson MZ (2009) The Enhancement of Local Air Pollution by Urban CO_2 Domes. Department of Civil and Environmental Engineering, Stanford University, Stanford, California; Jacobson MZ (2008) On the causal link between carbon dioxide and air pollution mortality. Geophysical Research Letters, 35.

78 Further reading on why it matters where emissions are reduced: – Jacobson MZ (2009) The Enhancement of Local Air Pollution by Urban CO_2 Domes. Department of Civil and Environmental Engineering, Stanford University, Stanford, California. – Jacobson MZ (2008) On the causal link between carbon dioxide and air pollution mortality. Geophysical Research Letters, 35. – Black Leadership Forum (2002) Air of Injustice. African Americans and Power Plant Pollution. – League of United Latin American Citizens (2004) Air of Injustice. How Air Pollution Affects the Health of Hispanics and Latinos.

cap and trade, which in practice has led not to 'polluter pays' but to 'polluter gets paid'.

See page 22

Argument 'Cap-and trade relies on permits given away for free at least initially to get industry to buy into the scheme and to address the risk of companies moving to uncapped areas as long as there is no global carbon trading regime in place'

Giving away permits for free may achieve buy-in from industries that are dependent on fossil fuels, but climate change requires structural change, so there is a limit to how much the 'needs' of waning fossil-fuel industries can be allowed to define policy. This is especially true if such giveaways come at a high cost to industries that are likely to play a key role in the transition to a low carbon future. While some industries will probably never break their dependence on fossil fuels, others such as the renewable energy and energy-efficiency sectors do not profit from carbon trading. In fact permit giveaways put them at a disadvantage and slows their innovation.

With regard to the free giveaway, Peter Dorman at Econospeak[79] says it was a mistake to issue permits on a company-by-company basis, i.e. to cap the users of carbon fuels rather than their sources. And as economist John Kay wrote in the Financial Times: *'When a market is created through political action rather than emerging spontaneously from the needs of buyers and sellers, business will seek to influence market design for commercial advantage.'*[80]

Argument 'Carbon trading is just one instrument of many and it is best to use all available tools to tackle climate change'

Many proponents of carbon trading argue that carbon markets can work in conjunction with other policies and measures, and that there is no reason to exclude carbon trading from the mix. The trouble is that carbon trading actively interferes with positive approaches to tackling climate change. For example, many politicians in the UK are using the EU ETS to talk down opposition to the building of new coal power stations. The logic is: *'Why should we do anything about fossil fuels if any intervention by us to cut emissions will merely shift them somewhere else in Europe?'*

79 http://econospeak.blogspot.com/search?q=carbon+trading
80 John Kay, 'Why the key to carbon trading is to keep it simple', Financial Times, 9 May 2006, http://www.johnkay.com/in_action/441

A 'Draft options paper on renewables target', written by the UK's Department of Business Enterprise and Regulatory Reform to advise UK ministers on the EU's proposed 2020 target for renewable energy, further highlights the risk of carbon trading hindering ambitious climate policies: *'If the EU has a 20 per cent GHG target for 2020, the GHG emissions savings achieved through the renewables target and energy efficiency measures risk making the EU ETS redundant, and prices to collapse. Given that the EU ETS is the EU's main existing vehicle for delivering least cost reductions in GHG, and the basis on which the EU seeks to build a global carbon market to incentivise international action, this is a major risk.'*[81]

Another example is the International Pollution Prevention and Control (IPPC) Directive, which sets energy-efficiency requirements and pollution limits. The application of the EU ETS has directly undermined the co-benefits of this legislation for tackling carbon emissions. As the European Environment Agency points out, the IPPC *'requires the definition of both energy efficiency requirements and emission or concentration limits. ... These requirements could restrict emissions trading. For example, operators of large sources might be obliged to reduce their emissions (in order to comply with the IPPC Directive) when it could be more economically efficient to increase emissions further and buy additional allowances instead. Article 26 of the Emissions Trading Directive, the legal basis for the EU ETS, therefore amends the IPPC Directive so that permits shall not include CO_2 emission limits for installations which are covered by the EU ETS.'*[82] The EU is currently consulting on whether to revise the IPPC and introduce nitrous oxide and sulphur dioxide trading schemes – a further example of how the EU ETS is serving to undermine existing environmental regulation that has been effective in cutting greenhouse gas emissions.

Leading climate scientist James Hansen recently concluded that carbon trading is *'guaranteed to fail in terms of getting the required rapid reduction in emissions'*. Even Lord Browne, former chief executive of BP and an early proponent of carbon trading, now says his enthusiasm was misplaced.[83] Another early proponent, former Dutch minister Willem Vermeend, has also changed his view on carbon trading. In an interview with the Dutch magazine EnergieGids, he stated that: *'The mechanism does not work in the interest of the climate. We see that companies massively buy emission rights when CO_2 prices are low. They stock these up to use them later or to sell them*

81 http://image.guardian.co.uk/sys-files/Guardian/documents/2007/08/13/RenewablesTargetDocument.pdf

82 European Environment Agency (2008) Application of the Emissions Trading Directive by EU Member States – Reporting Year 2007. EEA Technical Report no. 3/2008, p. 27.

83 Tim Webb and Terry Macalister (2009): Carbon trade wrong, says Lord Browne. The Observer, Sunday 8 March 2009. http://www.guardian.co.uk/business/2009/mar/08/oilandgascompanies-carbon-emissions

partly on in case the price has become higher; it is just trading with CO_2 and this has nothing to do with the climate.'[84] [85]

Argument 'There are problems with carbon trading, but these will be ironed out over time through refining the regulation in a trial and error manner'

Many proponents of carbon trading argue that it is not surprising that there have been initial problems in setting up carbon trading schemes, as the systems are complex and take in different greenhouse gases emitted from countless sources across a large number of different industry sectors. The question that arises, however, is whether the problems that have emerged are design flaws around which the scheme can be amended, or whether the design itself is so flawed as to be unfixable.

There is growing evidence to indicate the latter. Initial estimates of how long it would take to establish fully functional, interlinked carbon trading markets among the different trade blocs have turned out to be over-optimistic; and meanwhile the urgency for a rapid phase-out of fossil fuel use has been growing along with our increased understanding of the speed of climate change. In its February 2010 report, the UK Environmental Audit Committee addressed another crucial issue: carbon trading must have a use-by date, since fossil fuel use will need to have declined to negligible levels well before the end of this century. As Alan Bernstein of Sustainable Forestry Management Ltd has noted, *'30 years from now there better not be a carbon market because if there is we will have failed to address climate change'*.[86]

On the issue of fixing cap and trade schemes, many who see the problems with carbon offsets argue that emissions trading proper is different, and that if the trading scheme were set up without offset credits and with a tight cap, it would work. There are two issues to consider. First, the fact that all existing and planned carbon trading schemes both allow for the use of offset credits and operate with inappropriately low caps makes the discussion largely theoretical – especially considering the time-frame within which the transition to low-carbon economies has to get under way. Second, on the theoretical assumption that a carbon trading scheme were set up with tight

84 Issue 11 of EnergieGids.nl; translation from original interview in Dutch.

85 Further reading on how carbon trading undermines other regulation to phase out the use of fossil fuels: – Larry Lohmann: Carbon Trading, Climate Justice and the Production of Ignorance: Ten Examples. http://www.thecornerhouse.org.uk/pdf/document/IgnoranceFinal.pdf

86 Side event organised by Ecosecurities at CIFOR Forest Day, Dec. 2007, Bali.

caps and not allowing the use of offset credits for compliance, the scheme would still have two major obstacles.

The first obstacle is that although excluding offset credits might theoretically make it easier to verify whether emissions targets are being adhered to, verification of the effectiveness of stand-alone cap and trade schemes to achieve these targets (to say nothing of their effectiveness in addressing climate change) remains impossible because the necessary measuring and monitoring equipment is not available to monitor compliance with the cap. Second, the scheme would still include vastly different industry sectors with different economic fundamentals and different abilities to reduce emissions. Any cap and trade scheme that includes such a wide array of industrial sectors will thus always serve to delay the high-cost investments in the very industries that most need to make the structural change investments that are needed for a rapid and just transition to low carbon economies.

In addition, the more time that is spent trying to fix the problems, the more careers, jobs and institutions become tied up with carbon trading, and the more difficult it will be to deal with the problems due to increased vested interests. For example, one reason why the first phase of the EU ETS led to windfall profits was that companies and then governments spent a lot of time and energy lobbying for their own narrow interests – career time that could also have been spent on researching, analysing and implementing policies and measures that allow for the just and rapid transition to low carbon economies.[87]

Argument 'The price signal from carbon trading will incentivise investment in renewable energy'

See page 41

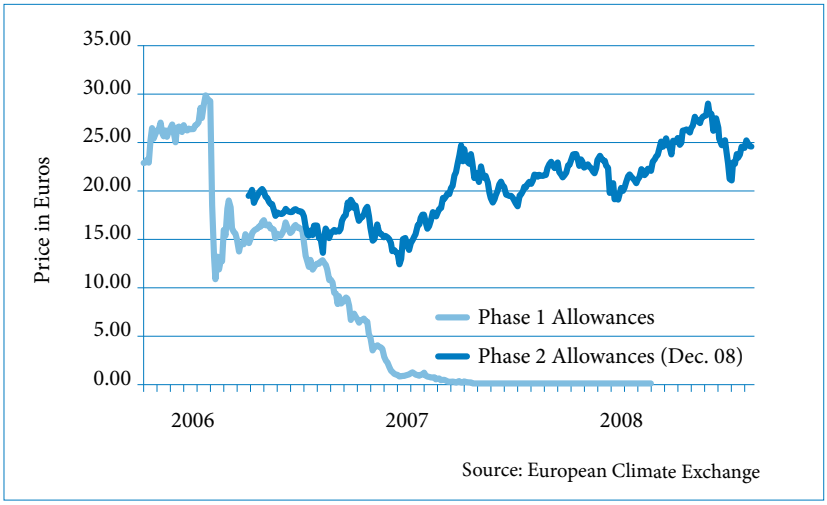
See Chart 2 on next page

The argument that high carbon prices will incentivise technological development once it is cheaper than purchasing permits is misleading in several ways. First, the carbon price has never been in the range considered necessary to trigger such investment decisions. In addition, in both the EU ETS and the proposed US trading scheme, 'price triggers' are in place to ensure that a high enough price is never reached. Many experts further agree that carbon prices cannot *'deliver the escape velocity required to get*

87 For further reading on why the problems with carbon trading as not just minor design flaws that can be overcome with some adjustments: – http://www.thecornerhouse.org.uk/pdf/document/IgnoranceFinal.pdf. – For examples of where attempting to fix problems triggered further difficulties, see: Financial markets: http://www.thecornerhouse.org.uk/pdf/document/Athens%2010.pdf http://www.thecornerhouse.org.uk/pdf/document/Unregulatability.pdf. Dams: http://www.thecornerhouse.org.uk/pdf/document/WhatNext.pdf. Development: http://www.thecornerhouse.org.uk/item.shtml?x=51964. GM crops: http://www.thecornerhouse.org.uk/pdf/briefing/21gmtree.pdf.

investment in technological innovation into orbit, in time'[88] and that *'there is little evidence of price incentives inducing a fundamental transformation in the economy or society'*.[89]

Chart 2 **Carbon price**



Secondly, it is important to remember that carbon trading has been designed in a way that delays action. Instead of ensuring that all industries look for low-carbon alternatives, it allows the worst polluters to pay for low-cost carbon reductions now whilst continuing business as usual – in other words, carbon trading is a cost-management tool that incentivises companies to prioritise short-term cost savings and end-of-pipe changes over long-term investments into low-carbon technology, energy use and production. As such, it hinders investment in structural change and smart grid development (i.e. in the sectors that matter most), because over the next decade the cost of such investment will always be higher than buying carbon permits or offset credits from someone else, thus delaying these crucial investments in structural change in our energy systems. Current low carbon prices and the design flaw of carbon trading schemes which introduces price ceilings will exacerbate this further. In order to create a shift to a low carbon economy, massive financial and infrastructure injections will be required to allow

88 Prins G, Rayner S (2007) Time to ditch Kyoto. Nature 449: 973.

89 Banuri T, Opschoor H (2007) Climate Change and Sustainable Development. United Nations Department of Economic and Social Affairs Working Paper No. 56, ST/ESA/2007/DWP/56, New York: United Nations. See also Sachs J, (2008) Technological keys to climate protection. Scientific American, March; Buck D (2007) The ecological question: can capitalism prevail? In Panitch L, Leys C (eds) Coming to Terms with Nature. New York: Monthly Review Press, 60-71.

technologies to get to the economies of scale required to bring their costs down to competitive levels. Carbon trading is not designed to encourage these investments or the research and regulatory framework that is required for their wide dispersal.

Michelle Chan of Friends of the Earth US further explains that *'it is hard to see how carbon markets can come up with the "right" price for carbon. Unlike other markets, an accurate price is not what best reflects "what the market will bear" – a figure that could be greatly influenced by who is trading – but rather whether the price is high, clear, and consistent enough to generate the intended environmental results.'*[90] And Jim Watson of Sussex University Energy Group stresses that *'[g]overnments are relying way too much on the price of carbon to deliver everything. … The oil price shocks of the 1970s didn't wean us off oil, so why should we believe that a high carbon price will wean us off carbon?'*[91]

Argument 'Even if carbon trading is not perfect, it is "the only game in town" so we'd better make it work as best it can'

Far from being the 'only game in town', carbon trading actively interferes with positive initiatives to phase out fossil fuel use and implement the rapid transition to low-carbon economies that is needed to tackle climate change. Carbon trading also distracts from the need to recognise that nothing else – not agrofuels, not hydro-dams, not wind farms – can simply replace fossil fuels without causing significant environmental and social harm. It is not only fossil fuels that must be left in the ground, but the practices and institutions that have made their extraction and burning possible and even necessary, must change.

90 Chan, M (2009) Simpler, Smaller and More Stable.
91 Quoted by Jeremy Lovell, 'Carbon price is poor weapon against climate change.' Reuters, 25 Sept.2007

Offsets

Carbon offsets do not reduce emissions, they only move them from one place to another

Chapter 3

Offsets

Every current, past and planned carbon cap and trade scheme involves offsets in one form or another. Carbon offset schemes occur in two separate contexts, the compliance market and the voluntary offset market. The Kyoto Protocol is at the heart of the compliance market because it created both the demand for offsets and the mechanism to fill this demand. It provides two instruments that generate carbon offsets. The Clean Development Mechanism (CDM) regulates offset projects located in countries that do not have emissions targets – generally speaking, the global South – while Joint Implementation (JI) is the offset mechanism that allows for offset projects in countries with emissions targets. The trade in credits generated by carbon offset projects under the Kyoto Protocol is often referred to as the 'compliance market', because countries with a target under the protocol can count offset credits towards compliance with this target. All existing and planned carbon trading schemes related to the Kyoto Protocol, as well as regional cap and trade schemes in the USA, allow companies to use offset credits to achieve compliance with their emissions targets. In 2009, the trade in carbon credits generated by the CDM was worth about $17.5 billion.[92]

'Offset credits are an imaginary commodity based on subtracting what you hope will happen from what you claim would have happened.'[93]

Dan Welsh, researcher at Ethical Consumer

Outside this compliance market, carbon offset credits are also traded in the 'voluntary offset market'. In this market, offset credits are available for nearly any imaginable activity that generates greenhouse gas emissions. Individuals, companies or governments can purchase carbon offsets to compensate for the emissions caused by such things as air travel, car rentals, a band's CD or concert, conferences, births, weddings and funerals. Compared with the compliance offset market, trading volume in the voluntary offset

92 http://www.businessgreen.com/business-green/news/2255709/global-carbon-market-expands-68
93 http://www.togetherworks.org.uk/index.php?q=node/156

market is relatively small, about one per cent of the regulated market.[94] In 2008, about US$ 705 million worth of carbon offsets were purchased in the voluntary market, with prices for offset credits ranging from € 1 to € 20.[95] The trade in carbon offset credits in the voluntary offset market does not create a hole in any emissions cap, because all actors in this market are buying offset credits voluntarily, not because they have a legal obligation to achieve a reduction target. However, many argue that offsets are a dangerous distraction as they create the illusion that the climate effects of a greenhouse gas emitting activity were neutralised through the purchase of the offset credit. This in turn undermines the acknowledgement and awareness that the activities had a negative effect on the climate, and removes the incentive for behavioural and structural change that would have prevented the emission in the first place.

