

The Stockholm Network Experts' Series

The Good, the Bad and the Ugly of the EU Emissions Trading Scheme

By Andrés Jonathan Drew

 STOCKHOLM NETWORK

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Foreword

Although Europe seems to have developed a consensus that emission trading is the only plausible mechanism to address climate change, Andrés Jonathan Drew skilfully illustrates many of the weaknesses of emissions trading, showing that genuine concern about the climate need not drive one to embrace emissions trading as a solution. Drew shows that market-based instruments are better suited than command and control approaches to addressing climate change, but shows that an optimal policy mix would include market mechanisms other than simple emissions trading.

To begin, let us think what a market mechanism for regulating carbon is meant to deliver. Unlike other pollutants that have successfully been regulated through a cap-and-trade system, most notably sulphur dioxide, carbon is emitted across the economy, both directly and indirectly (most notably in the form of electricity). This creates a few problems. First, simply counting carbon emissions is difficult and expensive, which is why carbon trading has so far been limited to large industrial firms. Second, it is very difficult for government bureaucrats to understand what the “right” level of carbon for an entire economy is, let alone for a particular industrial plant. Third, industry can exploit the complexity caused by the previous two problems as an effective lobbying tool, capturing the process of carbon regulation and using it for rent seeking.

Although the difficulty in counting carbon is quite straightforward to analyse—inability to easily count carbon makes it difficult to establish property rights or usage of a public commons, the atmosphere—complexity and capture are more complex and thus have often led policy discussion into the dangerously woolly realm of oversimplifications and platitudes. Drew addresses these problems by introducing two theoretical frameworks, the Hayek’s “knowledge problem”, that policymakers attempts to improve markets will fail

because of “insurmountable information asymmetries”, and a the public choice perspective, which sees the process of policy formation as a market in which “actors are self-interested and preferential legislation is “sold” to the highest bidder.” Taking this perspective, it seems inevitable that in a cap-and-trade system industry should lobby for free permits in areas affected by so-called “carbon leakage”, the possibility that carbon intensive industrial activities will move out of Europe to regions without carbon pricing. Carbon leakage may well prove to be a problem, but it also falls beautifully into the analytical scheme that Drew proposed. Because carbon leakage involves not only the EU economy, but the entire global economy for traded goods, information asymmetries rise even further. The complexity of forecasting what industries will leak and to what extent and then separating loss of industrial capacity caused by leakage from loss of industrial capacity caused by Europe’s generally higher costs and stricter regulations makes it easy for industry to use the possibility of leakage as a vehicle for rent-seeking, which it has successfully done in ETS Phase 3.

At the Stockholm Network, we have argued in the past for addressing these problems by simplifying carbon regulation by moving from regulating emissions to regulating inputs further upstream (e.g. oil, gas, coal), which are much less numerous, and then letting the price mechanism allocate carbon further down the value chain. Drew takes a less radical view. He shows that the EU has learned for problems of the ETS and has slowly improved regulation and reduced rent-seeking by gradually expanding the number of industries in the cap and using permit auctions to reduce rent-seeking and avoid giving windfall profits to industry. Nevertheless, he shows that this process is highly fraught and complex, and concludes by advocating addressing simplification and transparency through the use of independent expert bodies, a shift from cap-and-trade to taxation to reduce information asymmetries, and general reduction in regulatory complexity to make it harder for industry to game the system. While our upstream regulation is an interesting

thought experiment about an ideal world, Drew's recommendations would address many of the same problems in the real world where we remain wedded to counting carbon.

Paul Domjan

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March 2011

Executive Summary

Emissions trading (ET), once the darling of economists who desire efficient, effective and equitable climate change policy, has been severely criticised for its exposure to rent-seeking. This susceptibility explains government failures, such as permit over-allocation and windfall profits, which resulted from rent-seeking in the legislative process creating the European Emissions Trading Scheme (EU ETS). As a result, many optimists have become emissions trading sceptics because this exposure to rent-seeking may outweigh any policy benefits. This paper will canvass “the good, the bad and the ugly” of ET.

The Good

The paper describes how ET and other market based instruments (MBIs) are better tools than command and control (C&C) mechanisms at managing global public goods like the earth’s climate. It shows how MBIs can reduce the risk of capture, as well as promote allocative and dynamic efficiency and implementability, better than C&C.

The Bad

It follows by considering the practical problems experienced with the EU ETS, in particular looking at the allocation of emissions permits (EUAs) in Phase 1 and 2. This shows how free permits and over-allocation gave rise to rent-seeking and the establishment of an unstable carbon price.

The Ugly

The paper then looks at ancillary support policies, such as energy efficiency targets, and argues that the combination of regulatory tools has often been clumsy and inefficient, largely because the EU ETS carbon price has had little teeth

Furthermore, the paper discusses the redemption, reconciliation and fall-out from all of this and analyses whether Phase 3 allocation rules are an improvement on previous phases. A discussion of a potentially optimal policy instrument mix will provide indications for whether ET is truly the best vehicle for climate change policy institutionalisation, and whether it is possible to minimise rent-seeking and the policy muddle that this process appears to entail.

