

GREEN
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POLICY REPORT
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50 SHADES OF GREEN

THE RISE OF NATURAL CAPITAL MARKETS
AND SUSTAINABLE FINANCE

FRÉDÉRIC HACHE

PART I. CARBON

Everything that needs to be said has already been said. But since no one was listening, everything must be said again.

– **ANDRÉ GIDE**

However beautiful the strategy, you should occasionally look at the results.

– **WINSTON CHURCHILL**



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Report “50 Shades of Green: the rise of natural capital markets and sustainable finance – Part I. Carbon”

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Cover photo: Gas platform or rig platform in sunset or sunrise time – Shutterstock

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EXECUTIVE SUMMARY

Beyond the well-known excess allowances and cases of fraud, **carbon markets also have major conceptual issues, some of which are unresolvable** such as the inexistence of a price signal. **Carbon taxes suffer from some of the same flaws and are therefore only marginally better.**

As carbon becomes an asset class, carbon markets are also likely to be more vulnerable than traditional markets to market failures and abrupt losses of confidence from investors, with a high risk of contagion to other asset classes and the wider economy. The tremendous scientific uncertainty, high regulatory risk and poor environmental integrity of these markets translate into a high risk of rule changes and abrupt repricing. The inclusion of carbon in commodity indexes and its perception as an asset class would create fast contagion channels transmitting these risks and uncertainties to the rest of the financial system and the economy.

The unresolvable nature of some of the issues seriously questions the idea that carbon markets can ever meet their environmental and social objectives. While all policy tools are equally affected by the current lack of political ambition, effective ones will work when ambition increases, whereas failed ones like carbon offset markets will remain ineffective. This calls into question the current push to create new offset markets linked to the Paris Agreement at the COP25 and offsets for aviation emissions. The logical conclusion should be to abandon carbon markets for more robust alternatives, such as traditional binding regulations.

Mandating a progressive phasing out from fossil fuels complemented by targeted tax policies aimed at ensuring a fair sharing of the related costs would be simpler and much more effective in addressing climate change. Such a policy tool would also not create the financial stability risks attached to carbon markets.

Such binding regulations would incidentally make all finance sustainable with regards to climate change,¹ as the risk-adjusted returns of all companies and economic activities would automatically adjust to the new regulations and capital would shift accordingly. In turn, this questions the current political focus on 'changing finance' to facilitate the ecological transition, rather than changing environmental legislation, which would in turn shift investment priorities.

While there is currently no political appetite for shifting the policy response away from carbon trading, the current status quo is more fragile than most realize, and only one major natural catastrophe away from being abandoned. As carbon markets continue to prove their ineffectiveness while the incidence and amplitude of natural catastrophes increase and renewable energy prices continue to drop, public pressure is likely to make the current status quo gradually politically untenable. As a result, the choice between less effective but politically appealing carbon trading policies and more effective alternatives may shift abruptly.

¹ Reference is only here been made to the environmental aspect of sustainability. However, complementary social and governance regulations would make all finance sustainable with regards to environmental, social and governance factors.

INTRODUCTION

Since the 2015 Paris Agreement and adoption of the UN 2030 Agenda for Sustainable Development we have witnessed a growing political momentum to address the issues of climate change and ecosystem destruction. A great number of initiatives are underway to 'shift the trillions' to finance the great transition and develop a green economy.

In this context, a major development is underway that has been in the works for more than twenty years: the creation of new financial markets on environmental degradation and their integration into mainstream finance via a new European sustainable finance agenda.

Based on the idea that we need to put a price on nature to save it and that market-based solutions would succeed where traditional environmental policies have failed, these new markets aim at addressing climate change and ecosystem destruction in a more efficient and cost-effective way.

In March 2018, the European Commission adopted an action plan on sustainable finance shortly followed by a package of measures. It stated that *'the EU is committed to development that meets the needs of present and future generations, while opening up new employment and investment opportunities and ensuring economic growth'*.²

The sustainable finance agenda foresees a new role for private finance in environmental policies going far beyond the mere financing of renewable energy or energy efficiency projects. Three goals are put forward: re-orient private capital to fund sustainable and inclusive growth; strengthen financial stability by managing the financial risks linked to climate change and resource depletion; and foster transparency and long-termism.

Early proposals include establishing a classification system defining what constitutes 'green' economic activities, to be used for future ecolabels on financial products. They also include creating new low-carbon benchmarks and new disclosure obligations for asset managers.

Some of these proposals also crucially open the door to new environmental market mechanisms and instruments. In this, the sustainable finance agenda promises to be a game changer and a major contributor to the integration of EU environmental policies into mainstream finance.

Given the crucial importance of these forthcoming changes, there is a need to analyse the new mechanisms, in order to determine how likely they are to meet their stated environmental, economic, and social objectives. Assessing these mechanisms is also essential to contextualise and understand sustainable finance 2.0.

A recent book about artificial intelligence began with the sentence, *'welcome to the most important conversation of our time'*. Our policy response to climate change and biodiversity loss is the other most important conversation of our time.

2 European Commission Action Plan: Financing sustainable growth, 2018, <https://ec.europa.eu/transparency/regdoc/rep/1/2018/EN/COM-2018-97-F1-EN-MAIN-PART-1.PDF>

A. GLOBAL WARMING – WHAT ARE THE ISSUES, WHAT ARE THE OPTIONS?

Sections A and B are intended to provide a quick overview for novice readers. Others may skip directly to section C.

Climate change refers to significant change in climate systems over long periods of time. Within climate change, anthropogenic global warming describes surface temperature increases caused by human activities leading to changes in greenhouse gas concentrations.

While the main concern is the increase of carbon dioxide (CO₂) levels due to emissions from fossil fuel combustion, major greenhouse gases also include methane (CH₄), nitrous oxide (N₂O), chlorofluorocarbon-12 (CFC-12), hydrofluorocarbon-23 (HFC-23), sulphur hexafluoride (SF₆), and nitrogen trifluoride (NF₃).

There are three main policy responses to climate change: mitigation, adaptation and geoengineering:

- ▣ **Mitigation policies** aim at reducing greenhouse gas emissions (GHG) and/or increasing the ability of natural carbon reservoirs such as plants and the ocean to absorb GHG from the atmosphere. They range from switching to renewable energies and increasing energy efficiency and conservation to reforestation.
- ▣ **Adaptation policies** aim at increasing our ability to deal with the consequences of climate change. Examples include improving infrastructure, using drought resistant crops, and irrigation. As it is recognised that poor populations will be disproportionately affected by climate change, adaptation policies also aim at reducing poverty.
- ▣ **Geo engineering policies** seek to deliberately modify the climate by removing greenhouse gases from the atmosphere and increasing sunlight reflection. Projects include injecting sulphate aerosols into the stratosphere to reflect some sunlight before it reaches the surface of the earth,³ and ocean iron fertilization - introducing iron particles into the ocean to stimulate phytoplankton growth and sequester more CO₂ in the ocean.⁴ Thirteen ocean iron fertilization experiments have already been performed since 1990.⁵

Such policies are extremely controversial and risky, possibly disrupting regional weather patterns with catastrophic effects on water availability and food production,⁶ and altering oceans' chemistry with potentially dramatic and poorly understood impacts on the marine food webs.⁷ Some view these policies favourably due to their lower cost⁸ and potentially quick implementation, and as complementing mitigation policies in extreme circumstances.

Coming back to mitigation policies, one of their main priorities is to incentivise industrial sectors to reduce their carbon emissions. This can be achieved via three main policy tools: binding regulations (also called command and control) imposing a reduction in emissions, changes in technology or curbing fossil fuel extraction; carbon taxes; and carbon emissions trading schemes.

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- 3 The Guardian, Keith G, Wagner D, Fear of solar geoengineering is healthy – but don't distort our research, 29 March 2017, <https://www.theguardian.com/environment/2017/mar/29/criticism-harvard-solar-geoengineering-research-distorted>; MIT Technology Review, J Temple, Harvard Scientists Moving Ahead on Plans for Atmospheric Geoengineering Experiments, 24 March 2017, <https://www.technologyreview.com/s/603974/harvard-scientists-moving-ahead-on-plans-for-atmospheric-geoengineering-experiments/>
 - 4 The New York Times, Fountain H, A Rogue Climate Experiment Outrages Scientists, 18 October 2012, <https://www.nytimes.com/2012/10/19/science/earth/iron-dumping-experiment-in-pacific-alarms-marine-experts.html>
 - 5 Yoon et al 2016, Ocean Iron Fertilization Experiments: Past–Present–Future with Introduction to Korean Iron Fertilization Experiment in the Southern Ocean (KIFES) Project, https://www.researchgate.net/publication/310822713_Ocean_Iron_Fertilization_Experiments_Past-Present-Future_with_Introduction_to_Korean_Iron_Fertilization_Experiment_in_the_Southern_Ocean_KIFES_Project
 - 6 Geoengineering monitor, Hands Off Mother Earth!, October 2018, http://www.geoengineeringmonitor.org/wp-content/uploads/2018/10/HOME_manifesto-EN-Nov21.pdf
 - 7 Nature, Brent K, McGee J, McDonald J, Rohling E, International law poses problems for negative emissions research, 30 May 2018, <https://www.nature.com/articles/s41558-018-0181-2>
 - 8 The Guardian, Carrington D, Solar geoengineering could be 'remarkably inexpensive' – report, 23 November 2018, <https://www.theguardian.com/environment/2018/nov/23/solar-geoengineering-could-be-remarkably-inexpensive-report>

B. TWO TYPES OF CARBON TRADING MARKETS



1. DEFINITIONS

A. CAP AND TRADE

Definition

Cap and trade is a programme where a central authority (typically a government) gives or sells a limited number of permits to emit a specific quantity of a specific greenhouse gas during a specific period. Polluters are required to have sufficient permits to match their emissions during the allotted time period. If their emissions exceed the quantities allowed by their permits, they are allowed to purchase permits from other participants. Conversely, if they have not used all of their permits, they are allowed to sell them.

Cap and trade typically requires the central authority to define which sectors are covered and to establish annual, decreasing caps on emissions. As the cap decreases, the price of permits is expected to increase and emissions are thus expected to decline to a target limit.

Where cap and trade covers more than one greenhouse gas, it also requires the definition of equivalences between greenhouse gases in order to trade only the emissions of one gas and thus increase market liquidity.

Benefits

Cap and trade is based on the polluter pays principle: the idea that polluters should bear the costs of their pollution.

It is considered more flexible and cost-effective for corporations as they can achieve the environmental objective at the lowest cost: by allowing the trading of permits, companies that can reduce their emissions at low cost will do so and sell their permits to companies who cannot. In such a way, the cost to corporations of complying with relevant regulations is minimised and the allocation of permits is deemed more efficient.

Cap and trade also promotes economic growth by being able to respond faster to economic shocks via a decline in the price of permits than a carbon tax.

Lastly, cap and trade is expected to provide more certainty over the amount of emissions reductions than a carbon tax, as the quantity of emissions is fixed by the cap, whereas a carbon tax fixes the price but not the quantity.

B. CARBON OFFSET MARKETS

Definition

Carbon offsetting is an action, such as planting trees to store carbon dioxide, made to compensate for emissions of CO₂ or other greenhouse gases into the atmosphere, on the assumption that both are equivalent.

Parties engaging in such activities receive carbon offset permits in exchange, which can be sold and used to compensate for the emissions of other parties. As an example, a wind farm will receive carbon offset permits, measured in tons of CO₂ equivalents, for producing renewable energy that it will sell to a coal-fired power plant. The coal-fired power plant will then be able to use these permits to 'compensate' for its own emissions and comply with environmental regulations, by claiming that its purchase resulted in new non-polluting energy.

This is significantly different from cap and trade in several respects. Firstly, **there is no cap** to the number of credits that can be generated through offsetting. The only limit is on the proportion of parties' binding targets that are allowed to be achieved via offsets.

Secondly, determining the quantity of emissions avoided by the activity generating the offsets requires setting up a baseline and hypothetical scenarios to determine what would have happened without the offsetting activity. This is called **additionality**: the effect of the project or activity to reduce greenhouse gas emissions below the level that would have occurred in the absence of the project or activity.

Benefits

Carbon offsets have two main stated benefits: reducing GHG emissions in the atmosphere, and lowering the cost of achieving emission reduction targets, as carbon offsets are typically cheaper than credits in cap and trade schemes.

Many offset projects also claim complementary benefits such as improving the quality of life for local populations (e.g. better air and water quality, healthier communities), or better preservation of forests and thus habitats for wildlife.

2. HISTORICAL BACKGROUND AND TRACK RECORD

A. CAP AND TRADE

Historical background

The first cap and trade market was the US sulphur dioxide trading market created in 1995. Sulphur dioxide emissions from coal-fired power stations were generating so-called ‘acid rain’ with disastrous consequences for human health and the environment. Yet, the Reagan administration and some Democrats concerned about adverse economic consequences opposed any regulatory attempt to control sulphur dioxide emissions. Trading was presented as the way to combine curbing sulphur dioxide emissions with a market mechanism that appealed to some Republicans.⁹

110 electric power generating plants were given a set quantity of SO₂ emission allowances. For each ton of SO₂ emission reduced below the emission limit, plant owners received an emission allowance that could be saved for future use or sold on a new market managed by the Chicago Board of Trade. Plants would be fined USD 2000 for each ton of SO₂ emitted in excess of allowances. This was a landmark in environmental policies and inspired subsequent emissions trading schemes.

In 2005, the European Union set up the biggest carbon market worldwide as the main policy tool to meet its commitments under the Kyoto protocol. Encompassing the CO₂ emissions of 11000 large power plants and energy-intensive factories, the EU ETS programme (European Emissions Trading Scheme) covers roughly 45% of EU CO₂ emissions. The original objective was to reduce CO₂ emissions in the European Union by 8% by 2012, relative to 1990 emissions levels. The EU ETS originally only covered CO₂ emissions, but two other greenhouse gases were subsequently added to the scheme.

What pushed Europe towards carbon trading rather than the initially preferred carbon tax is in good part because the EU legislative remit simply does not cover fiscal policies such as carbon taxation.¹⁰ In addition, passing tax measures requires EU member states unanimity whereas emissions trading only requires a qualified majority. Given that the idea of a carbon tax faced vehement opposition from industry and from particular Member States (notably the UK),¹¹ a trading scheme was chosen.

In 2015, the United States under President Obama unveiled the Clean Power Plan, a new policy that created a cap and trade programme¹² and had the strong support of businesses

9 MacKenzie, Finding the Ratchet: The Political Economy of Carbon Trading, http://www.sociology.ed.ac.uk/__data/assets/pdf_file/0015/3417/DMacKenzieRatchet16.pdf

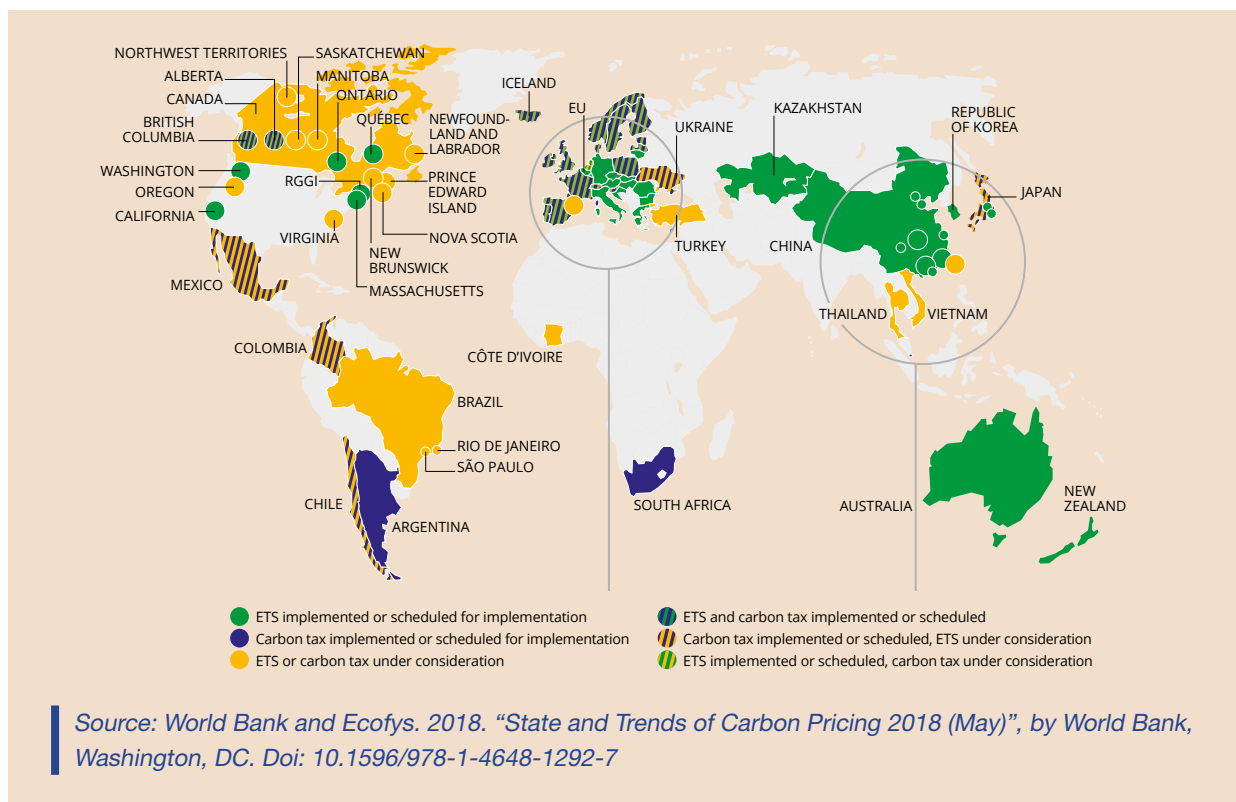
10 World Bank, State and trends of carbon pricing, 2015, <http://documents.worldbank.org/curated/en/636161467995665933/pdf/99533-REVISED-PUB-P153405-Box393205B.pdf>

11 MacKenzie, Finding the Ratchet: The Political Economy of Carbon Trading http://www.sps.ed.ac.uk/__data/assets/pdf_file/0015/3417/DMacKenzieRatchet16.pdf

12 UNFCCC, US Clean Power Plan Raises Carbon Trading Profile, 24 August 2015, <https://unfccc.int/news/us-clean-power-plan-raises-carbon-trading-profile>; Brookings Institute, Maurice A, Weber E, To comply with the Clean Power Plan, states should tax carbon, 2 September 2015, <https://www.brookings.edu/opinions/to-comply-with-the-clean-power-plan-states-should-tax-carbon/>

such as Goldman Sachs and eBay.¹³ However, in 2017, President Trump signed an executive order calling for a review of the Clean Power Plan, followed shortly by a proposal by the Environmental Protection Agency to repeal it.

Today, 25 carbon emissions trading schemes exist, with prices ranging from USD 1 to USD 25 /ton of CO₂.



Track record

During the first phase (2005- 2007), almost all permits were given to businesses for free and the total amount of permits issued exceeded actual emissions, due to a lack of reliable emissions data and to the pressure of Member States to protect their national industries. This led to the price of carbon permits falling from EUR 10 in early 2005 to zero in 2007.