In October 2009 Responsible Travel, once a strong voice in favour of carbon offsetting, became one of the first travel organisations to announce it would stop offering offsets to its clients, stating that 'too often offsets are being used by the tourism industry in developed countries to justify growth plans on the basis that money will be donated to projects in developing countries. Global reduction targets will not be met this way.'[96]

The compliance and voluntary offset markets have many elements in common. They are based on the same concept (see next sub chapter), and projects in both markets use many of the same tools, mechanisms and procedures to calculate the volume of offset credits a project will generate or can sell. But there are also important differences, the crucial one being the overall lack of scrutiny and transparency in the voluntary offset market which makes it likely that a significantly higher percentage of projects selling offset credits in that market is not leading to additional emissions cuts. In fact some projects that have been rejected by the CDM, because they could not substantiate their claims that the reductions would not have occurred in the absence of the carbon offset funding, have subsequently sold their credits in the voluntary offset market[97].

94 State of the voluntary carbon market 2010 at: http://moderncms.ecosystemmarketplace.com/repository/moderncms_documents/state_of_v_carbon_summary.1.1.1.2.pdf
95 http://www.ecosystemmarketplace.com/documents/cms_documents/StateOfTheVoluntaryCarbonMarkets_2009.pdf
96 http://www.responsibletravel.com/copy/copy100427.htm
97 See for example: Rejected Indian CDM projects head to CCX. Carbon Finance 25 June 2008 http://www.carbon-financeonline.com/index.cfm?section=lead&action=view&id=11339&return=search

The concept

The basic assumption behind carbon offset schemes is that what matters for the climate are overall greenhouse gas concentrations in the atmosphere, and that consequently it does not matter where emissions are reduced. Based on this underlying assumption, carbon offsets will seek out locations where it is cheapest in relative terms to reduce emissions. Generally, therefore, carbon offset projects are located in the global South, although there are also offset projects located in industrialised countries, especially the USA. In most cases, offset projects are carried out in sectors of the economy that do not have a legal obligation to achieve a reduction target[98] but where cuts in greenhouse gas emissions are apparently cheaper than in the sectors with emission limits.

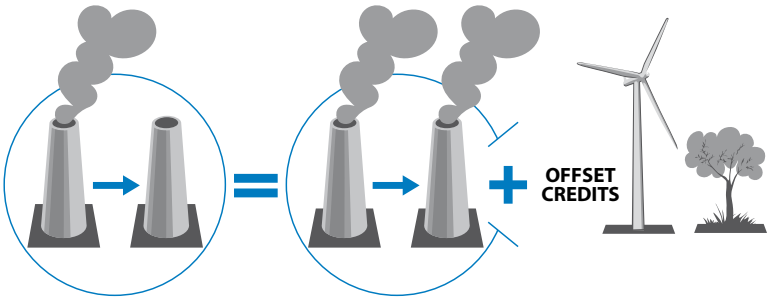
A November 2008 US Government Accountability Office report states that its 'key lessons from the CDM include: (1) the resources necessary to obtain project approval may reduce the cost-effectiveness and quality of projects; (2) the need to ensure the credibility of emission reductions presents a significant regulatory challenge; and (3) due to the tradeoffs with offsets, the use of such programs may be, at best, a temporary solution.'[99]

From the premise that what matters is not the location of the reduction but the reduction itself, offset credits can be used by companies subject to an emissions cap (as discussed in Chapter 2), to pay someone somewhere else to reduce the emissions for them – allowing the company under the cap in turn to exceed the emissions limit in its own operation's location. So offsets are not designed to reduce emissions. Their job is to move the emissions from one place to another. Because offset credits allow an *additional* emission by an entity with emissions limits which would otherwise not have been allowed (as it would have breached the cap), it is essential that the carbon credit allowing this extra emission is also additional. Otherwise greenhouse gases in the atmosphere will continue to increase. There are serious doubts about the additionality of between 30 and 50 per cent of the claimed emissions reductions in projects registered with the CDM, meaning that additional emissions have been justified by the CDM without being 'balanced

98 The exception to this are offset projects that are part of the Kyoto Protocol's JI mechanism, where the offset does take place in a country with a legal obligation to cut emissions.

99 http://www.gao.gov/new.items/d09151.pdf

out' by additional credits.[100] This will lead to increased greenhouse gas concentrations in the atmosphere.



Offset credits allow the company buying the credits to continue emitting greenhouse gases that it would otherwise have had to avoid. Thus offsets do not reduce emissions. The net effect of a carbon offset on greenhouse gas concentrations in the atmosphere is at best zero, because what is claimed to be reduced in one place allows continuation of emissions elsewhere. In many cases, where the claimed emissions cuts are not additional reductions and where offset credits are thus issued for business-as-usual reductions, the net effect is an increase of greenhouse gas emissions in the atmosphere as the additional emission the offset credit justifies, is not met with an additional reduction.

The need to ensure that the offset credits are the result of genuine, additional cuts in greenhouse gases that would not have occurred otherwise is at the heart of the concept of carbon offsets. This concept of additionality poses the biggest dilemma for offset markets because it relies on being able to know what would have happened in the absence of the offset project and then being able to calculate how many tonnes of greenhouse gases would have been emitted in a counterfactual future without the offset project. Researcher Dan Welch sums up the dilemma: *'Offset credits are an imaginary commodity based on subtracting what you hope will happen from what you claim would have happened.'*[101] Many proponents of carbon offsets agree that *'there is no one correct answer to the question of additionality'*, i.e. that it is impossible to verify the hypothetical story of what would

100 Schneider L (2007) Is the CDM Fulfilling its Environmental and Sustainable Development Objectives? An Evaluation of the CDM and Options for Improvement. Berlin, Germany.
101 http://www.togetherworks.org.uk/index.php?q=node/156

have happened in the absence of the project.[102] However, they say that well-chosen barrier tests, financial analysis and common sense can still enable any qualified consultant to judge if the reductions claimed are likely to be genuine, and thus that the 'additionality problem' can be addressed to some degree. The section on 'frequently used arguments' at the end of this chapter discusses this question further.

The approval process in the compliance offset market

Before a carbon offset project can sell offset credits, it has to pass through a series of stages intended to establish the number of offset credits that can eventually be sold. This guide uses the CDM process as a reference to explain the different steps. The voluntary market uses a less structured procedure with fewer independent assessments of the claims and calculations, and has no single agreed set of standards. It also lacks a central database comparable to the CDM's database that the UNFCCC Secretariat maintains to try and prevent the double selling of offset credits.[103]

How are CDM projects registered and credits generated?

The CDM is a project-based mechanism. A CDM project can consist of one activity at a single location, or be made up of the same activity in several locations. To calculate the amount of emissions they can sell, the projects must either use a previously approved methodology or propose a new one. In September 2009 there were 124 approved methodologies within the CDM, each of which has been approved separately by the CDM Executive Board.[104] These methodologies cover a broad range of activities, including the capture of greenhouse gases, and initiatives to encourage efficiency in the production and use of energy. Fossil fuel projects can also gain funding through the CDM, for example through methodologies that provide carbon offsets for the construction of new 'supercritical' coal-fired power stations (where coal is burned more efficiently than in 'normal' coal power stations). The proponents of these projects argue that a 'normal' coal-fired power station would have been built otherwise.[105]

102 Trexler MC et al. (2006) A statistically driven approach to offset-based GHG additionality determinations: what can we learn? Sustainable Development and Policy Journal 6: 30.

103 More details on the process including at which stage public input is possible is available in 'Making your voice heard; a citizens guide to the CDM', by International Rivers. www.internationalrivers.org

104 http://cdmpipeline.org/cdm-methodologies.htm#3; accessed 13 Sept. 2009.

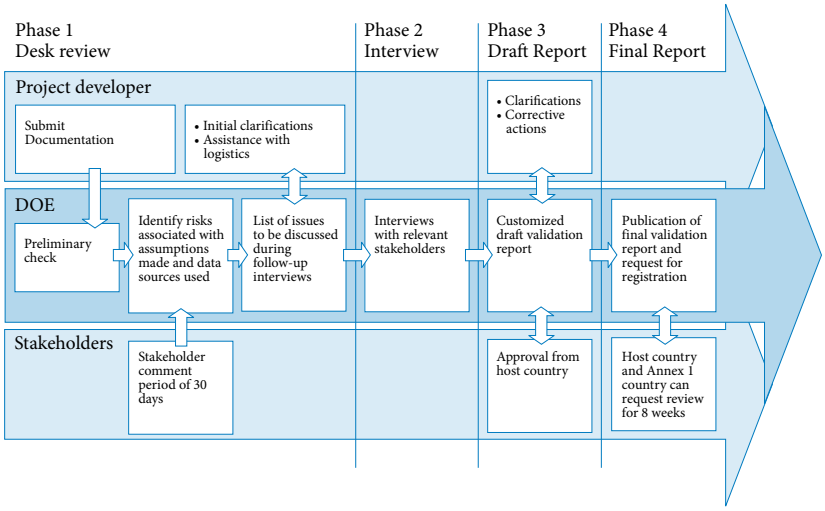
105 Fifteen projects have sought validation under the heading 'New grid-connected fossil fuel fired power plants using a less GHG intensive technology' (ACM0013) since this methodology was approved in April 2007. http://cdmpipeline.org/publications/CDMpipeline.xls, Sept. 2009.

Each project wishing to be considered must submit a Project Design Document (PDD) to show how it will produce emissions reductions that would not otherwise have happened. The PDD should also explain how the project ensures that emissions reduced at the project location are really reduced and not simply emitted at another location (a process known as 'leakage'). To establish both the volume of credits that result from these additional emissions savings and the potential emissions that arise elsewhere as a result of the project, the PDD also has to describe the hypothetical 'baseline' of the project. This hypothetical baseline describes how many emissions would have been released without the CDM project. Since the PDD documentation is highly complex, this task tends to be carried out by specialist 'project design consultants'. A project must then receive approval from the host country's Designated National Authority (DNA), which is usually the country's environment or energy ministry. If there are other entities directly involved in the project that are registered outside the host country, letters of approval must also be submitted from the country in which these project partners are registered before the PDD can be submitted for validation.

'If you are a good storyteller you get your project approved. If you are not a good storyteller you don't get your project through.'

Lambert Schneider, presentation at conference on Review of the EU ETS, Brussels, 15 June 2007

Steps of the validation process



The validation process starts with the PDD being sent to a Designated Operational Entity (DOE) or validator, whose task it is to assess the project, and who has to be accredited by the CDM Executive Board. In February 2010 there were 26 accredited CDM validators, with the two largest companies, Det Norsk Veritas (DNV) and TÜV SÜD, accounting for over half of the projects submitted to date. At the start of the validation process, there is a 30-day period when the proposed project is open to public comment, and any comments submitted during this time should inform the validator's recommendations. The total validation process is said to take around 13 weeks.[106]

In addition to the underlying problem of unverifiable additionality claims, some of the criticism of the CDM arises from the fact that PDDs are very technical documents and are generally available only in English, and that announcements about the public comment period often fail to reach the communities affected by the project. All of this means that few comments are ever submitted by those most directly affected. Where comments of a non-technical nature are submitted, they are often not addressed or reflected in the validator's recommendations.

Once the validator has assessed the project and recommended registration as a CDM project, a formal request for registration is made. The PDD and validation report are submitted to the CDM secretariat (the administrative body attached to the UNFCCC that is responsible for the implementation of the CDM). The documents are then passed to the UNFCCC registration and issuance team, which reviews both the PDD and validation report. The team can request revisions or reject the project outright.

Projects recommended by the registration and issuance team are then passed to the CDM Executive Board, which has the final say on registration. Once a project is registered, it must submit monitoring reports to the CDM secretariat. These are reviewed by the UNFCCC registration and issuance team, with the subsequent report sent to the CDM Executive Board for approval.

When this process is completed, the CDM Executive Board announces the number of certified emissions reductions (CERs) that have been issued to the project. In practice, many of these CERs will have been traded in advance on a futures market. Project information made public on the CDM database (http://cdm.unfccc.int/Projects/projsearch.html) includes the PDD,

See Chapter 4

106 http://www.cd4cdm.org/Publications/UNEP-DNV_PDD%20Pitfalls%20Guidebook.pdf

any comments made on the project and responses to them, the validation report, the monitoring reports and information about the volume of CERs issued to each project. The UN Risoe Centre (http://www.cdmpipeline.org) has an up-to-date and searchable database called CDM Pipeline which includes information on the project participants, and often the buyers too.[107]

Approval in the voluntary offset market

The main difference between the CDM and voluntary carbon offsets is the absence of oversight, transparency and a uniform set of standards by which projects in the voluntary offset market are assessed. In the voluntary offset market there are several standards (Gold Standard, Chicago Climate Exchange, Voluntary Carbon Standard etc.)[108] against which 'additionality' and other factors affecting the volume of reductions an offset project can claim are judged. Voluntary offset providers have often been criticised on the grounds that carbon reduction claims are exaggerated, unsubstantiated or misleading.[109] The most commonly cited shortcomings are the virtual absence of verification and long-term monitoring of compliance with emission reduction projections made in the PDD, and the potential for the double selling of credits in the absence of some form of comprehensive register for voluntary offset projects. Many also argue that this makes it difficult for buyers to assess the true value of offset credits. Because of this lack of transparency, it is not possible to assess with any certainty the level of demonstrably non-additional offset credits traded in the voluntary market. It can be assumed, however, that due to the absence of scrutiny, the percentage is higher than that in the CDM.

The offset mechanisms in the Kyoto Protocol

The main difference between the two offset mechanisms – the CDM and JI – is that the CDM generates offset credits in a country without an emissions target under the Kyoto Protocol, while with JI the offset-generating projects are located in a country that has a Kyoto target.

The conceptual problem of verifying the generated offset credits applies in both mechanisms, but many proponents of JI projects argue that additionality is less of an issue for them, because they take place in a capped

107 This section is an amended version of 'How are CDM projects registered and credits generated?' Carbon Trading – How it Works and Why it Fails, p. 64.

108 For an overview and analysis of the different voluntary offset standards see Kollmuss A et al. (2008) A review of offset programs: trading systems, funds, protocols, standards and retailers. http://www.sei-us.org/climate-and-energy/offset_review.html

109 Ibid.

country. Thus any credit it generates and sells is deducted from the capped country's pool of emission permits that it was issued under the Kyoto Protocol. This is important, as without such a conversion, the reduction would be counted twice: once by the carbon offset project that sells the offset credit, and once by the country in which the reduction takes place, where the project contributes to reducing the overall emissions in that capped country.