To conclude, the paper explains how EU ETS policy reform was achieved and considers how Hayek's "knowledge problem" can inform the perils of such approaches. Yet, it argues that Phase 3 EU ETS EUA allocation rules are a cause for optimism because they demonstrate that MBIs can be improved over time. Specifically, the level of rent-seeking, to which emissions trading is so disposed can be incrementally reduced in the medium-term and that this provides an example of where public choice fails to predict policy change.

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Introduction

Emissions trading, once the darling of economists who desire efficient, effective and equitable climate change policy, has been severely criticised for its exposure to rent-seeking. This susceptibility explains government failures, such as permit over-allocation and windfall profits, which resulted from rent-seeking in the legislative process creating the European Emissions Trading Scheme (EU ETS). As a result, many optimists have become emissions trading sceptics because this exposure to rent-seeking may outweigh any policy benefits.²

Phase 3 of the EU ETS (2013-2020), however, provides a source of optimism because the allocation rules that contributed to these government failures have been modified and should reduce the risk of recurring failures. However, the policy muddle induced by a low and unstable carbon price needs to also be considered when assessing the potential for the EU ETS' redemption. It is also too early to tell whether EU ETS Phase 3 will be an improvement on previous Phases 1 and 2 (2005-2012), particularly in light of rules that provide free permits (EUAs) to industries at risk of carbon leakage.

Nevertheless, the EU ETS provides interesting lessons for how incremental improvement of policies can escape the static "original sin" predictions of public choice scholars. Despite this optimism, the Hayekian "knowledge problem" does provide important insights into the downside risks of policy reform strategies and can help guide future reforms. The "knowledge problem" also supports a strong case for avoiding many of the policy instrument mixes that have supported a sub-optimal EU ETS carbon price, particularly in the UK.

² Baldwin 2008:265; Robinson 2008:62; Helm 2010a:183.

This paper will canvass “the good, the bad and the ugly” of emissions trading (ET). To begin it will describe how ET and other market based instruments (MBIs) are better tools than command and control (C&C) mechanisms at managing global public goods like the earth’s climate. This will be followed by considering the practical problems experienced with the EU ETS, including ancillary support policies and an analysis of whether Phase 3 allocation rules are an improvement on previous phases. A discussion of a potentially optimal policy instrument mix will provide indications for whether ET is truly the best vehicle for climate change policy institutionalization, and whether it is possible to minimize rent-seeking and the policy muddle that this process appears to entail. To conclude, the paper will explain how EU ETS policy reform was achieved and consider how Hayek’s “knowledge problem” can inform the perils of such approaches.³

³ Hayek 1945:524.

The Landscape: A property rights problem

Where property rights do not exist or are difficult to establish, the market does not always provide obvious solutions to social problems.⁴ This is particularly true of global public goods, like climate change, that also suffer from challenges of non-excludability and free-riding which cause collective action problems. Nicholas Stern describes climate change as “the greatest market failure of all time”.⁵ Following this logic, welfare economics prescribes government intervention to correct these market failures: i.e. promote collective action and internalize negative externalities.⁶ However, the form which this intervention takes is highly contentious.

Public choice and the Hayekian school of economics are both sceptical that politics can cure markets. Hayek argues that policymakers suffer from a “knowledge problem” of insurmountable informational asymmetries.⁷ They can therefore never beat the price mechanism at discovering information to design optimal policies, like the level of a carbon tax or the best new abatement technology.⁸ Public choice scholars provide a conceptually different critique of government intervention. They believe the political process is a marketplace, where actors are self-interested and preferential legislation is “sold” to the highest bidder.⁹ Legislation is tainted by this “original sin” and is suboptimal because the political process is prone to rent-seeking by firms that lobby for protective legislation.¹⁰ The insights of information asymmetry and political markets both highlight the risk of

⁴ Robinson 2008:57.

⁵ Stern 2009.

⁶ Breyer 1982.

⁷ Hayek 1945:530.

⁸ Pennington 2000:7.

⁹ Baldwin and Cave 1999:21-23.

¹⁰ Tullock 1967.

capture where vested interests bias the incentives of regulators and governments to act in their interests rather than the broader public interest.¹¹

¹¹ Helm 2006:174.

The Good: Theoretical market-based solution

MBIs can reduce the risk of capture. Traditional C&C instruments rely heavily on information provided by regulatees in setting and enforcing rules.¹² The case of greenhouse gas emissions (GHG) from industrial emitters is illustrative of the problem with using C&C instruments to address environmental problems where abatement costs are heterogeneous and the social costs of pollution are uniformly mixing (i.e. not localized). Regulatory design requires knowledge of the marginal abatement costs for each installation, so that efficient output levels can be set. The technical expertise for this analysis, which firms hold, provides incentives for them to reveal information strategically in order to benefit from less stringent rules or regulations that create barriers to market-entry that reduce competition.¹³ Technical experts become invaluable to both firms and regulators. This information asymmetry promotes revolving-door career paths between the regulator and regulatees, which furthers the cosy-relationships that contribute to capture.¹⁴ However, not all MBIs reduce capture as effectively.