Phase II (2008- 2012) saw a lowering of the cap but the financial and economic crisis of 2008 led to major emission reductions, creating a massive surplus estimated to be 1.5-2bn permits. Once again this led to a crash of the carbon price. While the crisis is often blamed for the excess permits, it is worth noting that according to the UK Committee on Climate Change, even without the crisis the allowance to use offset permits from Kyoto mechanisms meant that in effect no emission reduction within the EU was required to meet the phase II cap.¹⁴

Phase III (2013-2020) saw a tightening of the allowance to use offset permits, following

13 Rollingstone, Taibbi M, The Great American Bubble Machine, 5 April 2010, <https://www.rollingstone.com/politics/politics-news/the-great-american-bubble-machine-195229/>; The Guardian, Vaughan A, Obama's clean power plan hailed as US's strongest ever climate action, 3 August 2015, <https://www.theguardian.com/environment/2015/aug/03/obamas-clean-power-plan-hailed-as-strongest-ever-climate-action-by-a-us-president>

14 "At the EU level, however, the allowed use of offset credits is sufficiently generous that there will need to be no emissions reductions within the EU to meet the Phase II cap." UK Committee on Climate Change 2008, Building a low-carbon economy, <http://archive.theccc.org.uk/archive/pdf/TSO-ClimateChange.pdf>

blatant abuses and massive scams¹⁵. It also saw the inclusion of other sectors and gases and the auctioning off of some of the allowances: free allocations to industry were capped at 43% of all allowances.

Despite the enormous surplus of permits from phase II, participants were allowed to use all their unused phase II permits in phase III, in addition to the new phase III permits issued. Phase III therefore started unsurprisingly with a new price low of EUR 2.81 per ton of CO₂. It was also estimated that phase III would end with a surplus of 2.2bn permits in 2020.

Prices saw a minor rebound after the disastrous start to 2013 but remained stuck between EUR 4 and EUR 7 until early 2018, where the approval of significant reforms for the next period led to an abrupt rise in prices above EUR 20.

Amongst the most important reforms, Phase IV (2021-2030) will see an increased pace of emission cuts, with the cap - the overall number of emission permits - declining at an annual rate of 2.2% from 2021 onwards, compared to 1.74% currently. In addition, the number of permits put in the Market Stability Reserve – a mechanism to reduce the surplus of permits in the market – will double to 24% of the permits in circulation.¹⁶

So, is the EU ETS working? The objective to minimize the cost of compliance for private corporations has been achieved beyond expectations, due to the extremely generous and mostly free allocation of permits. This has enabled several prominent corporations to make windfall profits from the sale of extra permits and from charging customers for the hypothetical cost of carbon permits that they received for free. Not only did free permits contradict the polluter-pays principle, but they rendered the EU ETS effectively a subsidy factory for polluters instead of a scheme to incentivise technological change. A recent report estimated that the EU handed industry EUR 24 billion in windfall profits from 2008 to 2014.¹⁷

Conversely, the EU ETS has so far failed to contribute meaningfully to curbing emissions of greenhouse gases. While emissions have indeed decreased since 2005, according to scientific studies and a report from the European Commission¹⁸ the economic crisis rather than the market mechanism has been the major cause of the emission reductions, as it led to a decline in growth and energy demand.

This is not surprising given that since the creation of the ETS, allocated allowances have frequently been higher than actual emissions, not to mention the additional allowances generated through the Kyoto carbon offset markets. In fact, two-thirds of the over-supply can

15 The Guardian, Carrington D, EU plans to clamp down on carbon trading scam, 26 October 2010, <https://www.theguardian.com/environment/2010/oct/26/eu-ban-carbon-permits> ;

Environmental Investigate Agency, China's greenhouse gas vent threat in bid to extort billions, 8 November 2011, <https://eia-international.org/china-threat-to-vent-super-greenhouse-gases-in-bid-to-extort-billions/>

16 The Oxford Institute for Energy Studies, The EU ETS phase IV reform: implications for system functioning and for the carbon price signal, September 2018, <https://www.oxfordenergy.org/wpcms/wp-content/uploads/2018/09/The-EU-ETS-phase-IV-reform-implications-for-system-functioning-and-for-the-carbon-price-signal-Insight-38.pdf>

17 Carbon Market Watch, Industry windfall profits from Europe's carbon market 2008-2015, http://carbonmarketwatch.org/wp-content/uploads/2016/11/CMW-Industry-windfall-profits-from-EUs-carbon-market-2008_2015.pdf; CE Delft, Calculation of additional profits of sectors and firms from the EU ETS 2008-2015, December 2016, http://www.cedelft.eu/publicatie/calculation_of_additional_profits_of_sectors_and_firms_from_the_eu_ets/1763

18 Nature, Feng K, Davis S, Sun L, Hubacek K, Drivers of the US CO₂ emissions 1997–2013, 21 July 2015, <https://www.nature.com/articles/ncomms8714>; European Commission, The state of the European carbon market in 2012, 2012, <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52012DC0652&from=EN>

be blamed on the use of offset credits according to the NGO Carbon Market Watch.¹⁹ In the words of one banker *'the EU ETS has done nothing to curb emissions'*,²⁰ and many financial professionals such as George Soros have harshly criticised carbon markets' effectiveness.

The cost effectiveness of carbon markets has also been challenged: a UBS research report²¹ found that the EU ETS had cost the continent's consumers USD 287 billion for *'almost zero impact'* on cutting carbon emissions, and that had the money been used as part of a targeted approach to replace the EU's dirtiest power plants, emissions could have been reduced by 43 per cent, *'instead of almost zero impact on the back of emissions trading'*.

Other **unlikely critics of cap and trade include its creators**²²: the economists behind the sulphur dioxide market have questioned the usefulness of cap and trade to address global warming, highlighting the high volatility and uncertainty it creates for businesses and favouring a carbon tax instead.

It remains to be seen whether the recent price increase will have a more meaningful effect, as the price currently remains below the level of USD 40-80 per ton that most economists estimate to be the minimum necessary to trigger fuel switching.²³ Crucially, it also remains to be seen to what extent forthcoming offset markets – that will be described later in this report – will be allowed to link with the EU ETS and impact its cap.

The fact that the market stability reserve now foresees the release of millions of allowances in case of a strong rise in the price of EU emission allowances also questions the political appetite to let the carbon price rise to a meaningful level.

Fraud

Beyond the excess allowances, the credibility of the EU ETS has also been plagued by cases of fraud, from the theft of EUR 7m of emission permits from the Czech Republic's carbon registry²⁴ to phishing scams.²⁵ The most prominent scandal was a massive VAT fraud in 2009, where Europol that up to 90% of all market activity in some European countries estimated in 2009 was undertaken by fraudsters, and that carbon credit fraud caused more than EUR 5 billion worth of damage to European taxpayers.²⁶

19 Carbon Market Watch, Emissions trading and national carbon markets – Beware of past mistakes!, March 2013, <http://carbonmarketwatch.org/emissions-trading-and-national-carbon-markets-beware-of-past-mistakes/>

20 As reported in The Corner House, Lohmann L, Carbon Trading: Solution or Obstacle? <http://www.thecornerhouse.org.uk/sites/thecornerhouse.org.uk/files/Indiachapter.pdf>

21 The Global Warming Policy Forum, Europe's \$287 billion carbon waste: UBS report, 22 November 2011, <https://www.thegwpf.com/europes-287-billion-carbon-waste-ubs-report/>; The Australian, Maher S, Europe's \$287bn carbon 'waste': UBS report, 23 November 2011, <https://web.archive.org/web/20111128113617/http://www.theaustralian.com.au/national-affairs/europes-287bn-carbon-waste-ubs-report/story-fn59niix-1226203068972>

22 The Wall Street Journal, Hilsenrath J, Cap-and-Trade's Unlikely Critics: Its Creators, 13 August 2009, <http://www.wsj.com/articles/SB125011380094927137>

23 Carbon Pricing Leadership Coalition, 2016-2017 report, <http://pubdocs.worldbank.org/en/183521492529539277/WBG-CPLC-2017-Leadership-Report-DIGITAL-Single-Pages.pdf>

24 Reuters, Chestney N, Harrison P, EU locks carbon market after security breach, 19 January 2011, <https://www.reuters.com/article/us-carbon-czech/eu-locks-carbon-market-after-security-breach-idUSTRE70I55120110119>

25 EU Observer, Phillips L, Cyber-scam artists disrupt emissions trading across EU, 3 February 2010, <https://euobserver.com/environment/29403>

26 Europol press release, Carbon credit fraud causes more than 5 billion euros damage for European taxpayer, 9 December 2009, <https://www.europol.europa.eu/newsroom/news/carbon-credit-fraud-causes-more-5-billion-euros-damage-for-european-taxpayer>; Euractiv, Robert A, Multi-billion EU carbon market fraud operated from Poland, 18 July 2016, <https://www.euractiv.com/section/energy/news/polish-broker-faces-seven-year-prison-sentence-for-vat-fraud-on-eu-carbon-market/>

B. OFFSET MARKETS

Historical background

At the Earth summit of Rio in 1992, 165 nations signed an international environmental treaty – the United Nations Framework Convention on Climate Change (UNFCCC) – aimed at stabilising GHG concentrations in the atmosphere at a level that would prevent dangerous interference with the climate system originating from human activities.

In 1997, the Kyoto Protocol, a treaty extending the UN framework, defined legally binding greenhouse gases emission reduction targets for developed countries, for the first time. These limits pertained to the period between 2008 and 2012, and were later amended to include the period 2013–2020. Six GHG were included in the Protocol: carbon-dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulphur hexafluoride (SF₆).

The Kyoto Protocol also introduced three so-called ‘flexible mechanisms’: Emissions Trading; the Clean Development Mechanism (CDM) and Joint Implementation (JI). Their main purpose was to lower the overall costs of achieving emission reduction targets, by authorising parties to achieve their targets in other countries.

The Emissions Trading Mechanism is an allowance-trading scheme broadly similar to that of the US pertaining to sulphur dioxide, while the two other mechanisms are offset-based: they allow industrialised countries with binding targets to meet part of their commitments by buying certificates linked to emission reduction projects in developing countries where cutting emissions is cheaper, instead of by reducing emissions at home.

The crucial difference between the Joint Implementation and the Clean Development Mechanisms is that the former requires emission reduction projects to take place in countries with binding commitments, whereas the latter allows emission reduction projects to take place in developing countries with no binding targets.

Interestingly, the USA under President Clinton had pushed strongly for the inclusion of these flexibility mechanisms before withdrawing from the Kyoto Protocol due to US Senate opposition. One of the staunchest supporters of these market-based mechanisms had been Enron, a big sulphur dioxide market player that stated in an internal memorandum that Kyoto would ‘do more to promote Enron’s business than almost any other regulatory initiative outside the restructuring [of] the energy and natural gas industries in Europe and the United States.’²⁷

Participants in the European cap and trade market can use international credits from Kyoto’s JI and CDM mechanisms to fulfil part of their obligations under the EU ETS until 2020. The EU ETS is currently the biggest source of demand for international credits, with an inflow of more than 1.5 billion international credits occurring since 2013.²⁸

27 The Washington Post, Morgan D, Enron Also Courted Democrats, 13 January 2002, https://www.washingtonpost.com/gdpr-consent/?destination=%2farchive%2fpolitics%2f2002%2f01%2f13%2fenron-also-courted-democrats%2fdb9d5f82-b371-40d2-ae75-6b86dfb47f1a%2f%3f&utm_term=.a872e1bbb2e9

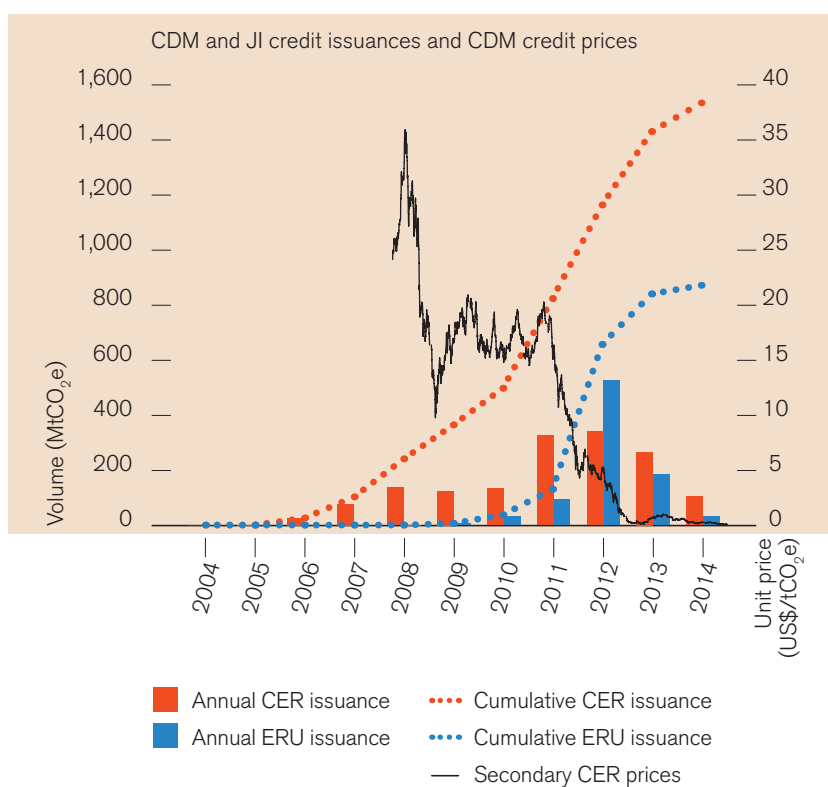
28 I4CE, Exploring the EU ETS beyond 2020, November 2015, <https://www.i4ce.org/wp-core/wp-content/uploads/2015/11/rapport-i4ce-BAT.pdf>; IETA, Use of offset credits across emission trading systems and carbon pricing mechanisms, May 2014, https://www.ieta.org/resources/Resources/3_Minute_Briefings/use%20of%20credit%20offset%20across%20ets_%20briefing_final%20version.pdf

As the Clean Development Mechanism ends in 2020, it is most likely to be replaced by the Sustainable Development Mechanism, a new carbon market instrument that is part of the 2015 Paris Agreement. Less publicised than the 2°C target headline, article 6 of the Paris Agreement provides the ability to create an international carbon offset market through the use of ‘**internationally transferred mitigation outcomes**’ to achieve nationally determined contributions. These internationally transferred mitigation outcomes are carbon offset credits. As a prominent think tank noted at the time ‘*the absence of the word “market” is deliberate, not accidental.*’²⁹

Track record

After starting to trade at around EUR 20 per ton of CO₂ in 2008, Certified Emissions Reductions (CER)³⁰ prices experienced a decline to around EUR 4 per ton in 2012 and have remained close to zero since 2013. A combination of a growing oversupply of offset credits, demand coming only from the EU ETS and the economic downturn following the 2008 financial crisis led to a saturation of demand and the crash of CER prices.³¹

Analysts now expect that only demand from the forthcoming carbon offset market for aviation emissions may revive the ailing Clean Development Mechanism.³²



Source: Alexandre Kossoy, Grzegorz Peszko, Klaus Oppermann, Nicolai Prytz, Noémie Klein, Kornelis Blok, Long Lam, Lindee Wong, Bram Borkent. 2015. *State and Trends of Carbon Pricing 2015 (September)*, by World Bank, Washington, DC. Doi: 10.1596/978-1-4648-0725-1

29 CEPS, Marcu A, Carbon Market Provisions in the Paris Agreement (Article 6), January 2016, <https://www.ceps.eu/system/files/SR%20No%20128%20ACM%20Post%20COP21%20Analysis%20of%20Article%206.pdf>

30 Certified Emissions Reductions (CER) is the name of the credits traded in the Clean Development Mechanism

31 CDC Climat, Will there still be a market price for CERs and ERUs in two years time?, May 2012, http://www.cdcclimat.com/IMG/pdf/12-05_climate_brief_no13_-_supply_demand_for_cer_eru_in_the_ets.pdf

32 Carbon Pulse, Airlines will be CDM's lifeline, but expect CER price slump first, say analysts, 27 April 2016, <https://carbon-pulse.com/18995/>

More worryingly, a 2017 study published by the European Commission³³ found that **85% of the offset projects used by the EU under the UN's Clean Development Mechanism failed to reduce emissions.** *'Only 2% of the projects and 7% of potential CER supply have a high likelihood of ensuring that emission reductions are additional and are not over-estimated. Our analysis suggests that the CDM still has fundamental flaws in terms of overall environmental integrity. It is likely that the large majority of the projects registered and CERs issued under the CDM are not providing real, measurable and additional emission reductions.'*

What this rather damning assessment means in practice is that the use of CDM credits towards climate targets has in fact increased global greenhouse gas emissions. *'In the EU alone, emissions increased by over 650 million tonnes of CO₂ as a result of the use of CDM credits in the EU Emissions Trading System. This is because an overwhelming majority of CDM projects essentially issue 'junk' credits that do not lead to real-world emission reductions.'*³⁴

This comes in part from the fact that the Clean Development Mechanism has been riddled with fraud, including Chinese companies manufacturing greenhouse gases to later destroy them and collect credits;³⁵ fake forestry credits;³⁶ organised criminal groups in Russia and Ukraine taking advantage of lax oversight and loopholes;³⁷ and the re-use of expired credits by a European member state.³⁸

33 Öko Institut, Study prepared for DG CLIMA, How additional is the Clean Development Mechanism?, March 2016, https://ec.europa.eu/clima/sites/clima/files/ets/docs/clean_dev_mechanism_en.pdf

34 Carbon Market Watch, Open letter to ICAO council representatives & national delegates on ending the Clean Development Mechanism, 29 October 2018, <https://carbonmarketwatch.org/publications/open-letter-to-icao-council-representatives-national-delegates-on-ending-the-clean-development-mechanism/>

35 The Guardian, Carrington D, EU plans to clamp down on carbon trading scam, 26 October 2010, <https://www.theguardian.com/environment/2010/oct/26/eu-ban-carbon-permits>;
Wara M, Victor D, A Realistic Policy on International Carbon Offsets, Stanford Working Paper, April 2008, <https://law.stanford.edu/wp-content/uploads/sites/default/files/publication/258646/doc/slpublic/Wara%20Victor%20Realistic%20Policy.pdf>

36 The Atlantic, Jacobs R, The Forest Mafia: How Scammers Steal Millions Through Carbon Markets, 11 October 2013, <https://www.theatlantic.com/international/archive/2013/10/the-forest-mafia-how-scammers-steal-millions-through-carbon-markets/280419/>;
Euractiv, Crisp J, Leaked paper exposes EU countries' abuse of climate loophole, 24 March 2017, <https://www.euractiv.com/section/climate-environment/news/leaked-paper-exposes-eu-countries-abuse-of-climate-loophole/>

37 The Climate Examiner, UN carbon trading hit by massive fraud, 27 August 2015, <http://theclimateexaminer.ca/2015/08/27/un-carbon-trading-hit-massive-fraud/>

38 The Corner House, Lohmann L, "Strange Markets" and the Climate Crisis, 2010, <http://www.thecornerhouse.org.uk/sites/thecornerhouse.org.uk/files/Strange%20Markets.pdf>



C. WILL CARBON MARKETS SAVE US?

While the practical flaws of and fraud associated with carbon markets are already widely known, there is less awareness of the underlying assumptions and conceptual flaws of these markets, which are the focus of this section.

1. DEBATABLE ASSUMPTIONS

A. TRADITIONAL REGULATIONS HAVE FAILED

One of the key implicit assumptions of market-based environmental policies is that traditional regulations have failed to address environmental issues, and that markets will succeed where binding regulations have not. Yet such an assumption is incorrect. In the words of a foundation, *‘regulations and prohibitions have always provoked resistance but have also proved highly effective. From the introduction of mandatory seat belts and catalytic converters to the prohibition of asbestos – regulatory policy can look back at a history of acceptance and success.’*³⁹ The hole in the ozone layer was also successfully addressed via a ban on chlorofluorocarbon chemicals. The recent ban on single use plastic bags is another success.

Studies have found that *‘the prevailing view that command-and-control is inevitably inefficient or less efficient than alternative “economic instruments” such as effluent taxes and marketable pollution permits-is inaccurate both as a matter of economic theory and experience.’*⁴⁰

In most cases where regulations have been put in place, they have proven highly effective. Therefore, the issue has not been the lack of effectiveness of regulations but instead a lack of political will to set up and implement more regulations.