To avoid this risk of double counting, every JI project requires approval from the country in which it is located. Once issued, the JI project's offset credits are exchanged for an equivalent portion of that country's allocation of AAUs, with the AAUs being converted into a new unit, Emissions Reduction Units (ERUs), to identify their origin as JI offset credits. With this conversion, the country that gives up some of its emissions permits for JI offset credits accepts an exchange between an emission permit with a clearly verifiable value (the AAU) with an offset credit whose reduction value is not verifiable to the same extent (because it is a credit generated from comparing an actual reduction with an estimate of how high emissions would otherwise have been).

Because JI credits can only be sold if the country in which the project takes place is willing to exchange the offset credits for emission permits, few JI projects currently exist. By February 2010, just 17 projects in three countries were eligible to earn JI ERUs.

What types of projects are financed through offset schemes?

By February 2010, over 2500 carbon offset projects in 62 countries had been registered with the CDM. The CDM identifies over 200 types of projects from which carbon offsets can be generated. They are grouped into broad categories, including renewable energy, energy distribution, methane abatement, energy efficiency, reforestation and fuel switching (see Chart 3 on next page)[110].

See Chart 3 an 4, page 66

Although Chart 3 shows the percentages of projects per sector, a different picture emerges if this is considered per offset credit, as shown in Chart 4. The fraction of renewable energy projects always has oscilliated around 60 per cent of all CDM projects while the number of HFC, PFC and nitrous oxide projects only account for 2.1 per cent of all projects. HFC, a refrigerant gas, and nitrous oxide, a by-product of synthetic fibre production, have

110 http://cdmpipeline.org/cdm-projects-type.htm#2

See Case study 4

however claimed a large proportion of all credits; 26 per cent of all CERs by 2012. These reductions were achieved by making comparatively minor technical adjustments to existing factory operations. These projects have been widely criticised mainly because of their spectacular profit margins: it is estimated that the value of credits given to HFC-23 projects at average 2007 carbon prices is €4.7 billion, while the cost of technology needed to capture and destroy the same amount of HFC-23 is around €100 million. Many companies invested their profits not in renewable energy but to expand their polluting operations.[111]

Chart 3

CDM projects in the pipeline in percentages per project category[112]

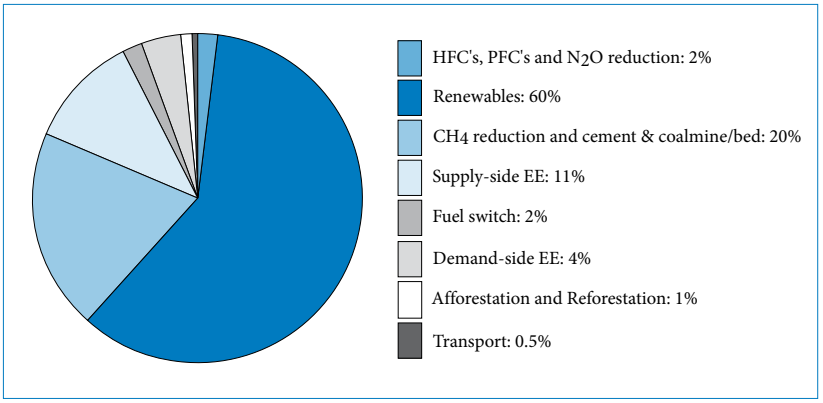
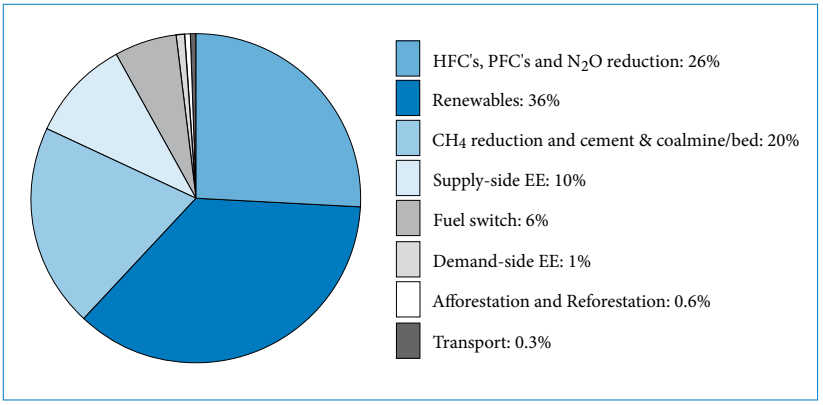


Chart 4

Expected offset credits until 2012 in percentages per project category[113]

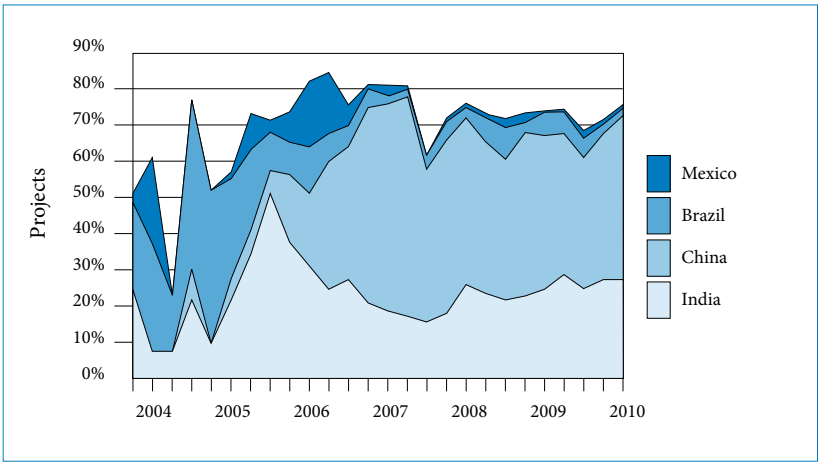


111 Point Carbon Market News, 10 April 2007: 'Indian chemical company books €87 million windfall from carbon trading.'
112 Source: http://cdmpipeline.org/
113 Ibid.

Who writes CDM project documents?

The approval of CDM offset projects is a very complex and technical process, with the project design documents (PDD) frequently numbering 100+ pages, including complex mathematical calculations. Few project developers even try to produce these documents without external help. Specialist 'project design consultants' have produced most of the PDDs for currently registered CDM projects. The largest of these companies is EcoSecurities. They are also the largest single purchaser of CDM credits, since their interests lie more in trading the credits than in the projects themselves. Then in October 2009, EcoSecurities was bought by investment bank J.P. Morgan, who had bought UK-based voluntary offset firm Climate Care the previous year. The purchase of EcoSecurities is an indication of the change and consolidation in the carbon market. Large financial players like Goldman Sachs and J.P. Morgan now hold shares or own companies involved in project origination, trading of offset credits and often also carbon market analysis. Increasingly, commentators are raising questions about conflicts of interest arising from such structural integration of the different carbon market businesses.

Chart 5 **All CDM projects in the pipeline in Brazil, Mexico, India and China as a fraction of all projects**[114]



114 Source: http://cdmpipeline.org/

Even if auctioning of permits was widespread, forests should be kept out of carbon trading.

Box 6

Why many NGOs believe forest offset credits must remain excluded from carbon trading schemes[115]

Concern about climate change has created awareness about the importance of forests for a healthy global environment. Much attention has focused on their contribution to climate change, with annual emissions from deforestation being estimated at 12-20 per cent of total carbon dioxide emissions. In this context, carbon trading is being put forward as a way of raising the funds necessary to halt deforestation. Many environmental NGOs opposed to carbon offsetting and even many who are in favour of carbon trading in general argue that forest offset credits should remain permanently excluded from carbon trading schemes for the following reasons:

1. Carbon storage in trees is temporary **Forests provide temporary carbon storage as part of the normal cycle of carbon exchange between forests, the atmosphere and the oceans. Trees can easily release carbon into the atmosphere through fire, disease, climatic changes, natural decay and timber harvesting.**

This inability to guarantee long-term carbon storage in the same way as fossil fuel-saving offset projects is one of the reasons that led to these forestry offset credits being excluded from the Kyoto Protocol's offset mechanisms and the EU ETS (though the Kyoto Protocol does allow tree planting offset projects). In the EU ETS, companies need to show that they have balanced their emissions with either EU ETS permits or additional offset credits at the end of each EU ETS phase. If a company were to use forest carbon credits, there would always be the risk that the carbon will be released into the atmosphere again – for instance if the trees burnt down or blew over in a storm. During the many decades before the forest carbon released through such events has re-accumulated in the trees, the company's accounts would not be balanced unless it bought replacement credits. [116]

2. One-way road **The release of fossil carbon in contrast is permanent and, over relevant time scales, will accelerate climate change by increasing**

↘

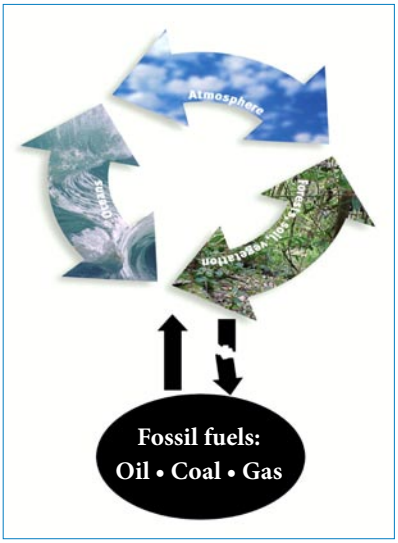
115 These NGOs include FERN, Friends of the Earth, Greenpeace, Global Witness and Rainforest Foundation among many others.

116 To date only thirteen plantation projects have made it to the CDM registration phase out of more than 2000 registered projects.

the overall amount of carbon in the atmosphere – the very cause of today's climate change. Fossil fuels such as coal, oil and gas are locked away and their carbon is only released when humans dig up and burn them for energy. Once released, fossil carbon becomes part of the active carbon pool, disrupting the natural cycle by adding carbon to the active carbon pool.

3. Fake credit Carbon credits from tree planting or forest protection claim that carbon stored temporarily in tree plantations can justify permanent releases of fossil carbon into the atmosphere without any harm to the climate.

The fossil carbon cycle, and the cycle of carbon in the oceans, atmosphere and forests



The active carbon pool

Carbon moves between the forests, atmosphere and oceans in a complex natural rhythm of daily/seasonal/annual and multi-annual cycles. The overall amount in all three carbon stores together rarely increases in nature. This is 'active' carbon.

The fossil carbon pool

Some carbon is locked away and rarely comes naturally into contact with the atmosphere. This 'fossil carbon' is stored permanently in coal, oil and gas deposits and therefore is not part of the active carbon pool. When humans mine and extract these reserves this inactive fossil carbon does not go back in the ground, but is added into the active carbon pool, disrupting a delicate balance.

This is one of the reasons that the concept of forest 'offsets' is flawed. Forest and tree planting offsets allow extraction of oil, coal and gas to continue, which in turn increases the amount of fossil carbon that is released into the active carbon pool, disrupting the cycle.

↘

4. Big foot Carbon credits from tree planting or forest conservation increase the ecological debt of the global North. The more fossil fuels a Northern country or company consumes, the more land it is entitled to use to 'offset' its emissions. This is unfair and increases the already high ecological footprint of the North.

5. Subsidies for mega-plantations Carbon credits from tree planting stand to provide a new subsidy for the plantations industry. Large-scale plantations have a long list of negative impacts on forests and forest peoples and often exacerbate local land disputes and violence.

6. Ticking time bomb Avoiding climate change requires drastic reductions of greenhouse gas emissions from fossil fuels. Offsets, however, allow emissions to continue under the false premise that they've been 'neutralised'. This just masks the real crisis and sentences future generations to live with fewer choices and worse conditions.

7. Forest fraud Forests play a vital role in storing carbon and buffering extreme weather events. But linking forest restoration with carbon credits is a dead-end for forest peoples as well as for the climate. Halting the forest crisis requires action against the underlying causes of deforestation, not more fossil carbon in the atmosphere and more monoculture tree plantations occupying land needed by local communities.

8. Blind guess Measuring carbon in forests is fraught with uncertainties. Scientists have found that estimates of the carbon balance in Canadian forests could vary by 1,000 per cent if seemingly small factors, such as increased levels of atmospheric CO_2, are taken into account.[117]

117 For source and more data see FERN's submission to Eliasch review at www.fern.org

Case study 4

Carbon offset projects

Many accounts of carbon offset projects describe the problems they have encountered and, in some cases, that they have caused. This section provides two examples where offset projects have provided windfall profits to large industrial polluters in the global South for installing end-of-pipe technology that costs a fraction of what they earn from the sale of offset credits.

When it was set up, the CDM was to fulfil a second objective: promoting sustainable development. Even in the carbon market, however, many agree that the CDM is failing to provide sustainable development benefits in most projects. After a lengthy discussion about sovereignty during the UNFCCC climate negotiations about the CDM rules, the definition of sustainable development was left to each host country. Neither the CDM Executive Board nor the validators thus question whether a project does in fact provide such benefits. Links to case studies where CDM registered projects have failed to provide sustainable development benefits for local communities and where some of the dirtiest industries in the global South are profiting from offset credits for business as usual are provided in Annex 1. These include offset projects by pig iron factories, windfarms and hydro power companies in India, landfill projects in South Africa, tree plantations in Brazil and a forest conservation and tree planting project in Uganda that is selling offsets in the voluntary sector.

With regards to the question of 'additionality', case studies from India and the Philippines in particular, as well as the cases of CDM registered hydro power projects in China highlight how a large portion of CDM projects are allowed to sell offset credits even though

A 2007 Delphi survey by the Öko-Institut in Germany on the perspectives of CDM and JI revealed that 71 per cent of the participants thought that 'many CDM projects would also be implemented without registration under CDM', and 85 per cent felt that 'in many cases, carbon revenues are the icing on the cake, but are not decisive for the investment decision'.[118]

↘

118 http://www.oeko.de/oekodoc/622/2007-162-en.pdf

their claimed reductions are obviously not additional. There are various estimates that around 30-50 per cent[119] of registered CDM projects are considered non-additional. The range of case studies that have been documented (see Annex 1 for links) show that misjudged additionality claims are limited neither to a particular country nor a project type, and have involved approval by a wide range of accredited validators.

CDM windfall profits

Burning HFCs in Rajasthan, India

See Chart 3 and 4 on page 66

See Box 2

Roughly two per cent of the offset projects (but around a quarter of the credits) in the CDM pipeline are for the burning of the refrigerant gas HFC-23. This capture and elimination of HFC-23 requires only minor technological changes to existing HFC factories, at relatively low cost. But because HFC-23 is such a potent greenhouse gas, it can create an enormous quantity of offset credits. Indian checmical company SRF Ltd, in Rajasthan, claims it can generate a volume of up to 3.8 million offset credits a year using this process. The company made €87 million from the sale of carbon credits in 2006/07 alone. Ashish Bharat Ram, managing director of SRF, noted that *'strong income from carbon trading strengthened us financially, and now we are expanding into areas related to our core strength of chemical and technical textiles business'*.[120]

According to Chandra Bushan at the Centre for Science and Environment in New Delhi, even with the currently low price that carbon offsets fetch, this has led to a 600-700 per cent profit margin. These enormous profit margins have also led to companies specifically producing HFCs beyond the demand for the main product these companies manufacture, because destruction of the by-product is more lucrative than the production of the product itself. Offset credits have meant that the production of HFCs has increased above market demand, undermining the Montreal Protocol on Substances that Deplete the Ozone Layer, an international treaty to phase out the production of a number of substances believed to be responsible for ozone depletion.[121]

119 Schneider L (2007) Is the CDM Fulfilling its Environmental and Sustainable Development Objectives? An Evaluation of the CDM and Options for Improvement. Berlin, Germany.
120 Point Carbon Market News, 10 April 2007: 'Indian chemical company books €87 million windfall from carbon trading.'
121 Wara MW, Victor DG (2008) A Realistic Policy on International Carbon Offsets. Stanford University Program on Energy and Sustainable Development Working Paper 74.

See Box 2

↘

Eliminating nitrous oxide in South Korea

French chemicals firm Rhodia produces adipic acid (used for making nylon) in South Korea. During production, nitrous oxide is released. Nitrous oxide is another potent greenhouse gas. Rhodia acquired CDM registration for an offset project where the company invested $ 15 million in equipment that destroys nitrous oxide at the location in South Korea. The technology Rhodia uses has been available since the 1970s. By the 1990s, most adipic-acid producers in the USA and the EU had started to cut their emissions voluntarily.

Rhodia itself did so in 1998 at its plant in France, but not in its overseas operations in South Korea and Brazil. The CDM project in South Korea is set to produce CDM credits worth up to $ 1 billion. Because the credit volume is calculated in CO_2 equivalents, and because nitrous oxide is assumed to be 298 times more potent than carbon dioxide in the Project Design Document, Rhodia can generate 298 carbon credits for every tonne of nitrous oxide eliminated. Revenue from the sale of carbon credits already is 35 times larger than from the sale of adipic acid, the company's core production. In 2007 alone, destroying nitrous oxide at the Rhodia operations in South Korea and at a similar plant in Brazil generated € 189 million in sales of CDM offset credits, compared to the $ 15 million cost of the equipment.

> **'We were not part of these discussions, we didn't make the rules of the game. We know only to work with the rules as they were set down.'** [122]
>
> *Philippe Rosier, president of Rhodia's Energy Services division*

122 http://expansionarytimes.wordpress.com/2008/07/23/carbon-trading-scam-french-firm-rhodia-cashes-in-under-un-warming-program/

FERN's responses to the most frequently used arguments in favour of offsets

Argument 'Carbon offsets reduce emissions'

By design, carbon offsets do not reduce emissions. At best, emissions are moved from one place to another. A reduction in one place (the offset project) allows an extra emission in another place, e.g. by a power company in an industrialised country. As Keith Allott at WWF-UK notes, *'[t]he problem with carbon offsetting is that at best it robs Peter to pay Paul – with no net benefit for the planet.'*

> **'As soon as you seek substantial cuts, carbon offsetting becomes an unfair, impossible nonsense, the equivalent of pulling yourself off the ground by your whiskers. Yes, let us help poorer nations to reduce deforestation and clean up pollution. But let us not pretend that it lets us off the hook.'**[123]
>
> George Monbiot, Guardian 17 July 2009

Argument 'Global warming is a global problem, and it is a problem of quantity, so it doesn't matter where emissions are reduced as long as they are reduced somewhere'

See Box 1

Since cuts in fossil fuel emissions will have to be drastic – according to the IPCC as much as 80-95 per cent by 2050 – the issue of where emissions are reduced is a serious one. To achieve such reductions, the way industrialised countries produce and use energy needs to change. Such changes take a long time, and require large capital investments. Offsetting distracts from implementing these far-reaching changes that need to be implemented to achieve reductions on such a scale. It allows a delay in such a change because the company that buys the credit can continue to use emissions-intensive technology. Offsetting therefore delays the much-needed phase-out of fossil fuel energy production.

123 http://ni.www.org.uk/ accessed August 2010

Furthermore, as most offsets are not additional, relying on offsets will in many cases lead to increases in emissions. For German companies covered by the EU ETS, for example, the annual reduction requirement during Phase II (2008-12) is around 30 million tonnes. In Phase II, they are allowed to top up their emissions quota with carbon credits amounting to 22 per cent of allocated emissions permits. If just a third of the offset credits they use are not additional, there would be no net global reduction.

See also page 59, 72 and 73

The problem with carbon offseting is that at best it robs Peter to pay Paul – with no net benefit for the planet. See Chapter 3 and page 75

In addition, offsets threaten to become an obstacle in international climate negotiations. At some point in the future, the global South will be required to limit their emissions. When this happens, these countries will be in a difficult position because the easiest and cheapest reductions will already have been achieved, and credited as emissions reductions to the North.

And there is still the dilemma that every offset project faces, irrespective of the scale of the credits generated or the size of the reduction commitment: they are selling offset credits based on a hypothetical and unverifiable account of how high emissions would have been in the absence of the offset project.

Argument **'Many offset projects do provide additional emissions reductions. Even if you can't ultimately prove it, you know that's what they do'**

'No additionality test can ever be perfect. There will always be some fraction of non-additional reductions that slip through any testing process into the credited offset pool, and some fraction of truly additional reductions that are denied crediting.'[124] Mark Trexler, Ecosecurities

Many proponents of the carbon market agree that there is no single correct answer to the question of additionality, i.e. that it is impossible to verify the hypothetical story of what would have happened in the absence of the project.[125] They say that well-chosen barrier tests, financial analysis and common sense enable any qualified consultant to judge if the reductions claimed are likely to be genuine. The issue, however, is that every offset credit sold in a compliance market allows the buyer of the credit to release greenhouse gases over and above the emissions cap, and every non-additional offset credit will result in more greenhouse gases in the atmosphere than there would have otherwise been.

When queried about whether or not carbon offset credits result in real, additional greenhouse gas reductions, the chair of the Chicago Climate Exchange replied in an unguarded moment: 'That's not my business. I'm running a for-profit company.'[126]

124 http://www.ecosecurities.com/Assets/13651/ef0508marfketview_p17_final.pdf
125 Trexler MC et al. (2006) A statistically driven approach to offset-based GHG additionality determinations: what can we learn? Sustainable Development and Policy Journal 6: 30.
126 http://online.wsj.com/article/SB122445473939348323.html

Experience with both the CDM and the voluntary offset market further shows that it has not been possible to establish such 'sufficiently credible screening mechanisms'. CDM analysts, who assessed CDM projects on the assumption that it is possible to establish 'additionality', estimate that between 30 and 50 per cent of registered CDM offset projects that have been approved as additional would have happened anyway.[127] And for the remainder, it is not possible to verify whether the emissions would or would not have been released in the absence of the offset finance.

There is also institutional overload as a result of strained resources and capacity. By February 2010, 2605 projects had been registered and 48 were awaiting registration. Many observers of the CDM attest that with this number of projects, the system is severely stretched. Project developers have criticised CDM procedures as being too complicated and time-consuming, resulting in delays in project registration and credit issuance, and they are pressuring the UN to relax the rules. To do so, however, misses the more fundamental reasons underlying the creation of a labyrinthine CDM bureaucracy. As Michael Wara and David Victor put it in their study of carbon offsets: *'Lacking any other source of information about individual projects and facing pressure from both developing and developed country governments, the CDM Executive Board is prone to approve projects. … Asymmetries of information are rampant; the incentives mostly align in favour of approval.'*[129]

> **'Without CDMs we'd still be profitable, but our earnings would be much lower.'**[128]
>
> Dr Chan, managing director of CLP Renewables.

Argument **'Offset projects provide an important investment opportunity that helps re-jig energy infrastructure in developing countries'**

A large percentage of energy projects that are selling CDM offset credits would have existed regardless of the CDM. This is the case for wind and hydro projects in particular. In addition, most CDM-registered energy projects are not replacing fossil fuels; at most, they are merely supplementing them. They are thus not helping southern countries to embark on a non-fossil industrial pathway. Investment in fossil fuel-powered energy

127 Schneider L (2007) Is the CDM Fulfilling its Environmental and Sustainable Development Objectives? An Evaluation of the CDM and Options for Improvement. Berlin, Germany.
128 http://www.theaustralian.news.com.au/story/0,25197,23392319-18544,00.html
129 Wara and Victor, op. cit., note 6, p.14.

infrastructure continues unabated in the key CDM countries. Sometimes it is even directly financed by the CDM, as in the case of super-critical coal power plant technology.

> **'That means an electric utility burning coal will not have to reduce the emissions at the plant site. It can just keep burning coal.'**[130]
>
> Hank Hayes, 29 August 2009

In addition, the structure of the carbon market has created incentives that favour offset projects which deliver large quantities of cheap credits rather than projects which arise from the needs and priorities of local communities or that disperse appropriate renewable energy. This is reflected by the experience of a long-term renewable energy and community activist and specialist in Africa: '*When the company for which I worked for 10 years got into carbon trading, I became increasingly distraught. It was no longer about "sustainable development", it was about tonnes of CO_2 on make-believe spread sheets.*'[131]

Because offsets provide a revenue stream for the reduction of some types of pollutants, they can in some cases provide an incentive to pollute more, so that polluting entities can later get credit for reducing emissions from an artificially high baseline. This is especially the case for offsets with a high profit margin. As described in Case study 4, some companies generated hundreds of millions of offset credits as a by product of installing a relatively cheap incinerator to burn the HFC-23 produced by the manufacture of refrigerant gases and air conditioners. The huge profits provided an incentive to increase production or expand existing factories solely for the purpose of increasing the production of HFCs and then destroying the resultant pollutants to generate offsets – an outcome that not only provides no cost-effective reduction in greenhouse gases, but also risks undermining the Montreal Protocol, an international treaty regulating the phase-out of ozone depleting substances, of which refrigerant gases are one.

Argument 'Offset projects benefit people in the South'

In 2009, 71 per cent of CDM offset projects were located in the semi-industrialised countries of China, India and Brazil. These are not the heavily indebted poor countries that need most help. The beneficiaries are often large northern-owned companies, and the subject of opposition from local communities affected by their operations. In some cases, the

130 http://www.timesnews.net/article.php?id=9016458
131 Personal communication.

companies' involvement in carbon trading has been significant enough to affect the company's credit rating. According to a 2009 report, *'The rating of French chemicals company Rhodia SA …, for example, has benefited from carbon credits. … All rating actions on Rhodia since the beginning of 2007 factor in the material CERs the company was able to receive. Our rating on Rhodia takes account of the very high margin available from these activities and their material cash flow. We expect carbon credits to remain the group's main source of cash flow in 2009 and 2010, as they were in 2007 and 2008. In the latter two years, we believe free operating cash flow would have been negative had it not been for the sale of carbon credits.'* Other examples exist where the CDM has provided income streams that either significantly increased profit margins or even were the main reason companies kept financially afloat. This is the case with Belgium-based lime producer Carmeuse Holding SA, whose income from carbon credit sales in the first quarter of 2009 enabled the company to comply with its financial obligations.[132]

On 4 February, 2010, travel networking site Vida Loca Travel announced that they would donate five per cent of profits to International Medical Corps, as they feel that international aid can be more effective at cutting global warming in the long term that carbon offsetting, citing the work of economist Jeffrey Sachs.

One of the main problems with the CDM is that while it is meant to encourage sustainable development, the host country defines what sustainable development is. This means that, to date, a large percentage of all the CDM projects have been far from sustainable, and have in fact led to social and environmental damage. These negative consequences include projects that allow expansion of polluting industries; displacement and other impacts from large-scale hydro-dams; and also damaging impacts as a result of 'renewable' energy offset projects. Sustainability is not guaranteed by any particular technology, but by the socio-economic context within which a technology is used. Renewable energy becomes locally non-renewable and destructive if it is not locally appropriate.

132 Standard & Poor's Credit Week (2009) Regulating CO_2 emissions. Special report. 23 Sept., p. 21.

Argument **'Offset projects are transferring sustainable technology from North to South'**

One of the stated aims of the CDM was to transfer technology from industrialised countries to the global South, to help these countries 'leapfrog' past high polluting, fossil fuel-dependent industries. But the evidence indicates that this is not happening, as the majority of offset projects depend on existing technology, with profits invested not on limiting but expanding polluting industries. There is also little evidence of moves towards the development of renewable-related energy infrastructure. By 2009, even using the CDM's definition of renewable energy, only 12 per cent of offset credits fell into this category.[133]

And there are still questions about who benefits from these energy projects. Renewable energy projects in the CDM often generate electricity that goes straight into the national grid and then on to urban centres or abroad, bypassing local communities which are faced with the impacts of, for example, wind turbine projects built on their grazing lands.

Michaelowa and Michaelowa argue that carbon offsets 'in developing countries provide politicians in industrialized countries with a welcome strategy to divert the attention of their constituencies from the lack of success in reducing greenhouse gas emissions domestically.'[134]

The cheapest reductions that the CDM is designed to promote are often the worst solution. 'Clean coal' is promoted above the transition to solar power, for instance. There is also clear evidence that because of the CDM, highly polluting activities such as production of the refrigerant gas HFC-23, have increased to allow companies to sell the offset credits from reducing harmful by-products of the production process[135].

See Case study 4

133 http://cdmpipeline.org/cdm-projects-type.htm
134 Michaelowa (2005); Climate or Development: is ODA diverted from its original purpose: ISSN 1861-504x
135 See CDM Watch website for detail on how companies producing refrigerant gases are exploiting the CDM to boost their profits. http://www.cdm-watch.org/?page_id=451

Box 7

Is investment involving technology transfer a defunct strategy?

If we keep it in link with CDM North-South technology transfers facilitated by the standard mechanisms of foreign aid, export subsidies, foreign direct investment and so on necessarily revolve around northern export technologies that have been developed in the shadow of fossil fuel dominance and the search for fossil fuel replacements. Technologies that are needed to overcome fossil fuel dominance tend to be neglected or suppressed. An excellent example is the World Bank's Clean Technology Fund, advertised as dealing with climate change, which promotes coal power in the South through transfer of 'clean coal' technologies (which are defined as those that emit no more than a standard coal fired power station in the North).

No less importantly, current conceptions of technology transfer slight the importance of technology exchange based on Southern innovation. South-to-North and South-to-South transactions are likely to prove increasingly key as the world warms further. In agriculture, for example, although no-till and permaculture movements in the North are important, the main reservoirs of knowledge on which to develop the non- or low-fossil fuel agriculture which is the key to food security are located in the South. Yet 'technology transfer' continues to carry the connotation, as it always has, of moving northern technology into a 'technology-deprived' area in the South. In practice, this typically plays out in the degradation, skewing or destruction of one set of technologies in favour of another.

The irony in an age of global warming is that it is often a green technology that is degraded by a less green one. One example of how this process is encouraged by today's international climate investment regime comes from the Bhilangana river valley in mountainous Uttaranchal, India. The low-carbon irrigation system of Sarona village uses porous rock dams to divert water gently into small canals while letting silt through. The water then flows into still smaller channels feeding terraced rice and wheat fields that then discharge any remaining water back into the river. This well-established, low-carbon system, like many others in the region, is under threat from a 22.5 megawatt run-of-the-river hydropower system being built by Swasti Power Engineering with prospective Kyoto Protocol carbon finance. Knock-on effects would include loss of livelihoods, migration and loss of a type of knowledge that, ironically,

↘

↘

will be especially valuable in a greenhouse world. Sarona residents were never consulted and first learned about the project only in 2003 when construction machines arrived. Some 146 similar dam projects are proposed or under way in Uttaranchal alone.