In this respect it is important to realise that political will is a limited quantity that affects all policy instruments equally: a limited political appetite to regulate pollution would translate similarly into a carbon market with excess allowances or a regulation mandating a progressive withdrawal from fossil fuel extraction over an excessively lengthy period of time. Conversely, strong political will would translate both into a shorter schedule for withdrawing from fossil fuel extraction or a carbon market with a lower number of allowances. **The assumption that market-based solutions would lead to better results than binding regulation for a given amount of political will ignores this political reality.**

Likewise, the **idea that traditional binding regulations are more coercive is incorrect**, as a given amount of political will translates equally across policy tools. Binding regulations are only more coercive in that they typically offer less loopholes.

39 Heinrich Böll Stiftung, Fatheuer T, New economy of nature, a critical introduction, 2014, https://www.boell.de/sites/default/files/new-economy-of-nature_kommentierbar.pdf?dimension1=ds_oekonomie_natur_en

40 Cole D, Grossman P, When Is Command-and-Control Efficient? Institutions, Technology, and the Comparative Efficiency of Alternative Regulatory Regimes for Environmental Protection, 1999, <https://www.repository.law.indiana.edu/cgi/viewcontent.cgi?article=1591&context=facpub>

B. THE POLLUTER PAYS PRINCIPLE

First mentioned in 1972, the polluter pays principle (PPP) was later included in the Single European Union Act of 1987 and in the UN Rio Declaration of 1992. The principle states that polluters should ‘*bear the cost of pollution, with due regard to the public interest and without distorting international trade and investment.*’⁴¹

According to the European Commission, ‘*the preventive function of the PPP is based on the assumption that the polluter will reduce pollution as soon as the costs which he or she has to bear are higher than the benefits anticipated from continuing pollution.*’ ‘*If environmental costs are not internalized (...) this could lead to distortion of international trade and investment. Thus, due application of the principle also protects economic interests.*’⁴²

This definition raises a number of remarks:

- i. First, it introduces the **non-neutral concept of externality**: the Oxford dictionary defines this as ‘*a consequence of an industrial or commercial activity which affects other parties without this being reflected in market prices.*’ Environmental degradation and pollution are thus considered as externalities of economic activity that needs to be internalized.

It is important to note that this framing is not neutral but is instead linked to a specific value system, utilitarianism, a theory viewing nature as a resource and service supplier to humans.⁴³ It also reflects a neo-classical economic perspective, that views the environment as a subsystem of the economy and maximising efficiency as the ultimate objective. From this perspective, integrating environmental externalities into economic decision-making improves efficiency and can enhance economic growth, instead of jeopardizing it. Addressing pollution and environmental destruction becomes a technical task of getting the price ‘right’.⁴⁴ As I will explain later, this framing generates severe limitations.

- ii. It also **assumes implicitly that polluting is free today**. This is an incorrect assumption as many existing regulations impose fines on pollution, such as water pollution caused by nitrates.
- iii. **Individuals are also assumed to act rationally, responding in consistent and predictable ways to price incentives**, an assumption that has been rebuffed by behavioural economist and Nobel laureate Daniel Kahneman among others.⁴⁵ It has

41 United Nations, Rio Declaration on Environment and Development, 1992, <http://www.un.org/documents/ga/conf151/aconf15126-1annex1.htm>

42 European Commission, workshop, The Polluter Pays Principle, http://ec.europa.eu/environment/legal/law/pdf/principles/2%20Polluter%20Pays%20Principle_revised.pdf

43 Loreau M, Reconciling utilitarian and non-utilitarian approaches to biodiversity conservation, *Ethics in Science and Environmental Politics*, Vol. 14: 27–32, 2014, <https://www.int-res.com/articles/esep2014/14/e014p027.pdf>

44 Gómez-Baggethun E, Muradian R, In *Markets We Trust? Setting the Boundaries of Market-Based Instruments in Ecosystem Services Governance*, *Ecological Economics* n°117, April 2015, https://www.researchgate.net/publication/275103765_In_Markets_We_Trust_Setting_the_Boundaries_of_Market-Based_Instruments_in_Ecosystem_Services_Governance

45 Tversky A, Kahneman D, Rational Choice and the Framing of Decisions, *The Journal of Business*, Vol. 59, No. 4, Part 2: The Behavioral Foundations of Economic Theory. (Oct., 1986), pp. S251-S278. http://www.cog.brown.edu/courses/cg195/pdf_files/fall07/Kahneman&Tversky1986.pdf

also been shown that *‘the effect of incentives on behaviour is mixed at best and is frequently perverse. When people are paid to do something that was previously part of their social norms—donating blood for example—the amount of the social good provided can decline (Gnezy and Rustichini, 2004). The presence of an award (or penalty) may actually have an opposing (or reinforcing) influence on what cognitive psychologists refer to as intrinsic motivation. This calls into question the relative importance of ‘getting the prices right’ in environmental policy, over potentially more effective non-price adjustments.*⁴⁶

- iv. **Policy decisions are transformed into cost-benefit analyses:** the assumption is that when the cost of polluting exceeds benefits for corporations, pollution will decline. Corporations assess whether it is more profitable for them to curb polluting or continue and pay the cost of internalising their externalities. Pollution thus becomes a cost of doing business.

Such a shift is a fundamental change, as calculation of risk and profit opportunities replace political judgement. It raises an important and legitimate question: on what basis do we decide that environmental policies should be subject to a cost-benefit analysis, when many other key areas of policy making are not? For example, law enforcement and defence are not subject to cost-benefits analyses; the decision to create the European Union was also not based on a cost-benefit analysis but was instead a political project.

Interestingly, the US supreme court took the opposite view, ruling that the Clean Air Act’s standards were absolute, and not subject to cost-benefit analysis.⁴⁷

- v. **A conceptual shift from responsibility to rights:** the framing of emissions in terms of rights instead of responsibilities is both a conceptual and practical shift. There is no human right to pollute, whereas there is a human right to live in an environment free of pollution. As philosopher Michael Sandel wrote *‘whether pollution is a crime or a purchasable and tradable permit makes a difference.’*

It is also a new forward-looking way to look at monetary compensation: historically, monetary compensation has not been paramount: *‘in most if not all judicial traditions, monetary compensation may play a role but (..) the issue is not the economic ‘accuracy’ of the fine (..), but its place in a larger, socially-accepted process to right a wrong.*⁴⁸ Economic valuation risks reducing the importance of non-monetary aspects, such as public apologies, public recognition of the wrong and commitment to change future behaviour.

Monetary compensation is also *‘used in two very different contexts. One context is retrospective: Courts have to determine what losses or damage individuals or communities have suffered because of an oil spill or other accident. The Chevron-Texaco case in Ecuador and the Exxon Valdez case in Alaska are familiar examples. Even in those cases, compensation is understood to consist of much more than*

46 Gowdy J, Erickson J, Ecological economics at a crossroads, Ecological Economics, January 2005, https://www.uvm.edu/giee/pubpdfs/Gowdy_2005_Ecological_Economics.pdf

47 Mayer J, Dark Money: The Hidden History of the Billionaires Behind the Rise of the Radical Right, 2016.

48 Heinrich Böll Stiftung, Kill J, Economic Valuation and Payment for Environmental Services Recognizing Nature’s Value or Pricing Nature’s Destruction?, September 2015, https://www.boell.de/sites/default/files/e-paper_151109_e-paper_economicvaluenature_v001.pdf

*a mere transfer of money from one bank account to another, as briefly touched on above. In the other context, compensation becomes part of a forward-looking project evaluation, in which a decision has to be made whether to allow future destruction. In many such examples, the people to be compensated reject the idea of monetary compensation altogether.*⁴⁹

C. A NEO-CLASSICAL ECONOMIC FRAMING THAT IGNORES DISTRIBUTION AND SCALE

Carbon markets are rooted in the neo-classical economic framing that views nature as a subsystem of the economy, providing resources for economic activity. As neo-classical economics see the economy as the whole, then the economy can expand without limits.

Neo-classical economics also assumes that natural resources can be replaced by human labour and technology, and are therefore not concerned by limits to natural resources but focus instead on the optimal allocation of resources as the ultimate goal and measure of good.

People are assumed to be insatiable, therefore overall well-being *'is increased through the ever-greater provision of goods and services, as measured by their market value. Thus, unending economic growth is typically considered an adequate, measurable proxy for the desirable end.'*⁵⁰ Efficiency and optimum allocation are considered to be objective criteria of 'the good'.

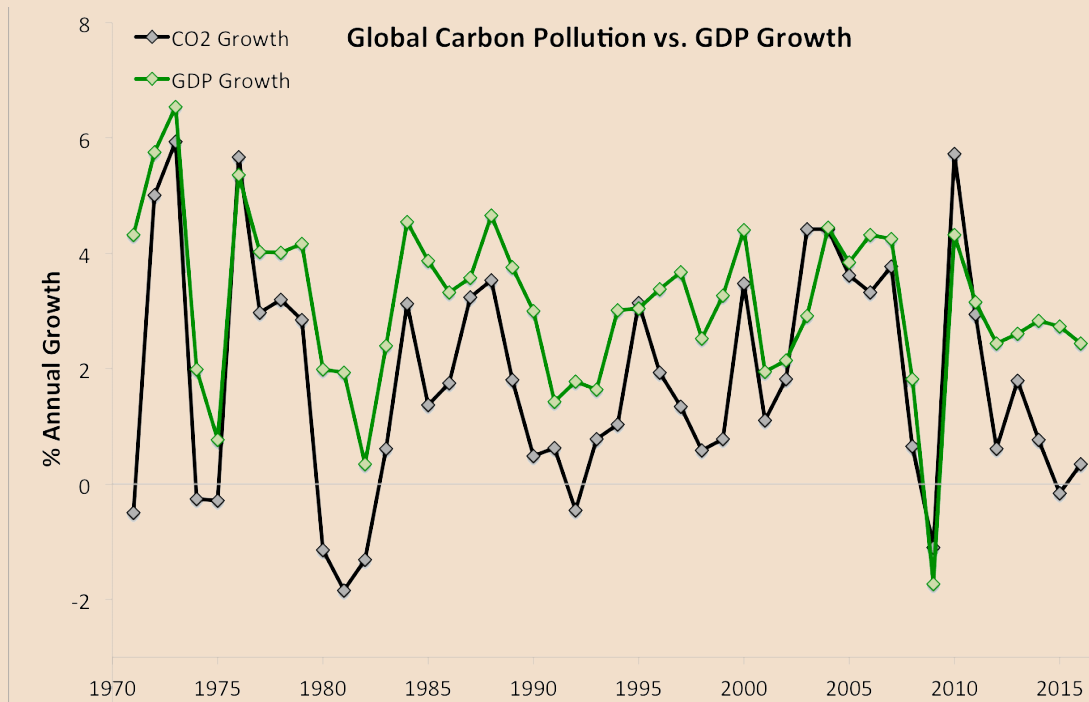
Yet it has been argued that *'a model that abstracts from the environment and considers the economy in isolation from it cannot shed any light on the relation of the economy to the environment.'*⁵¹ This is known as the fallacy of misplaced concreteness, the error of treating a model made to understand one aspect of reality as if it was adequate for understanding everything.

Ecological economics by contrast views the economy as embedded within an environmental system, and rejects the assumption that human labour and technology can replace natural resources. **If the economy is the whole, it can expand without limits, whereas if it is a part, its growth is limited and has an opportunity cost.** This view is supported by the first and second law of thermodynamics, that state that matter and energy cannot be created or destroyed, and that we can recycle materials and energy but never 100%. As economic growth is correlated with energy use, this means that unlimited growth is not possible.

49 Heinrich Böll Stiftung, Kill J, *ibid*

50 Daly E, Farley J, *Ecological Economics: Principles and Applications*, second edition <https://islandpress.org/books/ecological-economics-second-edition>

51 Daly, Farley, *ibid*



Source: Annual global carbon dioxide and gross domestic product growth. Data from the EU Joint Research Centre and World Bank. Illustration by The Guardian, Dana Nuccitelli; <https://www.theguardian.com/environment/climate-consensus-97-per-cent/2017/oct/30/new-data-gives-hope-for-meeting-the-paris-climate-targets>

This introduces the notions of uneconomic growth and of the optimal scale of the economy. Growth becomes uneconomic past a certain point when the scale of the economy relative to the ecosystem is not sustainable. Past this point, additional growth costs us more than it benefits us. However, **while growth must end, this does not imply an end to development**: whereas growth is a quantitative increase, development is a qualitative increase in the quality of goods and services measured as an increase in human well-being for a given quantity.

Empirical evidence has already shown that the contribution of US GDP growth to increased welfare since 1947 is weak, and probably non-existent since 1980.⁵²

Discussing the end of growth however implies a need to **open the politically fraught question of distribution**, ‘both for future generations and for current one living in poverty, as limits to growth removes the promise of a share of a bigger pie as an alternative to curbing inequalities.’⁵³ By dismissing the existence of trade-offs between growth, resources and inequalities, the neo-classical economic framing makes instead the trade-offs invisible and depoliticizes the political discourse.

As it does not address the issues of scale and distribution, neo-classical economics may not be well suited to the task at hand of addressing climate change. Even the UN recently

52 Daly, Farley, *ibid*

53 Daly, Farley, *ibid*

challenged the neo-classical economic model in a report it commissioned, arguing that *'today's dominant economic theories, approaches, and models were developed during the era of energetic and material abundance. These theories were challenged only temporarily by the oil crises of the 1970s and the 1990s; no significant theoretical or political changes were made. Thus, dominant economic theories as well as policy-related economic modelling rely on the presupposition of continued energetic and material growth. The theories and models anticipate only incremental changes in the existing economic order. Hence, they are inadequate for explaining the current turmoil.'*⁵⁴

D. THE EFFICIENT MARKET ASSUMPTION

The efficient market hypothesis is a theory that states that asset prices fully reflect all available information and it is therefore impossible to consistently 'beat the market' on a risk-adjusted basis.

This theory has been a cornerstone of financial economics for two generations. It is at the core of the belief that markets provide the best capital and risk allocation and that market-based solutions are more efficient than government regulations.

The European Commission relies on it when it states for example that markets *'frequently offer a more effective means of achieving environmental policy objectives than traditional environmental policy instruments such as direct regulation of polluting activities'*, and that *'markets also have another important advantage. Society normally benefits most when resources are allocated to their most productive use — the use that generates the greatest earnings. Market allocation often furthers this goal because the users generating the highest returns will bid most for the resource. For these reasons, society will often gain if resources are allocated through the market.'*⁵⁵

The assumptions of the theory have been shown not to hold in reality: from asset prices' random walk; to the rationality of investors; low transaction costs; the existence of complete markets; and perfect information. A number of Nobel laureates, from James Tobin⁵⁶ to Richard H Thaler, Daniel Kahneman and Joseph Stiglitz⁵⁷ have also shown that markets are not efficient in the strong or semi strong form.⁵⁸ It is commonly accepted today that only the weak form may exist in reality.

54 Järvensivu P & al, Governance of the Economic Transition, Global Sustainable Development Report 2019, https://bios.fi/bios-governance_of_economic_transition.pdf

55 European Environmental Agency, Towards efficient use of water resources in Europe, 2012, <https://www.eea.europa.eu/publications/towards-efficient-use-of-water>

56 Cunningham L, From Random Walks to Chaotic Crashes: The Linear Genealogy of the Efficient Capital Market Hypothesis, 1994, <https://pdfs.semanticscholar.org/b35c/c8503fd493d645d6c2f623fa68acae0c1e70.pdf>

57 Grossman S, Stiglitz J, On the Impossibility of Informally Efficient Markets, The American Economic Review 1980, https://www.jstor.org/stable/1805228?seq=1#page_scan_tab_contents;
The Chicago Maroon, Levterova B, Nobel winner: Efficient market hypothesis powerful, but wrong, 19 Feb 2010, <https://www.chicagomaroon.com/2010/2/19/nobel-winner-efficient-market-hypothesis-powerful-but-wrong/>

58 There are 3 forms of efficiency: 'weak', 'semi-strong', and 'strong'
Weak: prices on traded assets already reflect all past publicly available information. Past information does not enable to predict future prices, prices follow a random walk
Semi strong: prices reflect all publicly available information and that prices instantly change to reflect new public information. There is no profitable arbitrage and fundamental analysis is useless.
Strong: prices instantly reflect even hidden 'insider' information. It is therefore not possible to take advantage of non-public information about an asset to predict its future price. You can't beat the market.

Stiglitz also argued that as some government interventions can make all individuals better off, ‘*not only is there no presumption that competitive markets are efficient, but there is a presumption that they are inefficient.*’⁵⁹ He showed, furthermore, that governments have several marked advantages over markets in risk bearing, as they can avoid adverse selection problems⁶⁰ plaguing markets; can mitigate the effects of moral hazard;⁶¹ can engage in intergenerational transfers of risk unlike markets; and are more incentivised to do a good job as they bear the cost of failure.

2. A HYBRID MARKET ON A PSEUDO-COMMODITY

Carbon markets are vastly different from traditional capital markets in their objectives, structure, the nature of their underlying assets and their horizon. It is worth highlighting these differences as they have important consequences on their functioning and robustness.

A. OBJECTIVES

Cap and trade markets have the dual stated objectives of providing a price signal that incentivises changes in behaviour and technology, and of minimising the cost of compliance for polluters.

Incentivising a change in behaviour is a traditional remit of the state, typically via taxes and binding regulations. No traditional financial market whether the stock, bond, currency, commodity, or derivatives markets aims at changing behaviour.

In practice however, the systematic distribution of excess permits over the past fourteen years indicates that minimizing the cost of compliance has been largely prioritised over the other objective. The design of the European cap and trade market also fails to foster changes in technology as it does not distinguish between emission reductions stemming from technological change or from maintenance improvements.

B. MARKET STRUCTURE

Carbon markets are also different from traditional financial markets in two major respects: their underlying assets and their structure.

Carbon markets are markets created by the need to comply with a regulation. Without regulation requiring polluters to obtain credits to pollute, there would be no demand for the credits and no market.

59 Stiglitz J, The role of the state in financial markets, The International Bank for Reconstruction and Development / World Bank, 1994, <http://documents.worldbank.org/curated/en/239281468741290885/pdf/multi-page.pdf>

60 When buyers and sellers have different information, for example the seller of a used car knows more about the car than the buyer, then sellers are not incentivised to disclose any issue, buyers are suspicious of all used cars, and information asymmetry results in mostly defective cars being traded.

61 Moral hazard describes a situation where someone takes more risk as someone else bears the cost of that risk. The 2008 financial crisis is a good example.

As regulation defines the rules of the market – what is allowed to be traded and when – and sets the cap on emissions, this is also a market with much more government intervention than traditional markets. In this respect, **carbon markets are a hybrid instrument between market and binding regulation, where regulation sets the environmental objective and the trading element only aims at minimizing the cost of compliance.** This hybrid nature means that carbon markets are subject to both high government interference and what former US Federal Reserve chairman Alan Greenspan called ‘the irrational exuberance of markets.’

C. NATURE OF THE UNDERLYING ASSETS

The fact that carbon markets have to be created by regulation stems from the nature of the underlying assets being traded: unlike stocks, bonds, and currencies (before the abandonment of the gold standard), or commodities, carbon credits have no intrinsic value. Their value only comes from the requirement to use them to comply with a regulation.

Air pollution is also not a standardised, clearly delineated and readily tradable asset.

Transforming air pollution into a tradable asset requires what is called a commoditisation process⁶²:

- ▣ The goal of overcoming fossil fuel dependence is replaced by a goal of limiting emissions
- ▣ A large pool of emission reductions is created through regulatory means by abstracting emissions from place, technology, history, and gas type, making a liquid market and cost savings possible. *‘A large class of tradeable reductions is then constructed by stipulating that a reduction of a certain number of molecules achieved at one place or time by one technology is climatically ‘the same’ as a reduction of an equivalent number of molecules of a range of pollutants by another technology at another place or time.’*⁶³
- ▣ Additional tradable emission reductions equivalents are created by offset projects usually taking place in regions not covered by any cap and added to the commodity pool for additional liquidity.
- ▣ These tradable assets are then transformed into financial instruments that can themselves be traded.