Taken from Larry Lohmann (2009) Climate as investment. *Development and Change*.

Argument **'Offsets allow us to catch those reductions that are like low-hanging fruit, especially through stopping forest destruction, and thus achieve larger cuts than would otherwise be politically possible'**

Offsets do not reduce emissions. They cannot, since every offset includes both a sell side and a buy side. Whatever climate benefits a seller of carbon credits gives, the buyer takes away. Even a perfect offset project would have a net emissions result of zero. And since few offset projects are even close to perfect, the net result of offsets leads to increasing global greenhouse gas emissions.

See Box 6

Take the example of the UNFCCC's initiative on Reducing Emissions from Deforestation and Forest Degradation (REDD). Many people argue that financing REDD through carbon offsets would provide such 'low-hanging fruit' reductions. But if prevention of deforestation is used to license continued climate pollution from burning fossil fuel, then no net reduction of greenhouse gas emissions occurs. Indeed, due to the many additional problems with offsets, and the particular issue that carbon in forests is very volatile and may be released long before the extra fossil carbon has stopped interfering with atmospheric greenhouse gas concentrations, the net climate pollution is likely in fact to increase.

Many proponents of capturing the low-hanging fruit through offsets argue that they are not a zero sum game, because without the ability to leverage credible and environmentally robust REDD offsets, the reduction targets achievable by policy makers would be significantly scaled back. Here the idea is that although offsets themselves do not reduce emissions, the availability of extra credits, e.g. from REDD and other offsets, have an indirect climate benefit. Using these extra pollution rights as additional flexibility to achieve targets, policy-makers (so the argument goes) will be able to agree to stricter targets than would otherwise be politically feasible.

But who benefits from the flexibility? If the flexibility allows excessive users of fossil fuels to delay crucial investments, then the climate suffers. It is these long-term investments by the highest emitters, after all, that have to change the most if global warming is to be addressed. As discussed in the arguments section in Chapter 2, it matters very much to the climate whether a tonne of CO_2 comes from a coal-fired power plant or a burning forest. The first tonne permanently increases the overall burden of carbon dioxide circulating among oceans, air, soil, rock and vegetation. The second tonne does not. It has always been part of the pool of carbon circulating. It is the first tonne that is more problematic in the climate context, however, because once it is released it will not move back into the fossil carbon pool for a very long time. A CO_2 molecule from a coal-fired power plant may be chemically the same as a CO_2 molecule from a burning forest, but it is not climatically the same. Of course this does not mean that deforestation should not be stopped. But forests will not be saved if it is done through offsets, because offsets do not lead to emission reductions. And without drastic cuts in emissions (as opposed to just moving them around, as offsets do) forests will be lost in the long-term as a result of climate change.

See also Box 6

How the carbon market works

While investors search for more liquidity, more and more communities experience the effects of climate change.

Chapter 4

How the carbon market works

In 2009, the volume of carbon traded worldwide rose to 8.7 gigatonnes, up 56 per cent from 2008, according to the World Bank.[136] But at US$144 billion in 2009, the market's value only grew by 6 per cent, from US$135 billion in 2008.[137]

Figures like these raise some questions. What is exactly being traded? Who is trading, why and how? Who benefits, and how does it relate to halting climate change? This chapter examines these questions. It starts with a description of some key market mechanisms, followed by a look at how they are used in the carbon market, and who the main traders and buyers of carbon finance products are.

Many people still think of carbon trading as a simple process whereby offset providers with credits to sell, or companies with too many or too few permits, trade with each other directly. However, the carbon market has deepened or matured (to use the language of traders) significantly over the years, adding a wide variety of buyers and sellers to the original market participants and introducing a broad range of financial products. These include carbon forwards, futures and options contracts, aggregated financial instruments and carbon indices.

Different types of market transactions

The simplest transactions in the carbon market consist of exchanging carbon permits or offset credits for cash: this is known as spot trading because the agreed exchange takes place 'on the spot' (in fact usually between one and three days of the price being agreed). Spot trading is relatively risk-free for those involved in the transaction, as parties are unlikely to default on payments over such a short period of time.

136 World Bank; State and Trends of the Carbon Market 2010; page 1
137 Ibid.

Spot prices vary with each transaction in the market and can change rapidly and unexpectedly with changes in information about supply and demand. So those involved in the market look for ways to reduce the risk of buying too high or selling too low, which is where hedging comes in. This is where dealers and brokers enter the picture with various buying and selling instruments, creating a derivatives market. It is here, in the complex world of swaps, options and futures (all explained below), that the overwhelming majority of carbon permits and credits are traded.

Derivatives

Perhaps the simplest way to describe a derivative is to use the example of a farmer selling apples to a shop at an agreed price before the apples are ready to be harvested. This holds both pros and cons for the farmer; protection against future drops in price is set against the risk of missing out on future increases in price. This contract for the sale of future goods is called a 'forward' trade and is used wherever product prices are volatile. The date that the contract is entered into is known as the trade date, and the date that the apples are harvested and delivered is known as the maturity date.

In one example of a forward trade, the shop pays the farmer what is known as a premium in exchange for taking on the exposure to any movement in the price of apples. This premium usually takes the form of a slightly inflated price for the product rather than an up-front fee. The farmer hopes that if the price of apples rises between the trade date and maturity, any loss encountered from having agreed to sell at a lower price will be at least covered by the premium paid by the shop. If the price of apples drops between the two dates, then the farmer will have made extra profit.

As well as the forward, there are three other building-blocks of the derivatives market: the future, the option and the swap. Futures are closely related to forwards in that the buyer and seller agree to exchange the assets for cash on the maturity date. The difference is that futures are traded through an exchange, meaning that terms and conditions are set by whichever futures contract is offered by that exchange. Although a future is a bilateral agreement between two parties, as long as they are registered to trade on the exchange, parties do not need to know anything about each other. By contrast, forwards are traded between parties known to each other but where little information is made public about the trade. Typically, forwards have longer maturity dates than futures, which tend to be limited to the short to medium term. In the carbon market, futures are bought and

sold on an exchange such as the European Climate Exchange, while forwards are traded over the counter. Both can be traded by investors and emitters alike.

Options allow one of the parties to pay an up-front fee for the inclusion of a get-out clause in the carbon trading contract. In an option there is a fee-payer and a fee-taker. The fee-taker is obliged to fulfil the contract; the fee-payer is not. Options are popular because they allow the fee-payer to drop the contract if there is the opportunity of a better deal by buying or selling at the spot price available on the maturity date. All the fee-payer would lose is the up-front fee. In the carbon market, options are traded between emitters or speculators and dealers such as investment banks.

A swap is an agreement between two parties to exchange the difference between two prices of a fixed quantity of a commodity at periodic intervals. Typically the exchange is the difference between a fixed price (determined at the trade date) and the spot price of the commodity at periodic intervals. Who pays and who receives depends on whether the fixed price is higher than the spot price. Swaps are used as a way to fix future prices. Swaps are a purely financial transaction that allow traders to hedge or speculate against future prices without the need to hold the underlying asset.

These four basic derivatives are often mixed and matched according to desires of individual clients. Because the carbon market is relatively new, most trading is limited to these four basic derivative instruments – although new and more complex types of derivatives are being developed. In contrast to other commodities, no goods are ever exchanged when trading carbon.[138]

How derivatives are traded

Derivatives can be traded on an exchange, or over the counter (OTC). These two types of trade have important differences. While an exchange functions much like a club, with a paid-up membership, OTC trading is far less structured. Those involved in exchange trading, for example, have to provide evidence of solvency and a minimum level of standards relating to transparency. An exchange also attempts to reduce the risk of trading failure

138 Michelle Chan at Friends of the Earth US has conducted research into the development of the carbon market and detailed the emergence of structured securities backed by yet to be issued carbon credits. Her updated report is available at http://www.foe.org/sites/default/files/CarbonMarketsReport.pdf

by making sure buyers and sellers keep money on account (called a margin) in order to cover any potential losses.[139]

OTC trading is the favoured method of trading for a significant portion of the carbon market, although the percentage of OTC trading is declining in favour of transactions on exchanges.[140] OTC trading occurs when derivatives are bought and sold between two parties, often through an investment bank. Parties to the contract are free to choose terms and, as a result, contracts are less standardised than exchange-traded contracts and they vary from institution to institution. An advantage of the OTC system for the trader is that it avoids the requirement to have a margin and the costs involved in trading on an exchange. Because OTC trading is seen as less transparent and higher risk than the exchange system, in the aftermath of the financial crisis, both the USA and EU have proposed regulation for tighter OTC market control, which would also affect OTC trades in carbon permits and credits.

Who is trading?

Companies or governments covered by a cap and trade scheme use trading to manage the costs of their compliance with the cap on their emissions. They trade with the aim of minimising costs by maximising profits from carbon assets (permits received), and by trying to predict future prices of permits and credits. Traders who work for companies that own offset projects try to run their projects at a profit and get the best possible price for the credits they produce. Speculators aim to make a profit from price volatility while other traders focus on offering companies the chance to pay a fee to protect them from price volatility.

> **'There are now already in development derivatives of CO_2 prices that are so complicated that I do not understand it any more. If you get a reservoir of derivatives which becomes so big that it becomes an industry in itself that is very dangerous because you can get the tail wagging the dog.'**[141]
>
> *Feike Sijbesma, chief executive, Dutch chemicals group DSM*

139 As the price of the item traded fluctuates, so the amount in the account can change to reflect this, a process known as a 'margin call'. If one or other party to the deal fails to post a margin, then the exchange can force a sale of the asset at its present market value. Exchange traded futures are seen as the most transparent of all derivatives, though this has not stopped abuses of the system, most notably in the collapse of Barings in 1995 and the huge trading losses incurred by Nick Leeson, a Singapore-based futures trader at the bank.

140 Transactions on exchanges versus OTC declined from nearly 100 per cent in 2005 to less than 50 per cent in January 2010. World Bank; Stated and Trends of the Carbon Market 2010; page 9.

141 'DSM CEO cautions on carbon derivatives dangers.' Reuters, 27 Jan. 2010.

While some traders try to counter price volatility, others play the market in order to profit from that same volatility.

Enron, the energy-based conglomerate that collapsed spectacularly in 2001, was one of the most prominent proponents of carbon trading, and many of its employees are now involved in the carbon market.[142] Some of the biggest buyers of CDM offset credits currently are banks such as Barclays, Goldman Sachs, Credit Suisse, Deutsche Bank, Rabobank, JP Morgan, BNP Paribas, Vitol and Merrill Lynch.

Different prices within the carbon market

Spot trades

In the spot market, or the cash market, previously-issued permits or credits are sold. In 2008, difficult banking conditions led to the proportion of carbon spot-trading growing dramatically. Carbon traders, according to the World Bank, *'sold mostly on the spot market – which saw a dramatic increase in activity and broke daily and monthly records for traded volumes during the credits crunch. This is reflected in market data which shows that permits and offset credits were traded for cash as cash strapped companies in the EU monetised allowances to raise money in a tight credit environment.'*[143]

Derivatives trades

As explained in Chapter 3, the CDM has an Executive Board that vets and registers projects, and there are currently over 2500 registered projects. In the CDM, credits known as Certified Emissions Reductions (CERs) are not issued until the project has been approved and its projected reductions have been verified as having occurred. Due to the length of the process, capital-intensive offset projects often require considerable upfront funding. Companies or governments therefore sometimes provide finance to potential projects by buying credits *before* the credits have been issued.

In the voluntary offset market, the vast majority of sales are done before the emissions reduction has been achieved. In the language of traders, this means that in order to raise finance, many projects are brought to the market by forward selling the credits they will produce. Contracts of this sort are governed by so-called Emission Reduction Purchase Agreements (ERPAs). In exchange for the degree of certainty over future carbon prices that such

142 See http://archive.columbiatribune.com/2002/Feb/20020226Comm007.asp
143 World Bank 2008 Overview of Carbon Markets, p. 5.

contracts provide, the prices agreed are usually below the market price of the credits. These ERPAs also contain schedules for purchase and delivery and rules governing the transfer of contracts to other parties.

See Annex 2

Primary and secondary carbon markets

In the primary market, market participants buy carbon credits from original project-owners, often *before* the offset credits are validated. For emissions permits such as the EU ETS allowances, the primary market is the initial government auction or distribution of permits. For credits, a common example of a primary market transaction is an ERPA between a CDM project developer and a credit buyer such as the World Bank Prototype Carbon Fund or the carbon desk at, say, Goldman Sachs. The buyer may use or retire the credit, or sell the credit to another party.

If the buyer resells the CDM credit to another party, this transaction occurs in the secondary market. Similarly, if an entity acquires a permit at government auction and later sells it, this too is referred to as trading in the secondary market. Generally, if a carbon credit is purchased from someone other than the original project developer, the trade is done in the secondary market. A secondary CDM offset credit can be traded between market participants *before* or *after* it has actually been issued.

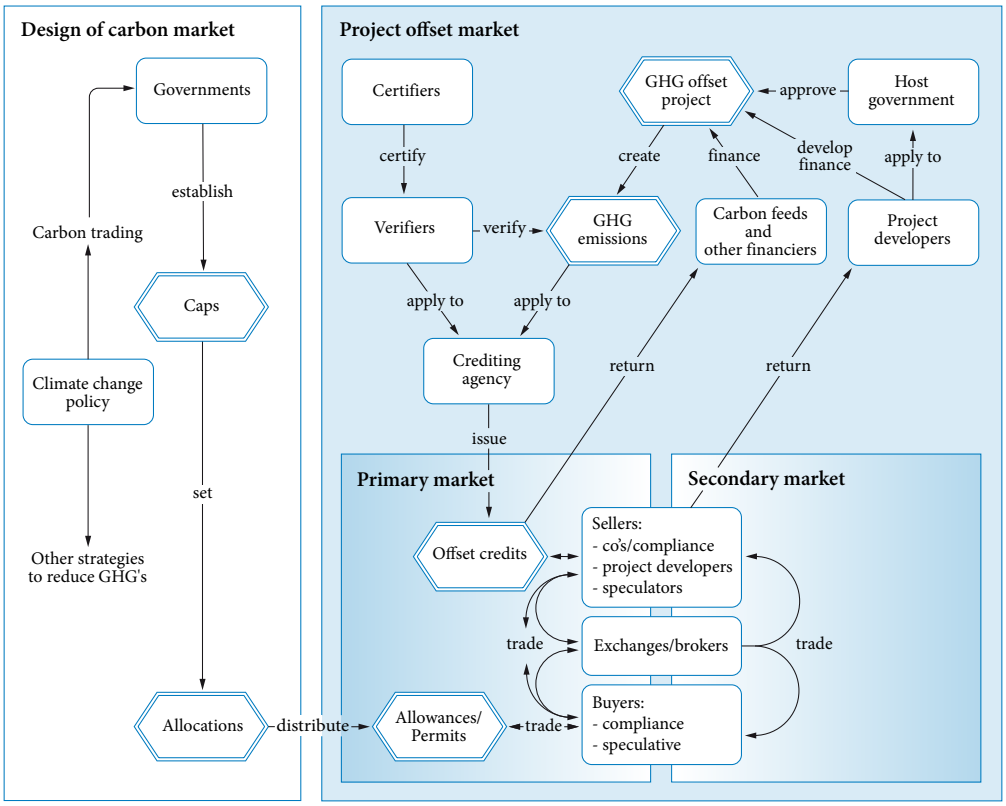
'Carbon offset credits will likely be traded as derivatives and can carry particularly high risks. One of the reasons is because sellers often make promises to deliver carbon credits before the credits are issued, or sometimes even before greenhouse gas emissions reductions have been verified.'[144]

Michelle Chan, Friends of the Earth US

Credits bought in the primary offset market and credits that are traded in the secondary market before being issued are relatively risky because of the possibility that the project will not deliver the projected volume of credits. Several specialist companies now offer 'project ratings', ranging from AAA to 'junk', on the CDM projects from which the offset credits originate. Factors such as the type of project, the stage of the approval process the project is in, and the country where the project is located, all affect the 'delivery risk' of a project and the offset credits, and therefore its rating. For example, compared with wind projects, hydropower projects have a lower and slower approval rate by the CDM

144 http://www.scribd.com/doc/20181893/Friends-of-the-Earth-Carbon-Markets-Report

Chart 6 **The carbon market in a flow chart**[145]



Executive Board, and are generally rated as riskier. Therefore different offset projects in the primary market can promise an equal amount of carbon reductions, but command very different prices for their credits.

Because determining project risk and liquidity in the permits market can be difficult for buyers of offset credits, many analysts have pointed to the worrying similarities between trading in offset derivatives and subprime mortgage derivatives. They both run relatively high risks of not delivering, yet comprise a disturbingly high proportion of the market.[146]

These risks can be obscured, especially when project aggregators or developers (companies who specialise in financing offset projects) like

145 Source: Michele Chan, Friends of the Earth US, private presentation
146 http://www.foe.org/pdf/Credit_Crisis_and_Climate.pdf

EcoSecurities[147] team up with investment banks with much more capital in order to offer securities, which group together future offset credits from a number of different project types and locations, spreading risks and separating them. This masks the build-up of risk in much the same way that subprime mortgage derivatives were packaged before being sold to unsuspecting customers. Valuations of such assets could be inflated due to conflicts of interest like those seen elsewhere in the financial markets, where firms involved in structuring the financial product are also involved in assessing the qualities of the underlying assets. Such risks will be exacerbated by the valuation problem at the core of any carbon offset: how does one credibly evaluate *'an imaginary commodity'* that was generated *'based on subtracting what you hope will happen from what you claim would have happened'*?[148]

See page 97

Carbon financiers use various strategies in order to manage these risks. In the above-mentioned carbon offset example, a carbon fund could group offset credits with earlier completion dates in order to create a 'safer' tranche of products for investors. An offset developer operating in an unstable host country could purchase political risk insurance to receive a better project rating. In 2008, the reinsurance company Munich Re and specialist insurer Carbon Re teamed up to offer policies covering delivery risk for offset credit buyers.[149] Perhaps the most common risk-mitigation strategy in the secondary offset market is to sell 'guaranteed delivery' credits; this means that the seller will make up the difference (through a cash payment for example) if the underlying CDM project fails to deliver the promised number of credits. This promise, especially if it is from a well-capitalised financial institution, makes guaranteed offset credits more expensive than unguaranteed ones; however, they still trade at a discount compared to government-issued permits, which are considered 'safest'.

How are financial derivatives applied in the carbon market?

Simple transactions account only for a very small percentage of the carbon market today. The carbon market has moved away from its beginnings, where carbon trading was about a simple trade between two parties: one needing a permit or offset credit for compliance, and the other having one to spare. At financial conferences, carbon is now being marketed as a new asset class for investors such as pension funds. The carbon market has 'matured'.

147 Increasingly, investment banks are buying up such offset project aggregators as part of their strategy for increasing involvement in the carbon market. EcoSecurities, while still operating under its old name, has recently been bought by investment bank J.P. Morgan.

148 Dan Welch. See http://www.togetherworks.org.uk/index.php?q=node/156

149 http://www.facmagazine.com/public/showPage.html?page=reinsurance_breakingnews_story&tempPageName=789874

As a consequence, the nature of the trading has changed significantly. This section therefore looks at how more complex financial derivatives, and trading for speculation rather than compliance, changed the dynamic of the carbon market. It also explores how complex financial instruments increase price volatility and speculation in the carbon market and increasingly uncouple the development of the carbon market from its original objective of providing the most cost-effective way for companies to reduce greenhouse gas emissions.

> **'Given that carbon markets, unlike any other, are formed by regulation, the exact detail of the regulatory design will have a profound effect on the success or otherwise of the cap and trade mechanism.'**[150]
>
> *Imtiaz Ahmad, executive director, carbon trading, Morgan Stanley*

OTC versus exchange trading

Both OTC traders and carbon exchanges trade in derivatives such as forwards (OTC), futures (exchanges) or swaps. They can also both trade in offset credits or emission permits directly. In 2009, 53 per cent of all EU ETS trading took place over the counter, while the remaining 47 per cent was made on exchanges.[151] Some 85 per cent of exchange trades were made through the European Climate Exchange (ECX) in 2009. ECX contracts are cleared by Europe's largest clearing-house LCH Clearnet and are regulated by the Financial Services Authority (FSA) in the UK due to the exchange's location in London. Other active exchanges include Bluenext, the Chicago Climate Exchange (CCX), Climex, EEX, EXAA, Green Exchange, GME/PEX, MCX and Norpool. In the OTC offset market, purchases are typically arranged through an ERPA. These can take a variety of forms, but usually stipulate the price of the reductions, the volumes expected, and delivery schedule.

Most trading in CDM carbon offset credits occurs on the OTC markets (71 per cent by value or US$ 7.1 billion in 2008).[152] Trading in secondary offset credits (i.e. credits generally purchased from a financial institution or other entity that has previously purchased the credits directly from the carbon project owner) more than doubled between the first three quarters of 2007 (US$ 4 billion) and the same period in 2008 (US$ 10 billion).[153] The

150 Carbon Market Europe, 12 June 2009 www.pointcarbon.com
151 World Bank: State and Trends of Carbon Market 2010
152 Capoor K, Ambrosi P (2009) State and Trends of the Carbon Market 2009. Sustainable Development Operations, World Bank. p.38.
153 Ibid.

primary CDM offset market, where offset credits are purchased directly from project developers, by contrast, decreased by more than half from 2008 to 2009 (see table below). The secondary market for offset credits has continued to grow exponentially.[154]

Table 2 **The carbon market in figures in 2008 and 2009**

	2008		2009	
	Volume ($MtCO_2e$)	Value (US$ million)	Volume ($MtCO_2e$)	Value (US$ million)
Allowances Markets				
EU ETS	3,093	100,526	6,326	118,474
NSW	31	183	34	117
CCX	69	309	41	50
RGGI	62	198	805	2,179
AAUs	23	276	155	2,003
Subtotal	**3,278**	**101,492**	**7,362**	**122,822**
Spot & Secondary Kyoto offsets				
Subtotal	**1,072**	**26,277**	**1,055**	**17,543**
Project-based Transactions				
Primary CDM	404	6,511	211	2,678
JI	25	367	26	354
Voluntary market	57	419	46	338
Subtotal	**486**	**7,297**	**283**	**3,370**
Total	**4,836**	**135,066**	**8,700**	**143,735**

Source: World Bank; State and Trends of Carbon market 2010

The table above shows that trade in permits takes up 85.5 per cent of the market, while trade in primary and secondary offsets takes up 14.5 per cent of the market, with trade in primary CDM credits declining.[155] The data also clearly shows that the EU ETS is the engine of the carbon market. For an explanation of the value, see Box 8.

154 Capoor K, Ambrosi P (2009) State and Trends of the Carbon Market 2009. Sustainable Development Operations, World Bank. p.38

155 For each market segment this represents the notional value of all trade in that segment, that is derivative and non-derivative trading as a whole – non-derivative being 'spot' or 'on the spot'. The numbers for the split between derivative and non-derivative trade across the whole market given earlier will not be mirrored in each segment. Data from State and Trends of the Carbon Market 2010, May 2010, p. 1.

Futures

Futures trades accounted for the bulk of transactions in 2009, with a 73 per cent share of the EU ETS[156]. A number of exchanges, such as Bluenext, the Chicago Climate Exchange (CCX), Climex, EEX, EXAA, Green Exchange, GME/PEX, MCX and Norpool, offer futures contracts.

Options

Options represent a small but growing percentage of carbon market activity, although there may be OTC trading of options not reported. A market for options on CDM offset credits started to emerge in the second half of 2008, with hedging, profit-taking, raising cash and arbitrage (the simultaneous purchase and sale of an asset in order to profit from price differences on different markets or in different forms) as the main drivers.[157] In 2009, 91.1 million options for CDM offset credits were traded against 2008's figure of 67.8 million, a rise of 34 per cent.[158] The first full year of options trading in EU ETS allowances was 2009.

Continuing global financial uncertainty and reduced access to cheap lending are cited as additional factors for the continued growth of options trading in ETS permits; options can provide a source of financing when other alternative financing is not available or more expensive. This is another example of how EU ETS permits become an asset with a value beyond the original objective of the asset: companies covered by the EU ETS, and who received free allowances, thereby gain an extra financial advantage over other industry sectors like the renewable energy or energy efficiency industries that do not have these alternative ways of accessing capital.

Asset-backed securities and collaterals

In November 2008, Credit Suisse, in a joint venture with EcoSecurities, was the first bank to launch a 'carbon structured product'. It bundled together carbon credits from 25 different offset projects that were at various stages of CDM approval, were located in three countries, and had been developed by five project developers. The package of project credits was then split into three tranches representing different risk levels. This arrangement allows investors to choose the level of investors to choose the level of risk they

156 World Bank; State and Trends of Carbon Market 2010

157 Capoor K, Ambrosi P (2009) State and Trends of the Carbon Market 2009. Sustainable Development Operations, World Bank. p.38

158 http://siteresources.worldbank.org/INTCARBONFINANCE/Resources/State_and_Trends_of_the_Carbon_Market_2010_low_res.pdf

would like to take on. Although the Credit Suisse deal was relatively small, future deals could become bigger and more complex, bundling carbon credits from many more projects of mixed types and origins, perhaps combined with agreements to swap more risky carbon credits for safer assets such as EU ETS allowances as 'insurance' against 'junk' carbon.

By diluting (or hiding) risk, this bundling would help make dubious offset projects more acceptable to buyers. The World Bank's Prototype Carbon Fund (PCF) has already performed a similar service, by bundling controversial projects such as the Plantar tree plantation project in Brazil together with less controversial projects.[159] The problem is that it is just as difficult to analyse the quality of the individual underlying carbon offset projects as it was to analyse the quality of the US sub-prime mortgages whose 'bundling' in structured financial products nearly brought down the world economy.[160] Trading in complicated carbon derivatives poses a threat to economic as well as climatic stability.

In another development reflecting the expanding economic role and exchangeability of carbon commodities, in September 2009 companies covered by the EU ETS began moving toward using their surplus European Union Allowances (EUAs) as collateral when trading oil. ICE Clear Europe for example, the clearing-house for the Intercontinental Exchange (ICE), has started to accept both EU ETS allowances and CDM offset credits as partial payment of margin fees in the trade of energy contracts.[161]

159 For more information on the problems with Plantar's carbon offset project and how its operations affect local communities and the environment, see www.sinkswatch.org and www.carbontradewatch.org

160 Chan M (2009) Smaller, Simpler and More Stable. Designing Carbon Markets for Environmental and Financial Integrity. Friends of the Earth US.

161 www.pointcarbon.com, Carbon Market News 29 Sept. 2009.

Case study 5

Short selling and the EU ETS over-allocation

The EU ETS, the largest functioning international carbon market, has seen much volatility in the price of its permits. In the first phase, these permits were allocated free of charge to companies, through the process of grandfathering. Companies ended up receiving more permits than they required. This gave an opportunity to benefit from short selling without the need to borrow assets, because companies believed they could sell at a high price and then purchase the same credits back later at the same or possibly even a lower price.

When the global economic slowdown took hold in 2008-09, and bank credit was frozen, many companies believed there would be less demand for permits after the crisis, and sold their permits to raise capital. They expected this to be cheaper and easier than borrowing funds, and believed that if demand continued to drop they could buy them back more cheaply later.

The result of the permit over allocation which set the conditions for short-selling, was a collapse in price, which caused further selling, causing the price to drop further. Such a stark drop in prices is often the result of short selling. This is important for the climate in that the price unpredictability that short selling tends to exacerbate is likely to discourage long-term investment in low-carbon technologies. In addition, a carbon market characterised by short selling will increasingly favour those large entities in the carbon market that either understand 'the game' or have sufficient resources to buy the expertise to manage their carbon permit allocations in such complicated ways. This will disadvantage smaller companies and all but eliminates the possibilities for community offset projects or their supporters to negotiate a fair price directly with the 'end consumer' of the carbon credit.

Box 8

How to measure the value of the carbon market

In its annual report on the carbon market, the World Bank states that in 2009 the global carbon market was worth US$144 billion.[162] In 2008, derivatives represented 99 per cent of the trade in carbon at the beginning of 2008, and 64 per cent of the trade at the end.[163] This decrease reflects the impact of the financial crisis in early 2008, when companies covered by the EU ETS sold permits on the spot market to gain access to cash. This means that most of what is being traded in the market is not greenhouse gas emissions, nor the reductions supposedly generated by offsets, but rather financial contracts which derive their value from the carbon allowance or offset credit. This makes the market hard to value because these contracts relate to future prices, which we do not know.

So how does the World Bank arrive at this figure of US$144 billion? To answer this, we need to look at how prices for derivatives are set.

A derivative contract gives the right to buy a quantity of carbon emission rights at a given price on a specified date. The contract itself also has a value, which depends on the price of carbon on the spot market and what is believed to be the likely price on the maturity date. The estimate of the future price is achieved by considering historical data about price volatility. The two main ways of considering the value of a derivatives market are gross nominal value (GNV) and gross fair value.

GNV is most widely used. It involves calculating the value of all products that are due to be delivered on the maturity date, assuming all contracts are fulfilled. This is likely to be an overestimate,[164] but it gives some idea of future cash flows. But another way of looking at the value of this market is to consider what the contract would be worth if sold today; this is the gross fair value (GFV).

162 State and Trends of the Carbon Market 2009, May 2009, p. 1.

163 Trading activity picked up dramatically in the second half of 2008, peaking in early 2009, during a particularly strong EUA sell-off by industrials looking for liquidity in a tighter credit environment. They sold mostly on the spot market – which saw a dramatic increase in activity and broke daily and monthly records for traded volumes during that period. This is reflected in market data which shows that spot transactions accounted for only 1per cent of all transactions in the first half of 2008, rising to 7 per cent in the third quarter and 19% in the fourth quarter (and accounting for 36 per cent of all transactions in December 2008 alone).' State and Trends of the Carbon Market 2009, May 2009, p. 5.