Carbon emissions thus become what is called a pseudo-commodity. This has important consequences: first, while the scalability benefits of traditional markets have no drawbacks, in the case of carbon, scalability and market liquidity imply a need to generate equivalences and simplify to the extreme complex non-linear climate processes, weakening environmental integrity in the process.

62 Lohman L, Uncertainty Markets and Carbon Markets: Variations on Polanyian Themes, New Political Economy, <http://www.thecornerhouse.org.uk/sites/thecornerhouse.org.uk/files/NPE2high.pdf>

It has been argued that carbon credits are not so much commodities but rather a form of rent where users pay for a right to be allowed to produce, as no process of value creation takes place. In this way it bears some historical resemblance to the rent that was paid by the industrial Bourgeoisie to the aristocrats owning the land. See Felli R, On climate rent, 2014, https://www.academia.edu/8762087/On_climate_rent?auto=download

63 Lohman, *ibid*

Secondly, as pseudo commodities require regulation to create a market, they are potentially exposed to much more frequent and potentially disruptive government interventions than traditional markets: this is known as regulatory risk.

Third, while there is a political decision on the total amount of GHG that can be released, the distribution of this limit amongst producers does not require an explicit political choice, and in this way depoliticises the allocation of pollution rights.

D. A MARKET IN COMPLIANCE COSTS, NOT EXTERNALITIES

As discussed earlier, while regulation is responsible for the environmental objective of the market by setting the cap and determining what can be traded and when, the trading element merely aims at minimizing the cost of compliance for polluters as it is deemed welfare enhancing.

Acknowledging that different polluters have different abatement costs – the cost to remove or reduce pollution, imposing the same cost on all polluters is considered less efficient as it would impose too high a cost on some and too low on others. Allowing the trading of carbon credits is thus seen as a way to ensure that companies whose cost is lowest will reduce pollution first, thereby minimizing the overall cost of complying with regulation for all polluters.

What is traded is therefore the cost of compliance with regulation. While minimizing the cost of compliance is in itself a legitimate objective, it raises interesting questions.

The carbon market is very similar to a driving licence point system: in both cases a limited allowance is given to act in socially undesirable ways, as it is considered necessary for the greater good. In the case of carbon, a limited allowance is given to pollute as it is viewed as necessary for the economy to function; in the case of driving licence points, a limited allowance is given to ignore traffic regulations and potentially cause accidents as this is viewed as necessary for fluid transportation and public buy-in. Yet, there are two major differences: driving licence points were introduced as it was recognised that fines alone were not an effective deterrent against reckless driving; in carbon markets however, paying a compliance cost is considered sufficient.

Secondly, in the case of carbon, the free trading of carbon credits is allowed as it is considered more cost effective, whereas it is forbidden for driving licence points. It could however be argued that allowing the free trading of driving licence points would also be more cost-effective and therefore welfare enhancing, as different drivers have different abatement costs.

In other words, do we consider that allowing the free trading of driving licence points just as we allow the free trading of carbon credits would bring a greater good? Doing so would mean that compliance with the law is a question of financial means, as wealthy drivers would purchase their way out of complying. As importantly, a flipside of the cost effectiveness would in all likelihood be that more points would be used, more offenses

committed and more road accidents would occur than under the current situation, as people with ‘unused points’ would sell them to serious offenders, who would thus be able to exercise less respect for traffic regulations.

Likewise, the trading of carbon credits means more emissions overall, as companies with extra quotas sell them to others instead of letting them expire unused. The cost-effectiveness benefits of trading thus weaken the environmental objective. In turn, this begs the following question: **on what basis do we decide that allowing the trading of compliance with regulation is desirable in some domains and not others?**

3. CONCEPTUAL ISSUES, SOME OF WHICH ARE UNRESOLVABLE

A. DEBATABLE EQUIVALENCES

1. Assuming burning biomass is neutral and failing to distinguish between biotic or fossil origin of emissions

The EU ETS currently considers that biomass (organic matter from plant or animal) burned in European installations does not create emissions because the carbon released when biomass is burned is said to be stored again in the vegetation as it builds up biomass in regrowth. This assumption has been shown to be untrue.⁶⁴ A recent study by BirdLife, the European Environmental Bureau and Transport & Environment found that the annual smokestack emissions from biomass in the EU ETS are between 90 and 150 million tonnes of CO₂.

Furthermore, carbon offset projects attempt to equate the carbon released from fossil fuels with the carbon stored in trees, plants and soils, ‘*founded on the mistaken belief that the release of the former can be negated (or ‘offset’) by increasing (or even simply protecting) the storage potential of the latter.*’⁶⁵ Yet, there is a fundamental difference between capturing carbon in trees and soils where it is stored for a few decades and emissions from fossil fuels which are permanent. As a prominent NGO put it ‘*if this fundamental difference between fossil and terrestrial carbon is not recognised, then **carbon ‘savings’ from land use change may be used to justify the continued combustion of fossil fuels, substituting irreversible fossil fuel emissions with temporary terrestrial stores.** The very real possibility that stored carbon will be released again after only a short time risks not a netting-off of carbon, but an increase of cumulative atmospheric GHG within a relatively short time frame.*’

64 Euractiv, Calvo Ambel C, Biomass’ ‘zero’ ETS rating burns us all, 19 March 2015, <https://www.euractiv.com/section/energy/opinion/biomass-zero-ets-rating-burns-us-all/>

65 FERN, Misleading numbers – the case for separating land and fossil based carbon emissions, January 2014, https://fern.org/sites/default/files/news-pdf/misleadingnumbers_full%20report.pdf

In addition, we are unable to accurately measure land use carbon emissions, due to the very high number of variables and proxies, inconsistencies in definitions and methodological factors, which lead to uncertainty levels of around 50% in most studies.⁶⁶

This does not mean that storing carbon in forests and soils is not desirable, but that doing so should not count against fossil fuel emissions and enable more emissions from fossil fuel burning.

2. Equivalences between gases are gross oversimplifications

Greenhouse gas equivalences are admitted to be gross oversimplifications, as the effects and lifetimes of different greenhouse gases in different parts of the atmosphere are so complex and multiple that any straightforward equation is impossible.⁶⁷ *‘Each gas behaves qualitatively differently in the atmosphere and over different time spans, and the control of each has a different effect on fossil fuel use. Even the IPCC finds itself revising its calculations of the CO₂-calibrated Global Warming Potential of various gases every few years, and insists on giving gases different Global Warming Potentials over 20-year, 100-year and 500-year time horizons.’*⁶⁸

As an example, the original carbon dioxide equivalence figure for HFC-23 of 11,700 originally put forward by the IPCC in 1995/1996 was revised in 2007 to 14,800, and the error band of this estimate is still an enormous plus or minus 5,000.

*‘Problems have arisen in trying to compare the role of the different GHGs by converting their concentration – accounting for different radiative properties and residence times in the atmosphere – into a single carbon metric (that is, CO₂ equivalent). Such calculations risk assuming away the uncertainty involved in measuring, comparing and aggregating, but seem appealing to those trained on the single pollutant model.’*⁶⁹

3. Abstraction from time and place of emission cuts

Abstracting from time and place of emission cuts, a necessary condition for the commoditisation process described earlier, leads to ignoring the different effects that pollution can have on different ecosystems.

In addition, equating reductions in place A and B also obscures a number of geographically specific factors that make a difference to energy transitions, such as the fact that reducing emissions in a high-income country may promote more technology development than reducing them in a low-income country.

66 FERN, *ibid*

67 Lohman L, Carbon Trading, Climate Justice and the Production of Ignorance: Ten Examples, September 2008, https://www.researchgate.net/publication/5219951_Carbon_Trading_Climate_Justice_and_the_Production_of_Ignorance_Ten_Examples

68 Lohman L, The Endless Algebra of Climate Markets, 28 October 2011, <https://www.tandfonline.com/doi/abs/10.1080/10455752.2011.617507>

69 Spash C, The brave new world of carbon trading, *New Political Economy* vol 15, June 2010, https://www.clivespash.org/wp-content/uploads/2015/04/2010_Spash_Brave_New_World_NPE1.pdf

4. Wrong equivalences between technologies

What matters is not only how much emissions are reduced but also how this is done. **Emission cuts resulting from a switch to renewable technologies and away from fossil fuel dependency is entirely different from emission cuts resulting from routine, low-cost efficiency improvements.** The former is a structural change contributing to the overall objective and potentially leading to major future cuts, whereas the latter entrenches existing practices by delaying long-term non-fossil investments. Yet both are treated as equivalent in carbon markets, undermining the environmental objective.⁷⁰

*'Equating CO₂e reductions that result from different technologies (...) makes it possible, indeed necessary to make climatically wrong choices in the name of molecule prices.'*⁷¹

If long-term structural alternatives are not available, not even the highest prices can compel anyone to choose them. Yet, by abstracting from time and place and equating emission cuts from different sources, carbon markets have no built-in incentives to design these structural alternatives. This strengthens the view that carbon markets are designed to favour incremental over structural change and questions the idea that they are reformable.

5. Intergenerational equity, discount factor and inability to handle long term

Addressing climate change is a long-term endeavour affecting not only the current generation but also all future ones, and carbon markets are thus characterised by very long horizons and a very high intergenerational dimension not present in traditional financial markets.

There are several competing approaches to the intertemporal distribution of resources: ecological economics views it in terms of obligations to future generations and suggests that we could assign inalienable resource property rights to future generations. Neo-classical economics on the other hand argues that as financial markets can tell us today's price of the future value of things, it can address the issue of intergenerational allocation.

Financial markets typically translate the future value of things in today's euros via a discount rate. EUR 1 today does not have the same value as EUR 1 a year from now as it could be invested profitably: EUR 1 today will be worth in one year EUR 1 plus the interest that could be earned by investing it. By the same token, EUR 1 a year from now is worth today EUR 1 minus the interest. This translation relies on an interest rate called the discount rate, typically the rate of return of a low risk investment over the relevant period.

Discounting in the context of environmental policies raises several concerns: the mere act of discounting implies that the future value of resources is less important than their value

70 Lohman L, Uncertainty Markets and Carbon Markets: Variations on Polanyian Themes, New Political Economy, <http://www.thecornerhouse.org.uk/sites/thecornerhouse.org.uk/files/NPE2high.pdf>; Lohman L, Carbon Trading, Climate Justice and the Production of Ignorance: Ten Examples, September 2008, https://www.researchgate.net/publication/5219951_Carbon_Trading_Climate_Justice_and_the_Production_of_Ignorance_Ten_Examples

71 Lohman L, The Endless Algebra of Climate Markets, 28 October 2011, <https://www.tandfonline.com/doi/abs/10.1080/10455752.2011.617507>

today, or put differently it discriminates against future generations by considering that they are less important than the current one.

Discounting also transforms an ethical and political choice about sharing resources with future generations into a technical debate over the choice of an interest rate. As it creates an equivalence between today's pollution and tomorrow's emission reductions, discounting also enables the postponement of emission cuts. Discounting also enables to equate perpetuity with a hundred years or less, as what happens beyond is valued at near zero; it thus enables to equate permanent environmental degradation with temporary 'compensation', when arguably the outcome of an offset should last as long as a project's impact.

Mainstream economics provides several justifications for the use of a discount rate: firstly, individuals have a preference for the present, i.e. they prefer to consume today rather than wait. Secondly, the cost of capital: resources available today could be invested to generate further benefits that would be lost if the resources are used today. The third argument is an assumption of continued economic growth. According to a project commissioned by the European Commission *'fairness requires per capita income over all generations to be the same. Thus, if future generations are likely to be richer than we are (measured by economic growth in consumption (.)), we have a moral right to discount.'*⁷² They however acknowledge that *'philosophers have long argued that a positive social discount rate for general well-being is not ethically defensible because it discriminates against future generations just because they are not present today (Dasgupta, 2007). This philosophical argument is convincing in terms of general well-being, but one must remember that this does not consider the potential for economic growth. Thus, one may still believe this philosophical argument, i.e., that the social rate of time preference is zero, but, given a (plausible) positive economic growth forecast in consumption, one may still believe in a positive social discount rate based on 'fairness'.'*

In other words, **discounting is acknowledged to be unethical and discriminatory, but under an assumption of continued economic growth we would have a moral right to discount to ensure that future generations are not richer than we are. As the assumption of unending economic growth is widely acknowledged to be unrealistic, this justification for discounting is very weak.**

The level of the discount rate is also a crucial decision. A positive discount rate means that what happens tomorrow is less important than what happens today. The higher the rate, the less the future is valued. As an example, EUR 100 in 50 years is valued today at EUR 60.8 with a discount rate of 1%, but only at EUR 8.7 using a rate of 5%. It has been argued where a discount rate is used, it should be zero – meaning that future generations have an equal right to natural resources – or negative, to incentivise the preservation of resources for future generations and counterbalance our natural preference towards the present.

Beyond discounting, the ability of markets to handle very long-term horizons is

72 REMEDE draft: Toolkit for Performing Resource Equivalency Analysis to Assess and Scale Environmental Damage in the European Union, July 2008, https://web.archive.org/web/20100602054339/http://www.envliability.eu:80/docs/D13MainToolkit_and_Annexes/REMEDE_D13_Toolkit_310708.pdf

questionable. Financial markets by design incentivise short-termism, as performance is measured over a one-year horizon and failure to perform within that time frame by a fund can lead to investors withdrawing their money. In addition, most fund managers are vulnerable to strong short-term price fluctuations, as their mandate forces them to withdraw from an investment when a temporary decline in its value reaches a specific threshold, even though they remain confident of the long-term prospects.

There are also severe doubts about the ability of markets to manage and enforce contracts over very long periods of time, as they typically do not trade beyond 20-30 years.

B. MARKETS ARE UNABLE TO PRICE SCARCITY

There is plenty of empirical evidence of financial markets' inability to price scarcity adequately. Oil is a good example: despite resources growing steadily more scarce, while new uses for oil have multiplied, the mean price of oil remained relatively stable in real terms between 1879 and 2002, with the notable exception of the oil embargoes and Middle East crises of the 1970s. Production surpassed new discoveries in 1982 and consumption currently exceeds new discoveries by a factor of two to six. In addition, while there are now more substitutes available, we have created far more technologies that depend on oil than technologies that substitute oil.⁷³ The price does not appear to reflect the scarcity of the resource in the ground. Prices also appear to fail to signal to producers the need to develop new substitutes. High prices merely incentivise more effective extraction technologies

Another major issue is that prices can't reflect future scarcities, as future generations cannot bid on resources. *'It is essentially impossible to accurately price irreproducible resources unless we assume future generations have no rights whatsoever to natural resources.'*⁷⁴

A number of reasons explain this failure. Firstly, rather than being determined by supply and demand, oil prices are determined to a considerable degree by speculation on derivatives:⁷⁵ the exchange of speculative bets on the future price of oil. As an example, oil prices rose by more than 60% during the first months of 2008 despite a decline in demand and an increase in spare production capacity.

While derivatives are traditionally viewed as deepening market liquidity, there is considerable evidence of the **destabilising effect and determining influence of derivatives on commodity prices, including carbon.**⁷⁶ Put simply, when the proportion

73 Daly E, Farley J, Ecological Economics: Principles and Applications, https://indomarine.webs.com/documents/Ecological_Economics_Principles_And_Applications.pdf

74 Farley J, The Role of Prices in Conserving Critical Natural Capital, January 2009, Conservation Biology 22(6):1399-408, https://www.researchgate.net/publication/23657743_The_Role_of_Prices_in_Conserving_Critical_Natural_Capital

75 Derivatives are financial contracts whose value is linked to that of an underlying asset. Essentially, they are financial bets on anything, from the rise of a particular stock or commodity to the weather next week.

76 Chester L, Rosewarne S, What is the relationship between derivative markets and carbon prices?, https://www.researchgate.net/publication/228451083_What_is_the_relationship_between_derivative_markets_and_carbon_prices

of speculators in a market is high, the price fluctuations of financial bets unrelated to the supply and demand conditions of a physical commodity end up determining to a large extent the price of that commodity. In the case of carbon, it has been found that since 2010, derivatives accounted for 99% of trades in the EU ETS.⁷⁷

The dominance of the information effect over the scarcity effect also explains this disconnection:⁷⁸ as we deplete the stock of a resource, we acquire new information by making new discoveries and developing new technologies. The information effect of new discoveries and new technologies increases the amount that is accessible and reduces the costs of extracting it. As long as the information effect is dominant, the price of the resource will decrease. As the scarcity effect eventually comes to dominate however, this leads to a sudden rapid increase of the price. Practically this suggests that instead of a gradual increase, the price of oil will steadily decline before abruptly rising. This contradicts the idea that market prices consistently reflect scarcity and provide a signal to producers to change technologies.

C. NO PRICE SIGNAL

Market-based solutions are based on the theory of incentives, which states that agents receive price signals and make decisions accordingly. The existence of a price signal is indeed at the core of market-based solutions, as prices provide the incentive for stakeholders to change their behaviour and reduce negative environmental impacts. The European Commission itself asserted that improving price signals was one of the main advantages of market-based instruments as a policy tool.⁷⁹

However, mathematician and former research director at the Ecole des Ponts ParisTech, Nicolas Bouleau, recently demonstrated that there is no price signal and there cannot be one when we need it.⁸⁰ **As price volatility⁸¹ reaches a certain level, prices are unable to transmit any information. Yet the end of natural resources like copper and oil will go hand in hand with a rise in volatility**, meaning that prices will be unable to transmit any relevant information to corporations and policy-makers.

As he explains it, *'there are two types of imperceptible phenomena: very slow evolutions and the average trend of very irregular variables. The first one is well-known, e.g. shifts in tectonic plates. The second one is more insidious, as we can observe changes but are*

77 Bertat N, Gautherat E, Gun O, Transactions in the European carbon market: A bubble of compliance in a whirlpool of speculation, August 2016, Cambridge Journal of Economics, https://www.researchgate.net/publication/305951143_Transactions_in_the_European_carbon_market_A_bubble_of_compliance_in_a_whirlpool_of_speculation

78 Daly E, Farley J, Ecological Economics: Principles and Applications, https://indomarine.webs.com/documents/Ecological_Economics_Principles_And_Applications.pdf

79 European Commission, Green paper on market-based instruments for environment and related policy purposes, 28 March 2007, <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52007DC0140&from=EN>

80 Bouleau N, Le mensonge de la finance, Editions de l'Atelier, 2018, https://www.amazon.fr/mensonge-finance-math%C3%A9matiques-signal-prix-plan%C3%A8te/product-reviews/2708245554/ref=dpx_acr_txt?showViewpoints=1

81 Price volatility describes the degree of variation of prices, the higher the volatility, the larger the prices fluctuations. Volatility is measured by calculating the standard deviation of the quoted instantaneous prices over a given period of time.

unable to detect a trend. For example, **by observing waves come and go for a short period of time, we are unable to tell whether the tide is rising or falling.** Market prices are variables fluctuating irregularly that hide the underlying trends that are nevertheless the most important information for the future.’ Volatility is like a fog that conceals the price signal and its impact has been largely underestimated by economists. **‘When randomness goes beyond a certain level, it is impossible by looking at the trajectory to measure what it would have been without the randomness. In other words, the trend cannot be seen on what is objectively observable.’** This can be demonstrated mathematically.