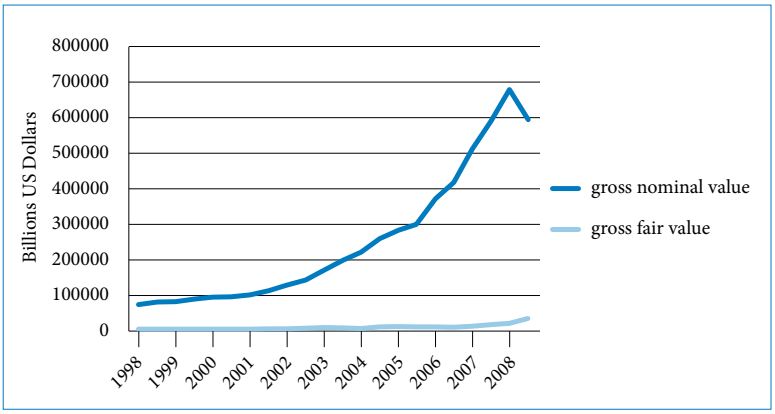
164 This GNV includes 'genuine hedging options contracts' (similar to insurance in which a premium is paid with the hope of never having to exercise the policy) which have next to no real value in the market unless there is a lot of demand for that level of insurance. It also includes derivatives bought to limit the loss on a future contract. This can be achieved by buying an opposite future, one to buy and one to sell, with the value being the difference between them. The GNV of the contracts will however include both these contracts as positive values, not just the difference between them.

↘

The graph below (of the value of the overall over the counter derivatives market) shows the importance of the difference between using these ways of valuing the market.[165] As well as there being a wider difference between them, there is a lack of correlation (the GNV decreased while the GFV continued to increase). The GNV decrease most likely occurred because the credit crunch led to less use of derivatives, while the total market value of the remaining contracts increased because the decrease in spot price meant many derivatives represented larger than expected gains.

Chart 7

Value of OTC derivatives



A third measure sometimes given is the number of contracts being taken out. This is significant in that the two values above might tell you very little about how many buyers and sellers there are at any one time. In other words, when you see a number telling you the size of a derivatives market you need to know whether it is the gross nominal value, the gross fair value, or the number of contracts being taken out. If it is not specified, the numbers are most likely the GNV.

165 http://www.bis.org/statistics/index.htm

Regulating the carbon market

Recent studies of commodities markets have shown that speculators using derivatives can cause spot price spikes due to changes in demand and/or liquidity. Although it may seem that these are unimportant matters involving only a few people in trading rooms, they have a real effect on the world around us; one example is the rise in world food prices in 2007, which led to a sharp increase in hunger and unrest in many countries in the global South.[166] Some jurisdictions have legislated to ensure that spot prices do not spike as a result of derivatives trading,[167] but many believe they still do.

The current global financial crisis has clearly shown that significant parts of the financial system, specifically the OTC derivatives trade, are regulated too little or not at all, and are possibly unregulatable, with investor Warren Buffet referring to derivatives as *'weapons of mass destruction'*.[168] Yet carbon markets were set in motion through governmental and intergovernmental regulations such as the Kyoto Protocol and the EU ETS, with little thought for the regulatory dilemmas that the creation of a market in a 'virtual' commodity such as carbon could encounter.

Some governments have responded to the financial crisis by looking into the possibility of regulating derivatives trading. This is unwelcome to many carbon brokers and investors, who fear that regulation of financial derivatives markets will restrict trading in the carbon market, which is still largely unregulated. Given that most carbon trading, in the offset market, takes place over the counter, opposition to regulation of OTC trading in carbon is particularly strong. IETIA, the International Emissions trading Association, stated that OTC trading is necessary because carbon prices will be volatile and *'many carbon offset transactions and structured allowance trades are non-standard and cannot be listed as contracts on a commodity exchange'*.[169]

Trading associations like IETA argue that bilateral OTC trades should be permissible in carbon markets, without having to go through clearing-houses: even though one major company, AIG, speculated with OTC derivatives in exactly that way in the sub-prime mortgage market and went out of business. IETA argues that clearing is too long and cumbersome

166 Pace N, Seal A, Costello A (2008) Food commodity derivatives: a new cause of malnutrition? Lancet, 371, issue 9625, 1648-50, DOI: 10.1016/S0140-6736(08)60707-2. (http://www.sciencedirect.com/science/article/B6T1B-4SHM6MC-9/2/171fd9c560942102614109fad17d17d2)
167 The Commodity Exchange Act of 1936 in the US, and the Market Abuse Directive in the EU.
168 http://news.bbc.co.uk/1/hi/2817995.stm
169 http://www.ieta.org/ieta/www/getfile.php?docID=3432

a process in an industry where a *'virtually instantaneous risk assessment'* is required. But as Michelle Chan explains, *'project finance transactions have some of the longest deal cycles on Wall Street, sometimes taking 2-3 years to pull together. New power plants need to secure permits, perform environmental studies, secure power purchase agreements, organize banking consortia, obtain credit ratings for syndicated loans, etc. They do not need "virtually instantaneous risk assessment", and exempting OTC carbon deals from mandatory clearing is a loophole that is bound to be abused.'*[170]

'30 years from now there better not be a carbon market because if there is we will have failed to address climate change.'

Alan Bernstein, Sustainable Forestry Management Ltd. 2007 CIFOR Forest Day Bali, Indonesia

In addition to lobbying for as little regulation as possible to a potentially large and lucrative emerging carbon market, IETA argues that carbon is essentially equivalent to other commodities and therefore should not be subject to substantial additional regulation – and further should be exempted from regulation to allow an 'emerging market' to develop. And while the UK Financial Services Authority counters that the carbon market is different from other commodities markets in that it is politically generated and managed, with *'a compliance aspect to the underlying market'*,[171] many policy-makers continue to believe that carbon markets can be regulated just like traditional commodities markets.

'The mechanism does not work in the interest of the climate. We see that companies massively buy emission-rights when CO_2 prices are low. They stock these up to use them later or to sell them partly on in case the price has become higher; it is just trading with CO_2 and this has nothing to do with the climate.'[172]

Former Dutch minister Willem Vermeend.

In addition, while supply in the carbon market is supposed to decline over time (and the market eventually to be wound down in an orderly fashion), it is difficult for regulators to determine whether or to what extent prices are moving due to normal supply dynamics, excessive speculation or inappropriate lobbying and regulatory capture. It is unclear what regulators can do to effectively

170 Chan M (2009) Smaller, Simpler and More Stable. Designing Carbon Markets for Environmental and Financial Integrity. Friends of the Earth US.

171 UK Financial Services Authority Commodities Group, 'The emissions trading market: risks and challenges', March 2008 at http://www.fsa.gov.uk/pubs/other/emissions_trading.pdf

172 De Energiegids 1

regulate, when the policy instrument they are supposed to regulate is shaped less by the climate objective than by the economic demands of those covered by the cap and trade regulation and the desires of many traders for a globally integrated carbon market with high liquidity.

Will carbon markets provide a stable price of carbon?

Many including FERN would argue that what is needed to avert a climate crisis is investment in low carbon infrastructure, and that neither a small nor a big carbon market will deliver either price stability or the kind of long-term incentives that are needed for this transformation of our fossil fuel-dependent economies. Leaving aside for a moment this wider debate, what do the proponents of a price on carbon established through carbon markets say about the preferred size of a carbon market? Should markets be small and simple, with restricted access to trading, or should there be a virtual free-for-all: with large and globally interlinked markets, open to those trading for compliance as well as to those trading for speculation?

> **'In general, the more that "bells and whistles" are included in carbon market design – strategic reserves, trigger prices, offsets, banking, borrowing, free allocations, etc. – the more chances there are to game the system.'**[173]
>
> *Michelle Chan, Friends of the Earth US*

Many working in the financial markets favour large and liquid carbon markets, with unlimited offset access and minimal regulation. They argue that the more liquidity there is in a market, the more stable the price will be and that these design options are the best way of protecting the climate. For example, one offsets trade association claims that trading of international offsets can *'broaden the collaboration between nations that will be required to protect the climate over the long term'*.[174] Yet it was precisely the search for massive liquidity and interlinkage that led ultimately to a catastrophic drying up of liquidity in the credit crash from 2007 onwards.

Because higher-volume markets amount to more trade and increased fee revenue for brokers and traders, IETA and many within the market argue for carbon trading *'to be open to all market participants'*, not just emitters. They also say this will prevent a single trader from cornering

173 Chan M (2009) Smaller, Simpler and More Stable. Designing Carbon Markets for Environmental and Financial Integrity. Friends of the Earth US.

174 http://www.ieta.org/ieta/www/pages/getfile.php?docID=2968

the market. However, large markets are hard to regulate and are subject to excessive speculation, especially if a substantial portion of the trade occurs over-the-counter. Those arguing for large liquid markets also tend to argue for unlimited inclusion of offset credits into carbon trading schemes. As Michelle Chan explains, *'this benefits banks, which are not only building offset businesses, but looking to generate higher fees from non-standardised offset derivatives. Carbon trading proponents have seized on the use of offsets as a key cost containment strategy.'*[175]

Price volatility is of little concern to advocates of large and liquid carbon markets. Non-compliance traders favour price volatility, because it creates arbitrage (or hedging) opportunities. But policy-makers, and companies covered by cap and trade regulation, are less happy about volatility. Companies having to plan their operations in accordance with emissions caps see volatility as increasing costs and hindering long-term investment decisions. They prefer predictable carbon prices.

Carbon trade associations also call for the widespread use of OTC trading since much trading, and particularly in carbon offsets, is done over the counter. The IETA claims that OTC trading is necessary because carbon prices will be volatile and *'many carbon offset transactions and structured allowance trades are non-standard and cannot be listed as contracts on a commodity exchange'*.[176]

Finally, and crucially, there is the question of what is the 'right' price for carbon? In her report Smaller, Simpler and More Stable, Michelle Chan explains that, unlike in other markets, *'an accurate price is not what best reflects "what the market will bear" – a figure that could be greatly influenced by who is trading – but rather whether the price is high, clear, and consistent enough to generate the intended environmental results.'* It is clear this has not been the case to date

A second look at the size of the carbon market

See Box 8 for an explanation of this figure

The carbon market is said to be worth US$144 billion (2009), but little of this money is available for funding actual emissions reduction activities. Most of the value behind this impressive figure circulates among banks, brokers speculating on price changes and companies hedging their risks,

175 Chan M (2009) Smaller, Simpler and More Stable. Designing Carbon Markets for Environmental and Financial Integrity. Friends of the Earth US

176 http://www.ieta.org/ieta/www/pages/getfile.php?docID=3432

meaning that only a tiny fraction of this money represents the cost of emissions and funds available to reduce them.

The large majority of the carbon trade is derivative trading (estimates range from 64 to 99 per cent in 2008), and whilst some of this may relate to companies covered by emission caps hedging against price fluctuations, a large percentage is for speculation and quick profits. There is therefore no direct link any more between the size of the carbon market and the money available to reduce GHG emissions. How much of the US$144 billion is available to finance emissions reductions is unclear, as the financial market is so opaque. What is clear is that it is only a very small fraction of the total size of the market.

Glossary

Additionality the quantity of GHG emissions that have been reduced or removed thanks to an offset or transfer project. In quantitative terms it is the difference between the emissions occurring in the baseline scenario (if nothing has happened), and the emissions that occur as a result of an offset project.

Annex I countries countries committing themselves specifically to the aim of returning individually or jointly to their 1990 levels of GHG emissions by the year 2012.

Annex B countries countries (included in Annex B to the Kyoto Protocol) agreeing to a target for their GHG emissions. It includes all Annex I countries (as amended in 1998) except for Turkey and Belarus.

Anthropogenic resulting from or produced by human beings.

Arbitrage the simultaneous purchase and sale of an asset in order to profit from price differences on different markets or in different forms

Assigned Amount Unit (AAU) a permit-type token representing the right to emit one tonne of carbon dioxide equivalence (CO_2e). AAUs are issued to nations, which are signatories to the Kyoto Protocol listed in Annex B. They are issued in accordance with Article 3 of the protocol.

Barrier tests tests which aim to show that the CDM breaks down barriers (such as a project not being financially viable) that would otherwise halt implementation of an offset project.

Baseline GHG emissions from activities that would have occurred in the absence of offsetting or transfer policies or projects. Not to be confused with business-as-usual.

Broker-dealer a broker who also acts as a buyer or seller to transactions and thus becomes a principal party to a deal. In the over the counter derivatives segment, broker-dealers usually act as counterparty to end customers.

Business-as-usual (BAU) GHG emissions which would occur without any climate change specific regulations.

Cap and trade a policy where a regulatory or international body sets a limit (i.e. the cap) on the amount of pollution (e.g. GHGs) that can be emitted in a certain period by certain entities (depending on the body these entities might represent industrial sectors or a group of nations). The cap is divided into permits for the

right to a small part of the capped pollution. The permits have transferable title (ownership) which allows for exchange of permits. Not to be confused with offsetting.

Carbon an element found in many GHGs, though not all. Carbon dioxide (CO_2), the most significant component in the GHG mix, accounts for about 80 per cent of the total; methane (also a carbon-based GHG) is another important component.

Carbon credits offset credits represent the right to emit one tonne of carbon dioxide. Credits can be exchanged between the offset project owner and a company or individual requiring such a credit to offset their emission or can be bought and sold on the international market at the current market price.

Carbon dioxide (CO_2) a naturally occurring gas, also a by-product of burning fossil fuels such as oil, gas and coal, of burning biomass, and of land use changes and other industrial processes. It is the principal anthropogenic GHG and thus the reference gas against which other GHGs are measured. It is described as having a global warming potential of one.

Carbon dioxide equivalence (CO_2e) there are several gases other than carbon dioxide that have a global warming effect and half-lives in the atmosphere. In order to be able to compare the dangers of each of the gases, their global warming potentials (GWPs) are measured against a metric tonne of carbon dioxide over a fixed period so as to know what mass of the gas would have the same global warming effect. This is known as its carbon dioxide equivalence. The Kyoto Protocol measures carbon dioxide equivalence using a time horizon of 100 years.

Carbon finance investments in GHG emission reduction projects and the creation of financial instruments that are tradeable on the carbon market

Carbon offsets an instrument that aims to allow carbon to continue being released in one place in return for reducing carbon in another place. They are measured and given credits for each metric tonne of carbon dioxide-equivalent (CO_2e) they reduce. One carbon credit represents the reduction of one metric tonne of carbon dioxide, or its equivalent in other greenhouse gases. They are issued by various bodies, with some only accepted in voluntary markets. Only those issued by the Kyoto Protocol are accepted in the EU ETS.

Carbon trading the sale and purchase of GHG (or carbon) accounting tokens (permits and credits) including transactions and securities based on these accounting tokens.

Certified emissions reductions (CERs) a unit of GHG emission reductions issued pursuant to the Clean Development Mechanism of the Kyoto Protocol, and measured in metric tonnes of carbon dioxide equivalent. One CER represents a reduction of GHG emissions of one tCO_2e.

Clean Development Mechanism (CDM) an arrangement under the Kyoto Protocol that allows industrialised countries with a GHG reduction commitment to invest in projects that reduce emissions in developing countries as an alternative to more expensive emission reductions in their own countries.

Climate change/global warming a change in global climate which results directly or indirectly from human activity that changes the composition of the global atmosphere and which is in addition to natural climate variability. Global warming is a more popular term that recognises that global temperatures overall have been increasing since the Industrial Revolution.

Credit issued to project owners who prove they have reduced emissions from their baseline level in an industry or country that sits outside of a cap and trade system.

Derivative a contract between two parties to carry out a transaction in the future based on an 'underlying' quantity such as an asset (e.g. carbon permits) or a financial variable (e.g. an interest rate). This has four basic types: the forward, future, option and swap.

Emissions Reduction Purchase Agreement (ERPA) a contract between a buyer and seller of project based offset credits under the Kyoto Protocol stipulating the firm intent and method of purchase of credits eventually awarded to the project owners. The contract will also cover such events as failure to deliver. A pro forma has been developed by the International Emissions Trading Association, and as such reflects the needs of its members, being mostly on the purchasing side of the contract; however, the terms are free to be set according to each project's needs.