This is a major issue. **‘Everyone believes that the end of oil and other mineral resources will lead to a rise in price reflecting their scarcity, and that this scarcity will divert corporations and consumers from these resources. The rise in uncertainty will however increase volatility and completely obscure this crucial information by an increasingly chaotic and disorderly agitation.’** Derivatives instruments as a hedge are unable to replace the price signal that disappeared, as in the absence of an observable trend insurance does protect but does not indicate any direction. **‘Price fluctuations will look like a punk haircut followed by a collapse.’**

Yet high volatility is an inherent feature and the main characteristic of financial markets, as explained by arbitrage theory. The creation of derivatives markets enabling hedging in the 1970s was expected to curb volatility but the opposite happened, and volatility has been increasing constantly ever since. Volatility stems from speculation, the largest activity of financial markets, representing up to 80% of trading in some markets.⁸²

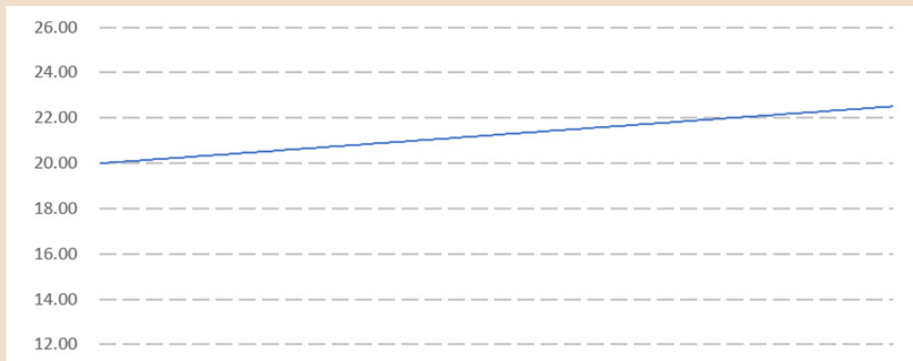
High price volatility linked to speculation had already been flagged as a major issue in food and agricultural markets, contributing to the 2007-2008 food price crisis. Carbon price volatility is also already extremely high at around 60%,⁸³ and OECD experts expect climate change to lead to additional volatility in the future.⁸⁴

82 For example, it has been shown that in 2008 commodity speculators represented 69% of long open interests in commodity markets, while according to the Food and Agriculture Organisation just 2% of commodity futures contracts end with delivery of the physical good. Likewise, it is estimated that around 80% of trades in the currency market are speculative in nature. Testimony of Michael W. Masters, Managing Member / Portfolio Manager Masters Capital Management, LLC before the Committee on Homeland Security and Governmental Affairs United States Senate, May 20, 2008, <https://www.hsgac.senate.gov/imo/media/doc/052008Masters.pdf>; Transnational Institute, Financialisation: a primer, September 2018, <https://www.tni.org/files/publication-downloads/financialisation-primer-sept2018-web.pdf>; ESRB, D’Errico M, Roukny T, Compressing over-the-counter markets, working paper 44, May 2017, <https://www.esrb.europa.eu/pub/pdf/wp/esrbwp44.en.pdf>; The Guardian, Andreou A, The rise of money trading has made our economy all mud and no brick, 20 November 2013, <https://www.theguardian.com/commentisfree/2013/nov/20/money-trading-economy-foreign-exchange-markets-economy>

83 Barchart, ICE EUA Futures Dec ‘20 implied volatility, <https://www.barchart.com/futures/quotes/CKZ20/volatility-greeks>

84 OECD, Price Volatility in Food and Agricultural Markets: Policy Responses, 2 June 2011, <http://www.oecd.org/agriculture/pricevolatilityinfoodandagriculturalmarketspolicyresponses.htm>

To give an indicative visual illustration, the chart below shows the price evolution of an asset over one year with an upward trend and zero volatility.



The chart below now shows one of the possible price evolutions of the same asset over the same period with the same trend but with 10% annual volatility. Can you still observe the upward trend?



The final chart below shows one of the possible price evolutions of the same asset over the same period with the same trend but with 63% volatility. If you were asked what trend can be observed on this chart, what would you say?



Now imagine that you were the CEO of a carmaker company having to decide on your industrial strategy for the next 15 years. What information could you derive from the chart? What level of price should you rely on to determine whether it would be financially advantageous to refocus your factories and strategy towards the production of electric cars or not? Should you use EUR 20, EUR 12, EUR 26, or the average?

According to Nicolas Bouleau, it is illusory to try and control speculation. Recent empirical evidence from the EU regulatory response to the financial crisis confirms his assessment.⁸⁵ Attempts at introducing position limits on speculation were watered down and a regulatory proposal to separate the speculative activities and retail activities of banks was abandoned under pressure from the banking lobby.⁸⁶ The IMF even recently warned about the risks linked to the failure to reform the financial system post crisis.⁸⁷

Introducing a floor and cap on the carbon price would also fail to address the issue comprehensively: either the corridor would be wide and volatility would remain very high within it, or it would be narrow and this would essentially transform it into a carbon tax. More importantly, this would fail to address the issue of imported volatility from oil and other energy commodities. Put more simply, the strategic decisions of big polluters on whether to switch or not towards green technologies would still be adversely impacted by the wild swings in oil prices.

*'We are entering a phase where volatility will play a growing role (..) The illegibility of prices today does not enable the world economy to take the right decisions. On the contrary, it confines decision makers in a universe of meaningless prices, whose short-term variations no longer reflect anything but the mimetic anxiety of traders.'*⁸⁸

The inexistence of a price signal around the end of a natural resource has major implications. What it means is that no matter how high the price of carbon, its wild fluctuations prevent corporations from making strategic decisions based upon it. A price growing gradually from EUR 8 to EUR 15 to EUR 30 would provide decision-makers with information that they could use to plan ahead for a switch away from fossil fuels and towards renewable technologies; however, a price changing from EUR 5 to EUR 22 to EUR 6 to EUR 35 to EUR 10 etc... would paralyse them and prevent any action to curb emissions meaningfully.

Beyond a certain level, price fluctuations matter more than the actual price level. In this respect, the recent price increase of carbon towards EUR 20 that was applauded by elected officials fails to address the issue of excess volatility and absence of a price signal, and it would be therefore incorrect to see it as a sign of success.

In essence, the impossibility of a price signal around the end of natural resources combined with the unlikelihood of a biting cap, means that carbon markets will never work and should be abandoned as a policy tool to address climate change, as this issue is not resolvable. This is sobering news.

85 Finance Watch, Ten Years After: Back to Business as Usual, September 2018, <https://www.finance-watch.org/wp-content/uploads/2018/09/10YA-FW-report.pdf>

86 Finance Watch policy brief, Structural reform to refocus banks on the real economy, August 2014, <https://www.finance-watch.org/wp-content/uploads/2014/07/Finance-Watch-Policy-Brief-August-2014.pdf>

87 The Guardian, Inman P, World economy at risk of another financial crash, says IMF, 3 October 2018, <https://www.theguardian.com/business/2018/oct/03/world-economy-at-risk-of-another-financial-crash-says-imf>

88 Bouleau, *ibid*

Practically, let us imagine that governments suddenly decide to act more decisively. In the case of the EU ETS, this would translate into a drastic reduction in the number of permits and a related rise in the price of carbon permits. This would only incentivise a change of technology if:

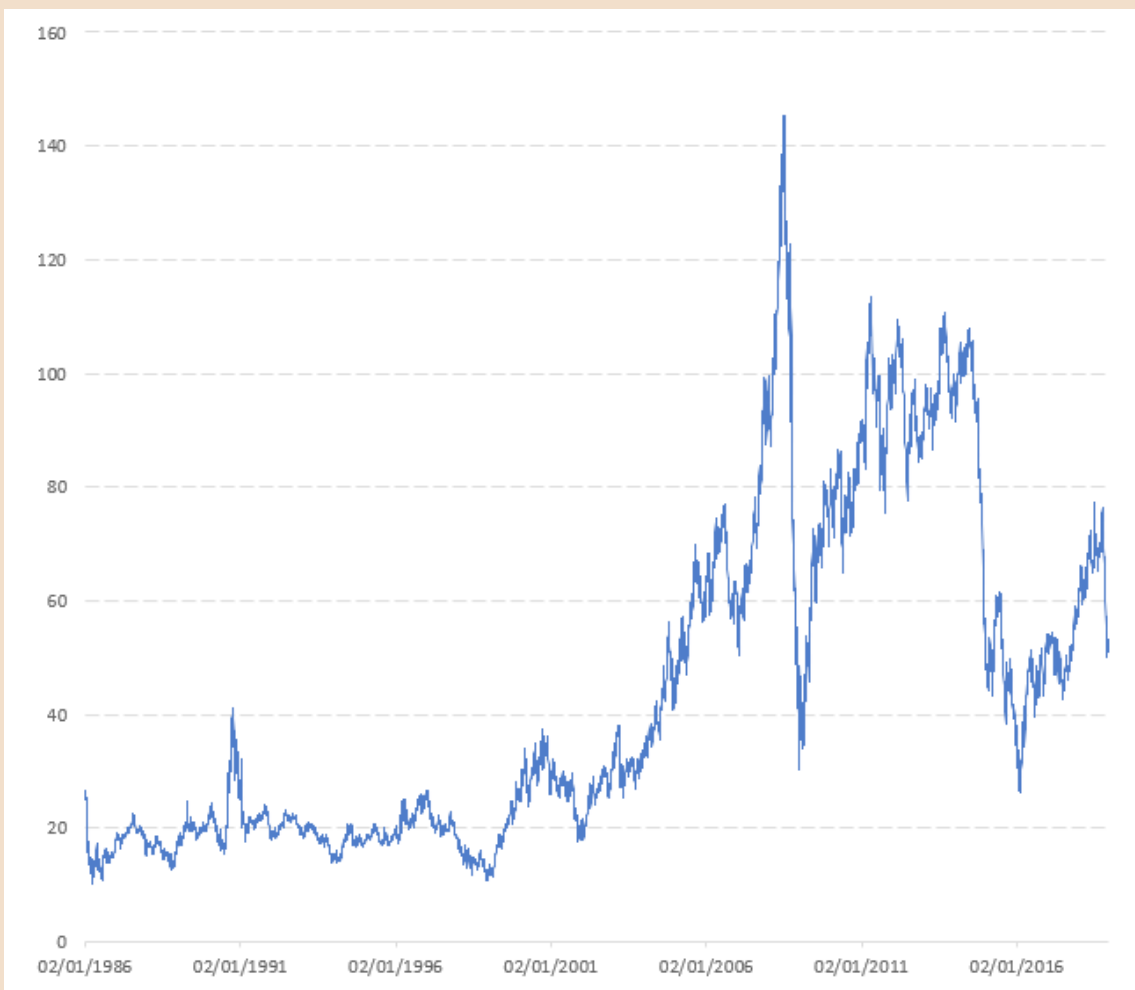
1. There are affordable and scalable renewable technology alternatives, which is now the case.
2. There is a real biting cap, i.e. the number of permits is significantly below current emissions; the use of offset permits in the ETS is fully banned; and the cap is expected to remain stable or decrease over time irrespective of changes in government. International competitiveness concerns and the need to generate demand for the forthcoming offset markets suggest that this is unlikely to happen. In addition, Brexit, the election of Trump and of Bolsonaro show that betting on continued political support is a risky proposition.
3. Within the cap, the price of permits is high enough relative to the price of fossil energy to make fossil fuel extraction and use unprofitable: yet this would require a stable price signal that is not possible due to current and future volatility.

In the case of offset markets, more political will could translate into a ban on offset projects with the worst and least calculable additionality, strengthening monitoring and only allowing offset projects to take place in countries with binding targets. Yet, as these markets have no cap and only rely on a price signal, this means that they would still fail to incentivise a change of technology.

Incidentally, **the absence of a price signal also questions the idea that carbon markets minimize the cost of the transition for corporations**: while at a given instant the trading of carbon permits does indeed reduce the cost of compliance, the fact that carbon prices are unable to provide certainty and visibility for the industry is actually very costly for corporations, as it prevents them from planning ahead and making strategic decisions. The only scenario under which carbon markets would ultimately prove less costly for polluters is the one that assumes that polluters will not be required to switch and that the status quo will continue indefinitely.

Agreeing with Nicolas Bouleau, **the issue of high volatility also means that a carbon tax would only be marginally better: while a tax would not be volatile itself, it would still make the transition conditional upon a cost-benefit analysis for polluters, and this cost-benefit analysis would be adversely impacted by the high volatility of oil and other fossil energy prices**. The incentive effect provided by an expected gradual increase in the tax would be muddled by the frequent changes in opportunity cost. When the price of oil is low, the tax acts as an incentive to switch away from fossil fuels, but when the price of oil is high, the tax no longer has any incentive effect and is merely a cost of doing business. **As oil prices fluctuate wildly, the incentive effect from the tax keeps on appearing and disappearing, and corporations find themselves unable to make any decisions**. As oil prices are unable to reflect scarcities – as explained above – but are instead likely to become more and more volatile as the end of the resource approaches, the incentive effect will become more and more inexistent.

Crude oil prices over the past 30 years



Source: <https://datahub.io/core/oil-prices#resource-wti-daily>

The volatility of oil prices also fluctuates itself. The crude oil volatility index of the Chicago Board of Exchange has fluctuated between a low of 6% and a high of 98% over the last year alone.

CBOE crude oil volatility index



Source : <http://www.cboe.com/delayedquote/advanced-charts?ticker=OVX>

This questions the appropriateness of price-based mechanisms to address climate change and suggests instead the need for traditional binding regulations that are not affected by these issues: a mandatory scheduled withdrawal from extracting fossil fuels over the next decade(s) would indeed provide far more certainty and visibility to corporations and decision-makers and thus clearly incentivise a technological change towards renewable energies. The increased visibility would also enable industries to prepare and thus curb their costs. In addition, it would provide the necessary time to retrain workforces. Green taxation would prove a very useful complement to ensure a fair sharing of the cost of transition and to prevent the imposition of excessive costs on categories of citizens that have no alternatives.

D. CONCEPTUAL ISSUES LINKED TO OFFSETS

Offset markets create a number of specific additional issues, some of which cannot be resolved:

▣ **Offsets remove the ‘cap’ in cap and trade:**

Allowing the trading in the EU cap and trade system of carbon offset credits that can be created without limit means that the real cap becomes the official cap plus the proportion of offset credits that are allowed in the EU ETS. This further aggravates the issue of excess allowances and practically removes the scale element of the scheme. While CDM offset credits have been banned from the EU ETS from 2021 onwards, it is very likely that offset credits from its successor the Sustainable Development Mechanism will be allowed.

▣ **Offset markets assume no residual impact of offsets:**

As offset markets have no cap, they implicitly assume that offset projects perfectly compensate for fossil fuel emissions taking place at different places and times. Yet as we have seen this is not the case. This unmonitored and wilfully ignored residual impact is a serious flaw.

▣ **Emissions are not reduced, but at best displaced and responsibility shifted:**

A common misconception is that offsets reduce emissions. Offsetting is at best a zero-sum game and by design does not reduce emissions: done properly it merely compensates for emissions growth by a reduction elsewhere. If it lacks environmental integrity (i.e. does not represent real emission reductions) it leads to an overall increase of emissions.⁸⁹

Offsets exchange certain losses for uncertain gains: at best they displace emissions, at worst they increase them. In no scenario are emissions reduced, despite the misleading name of UN offset credits called Certified Emissions Reductions.

In addition, offsets allow companies and governments in developed countries that have a historical responsibility to clean up the atmosphere, to buy credits from projects undertaken in developing countries. In so doing, offsetting provides a means to delay domestic action in industrialised countries and entrenches the status quo instead of promoting transition.⁹⁰

89 Carbon Market Watch, The CORSIA: ICAO’s market based measure and implications for Europe, October 2016, <http://carbonmarketwatch.org/wp-content/uploads/2016/10/Post-Assembly-Policy-Brief-Web-1.pdf>

90 Carbon Trade Watch, Carbon offsets, <http://www.carbontradewatch.org/issues/carbon-offsets.html>

▣ **Additionality is not calculable (not resolvable):**

One of the crucial and unresolvable issues of offsets is that the impact of offset projects is not calculable. Calculating it would require being able to determine with reasonable certainty a hypothetical world without the project and then assign a single number to the greenhouse gas emissions associated with that world over the next 100 years – the approximate residence time of carbon dioxide in the atmosphere. To put in perspective the staggering level of uncertainty involved, ‘*if you can imagine Marconi and the Wright brothers getting together to discuss whether in 2009, EasyJet and the internet would be facilitating each other through internet booking, that’s the level of ... certainty you’d have to have over that period. You cannot have that.*’⁹¹

The United States General Accounting Office stated in its assessment of the Kyoto CDM program that ‘*it is impossible to know with certainty whether any given project is additional.*’⁹² In the words of a journalist ‘*offsets are an imaginary commodity created by deducting what you hope happens from what you guess would have happened.*’⁹³

More recently, a San Diego court rejected for the third time a climate action plan relying on carbon offsets, ruling that using carbon credits, or offsets from around the world, was not acceptable, calling the mitigation unverifiable.⁹⁴

▣ **A devastating social impact:**

Many carbon offset projects have been documented to result in land use and land ownership conflicts, land grabs and human rights violations against indigenous communities.⁹⁵ Documented issues include a private company blocking access to land vital for the livelihoods of local communities in Uganda in order to claim credits for planting forests, and hydroelectricity projects exacerbating land rights conflicts and damaging biodiversity in Chile and Guatemala.

In addition, ‘*one of the more tragic ironies of the Kyoto Protocol is that “carbon sinks” (forests, oceans, etc.) can only qualify for emission credits if they are managed by those with official status. This means that an old-growth rainforest inhabited for*

91 Lohman L, Uncertainty Markets and Carbon Markets: Variations on Polanyian Themes, New Political Economy, <http://www.thecornerhouse.org.uk/sites/thecornerhouse.org.uk/files/NPE2high.pdf>

92 United States General Accounting Office, ‘International Climate Change Programs: Lessons Learned from the European Union’s Emissions Trading Scheme and the Kyoto Protocol’s Clean Development Mechanism’, GAO Report GAO-09-151 (November 2008), p. 39, <https://www.gao.gov/new.items/d09151.pdf>

93 The Guardian, Davis N, The inconvenient truth about the carbon offset industry, 16 June 2007, <https://www.theguardian.com/environment/2007/jun/16/climatechange.climatechange>

94 KPBS, Anderson E, Court Rejects San Diego County’s Climate Action Plan Again, 26 December 2018, <https://www.kpbs.org/news/2018/dec/26/court-rejects-san-diego-countys-climate-action-pla/>

95 Carbon Market Watch, The Clean Development Mechanism: Local Impacts of a Global System, 29 October 2018, <https://carbonmarketwatch.org/publications/the-clean-development-mechanism-local-impacts-of-a-global-system/>;

Bachram H, Climate Fraud and Carbon Colonialism: The New Trade in Greenhouse Gases, Capitalism, Nature, Socialism Vol 15, December 2004, <http://www.carbontradewatch.org/pubs/cns.pdf>;

Carbon Market Watch, Open letter to ICAO council representatives & national delegates on ending the Clean Development Mechanism, 29 October 2018, <https://carbonmarketwatch.org/publications/open-letter-to-icao-council-representatives-national-delegates-on-ending-the-clean-development-mechanism/>;

Friends of the Earth, New report on human rights violations linked to REDD in Acre, Brazil, 8 December 2014, <https://foe.org/news/2014-12-new-report-on-human-rights-violations-linked-to-redd/> ;

The Oakland Institute, Carbon Colonialism: Failure of Green Resources’ Carbon Offset Project in Uganda, 2017, <https://www.oaklandinstitute.org/carbon-colonialism-failure-green-resources-carbon-offset-project-uganda/>;

Motherboard, Ahmed N, Carbon Colonialism: How the Fight Against Climate Change Is Displacing Africans, 1 December 2014, https://motherboard.vice.com/en_us/article/kbzn9w/carbon-colonialism-the-new-scramble-for-africa

*thousands of years by indigenous peoples does not qualify under Kyoto rules as “managed,” and cannot get credits. However, a monoculture plantation run by the state or a registered private company does qualify.*⁹⁶

The financialisation of carbon offset projects via securitisation further disempowers local communities, just as the securitisation of subprime mortgages did to mortgage borrowers prior to the financial crisis: as the future cash flows from carbon offset projects are repackaged and sold to international investors, local communities are left with even less ability to negotiate with decision-makers, as ownership of the project has been transferred and split amongst a myriad of foreign investors.

4. FINANCIAL STABILITY RISKS LINKED TO THE POLICY RESPONSE TO CLIMATE CHANGE

In his famous speech ‘Breaking the tragedy of the horizon’,⁹⁷ Bank of England governor Marc Carney highlighted three risks for financial stability stemming from climate change: physical risks (damage to property affecting the value of financial assets); liability risks (people seeking compensation affecting the profits of reinsurers and polluters); and transition risks (reassessment of the value of financial assets linked to a shift to a low carbon economy).

This assessment is correct: furthermore, **the current policy response to climate change and its most prominent tool – carbon markets – also carry significant potential financial stability risks that need to be looked into.**

These risks have not materialised so far due to the limited size and lack of real functioning of carbon markets for now. However, the recent spike in carbon prices following the review of the EU ETS has reawakened the interest of banks and hedge funds, with trading volumes spiking 45% in 2018⁹⁸ and carbon being called the City’s hottest trade this year.⁹⁹ In addition, a number of factors will in all likelihood lead to a complete change of scale over the coming years: from increased political pressure to act following more frequent natural catastrophes; to the newly finalised carbon offset market emerging from the COP25; the new aviation carbon offset market CORSIA; the ambitious sustainable finance agenda integrating carbon capture and storage into mainstream finance; and China’s new carbon market.

As these markets grow, the aforementioned risks should be given due consideration and integrated into environmental policy-making and financial regulation.

96 Bachram H, Climate Fraud and Carbon Colonialism: The New Trade in Greenhouse Gases, Capitalism, Nature, Socialism Vol 15, December 2004 <http://www.carbontradewatch.org/pubs/cns.pdf>; Carbon Trade Watch, Protecting carbon to destroy forests: Land enclosures and REDD+, April 2013, <http://www.carbontradewatch.org/publications/protecting-carbon-to-destroy-forests-land-enclosures-and-redd.html>

97 Carney M, Breaking the tragedy of the horizon – climate change and financial stability, speech at Lloyd’s of London, London, 29 September 2015, <https://www.bis.org/review/r151009a.pdf>; Financial Times, Banks should recognise the risks of climate change, 18 December 2018, <https://www.ft.com/content/0f530242-02c1-11e9-9d01-cd4d49afb3e3>

98 Carbon Pulse, Global CO2 trading volume spikes 45% in 2018, value soars 250% amid reforms -analysts, 15 January 2019, <http://carbon-pulse.com/67069/>

99 Financial Times, Sheppard D, Hedge funds and Wall St banks cash in on carbon market’s revival, 7 September 2018, <https://www.ft.com/content/6e60b6ec-b10b-11e8-99ca-68cf89602132>; The Telegraph, Evans-Pritchard A, Soaring carbon prices turn Europe’s energy landscape upside down, 27 August 2018, https://www.telegraph.co.uk/business/2018/08/27/soaring-carbon-prices-turn-europes-energy-landscape-upside/?WT.mc_id=tmgliveapp_iosshare_ArLV4BmcTJ6M

A. HIGH SCIENTIFIC AND REGULATORY UNCERTAINTY COMBINED WITH LOW ENVIRONMENTAL INTEGRITY AND OVERSIMPLIFICATIONS CREATE A HIGHER RISK OF MARKET FAILURE AND BRUTAL LOSS OF INVESTOR CONFIDENCE

Climate systems are characterized by non-linear complex relationships, threshold effects and feedback loops, some of which are still being discovered.¹⁰⁰

Our knowledge of climate systems is also incomplete: we are currently incapable of even accounting for carbon dioxide flows, the most basic piece of the puzzle. How much carbon is being absorbed by oceans or terrestrial ecosystems? How will it affect these ecosystems? Several studies have found that accounting for greenhouse-gas emissions reductions is quite impossible.¹⁰¹ There are still ongoing debates among scientists to find out where some missing emissions have gone; there are also still large margins of error and questions over whether some parts of the carbon cycle are net sources or sinks.¹⁰²

The incredible magnitude of the uncertainties that are involved in climate-change analysis presents a major challenge for carbon markets. Here it is important to distinguish between different types of uncertainty: risk, uncertainty, and ignorance. *‘When I throw a dice, I cannot say in advance what the outcome will be, but I do know the possible outcomes and their probabilities. This type of uncertainty is referred to as risk. Pure uncertainty occurs when we know the possible outcomes, but cannot assign meaningful probabilities to them. Ignorance or absolute uncertainty occurs when we do not even know the range of possible outcomes.’*¹⁰³

While financial markets are designed to handle risk, they are not able to handle uncertainty and ignorance. In fact, according to the BIS,¹⁰⁴ *‘the main problem with the prevailing economic paradigm is that there is no well-developed process, in either the corporate or the public sector, that recognizes and deals with market uncertainty. (...) As a consequence, the financial system is liable to the build-up of unrecognized and unmanaged market uncertainty in good times and can suddenly fall apart leaving the stakeholders of the socio-economic system guessing ‘what went wrong?’ (...) The prevailing paradigm’s view is that because the “unknown information set” is not identifiable, market uncertainty does not matter, and even if it does matter nothing can be done about it.’ Yet ‘from the perspective of market instability, the most important factor is the degree of market uncertainty.’ ‘Assets with a higher degree of market uncertainty are more liable to sudden and unexpected shocks.’ ‘The dot.com boom as well as the recent financial crisis serve as good examples of market mispricing due to limited or diminishing knowledge.’*

100 Steffen et al, Trajectories of the Earth System in the Anthropocene, Proceedings of the National Academy of Sciences of the United States of America, 14 August 2018, <http://www.pnas.org/content/pnas/115/33/8252.full.pdf>

101 Lohmann 2005, 2010 and 2011; MacKenzie 2009; Spash 2010, mentioned in Felli R, On climate rent, https://www.academia.edu/8762087/On_climate_rent?auto=download

102 Spash C, The brave new world of carbon trading, New Political Economy vol 15, June 2010, https://www.clivespash.org/wp-content/uploads/2015/04/2010_Spash_Brave_New_World_NPE1.pdf

103 Daly E, Farley J, Ecological Economics: Principles and Applications, https://indomarine.webs.com/documents/Ecological_Economics_Principles_And_Applications.pdf

104 Slovik P, Market uncertainty and market instability, IFC Bulletin No 34, <https://www.bis.org/ifc/events/5ifconf/slovik.pdf>

No probabilities can be attached to the many unknowns, indeterminacies, unknowables and positive feedbacks of the climate system.

This high uncertainty means that carbon markets are even less efficient than traditional markets as the validity of prices is inversely proportional to the level of uncertainty. This contradicts the claims that market-based solutions are the most efficient policy instrument for climate change mitigation.

The very high scientific uncertainty about climate systems and their response to climate change combined with the higher regulatory uncertainty of hybrid markets also means a much higher risk of unforeseen shocks and market failures in carbon markets than in traditional financial markets. Both the price of carbon permits and the rules and regulations governing carbon markets (number of allowances, equivalences etc.) are vulnerable to abrupt changes following climate shocks, new scientific discoveries and changes in public opinion.

The lack of environmental integrity of carbon markets compounds this risk, heightening in turn the risk of a brutal loss of confidence from investors in these markets. While uncertainty is an inherent feature of climate systems, carbon markets compound the issue by requiring gross oversimplifications that weaken environmental integrity in order to increase market liquidity.

The higher regulatory uncertainty is a consequence of the hybrid nature of carbon markets, that is, the fact that they are created by regulations that need to be reviewed on a regular basis and are subject to the influence of political changes or changes in public opinion. This higher regulatory uncertainty is also necessary to integrate into market rules new scientific discoveries about climate change. In practice however, this means that carbon markets are much more exposed to potential abrupt changes of rules and political interference than traditional markets.

B. COMPLEXITY, ASYMMETRY OF INFORMATION AND SECURITISATION COMPOUND THESE RISKS BY FAVOURING ADVERSE SELECTION AND THE SUBCONTRACTING OF DUE DILIGENCE

The difficulty to asset additionality in offset projects and the asymmetry of information between project developers and investors also means a higher risk of adverse selection and a likely transfer of due diligence to third parties, as happened with subprime mortgage securitisation,¹⁰⁵ increasing the risk of an indiscriminate fire sale in the event of a downturn. As investors find themselves unable to calculate additionality and distinguish adequately between good and bad offset projects, they are implicitly incentivised to arbitrage the rules instead and favour the cheapest-to-deliver projects. Yet, as the subprime mortgage market showed, it is unhealthy to have a separation between those who understand the risk and those who take the risk.

¹⁰⁵ Instead of themselves assessing the quality and risk of the large number of mortgage loans involved in pre-crisis securitisations, investors often relied on the opinion of rating agencies

The securitisation¹⁰⁶ of carbon offset projects, by bundling together a very large number of projects of mixed types and origins using complex financial structures, magnifies the risks of adverse selection, disincentivises due diligence and fosters subprime carbon.

Subprime carbon¹⁰⁷ refers to contracts or projects that carry a high risk of not being fulfilled and may collapse in value. These may come from projects using controversial methodologies to verify emissions reductions, or projects where additionality is nearly impossible to calculate. Subprime carbon is comparable to subprime loans or junk bonds, which are debts that have a high risk of not being repaid. As hundreds of projects at various stages of regulatory approval are pooled together, it could be extremely difficult to assess the quality of the underlying projects. As a result, the rating downgrade or unexpected price decline of one securitisation may spark undue panic among investors.

A 2010 report from the French Ministry of the Economy¹⁰⁸ already highlighted that the development of collateralised debt obligations (CDOs)¹⁰⁹ on carbon offset projects ‘*can create risk valuation issues and, should their importance grow significantly, involve a risk of destabilisation of the related market. In the case of CO₂, this risk appears in addition increased by the short maturity of the underlying market that may intensify valuation issues.*’ The report emphasized that carbon CDOs appear more risky than traditional CDOs due to the lack of historical data available to measure accurately the probability of project failure and risk correlations.

C. CARBON AS AN ASSET CLASS WOULD CREATE A HIGH RISK OF A BUBBLE AND CONTAGION TO OTHER ASSET CLASSES, AS SHOWN BY LESSONS FROM COMMODITY DERIVATIVES. THESE CONTAGION CHANNELS WOULD TRANSMIT THE HIGH UNCERTAINTY OF CARBON MARKETS TO OTHER MARKETS AND THE WIDER ECONOMY.

In the early 2000s a number of institutional investors who had suffered as a result of the declining equity market of 2000-2002 began to look at commodity markets as a potential new asset class. Commodities looked attractive as they had been historically uncorrelated to other asset classes, and as the 2000 Commodity Futures Modernization Act (CFMA) had just deregulated commodity markets. As a result, financial investment in commodity futures has increased 10 times since 2000 and has almost doubled since 2006,¹¹⁰ while the proportion of speculators rose from 20% to 50%.¹¹¹

106 Securitisation is the activity of repackaging and selling to investors a pool of financial assets such as mortgage loans

107 Friends of the Earth, Subprime Carbon? Re-thinking the world’s largest new derivatives market, March 2009, http://www.reimaginerpe.org/files/SubprimeCarbonReport_0.pdf

108 La régulation des marchés du CO₂ - Rapport de la mission confiée à Michel PRADA, April 2010, <http://www.ladocumentationfrancaise.fr/rapports-publics/104000201/>

109 Collateralised Debt Obligations are a particular type of securitisation

110 Spratt S, Food price volatility and financial speculation, Future-Agricultures working paper, January 2013, <https://pdfs.semanticscholar.org/3af2/d8cf9fdc5a15131e1002757a1428d950de49.pdf>

111 Better Markets, Frenk D, Review of Irwin and Sanders 2010 OECD Reports Speculation and Financial Fund Activity and The Impact of Index and Swap Funds on Commodity Futures Markets, 30 June 2010, https://www.newconstructs.com/wp-content/uploads/2010/10/FrenkPaperReutingOECDStudy_IrwinAndSanders.pdf

This financialisation of commodity markets in the mid-2000s had several major consequences. A report by UNCTAD, the UN body in charge of trade and investment, found that it changed fundamentally the behaviour of commodity prices, leading to **price distortions, herding effects and increasing volatility**.¹¹²

As prices from derivatives contracts became the benchmark for the prices of actual physical commodities, the demand from institutional investors drove higher the price of essential goods. **The steady injection from 2003 to mid-2008 and then rapid withdrawal (later 2008) of speculative money in commodity derivatives markets has been found to be behind the inflation and then sudden bursting of the food price bubble** and related food crisis.¹¹³

The level of volatility witnessed in commodity prices through 2008 was unprecedented throughout history, and completely unheard of before the tidal wave of speculative money that followed the passage of the CFMA.¹¹⁴

As importantly, UNCTAD reported on how this higher volatility came from a different type of speculation called index trading. As commodities began to be perceived as an asset class, a new category of participants arrived: index speculators, who were markedly different from traditional speculators. Index speculators replicate passively the price movements of an index based on a basket of commodities at whatever price is necessary. Their insensitivity to prices however has been found to multiply their impact on commodities markets, driving prices up and down with no linkage to economic fundamentals and amplifying market fluctuations: *'one particularly troubling aspect of index speculator demand is that it actually increases the more prices increase. This explains the accelerating rate at which commodity futures prices (and actual commodity prices) are increasing. Rising prices attract more index speculators, whose tendency is to increase their allocation as prices rise. So their profit-motivated demand for futures is the inverse of what you would expect from price-sensitive consumer behaviour'*.¹¹⁵

Last but not least, the increased participation of financial investors has been shown to **greatly increase the risk of contagion to other markets**. As index speculators take positions in commodities as an entire group and not according to the supply and demand of specific physical markets, prices are disconnected from fundamentals and tied more closely to the movements of stocks and bonds.¹¹⁶ Recent research found that in the presence of institutional investors, shocks to any index commodity spill over to all storable

112 UNCTAD, Price formation in financialized commodity markets, June 2011, https://unctad.org/en/docs/gds20111_en.pdf

113 Finance Watch, Investing not betting, April 2012, <https://www.finance-watch.org/publication/mifid-ii-position-paper-investing-not-betting/>

114 Better Markets, *ibid*

115 Testimony of Michael W. Masters Managing Member / Portfolio Manager Masters Capital Management, LLC before the Committee on Homeland Security and Governmental Affairs United States Senate May 20, 2008, <https://www.hsgac.senate.gov/imo/media/doc/052008Masters.pdf>

116 Silvennoinen A, Thorp S, Financialization, crisis and commodity correlation dynamics, *Journal of International Financial Markets, Institutions and Money*, 2013, vol. 24, issue C, 42-65, https://econpapers.repec.org/article/eeeintfin/v_3a24_3ay_3a2013_3ai_3ac_3ap_3a42-65.htm; BIS, Lombardi M, Ravazzolo F, On the correlation between commodity and equity returns: implications for portfolio allocation, July 2013, <https://www.bis.org/publ/work420.pdf>; Transnational Institute, Financialisation: a primer, September 2018, <https://www.tni.org/en/publication/financialisation-a-primer>

commodity prices.¹¹⁷ Increased cross-market correlations between equity and commodity and between currency and commodity have also been evidenced.¹¹⁸

The transformation of carbon into an asset class and its inclusion in commodity indices be would likely to result in the same consequences: higher volatility, carbon bubbles, and a high contagion risk to other markets.

The inclusion of carbon permits in commodity indices and the creation of new sustainable indices would be likely to result in a greater market participation by index investors and lead to a similar increase in carbon price volatility, further obscuring the price signal. The bundling of carbon contracts with agricultural and non-agricultural contracts in commodity index funds would also let carbon volatility influence the price of food commodities.¹¹⁹

Likewise, a large and rapid influx of investor funds could create a speculative bubble with too much money chasing too few viable investments, and threaten financial stability. As carbon markets are already characterised by very high levels of uncertainty complicating the price discovery mechanism, the potential for bubbles and crashes seems even higher than with other commodities.

US hedge fund manager Michael Masters warned that speculators will end up controlling carbon markets, triggering the same boom-and-bust cycles that have affected other commodities.¹²⁰

Carbon as an asset class would create contagion channels to other assets:

- ▣ Portfolio management techniques, whereby a trader facing losses on one of his investments closes other, unrelated positions to lock in some profits that compensate his losses, have been shown to transmit shocks to other, economically unrelated assets.¹²¹
- ▣ The inclusion of carbon in commodity indices would be likely to create contagion channels to other commodities and asset classes, as discussed earlier.
- ▣ More broadly, the mere fact of viewing carbon as an asset class is also likely to increase price correlations with other asset classes, as happened with commodity prices. This is explained by the fact that all asset classes are looked at from the prism

117 Basak S, Pavlova A, A Model of Financialization of Commodities, 10 June 2015, <http://faculty.london.edu/apavlova/Commodities.pdf>

118 Basak S, Pavlova A, A Model of Financialization of Commodities, 10 June 2015, <http://faculty.london.edu/apavlova/Commodities.pdf>; UNCTAD, Price formation in financialized commodity markets, June 2011, https://unctad.org/en/docs/gds20111_en.pdf

119 Institute for Agriculture & Trade Policy, Suppan S, Lilliston B, Speculating on Carbon: The Next Toxic Asset, 24 December 2009, <https://www.iatp.org/documents/speculating-carbon-next-toxic-asset>

120 Bloomberg, Kassenaar L, Carbon Capitalists Warming to Climate Market Using Derivatives, 4 December 2009, <http://www.bloomberg.com/news/articles/2009-12-04/carbon-capitalists-warming-to-climate-market-using-derivatives>

121 Broner F, Gaston Gelos R, Testing the portfolio channel of contagion: the role of risk aversion, October 2003, <https://pdfs.semanticscholar.org/30ce/02acbf895c4944ce6e1fc97dea49756964c3.pdf>

of investor risk appetite¹²² and relative-risk adjusted returns for portfolio allocation purposes. As a result, all asset classes are affected to some degree by investors' reactions to the same external shocks, whether US–China trade disputes, Brexit or others, for example. As JP Morgan research put it, '*in times of high macro uncertainty, the prices of equities, risky bonds, oil, gold, and emerging market currencies are largely driven by changes in the macroeconomic outlook.*'¹²³

These contagion channels would in turn transmit the high uncertainty and risk of market failure of carbon markets to other asset classes and the wider economy.

Command and control policies on the contrary would not build a direct connection between environmental shocks and financial markets and the economy. In this respect they appear more suited to the European Commission objective of strengthening financial stability by incorporating risks stemming from climate change into investment decision-making.