Emissions trading the sale and purchase of airborne pollution accounting tokens (permits and credits) including transactions and securities based on these accounting tokens.

EU Emissions Trading Scheme (ETS) the ETS is the largest multinational emissions trading scheme in the world, and it forms a major pillar of EU climate policy. Under the ETS, some large emitters of CO_2 within the EU must monitor and annually report their CO_2 emissions.

European Union Allowances (EUAs) the allowances in use under the EU ETS. An EUA unit is equal to one metric tonne of CO_2e. These are issued by converting part of the EU Member States allocation of AAUs under the Kyoto Protocol to EUAs. An EUA is thus also an AAU but is subject to different restrictions on how it is traded.

Exchange a private company which provides an open market where members can see latest prices for the exchange of standard contracts, particularly for derivatives. Buyers can request quotes and sellers can offer prices. The exchange tries to guarantee an orderly market by ensuring that members have the liquidity to cover all contracts they have open on the exchange.

Exercise when a party in an options contract asks the other party to fulfil the contract. In the example of the carbon trade, an option buyer could exercise a call (put) option in which case the seller must sell (buy) the underlying at the price specified in the options contract.

Forward (contract) a derivatives contract for the delivery or receipt of a specific amount of an underlying, at a set price, on a certain date in the future.

Fossil fuels fossil fuels or mineral fuels are fuel sources derived from fossils, or hydrocarbons found within the top layer of the Earth's crust. Examples include coal, petroleum, and methane. Fossil fuels are non-renewable resources because they take millions of years to form, and fossil fuel reserves are being depleted much faster than new ones could ever be formed.

Future (or futures contract) a standardised forward contract for the delivery or receipt of a specific amount of an underlying, at a set price, on a certain date in the future. Futures are traded in the derivatives market.

Global warming potential (GWP) an index measuring the climate changing effect of a quantity of GHG relative to the climate changing effect of the same quantity of CO_2 over a specific time-span (assuming that there is a uniform mix of gases in the atmosphere). The GWP of CO_2 is thus always one. The GWP of other GHGs depends on the timeframe considered, as their decay rates vary. The value also depends on initial concentration, as the relationship for some gases is non-linear, i.e. there is a concentration at which their effect is suddenly magnified.

Grandfathering the free allocation of permits to participants in a cap and trade system, based on their historic emissions.

Greenhouse gases (GHGs) those gaseous constituents of the atmosphere, both natural and anthropogenic, that trap or in some case repel heat energy such as the sun's rays. This property causes the greenhouse effect. Water vapour (H_2O), carbon dioxide (CO_2), nitrous oxide (N_2O), methane (CH_4) and ozone (O_3) are the primary GHGs in the Earth's atmosphere. Moreover, there are a number of entirely human-made GHGs in the atmosphere, such as the halocarbons and other chlorine- and bromine-containing substances dealt with under the Montreal Protocol. Besides CO_2, N_2O, and CH_4, the Kyoto Protocol deals with the GHGs, sulphur hexafluoride (SF_6), hydrofluorocarbons (HFCs) and perfluorocarbons (PFCs).

Hedging the use of derivatives to reduce or protect against risk.

Intergovernmental Panel on Climate Change (IPCC) the leading body for the assessment of climate change, established by the United Nations Environment Programme (UNEP) and the World Meteorological Organization (WMO) to provide the world with a scientific view on the current state of climate change and its potential environmental and socio-economic consequences. It is staffed by leading academics and representatives of the national members of the United Nations. Although it has been criticised for not being independent, having too

many vested interests, for being too conservative or too reliant on incomplete data, it is widely seen by governments as the scientific body that provides them with the analysis of the latest science on climate change and indicates what level of impact can be expected at different GHG concentrations. The IPCC does not produce original research, but synthesises peer-reviewed research in the form of Assessment Reports. It has published four reports (1990, 1995, 2001 and 2007), and the next report is due in 2014.

International Transaction Log (ITL) a computer system which keeps track of each participating nation's ownership of permits. It is also sometimes referred to as a registry.

Joint Implementation (JI) under the Kyoto Protocol, JI allows an Annex B country with an emission reduction or limitation commitment to earn emission reduction units (ERUs) from an emission reduction or emission removal project in another Annex B country, each equivalent to one metric tonne of CO_2. This can be counted towards meeting its Kyoto target. ERUs are created by converting an equal number of the host countries AAUs into ERUs and transferring them to the implementing countries registry account.

Kyoto Protocol an international agreement linked to the UNFCCC. The Protocol sets binding targets for industrialised countries which are signatories to the protocol as listed in Annex 1, for reducing GHG emissions amounting to an average of a five per cent reduction against 1990 levels over the five-year period 2008-12. The UNFCCC 'encourages' industrialised countries to stabilise GHG emissions, the Kyoto Protocol 'commits' them to do so.

Linking Directive a directive allowing GHG emission credits earned through the Kyoto flexible mechanisms (JI and the CDM) to be used for compliance by operators of installations covered by the EU ETS.

Option (or options contract) a derivatives contract giving the buyer the right to buy (call) or sell (put) a specific quantity of a specific underlying, at a fixed price, on, or up to, a specified date. The seller is obliged to deliver or accept the asset, when the option is exercised.

Over the counter (OTC) bilateral transactions between (two) trading parties that are not conducted on a regulated exchange. In the derivatives market, the over-the-counter segment is by far the largest part of the market.

Permit in the context of cap and trade policy, a permit allows the holder to emit a fixed quantity of pollution and must be surrendered to a regulator as a result of doing so.

Securitisation a mechanism whereby assets (e.g. future carbon credit issues from several different projects at different stages of approval) are used as collateral backing for the issue of securities to third party investors. The most risky issues attract the highest interest payments but are the most likely to default.

Security an asset that accrues income. It is usually in the form of a contract detailing a debt or equity issued by a corporation, government or other organisation. Classic examples of securities would be government bonds or corporate shares.

Swap (contract) a derivatives contract under which the two counterparties agree to exchange the cash difference between two values (e.g. the price of carbon permits now versus the price of carbon permits in the future) at future agreed dates as stipulated in the contract.

Underlying the security that must be delivered when a derivative contract, such as a put or call option, is exercised. The price of the underlying is the main factor that determines prices of derivative securities. Thus, a change in an underlying results in a simultaneous change in the price of the derivative asset that is linked to it. In most cases, the underlying is a security such as a stock (in the case of options) or a commodity (in the case of futures).

United Nations Framework Convention on Climate Change (UNFCCC) an international treaty to consider how to respond to climate change. Now includes the Kyoto Protocol. Most countries are signatories.

Vintage generally vintage of a credit or permit relates to the year of allocation/auction – as with a bottle of wine. Each permit will have as part of its record the date of initial issue. It can also be used in relation to phases as each permit will also have a phase it was allocated in. For example, ETS permits have vintages based on each of the three phases of the ETS.

Voluntary Emissions Reduction (VER) a form of offset produced primarily for sale in voluntary offset markets.

Annexes

Carbon released from fossil fuel combustion should not be confused with carbon from forests.
See Box 6, page 70

Annex 1

Further reading and information

Carbon trading in general

Carbon Trading. A Critical Conversation About Climate Change, Privatisation and Power. DHF Development Dialogue 48 Sept. 2006. Cornerhouse website: www.thecornerhouse.org.uk/subject/climate

Carbon Trading – How it Works and Why it Fails. DHF Critical Currents 7 Carbon Trade Watch. This report demonstrates that the EU ETS has consistently failed to cap emissions, while the CDM routinely favours environmentally ineffective and socially unjust projects. This is illustrated with case studies of CDM projects in Brazil, Indonesia, India and Thailand. http://www.dhf.uu.se/pdffiler/cc7/cc7_web.pdf

Upsetting the Offset: The Political Economy of Offset Markets Stefan Bohm and Siddhartha Dabhi (2009) .

A Dangerous Obsession FoE UK. This report by Friends of the Earth warns against the UK government's obsession with carbon trading. It says that expanding carbon trading risks both economic and climate collapse. http://www.foe.co.uk/resource/reports/dangerous_obsession.pdf

Carbon offsets

Offsetting: A Dangerous Distraction FoE UK. An examination of the record of the main offset scheme – the CDM. The report shows that in practice offsetting is not leading to global emissions reductions or benefiting developing countries. Instead it is simply leading to more ingenious ways to avoid cutting emissions. http://www.foe.co.uk/resource/briefing_notes/dangerous_distraction.pdf

The CDM in the Philippines: Rewarding Polluters Focus on the Global South. In the Philippines the multi-billion peso CDM money trail leads to the doors of some of the country's richest men and largest business conglomerates, with interests in 'dirty' industries such as mining, fossil fuel-based power generation, oil and gas exploration. http://www.focusweb.org/philippines/content/view/334/7/

Rip-Offsets: The Failure of the Kyoto Protocol's Clean Development Mechanism International Rivers (2008). http://www.internationalrivers.org/en/rip-offsets-the-failure-kyoto-protocols-clean-development-mechanism

International Climate Change Programs: Lessons Learned from the European Union's Emissions Trading Scheme and the Kyoto Protocol's Clean Development Mechanism GAO-09-151 United States Government, General Accounting Office. Washington, 18 Nov. 2008.

Climate or development? Climatic Change 84, no. 1. Axel Michaelowa (ed) (2007)

Emissions

UNFCCC Google Map Emissions Monitor has extensive and very accessible information for every country that has an emissions target under the Kyoto Protocol. http://maps.unfccc.int/di/map/

The EEA reports on greenhouse gas emission trends and projections in Europe http://www.eea.europa.eu/publications/eea_report_2009_9 for many graphs on the ETS

Carbon markets

When Markets Are Poison: Learning about Climate Policy from the Financial Crisis Cornerhouse. Studying the financial crisis and the climate crisis together can provide useful tools for understanding how to tackle both. Overconfident commodification of uncertainty helped precipitate a global economic crash. Overconfident commodification of climate benefits (in the form of a trade in carbon) threatens to hasten an even worse catastrophe. http://www.thecornerhouse.org.uk/subject/climate/

Subprime Carbon? Re-thinking the World's Largest New Derivatives Market FoE US. As policy-makers debate Wall Street reform, they are not paying adequate attention to whether new regulations will be adequate to govern carbon trading and the carbon derivatives markets, which many experts believe could become larger than credit derivatives markets. http://www.foe.org/pdf/SubprimeCarbonReport.pdf

Video, audio and powerpoint material

The Story of Cap and Trade Free Range Studios. A fast-paced, fact-filled look at the leading climate solution being discussed at Copenhagen and on Capitol Hill. Host Annie Leonard introduces the energy traders and Wall Street financiers at the heart of this scheme and reveals the 'devil in the detail'. http://storyofstuff.com/capandtrade/

Brazil: The Money Tree Documentary by Centre for Investigative Reporting. Mark Schapiro travels deep into Brazil's forests to investigate how this abstract carbon economy is affecting real people. http://www.pbs.org/frontlineworld/stories/carbonwatch/moneytree/

The Carbon Connection Video letters between a community in Grangemouth, Scotland and a community affected by the Plantar carbon offset project in Minas Gerais, Brazil. http://www.carbontradewatch.org/carbon-connection/index.html

The Carbon Hunters Documentary about several American companies who have been investing in forests to soak up the carbon that they may have to count for in proposed energy legislation. http://www.pbs.org/frontlineworld/stories/carbonwatch/2010/05/the-carbon-hunters.html

CO_2 alibi Documentary about Dutch company FACE buying trees in Uganda to offset their emissions with negative consequences for the people inUganda. http://player.omroep.nl/?aflID=7320917 In Portuguese: http://player.omroep.nl/?aflID=7320915 In French: http://vimeo.com/12020892

Useful websites

Carbon Trade Watch: www.carbontradewatch.org

Environmental Data Service ENDS: http://www.ends.co.uk/

Ecosystem Market Place Forest Portal for info on forest carbon market: http://www.forestcarbonportal.com/

FERN: www.fern.org

Point Carbon: http://www.pointcarbon.com/

REDD Monitor: www.redd-monitor.org

SinksWatch: www.sinkswatch.org

The Corner House: www.thecornerhouse.org.uk

UN Risoe: http://uneprisoe.org/

UNFCCC CDM database: http://cdm.unfccc.int/index.html

World Bank State of the Carbon Market annual report: http://siteresources.worldbank.org/INTCARBONFINANCE/Resources/State_and_Trends_of_the_Carbon_Market_2010_low_res.pdf

Annex 2 Permits and credits in the carbon trading system

Unit	Acronym	Description	Who issues them?	Can they be used by operators for EU ETS compliance?	What happens to them at the end of the phase/ commitment period?	Additional restrictions
European Union Allowance. *This is a permit*	EUA	Allocated to installations that fall within the scope of the EU ETS according to the methodology set out in the National Allocation Plan. Created by converting a proportion of a party's AAUs (in effect, EUAs are 'backed' by AAUs). EUAs for Phase II are referred to as EUA-AAU in the UK national registry	Member State that is an Annex 1 party to the Kyoto Protocol	Yes	EUAs are only valid for compliance use in the EU ETS in the phase in which they are issued. However, any unused EUAs will be replaced with EUAs that are valid in the next phase. There are no restrictions on the number of EUAs that can be replaced.	EUAs cannot be transferred outside of the EU ETS system unless an agreement as set out in Article 49 (2) of the Registries Regulation has been made. At the time of publication, no such agreement exists.
Assigned Amount Unit. *This is a permit*	AAU	Created in the national registry, they are the basic Kyoto currency; tracking performance against targets*	Annex 1 Party to the Kyoto Protocol	No	All AAUs can be carried over for use in the next commitment period	None
Certified Emission Reduction. *This is a credit*	CER	Generated for emission reductions or removals by CDM projects	CDM Registry	Yes – but with restrictions on the number and type of credits	CERs can be carried over for use in the next commitment period, but there is a limit which may impact on those being held in person and operator holding accounts	None
Temporary Certified Emission Reduction. *This is a credit*	tCER	Generated for emission removals by afforestation and reforestation CDM projects	CDM Registry	No	Any tCERs that remain in person or operator holding accounts at the end of the commitment period will be cancelled	tCERs have a limited life-span and are subject to expiry and cancellation under certain circumstances
Long-term Certified Emission Reduction. *This is a credit*	lCER	Generated for emission removals by afforestation and reforestation CDM projects	CDM Registry	No	Any lCERs that remain in person or operator holding accounts at the end of the commitment period will be cancelled	lCERs have a limited life-span and are subject to expiry and cancellation under certain circumstances
Emission Reduction Unit. *This is a credit*	ERU	Issued for emission reductions or removals from JI projects by converting an equivalent quantity of the Party's existing AAUs or RMUs	Annex 1 Party	No	ERUs can be carried over for use in the next commitment period, but there is a limit which may impact on those being held in person and operator holding accounts	None
Removal Units. *This is a credit*	RMU	Issued for net emission removals from land use, land use change and forestry activities	Annex 1 Party	No	RMUs cannot be carried over and any that remain in person and operator holding accounts at the end of the commitment period will be cancelled	None
Voluntary Emission Reduction. *This is a credit*	VER	Generated by projects that are assessed and verified by third party organisations rather than through the UNFCCC	Variable	No	N/A	VERs cannot be acquired, held or transferred in national registries

* For more information, see the Kyoto Protocol Reference Manual on Accounting of Emissions and Assigned Amounts.