There is however a major difference between carbon and agricultural commodities. In theory an influx of new passive investors could be expected to generate a quick rise in the price of carbon as happened with the price of agricultural commodities. Yet, **the ability to create unlimited offsets combined with the implicit political cap on the price trajectory of carbon makes it very unlikely that the influx of institutional investors will lead to a significant rise in the carbon price.** As a rapid rise in the price of carbon could be painful for utilities, airlines, and manufacturers, '*it is believed that there are political limits on how high prices can go.*'¹²⁴ Several fund managers have been quoted as saying that '*they did not expect a political backlash unless the credits approached €50 a tonne.*'¹²⁵ This already happened in Southern California in 2000: as electricity generators had to rely more on old gas-fired plants for electricity production, the price of NOx permits skyrocketed; as a response the State decided to remove electricity generators from the trading scheme.¹²⁶

This implicit political cap could take several forms, and is already enshrined in the Market Stability Reserve, that foresees that 100 million allowances would be released in case of a strong rise in the price of EU emission allowances. What that means in practice is that **the only environmental benefit that could be expected from transforming carbon into an asset class, namely a big rise in the price of carbon, is very unlikely to materialize.**

122 Risk appetite is the level of risk that an investor is prepared to accept in pursuit of his objectives. The Chicago Board Options Exchange Volatility Index (VIX) is commonly treated as a quick and easy proxy for risk appetite, because it is derived from S&P 500 options, which investors buy and sell to change the amount of risk to which they are exposed Financial System Review, Illing M, Aaron M, A Brief Survey of Risk-Appetite Indexes, <https://www.bankofcanada.ca/wp-content/uploads/2012/01/fsr-0605-illing.pdf>

123 JP Morgan, Global Equity Derivatives & Delta One Strategy, Rise of Cross-Asset Correlations, 16 May 2011, <https://pdfs.semanticscholar.org/15d0/3022164c5038d44378147a2c0cf668a4daa1.pdf>

124 The Telegraph, Evans-Pritchard A, Soaring carbon prices turn Europe's energy landscape upside down, 27 August 2018, https://www.telegraph.co.uk/business/2018/08/27/soaring-carbon-prices-turn-europes-energy-landscape-upside/?WT.mc_id=tmgliveapp_iosshare_ArLV4BmctJ6M

125 Financial Times, Sheppard D, Hedge funds and Wall St banks cash in on carbon market's revival, 7 September 2018, <https://www.ft.com/content/6e60b6ec-b10b-11e8-99ca-68cf89602132>

126 Climate Justice Alliance, Carbon pricing, a critical perspective for community resistance, <https://www.arb.ca.gov/lists/com-attach/247-scopingplan2030-BjRBZFU7JUV0FAc2z.pdf>

D. HYBRID MARKETS MAKE BEHAVIOUR PREDICTABLE AT CERTAIN POINTS, LEADING TO A HIGHER RISK OF MARKET MANIPULATION

Prudential rules generate arbitrage opportunities as the behaviour of a number of participants is constrained and therefore predictable in the vicinity of the application thresholds of the rules. As carbon markets are subject to more rules than traditional markets, this risk is higher.

Using predictable behaviour to gain an edge and make easy profits is a common occurrence in traditional markets. For example, in currency markets, when aware of another bank's large position in a currency pair – a large option barrier or large option expiry close to the current spot price – traders will typically try to 'push' the market in order to take advantage of this information, as hitting the barrier, for example, means that the spot price will accelerate in a predictable direction. Likewise, knowing, for example, that a certain utility has a significant shortage of carbon permits close to the end of the reporting period means that they will have to buy and the price is likely to increase.

Appropriate regulation is necessary to prevent market manipulation and insider trading in carbon markets: the ability to influence outcomes and trade on it at the same time, as in the case of a large offset developer trading carbon credits must be strictly regulated, just as a company must follow strict rules on the trading of its own stock around key announcements.

On a related topic, the recent scandal of coco bonds sold to Spanish retail investors¹²⁷ shows the need to **ensure that inappropriate regulatory risk is not repackaged and transferred to retail investors**. As carbon becomes an asset class, banks are likely to be very creative in transferring regulatory risk and there is a significant risk of mis-selling. As an example, being exposed to the risk of carbon credits not being approved by the UN, or the risk of being left with partial ownership of the land of a failed restoration project in a faraway country, or having your return conditional upon a utility company hitting its emission target, are not suitable risks for non-professional investors. Environmental performance bonds where the issuer pays an extra return if it fails to meet its environmental target is also not a risk that a retail investor can reasonably be expected to assess. While carbon scams targeting retail investors already exist,¹²⁸ inappropriate transfer of risk is different and investor protection regulation should make sure it keeps pace with forthcoming innovations.

127 Spanish retail investors were sold bonds that would automatically convert into equity when the issuing bank's regulatory capital reached a certain threshold. As the conversion would occur when the bank's solvency was fragile, it would be likely to translate into losses for the investor. It has been recognised that non-professional investors cannot be reasonably expected to assess the likelihood of a bank's capital falling below a certain threshold. Financial Times, Gallo A, Regulators must act on coco bond risks, 7 May 2014, <https://www.ft.com/content/dbef9b1a-cede-11e3-8e62-00144feabdc0>

128 REDD monitor, Lang C, A cautionary tale about carbon credits, involving Eco Business Management, Eco Asian Consulting, SJL Risk and Abacus Advisory. Oh, and Montague Pitman, Carbon Neutral Investments, MH Carbon and Eco-Synergies, 16 October 2014, <https://redd-monitor.org/2014/10/16/a-cautionary-tale-about-carbon-credits/>; Lang C, The carbon credits sold to private individuals as investments are worthless, 4 June 2015, <https://redd-monitor.org/2015/06/04/guest-post-the-carbon-credits-sold-to-private-individuals-as-investments-are-worthless/>

E. MORAL HAZARD MUST BE AVOIDED

Moral hazard is defined as a lack of incentive to guard against risk where one is protected from its consequences. For example, during the 2008 financial crisis, large international banks expected to be bailed-out in case of bankruptcy and this encouraged them to take on excessive risks, as they would collect the profits in the case of success, while taxpayers would bear the cost of failure.

As governments – and citizens – will bear the ultimate cost of failure of climate change mitigation policies, there is a non-negligible risk that this could encourage excessive risk-taking by private actors in carbon markets. Speculators and end-users trading on carbon markets have no built-in incentive to ensure that GHG emissions decline and technologies change towards renewable ones. The former only care about making profits from trading carbon credits, and the latter care about complying with mandatory requirements at the cheapest cost.

By contrast, in command and control policies governments both define the rules mandating the trajectory of emission reductions and technological change, and have a vested interest in their success as they are ultimately responsible. Moral hazard and the risk of a related public backlash are thus minimised.

Should carbon nevertheless become an asset class, there would be a strong need for supervisory authorities to develop robust regulations to try and mitigate some of these risks. Lessons from commodity derivatives may prove useful in the design of rules aimed at curbing speculation and limiting contagion channels to other asset classes and the wider economy.

D. MAJOR DEVELOPMENTS AND A FRAGILE STATUS QUO



1. ARTICLE 6, CORSIA, CHINA

Sustainable Development Mechanism: as Kyoto's carbon offset markets approach their end, a number of new markets are emerging. Kyoto's Clean Development Mechanism is likely to be replaced by the Paris Agreement's Sustainable Development Mechanism and its new carbon offset market. The Paris Agreement guidelines will shape *'the way forward for international market mechanisms and the linking of domestic carbon pricing initiatives under the new international climate accord.'*¹²⁹ While the specific rules of this market are expected to be defined at the COP25 in 2019 in Chile,¹³⁰ disagreement with some countries such as Brazil means that it may still be a few years away.

CORSIA: aviation is one of the fastest growing sources of greenhouse gas emissions, with global aviation emissions expected to grow 300-700% by 2050,¹³¹ and the number of aircraft and passenger-kilometres flown expected to double over the next 20 years.¹³² In this context and under the stated objective to make aviation's growth carbon neutral, a new carbon offset market for international civil aviation emissions was created in 2016.

Under this new agreement, called CORSIA (Carbon Offsetting and Reduction Scheme for International Aviation), airlines will be required to buy carbon offsets to compensate for their growth in CO₂ emissions. Carbon offsets will be generated through the implementation of carbon reduction projects in developing countries.¹³³ Flights subject to CORSIA are expected to account on average for over 600 million tons of CO₂ per year between 2021 and 2035, making CORSIA one of the largest carbon pricing instruments in the world.

A number of serious concerns have already been expressed:

- ▣ As domestic flights are not included, only 60% of civil aviation flights are covered.
- ▣ As CORSIA is an offset market instead of cap-and-trade, there is no cap on the aviation related emissions that may be produced by an airline or a country.
- ▣ Offsetting will not reduce aviation emissions but will instead allow airlines to pollute more while buying carbon offsets to compensate. As a Bloomberg article put it, *'rather than make their aircraft more fuel-efficient, airlines will be allowed to negate their post-2020 emissions growth on paper, through the purchase of offsets – for example, by paying to plant trees somewhere in the world.'*¹³⁴ It has been found that CORSIA could nearly double emissions from the airlines industry.¹³⁵

129 World Bank, State and trends of carbon pricing, 2017, <http://documents.worldbank.org/curated/en/468881509601753549/State-and-trends-of-carbon-pricing-2017>

130 Carbon Market Watch, COP24 overshadowed by market failure as countries fail to agree on basic accounting principles and the future of the CDM, 15 December 2018, <https://carbonmarketwatch.org/2018/12/15/cop24-overshadowed-by-market-failure-as-countries-fail-to-agree-on-basic-accounting-principles-and-the-future-of-the-cdm/>

131 European Commission, Reducing emissions from aviation, https://ec.europa.eu/clima/policies/transport/aviation_en

132 Heinrich Böell Stiftung, Heuwieser M, The illusion of green flying, 21 September 2018, <https://www.boell.de/en/2018/09/21/illusion-green-flying>

133 IATA, What is Carbon Offsetting and Reduction Scheme for International Aviation?, https://www.iata.org/about/worldwide/asia_pacific/Pages/What-is-CORSIA.aspx

134 Bloomberg, A Weak Deal on Airplane Emissions, 14 October 2016, <https://www.bloomberg.com/view/articles/2016-10-14/a-weak-deal-on-airplane-emissions>

135 Institute for Policy Studies, Reyes O, Why a New Global Deal on Aviation Emissions is Really Bad News, 28 September 2016, <https://ips-dc.org/new-global-deal-aviation-emissions-really-bad-news/>

- ▣ The lack of explicit language on international oversight and environmental safeguards opens the door to risky offset credits.¹³⁶
- ▣ ICAO, the UN agency in charge of aviation has recognised that the agreement is not compatible with the 1.5°C goal of the Paris Agreement. The trade association for airlines called CORSIA ‘aviation’s licence to grow’.¹³⁷
- ▣ As participation in the scheme is voluntary until 2027, it is already clear that CORSIA will not even reach its insufficient goal.
- ▣ CORSIA is already being instrumentalised by airline associations to push for the invalidation of existing, more effective measures,¹³⁸ such as the current inclusion of airline emissions into the European Cap and Trade system.¹³⁹ IATA the main airline trade association is also using CORSIA as a way to push back against carbon pricing or airline ticket taxes.¹⁴⁰

China’s cap-and-trade: after testing seven regional pilot markets since 2008, China officially launched its carbon cap-and-trade scheme in December 2017. Starting initially with the power generation sector, the system will be extended over time to cover seven other sectors including cement, steel, and aluminium. The Chinese carbon market is expected to soon dwarf all the others and set the de facto carbon price.¹⁴¹ China has also developed almost 100 forest carbon offset projects that will generate offset credits for the national emissions trading scheme.¹⁴²

As China’s cap and trade starts to function effectively over the coming years, it is likely to be linked to other cap and trade schemes: in Japan; South Korea; and also Europe. Such linkages are not only difficult, as they involve design differences and sovereignty issues, but they also raise environmental integrity questions: should we, for example, authorize the use of Chinese offset credits in the European cap-and-trade system with a risk of weakening the cap? Will we be able to assess the difference in environmental integrity and additionality between offset credits created under different systems? Will the prominence of the Chinese ETS further reduce the ability of European policy makers to send policy incentives through carbon prices?

136 Carbon Market Watch, The CORSIA: ICAO’s market based measure and implications for Europe, October 2016, <http://carbonmarketwatch.org/wp-content/uploads/2016/10/Post-Assembly-Policy-Brief-Web-1.pdf>

137 IATA press release, Historic Agreement on Carbon-Neutral Growth, 3 June 2013, <https://www.iata.org/pressroom/pr/Pages/2013-06-03-05.aspx>

138 CE Delft, A comparison between CORSIA and the EU ETS for Aviation, December 2016, https://www.transportenvironment.org/sites/te/files/publications/2016_12_CE_Delft_ETS_CORSIA_final.pdf

139 Transport & Environment, EU urged to stand firm on aircraft emissions, 6 October 2018, <https://www.transportenvironment.org/news/eu-urged-stand-firm-aircraft-emissions>; GreenAirOnline, Airlines and NGOs spell out differing positions over CORSIA implementation and the future of the Aviation EU ETS, 18 September 2018, <http://www.greenaironline.com/news.php?viewStory=2523>; T&E, Carbon Market Watch, Aviation Environment Federation, Open letter to Vice President Šefcovic, Commissioner Violeta Bulc, Commissioner Miguel Arias Cañete, European Commission, 12 September 2018, https://www.transportenvironment.org/sites/te/files/publications/2018_09_EuroICSA_letter_Commission_re_CORSIA_ETS.pdf

140 IATA Fact sheet: CORSIA & carbon pricing, December 2018, <https://www.iata.org/policy/environment/Documents/corsia-factsheet-carbon-pricing.pdf>

141 Foreign Affairs, DiPerna P, China’s Carbon Markets How Beijing Is Leading With Cap-and-Trade, 18 August 2016, <https://www.foreignaffairs.com/articles/china/2016-08-18/chinas-carbon-markets>

142 Carbon Pulse, China builds forest carbon offset portfolio ahead of ETS launch, 29 November 2018, <http://carbon-pulse.com/64235/>

Carbon removal crypto-markets¹⁴³

Finally, it is necessary to mention here a recent push supported by the UN towards using new technologies such as blockchain¹⁴⁴ to help address climate change.¹⁴⁵

Among the many potential uses of blockchain, some companies are pushing to create a new financial market on carbon removal using crypto-currencies and blockchain technology.¹⁴⁶ While there is no related legislative initiative at the time of writing, political support for it may grow over time and it deserves monitoring. The pitch is indeed very compelling: under headlines such as ‘blockchain for climate’, it combines two of the hottest policy topics of the moment.

Carbon removal, also called carbon capture and storage (CCS), is the process of capturing waste CO₂ generated by electricity production or industrial processes, and transporting it and storing it elsewhere where it will not enter the atmosphere. Storage locations are typically geological rock formations several kilometres below the surface; depleted oil fields; or deep saline aquifer formations. CCS can also describe geoengineering techniques such as the chemical removal of CO₂. It is presented as complementary to existing carbon markets focused on reducing present and future emissions, as it aims instead at removing emissions.¹⁴⁷

‘CCS is controversial for a number of reasons. It’s expensive, unproven, and according to researchers at Duke University, there’s the troubling possibility that captured carbon could leak into groundwater aquifers, potentially rendering water undrinkable.’¹⁴⁸ Captured carbon could also leak into the atmosphere, compromising climate mitigation.¹⁴⁹ Two major cases of leakage have already occurred. The first one occurred in 1986, when naturally sequestered CO₂ rose from a lake in Cameroon and asphyxiated 1,700 people. A 2011 study also found evidence of CO₂ leakage in the land above the world’s largest carbon capture and storage site in Canada.¹⁵⁰

143 Crypto-markets refer to the trading of crypto-currencies such as Bitcoin.

144 Blockchain is a digital database that securely stores a list of data such as Bitcoin transactions.

145 UNFCCC, How Blockchain Technology Could Boost Climate Action, 1 June 2017, <https://unfccc.int/news/how-blockchain-technology-could-boost-climate-action>

146 Medium.com, Gambill P, Why a carbon removal market belongs on the blockchain, 15 November 2018, <https://medium.com/nori-carbon-removal/why-a-carbon-removal-market-belongs-on-the-blockchain-91da31127228>;

Nori.com, A blockchain-based marketplace for removing carbon dioxide from the atmosphere, <https://nori.com/>

147 Bloomberg BNA, Magill B, Carbon Removal Firms See Opportunity in U.N. Climate Report, 12 October 2018 <https://www.bna.com/carbon-removal-firms-n73014483159/>;

The Hill, Atkinson R, Carbon removal: An opportunity for American innovation, 20 November 2018, <https://thehill.com/opinion/energy-environment/417706-carbon-removal-a-new-opportunity-for-american-innovation>

148 Fast Company, Schwartz A, The Problem With Carbon Capture: CO₂ Doesn’t Always Stay Captured, 19 November 2010, <https://www.fastcompany.com/1704105/problem-carbon-capture-co2-doesnt-always-stay-captured>
The New York Times green blog, Barringer F, What if Captured Carbon Makes a Getaway?, 19 November 2010, <https://green.blogs.nytimes.com/2010/11/19/what-if-captured-carbon-makes-a-getaway/>

149 Phelps J, Blackford J, Holt J, Polton J, Modelling large-scale CO₂ leakages in the North Sea, International Journal of Greenhouse Gas Control Volume 38, July 2015, <https://www.sciencedirect.com/science/article/pii/S1750583614003144?via%3Dihub>;
IPCC Special Report. Carbon Dioxide Capture and Storage. Technical Summary, <http://docplayer.net/20437054-lpcc-special-report-carbon-dioxide-capture-and-storage-technical-summary.html>

150 GEOCHEMICAL SOIL GAS SURVEY A Site Investigation of SW30-5-13-W2M Weyburn Field, SASKATCHEWAN, 27 August 2010, https://web.archive.org/web/20110219025128/http://www.ecojustice.ca/media-centre/media-release-files/petro-find-geochem-ltd.-report/at_download/file

Beyond the risks of leakage, CCS has documented adverse environmental effects such as the additional use of chemicals, and reductions in air quality. As additional energy is required for carbon capture, this in turn increases the use of chemicals needed for the extraction of coal and gas, and increases emissions of other air pollutants.

Some companies are pushing to create a carbon removal market using crypto-currency and blockchain.¹⁵¹ They are offering to issue cryptocurrencies that could be exchanged for carbon credits and regular currencies. The selling points of such a proposal include better carbon accounting (i.e. more measurable additionality); additional liquidity; lower transaction costs; and secure payments. They hope to attract new people looking for more environmental integrity, farmers looking for a new revenue stream, and crypto-currency enthusiasts.

Blockchain could certainly improve transparency and reduce transaction costs. However, beyond the major environmental concerns associated with carbon capture and storage and with crypto-currencies,¹⁵² it is also worth highlighting that such a market would add the extreme volatility of crypto-currencies to the already very high volatility of carbon markets. In practice, it would mean that such a market would be likely to have an even more inexact price signal and be a recipe for bubbles and crashes.

While these huge emerging markets are still a few years away, they strongly indicate a forthcoming change of scale and that carbon will eventually become an asset class.

151 Nori.com, <https://nori.com/>

152 The Independent, Gabbatiss J, Expanding Bitcoin use will push global warming above 2C in two decades, finds study, 29 October 2018, <https://www.independent.co.uk/environment/bitcoin-climate-change-global-warming-cryptocurrency-mining-electricity-a8607036.html>

2. A POLITICAL WIN AND AN ENVIRONMENTAL FAILURE

A. BETTER THAN NOTHING? AN OFT HEARD COMMENT IS THAT CARBON MARKETS MAY NOT BE PERFECT BUT THEY ARE BETTER THAN NOTHING: BUT ARE THEY?

Carbon markets have been shown to be instrumentalised to dismantle existing effective regulations or to prevent new ones.¹⁵³ Incidentally, in a surprisingly candid statement Shell's Chief Climate Change Adviser David Hone recently took credit for the inclusion of a carbon market in the Paris Agreement¹⁵⁴ as a way to pre-empt other regulations. Carbon markets also divert precious and limited political attention away from more robust alternatives. They finally can create a perception that climate change is being addressed to a greater extent than it is in reality, thereby reducing public pressure for structural change.

The question of whether carbon markets are better than nothing is also a moot one, as there wouldn't be nothing: it would be politically untenable to have nothing and therefore the choice has never been between carbon markets and nothing. This seems to indicate that unworkable carbon markets are in fact worse than nothing.

B. KNOWING ALL THE ISSUES, WHY DO WE CONTINUE?

A large number of prominent economists, business figures, and free-market advocates have publicly expressed strong scepticism about carbon markets: from Nobel laureate Joseph Stiglitz to Georges Soros, Harvard's Lawrence Summers and former US Federal Reserve chairman Alan Greenspan.¹⁵⁵ Even the Wall Street Journal provided a damning assessment, writing that while a lot of money can be made from carbon trading '*don't believe for a minute that this charade would do much about global warming.*'¹⁵⁶ Given all the issues identified here, their poor track record, and the strong criticism raised, one may wonder why we are continuing down the road of carbon markets.

A combination of factors contributes to the current status quo, including globalisation: it has been evidenced that by reducing states' sovereignty, the formulation of policy in favour

153 "The EU's Integrated Pollution Prevention and Control (IPPC) Directive was modified to explicitly exclude CO₂ emission limits for the "installations" (power stations and industrial plants) which are covered by the EU ETS amid fears that it could lead to energy efficiency improvements, reducing demand for emissions allowances and in so doing weaken carbon prices. Similarly, the revision of the Energy Taxation Directive was weakened (and ultimately abandoned) for fear of affecting carbon prices." Corporate Europe Observatory, EU emissions trading: 5 reasons to scrap the ETS, 26 October 2015, <http://corporateeurope.org/environment/2015/10/eu-emissions-trading-5-reasons-scrap-ets>

154 The Intercept, Aronoff K, Shell oil executive boast that his company influenced the Paris Agreement, 8 December 2018, <https://theintercept.com/2018/12/08/shell-oil-executive-boasts-that-his-company-influenced-the-paris-agreement/>

155 Lohman L, Carbon Trading: Solution or Obstacle? April 2008, <http://www.thecornerhouse.org.uk/sites/thecornerhouse.org.uk/files/Indiachapter.pdf>

156 The Wall Street Journal, Cap and Charade, 3 March 2007, <https://www.wsj.com/articles/SB117287909501625359>

of market principles,¹⁵⁷ regulatory capture by private interests,¹⁵⁸ and procrastination in the face of massive and scary changes, is encouraged. The renowned economist and diplomat John Galbraith once said that *'faced with the choice between changing one's mind and proving that there is no need to do so, almost everyone gets busy on the proof.'*

Two factors in particular play a decisive role:

1. Disputes over cost-sharing / avoiding the politically fraught question of distribution:

current policies are rooted in the prioritization of short-term growth, jobs and competitiveness over environmental concerns, because not doing so would open a political Pandora's box. As discussed earlier, **acknowledging that there are limits to growth would remove the promise of a share of a bigger pie**, and in turn open the question of the sharing of the pie. In other words, removing the promise of growth would force us to address the question of rising inequalities, a question most politicians are reluctant to ask.

Many governments of developed countries assess that a significant share of their citizens express conflicting preferences: wanting both climate change to be addressed and not wanting to change their way of life / additional taxes. Such a framing downplays the distributional aspect: most of the resistance to new environmental taxes and regulations is likely to come – depending on their design – either from lower income groups that cannot afford them and do not have any alternative, or from private lobbies that oppose any regulation that reduces their profitability. The recent French *gilets jaunes* protests offer an example of the low public buy-in for a socially regressive environmental tax and the inescapable distributional aspect of environmental policies.

The weak outcome of international climate negotiations also comes from disputes over cost-sharing. Some nations such as the United States consider that from a cost-benefit perspective, it is not in their best interest to cooperate, even or especially if all other parties comply. From their perspective, they would have to bear the lion's share of the cost of emissions reductions, whereas they expect to lose relatively less from climate change than other nations. Developing countries have a very different perspective, considering that since developed countries are responsible for most of the global warming, it is only fair that they should bear a much higher cost. In addition, as developed countries have outsourced the industrial production of most of the goods they enjoy, they have also outsourced the corresponding emissions, which should be taken into account. As Stiglitz put it, *'The only principle that has some ethical basis is equal emission rights per capita (with some adjustments - for instance, the US has already used up its share of the global atmosphere, so it should have fewer emission allowances). But adopting this principle would entail such huge payments from developed countries to developing countries, that, regrettably,*

157 Global Policy Journal, Wall K, The end of the welfare state? How globalization is affecting state sovereignty, 17 August 2012, <https://www.globalpolicyjournal.com/blog/17/08/2012/end-welfare-state-how-globalization-affecting-state-sovereignty-0>

158 A situation where regulatory agencies may come to be dominated by the industries or interests they are charged with regulating. As a result, the agency charged with protecting the public's interest instead acts in ways that benefit the industry it is supposed to be regulating.

*the former are unlikely to accept it.*¹⁵⁹ **International climate negotiations thus resemble passengers fighting over the cost sharing of a lifeboat on the Titanic.**

Flexible tools such as carbon markets play a politically useful role in this context, as their limited effectiveness enables the buy-in of more countries while not committing to much in reality.

As an added benefit, carbon markets create a new asset class offering the promise of both diversification benefits and attractive returns to the trillions of assets under management currently looking for new investment opportunities. A financial newspaper titled ‘only the ecology can save capitalism’¹⁶⁰ explained that ‘*capitalism lacks projects, companies give back money to shareholders instead of investing it. Only the ecological transition could satiate it.*’

2. Carbon markets are both an environmental failure and a political success, making it difficult for politicians to abandon them. As a recent example, while the recent rise in the carbon price following the reform of the EU ETS does not address the absence of a price signal, the rising price has been hailed by politicians as an indication that the EU scheme is finally working.

More broadly, emissions markets ‘*gain their political force from their capacity to create alliances between ‘left-wing’ environmentalism and ‘right-wing’ pro-market sentiment, and to attract business leaders such as BP’s John Browne.*’¹⁶¹ They receive broad support from across the political spectrum, from business lobbies opposing any increase in climate ambitions¹⁶² to a number of well-intentioned NGOs disillusioned after decades of failure and blinded by the excessive technicality and the win-win rhetoric.¹⁶³

The broad political support enjoyed by market-based solutions is rooted in the misguided hope that all competing interests will get what they want: environmentalists will get

159 The Guardian, Stiglitz J, Carbon-taxing the rich, 7 December 2007, <https://www.theguardian.com/commentisfree/2007/dec/07/carbontaxingtherich>

By contrast, the United States judged that addressing the hole in the ozone layer was in their best interest from a domestic cost-benefit analysis perspective. They therefore supported the Montreal Protocol, an international agreement that succeeded in addressing the issue.

A research paper trying to understand the dramatic difference between the Montreal Protocol that had successfully eliminated the production and use of ozone-depleting chemicals, and the Kyoto Protocol that had spurred only modest steps toward stabilizing greenhouse gas emissions concluded that “*both the success of the Montreal Protocol and the mixed picture for the Kyoto Protocol were largely driven by the decisions of the United States, and those decisions were driven in turn by a form of purely domestic cost-benefit analysis.*”

Sunstein C, Montreal versus Kyoto: A Tale of Two Protocols, University of Chicago Law School working paper, 2006, https://chicagounbound.uchicago.edu/cgi/viewcontent.cgi?article=1194&context=public_law_and_legal_theory

160 Euractiv, Simon F, Business lobby prepares pushback against EU climate goals update, 19 September 2018, <https://www.euractiv.com/section/climate-environment/news/business-lobby-prepares-pushback-against-eu-climate-goals-update/>;

Les Echos, Vittori JM, Seule l’écologie peut sauver le capitalisme, 10 July 2018, https://www.lesechos.fr/10/07/2018/lesechos.fr/0301925350136_seule-l-ecologie-peut-sauver-le-capitalisme.htm;

Also see the 2009 statement of the Chief Executive of American Electric Power, if anyone claims that the “*only reason American Electric Power wants to [invest in a forest offset project in Bolivia] is because it doesn’t want to shut down its coal plants, my answer is, ‘You bet, because our coal plants serve our customers very cost-effectively.’*” The Corner House, Lohmann L, “Strange Markets” and the Climate Crisis, 2010, <http://www.thecornerhouse.org.uk/sites/thecornerhouse.org.uk/files/Strange%20Markets.pdf>

161 MacKenzie, Finding the Ratchet: The Political Economy of Carbon Trading, http://www.sps.ed.ac.uk/__data/assets/pdf_file/0015/3417/DMacKenzieRatchet16.pdf

162 Liberation, Massiot A, Quand le lobby du patronat européen veut «minimiser» les efforts climatiques, 19 Septembre 2018, https://www.liberation.fr/planete/2018/09/19/quand-le-lobby-du-patronat-europeen-veut-minimiser-les-efforts-climatiques_1679840

163 Bachram H, Climate Fraud and Carbon Colonialism: The New Trade in Greenhouse Gases, Capitalism, Nature, Socialism Vol 15, December 2004, <http://www.carbonradewatch.org/pubs/cns.pdf> page 11

environmental integrity, and business lobbies will get a marginal cost of compliance. This misguided hope comes both from a lack of knowledge about financial markets amongst civil society and many politicians, and the ability of carbon markets to give the perception that the issue is being addressed to a greater degree than it actually is.

Through the continued hope that once the price is higher everything will work out, markets are able to maintain more political support over time than alternative policy tools with a comparable track record. A carbon tax set 14 years ago at the level of carbon market prices would have been likely to generate more public outcry for governments to increase it. Likewise, a scheduled phasing out of fossil fuels implemented 14 years ago and planning no action for the first 14 years would have in all likelihood been untenable politically.

Carbon markets can thus also be understood as a policy tool offering more political room for manoeuvre than more binding policy alternatives. **The political appeal of carbon markets rests on their limited effectiveness and simultaneous ability to promise future performance ‘once the price is right’.** Such a combination can be politically useful to reach global agreements between countries with diverging interests, enabling them to save face while not committing to much in reality. This in turn begs the interesting question of whether it is preferable to have a robust agreement with less signatories or a weak one with more signatories.

From a civil society perspective, after decades of failure to create political room for action, many NGOs and politicians have understandably given up on non-pricing mechanisms. Yet, we find ourselves in the paradoxical situation where public pressure for real solutions will increase over the coming decade while more doomed carbon offset markets are being created. It is perhaps time to acknowledge that endorsing market mechanisms has failed in equal measure to achieve any meaningful outcome. Now is therefore arguably not the time for NGOs to endorse more disadvantageous mechanisms but instead to raise awareness about the difference between effective tools and doomed ones.

All these reasons may explain why more attention is dedicated to making Paris the capital of green finance¹⁶⁴ and to creating new carbon offset markets than to working out robust policy alternatives.

C. THE ALTERNATIVE – MONTREAL VS KYOTO

Traditional environmental regulations phasing out fossil fuels would be a much more effective alternative to carbon pricing.

Such a policy tool was used not long ago to address the hole in the ozone layer: The Montreal Protocol is an international treaty signed in 1987 designed to protect the ozone

¹⁶⁴ France Info: Le brief éco. Paris veut devenir la capitale mondiale de la finance verte, 11 December 2017, https://www.francetvinfo.fr/replay-radio/le-brief-eco/le-brief-eco-paris-veut-devenir-la-capitale-mondiale-de-la-finance-verte_2486793.html

layer by phasing out the production of numerous substances that are responsible for ozone depletion. As a result, the issue has been successfully addressed and the hole in the ozone layer above Antarctica is slowly recovering. According to former UN Secretary General Kofi Annan, *'perhaps the single most successful international agreement to date has been the Montreal Protocol'*.

Such a policy tool would have a number of benefits:

- ▣ It would be much simpler and cheaper to implement and monitor as it addresses the cause rather than the symptoms.
- ▣ It would work. Any policy tool is impacted by the current lack of political ambition; as ambition grows however over time with the end of some natural resources, environmental regulations would progressively become more binding and effective. Carbon markets on the other hand would still be unable to deliver a price signal meaning that carbon offset markets would still fail. Similarly, the wild fluctuations in oil prices would still continue to severely weaken the incentive effect of a carbon tax.
- ▣ It would minimise financial stability risks by starting the transition earlier and with a more predictable path. It would also not create the financial stability risks linked to carbon as an asset class.
- ▣ It could be implemented quickly and deliver change faster than markets could. While some believe that markets are *'humanity's most effective mechanism for delivering change at speed and scale'*,¹⁶⁵ this is in fact incorrect in the case of carbon markets, as they are designed for incremental and not structural change. By fostering structural change, binding regulations could be as fast as we want them to be – once a law is passed it can be in theory implemented overnight – only slowed down by our desire to phase them in and smoothen the transition.
- ▣ The impact on jobs would be positive: a scheduled and progressive phasing out of fossil fuels would enable a more coordinated shift compared to a later and more abrupt one. In turn, this would provide more time to plan ahead and retrain workforces, and thus minimize the impact on jobs.

In addition, while industry lobbying has brandished for years the threat of job relocation in case of stronger climate regulation, the most thorough study on the topic funded by the European Commission found no evidence of such risk.¹⁶⁶

- ▣ **By legislating for outcomes, binding regulation would also, most importantly, foster innovation.** As an industry figure put it recently, it is a fundamental error to see putting a price on emissions as an efficient market-based solution. *'The fact is the private sector competes only on price and through innovation, so if government wants to liberate the private sector to find solutions, regulation must not dictate price or solutions.'*¹⁶⁷ Instead, she argues, governments should focus on legislating for outcomes (...) and leave it up to private sector companies to figure out how to deliver those outcomes at the lowest cost.

¹⁶⁵ Six Lessons From Nori's Director Of Carbon Economics, <https://www.linkedin.com/pulse/six-lessons-from-noris-director-carbon-economics-richard-roberts/>

¹⁶⁶ Carbon Leakage Evidence Project, Study commissioned by DG CLIMA, September 2013, https://ec.europa.eu/clima/sites/clima/files/ets/allowances/leakage/docs/cl_evidence_factsheets_en.pdf

¹⁶⁷ Six Lessons From Nori's Director Of Carbon Economics, <https://www.linkedin.com/pulse/six-lessons-from-noris-director-carbon-economics-richard-roberts/>

- ▣ **Traditional environmental regulation would also incidentally make all finance sustainable with regards to climate change.**¹⁶⁸ As technologies relying on fossil fuels would be progressively phased out, the risk-adjusted returns of all economic activities and companies would automatically adjust and capital would automatically shift towards renewable alternatives whose relative profitability would suddenly have increased.

In turn, this questions the current political focus on ‘changing finance’ to facilitate the ecological transition. It argues instead for changing weak climate policy regulations, which would in turn change finance.

The political focus on sustainable finance can thus be understood as a choice to incentivise the transition via financial regulation rather than induce it via environmental regulation.

The issues are of a political nature:

- ▣ The main opposition to binding regulations comes from industry who perceive it as too coercive. As awareness is growing about the financial risks of climate change and the business case for transitioning to renewable energies grows stronger, things will certainly evolve although probably too late to avoid an abrupt transition.
- ▣ A major difference between addressing the hole in the ozone layer and addressing climate change is that producers of CFC¹⁶⁹ gases did not own massive reserves of gas. As a result, there were less vested interests in maintaining the status quo and avoiding effective regulations. Nations owning huge reserves of fossil fuels on the other hand are extremely reluctant to abandon this source of enormous economic power and therefore unlikely to agree to effective climate regulations until a critical mass of their citizens requests it.
- ▣ Changing policy tool will not by itself address the lack of political ambition and the prioritisation of short-term self interest over common long-term interest. However, as discussed earlier, environmental regulations would be able to reflect any future increase in political ambition, unlike carbon markets that would still be plagued with excessive volatility and uncertainty thereby preventing any progress.

In addition, by offering less loopholes and room for regulatory avoidance and being generally more transparent than market mechanisms, binding regulations would greatly increase accountability.

¹⁶⁸ I use sustainable in this section in the narrow sense of climate friendly, i.e. focussing on the Environmental aspect of ESG. However complementary social and governance regulations would make finance truly and comprehensively sustainable.

¹⁶⁹ Chlorofluorocarbons (CFCs) are a family of gases used for refrigeration and as spray can propellants and responsible for creating a hole in the ozone layer.

D. TOO LATE TO CHANGE COURSE?

A frequently used argument is that even though carbon markets may not work, it is now too late to change course. While there is indeed currently no political appetite for shifting the policy response away from carbon prices, **the current status quo is more fragile than most realize, and only ‘one major natural catastrophe away from being abandoned’** in the words of a senior industry lobbyist who wishes to remain anonymous. As he explains it, *‘everybody knows that carbon markets do not work and never will. We thought they were going to die and were happily surprised when the Paris agreement saved them. However, we are just buying time. Over the next decade a major city like London will be under water and then politicians will drop it overnight for a carbon tax or something else.’*

As carbon markets continue to prove their ineffectiveness to address climate change while the incidence and amplitude of natural catastrophes increase, the status quo is likely to gradually become politically untenable.

The path of least political resistance seems therefore likely to change significantly over the coming years under the combined effect of increased public pressure and technological development.

While more robust climate mitigation policies were until recently dismissed as not being pragmatic, pragmatism may well now precisely require not waiting for overwhelming public pressure to shift political course, as the sooner we do, the less disruptive the transition will be and the more time that will be available to make the necessary adjustments.

In addition, up to now the political cost of acting – challenging the economic paradigm at the risk of not being re-elected – was perceived to be higher than the political cost of waiting – public unrest and growing distrust of institutions. This is likely to change over the coming decade. The political benefits of acting are also currently underestimated: addressing climate change could be the common project that Europe needs to revitalise much needed faith in its institutions; counterbalance fear of the future and the temptation of a retreat to nationalism; and generate a renewed sense of optimism.

CONCLUSION

Beyond the well-known excess allowances and cases of fraud, **carbon markets also have major conceptual shortcomings, some of which are unresolvable**: such as the inexistence of a price signal towards the end of natural resources. **Carbon taxes are also affected by such shortcomings and are only marginally better.**

As carbon becomes an asset class, carbon markets are very likely to be more vulnerable than traditional markets to market failures and abrupt losses of confidence from investors, with a high risk of contagion to other asset classes and the wider economy.

The unresolvable nature of some of the issues seriously calls into question the idea that these policies can ever meet their environmental and social objectives. While all policy tools are equally affected by the current lack of political ambition, effective ones will work when ambition increases; whereas failed ones such as carbon offset markets will remain ineffective. As the evidence points to the continued failure of these latter policies, the logical conclusion should be to abandon them for more robust alternatives. Yet two new potentially major carbon offset markets are arriving: one linked to aviation emissions; and the other to the Paris Agreement.

Mandating a progressive and time-bound withdrawal from fossil fuels complemented with tax policies aimed at ensuring a fair sharing of the costs would be far more effective and have more environmental integrity. Such a policy tool would not create the financial stability risks attached to carbon markets. It would provide businesses with more certainty and ability to plan.

Binding regulations would also incidentally make all finance sustainable with regard to climate change, as the risk-adjusted returns of all companies would automatically adjust to new regulations.

While there is currently little political appetite for shifting the policy response to climate change away from carbon pricing, the current status quo is more fragile than most realize, and only one major natural catastrophe away from being abandoned. As carbon markets continue to prove their ineffectiveness while the incidence and amplitude of natural catastrophes increase and the cost of renewable energy continues to drop,¹⁷⁰ public pressure is likely to make the current status quo gradually become politically untenable.

170 The Independent, Gabbatiss J, Renewable energy set to be cheaper than fossil fuels by 2020, according to new report, 15 January 2018, <https://www.independent.co.uk/environment/renewable-energy-cheaper-fossil-fuels-2020-uk-green-climate-change-global-warming-report-irea-a8160051.html>

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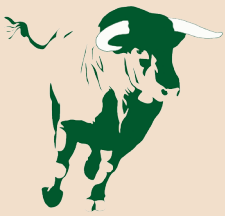
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ABOUT US

The Green Finance Observatory is an independent NGO whose mission is to analyse new financial markets and instruments linked to environmental policies, to assess whether they can meet their stated environmental, economic and social objectives.

We are a small team of ex financial market, advertising and policy advocacy professionals. Our respective experiences led us to conclude that while there was a tremendous expertise on environmental matters in the CSO universe, fewer civil society organisations were engaging in complementary and essential angles such as finance, looking at the nuts and bolts of green financial markets and instruments.

Find out more about the organisation on our website:
www.greenfinanceobservatory.org