Capture is more likely using quantity-based (ET) rather than price-based (carbon taxes) MBIs, because setting and allocating quantities is more information intensive.¹⁵ Even between emissions trading regimes, a similar choice presents itself. A baseline-and-credit model requires knowledge of output levels. Permits are often grandfathered based on historical emissions with gradual abatement target reductions over time. Firms can then use this informational advantage to game the allocation system.¹⁶ The alternative cap-and-trade model, if permits are completely auctioned, does not require knowledge of

¹² Baldwin and Cave 1999:36.

¹³ Sunstein 1990:433.

¹⁴ Helm 2006:179.

¹⁵ Ibid.:180.

¹⁶ Baldwin 2008:265.

pollution abatement costs for each installation. This reduces the information asymmetry and rent-seeking potential.¹⁷ Harnessing markets provides other co-benefits.

MBIs promote allocative efficiency better than C&C regulation.¹⁸ This is because MBIs incentivize behavior through market signals rather than explicit directives which is the approach of C&C instruments (e.g. methods and levels of pollution control). MBIs harness market forces because pollution abatement is motivated by self-interest that in aggregate can also meet collective policy goals.¹⁹ For example, emissions trading provide incentives to exceed abatement targets because excess permits can be sold. In contrast, C&C instruments provide less flexibility and tend to force firms to take on similar pollution-control burdens regardless of costs.²⁰

MBIs are said to promote dynamic efficiency (technology) better than C&C instruments because it provides incentives for firms to find cheaper abatement methods and sell excess permits on the market. However, very little empirical evidence supports this theoretical claim.²¹ In fact a recent analysis by Driesen finds that MBIs promote expensive innovation less often than C&C approaches.²²

MBIs also have the advantage of implementability. The theoretical qualities of efficiency endear MBIs to stakeholders who often prefer them to blunt C&C mechanisms.²³ However, a distinction must be drawn between carbon taxes, which are less popular with voters, and ET schemes which can be a politically invisible stealth tax that industry

¹⁷ Helm 2006:180; Baldwin 2008:266

¹⁸ Bohm and Russel 1985:395-460.

¹⁹ Stavins 2002:1.

²⁰ Ibid.

²¹ Stavins 2005:71.

²² Driesen 2007:454.

²³ Michaelowa 1998b:253; Baldwin 2008:264.

supports because of potential profits from trading and rents.²⁴ ET also provides a readily available mechanism for capital to flow between developed and developing countries through the Clean Development Mechanism (CDM) or Joint Implementation (JI) of the Kyoto protocol and therefore lends itself more easily to the emergence of a global carbon price and therefore a global deal on climate change.²⁵ However, the price stability of a carbon tax and the severe exposure of ET to rent-seeking, have converted many experts to the idea of a global carbon tax or hybrid system instead.²⁶ Nevertheless, the potential for policy lock-in which ET provides is highly alluring for policymakers in countries like America and Australia where interest groups have blocked the formulation of policy, and continue to block legislative conversion of policy.²⁷ ET can turn foes into friends, by paying-off political opponents with free permits and creating new vested interests that have a stake in carbon markets. For example, the commoditization of carbon becomes an asset for regulated firms to bank and borrow across phases and the emergence of a burgeoning financial services sector that supports carbon trading is a powerful ally to further institutionalize the reform. Ring fencing auctioning revenues for the green economy can also create new policy supporters.²⁸ Policymakers can be further converted to ET if it can be demonstrated that this policy is redeemable from its “original sin” and regulatory failure can be designed-out over time.²⁹

²⁴ Baldwin 2008:262; Helm 2010:188-89.

²⁵ Stern 2009:106, 163; Stavins 2009:221.

²⁶ Helm, 2010b:54-64.

²⁷ Lizza 2010.

²⁸ Helm 2009a:230; Helm 2010a:190.

²⁹ Drew 2010.

The Bad: Practical problems with ET

In practice, the European Emissions Trading Scheme (EU ETS) has suffered serious problems that validate the Public Choice and Hayekian arguments outlined above. The allocation of emissions permits (EUAs) in Phase 1 and 2 of EU ETS (2005-2012) was free and based on historical emissions (grandfathered) rather than auctioning. Member states determined the level of the cap and allocation methodologies; subject to EU approval.³⁰ Public choice predictions that firms would lobby to minimize climate policy costs or gain additional rents is confirmed by the large windfall profits of electricity generators who passed-on the nominal cost of permits to consumers.³¹ Estimated windfall profits for UK generators in 2007 were €1.76 billion.³²

Hayekian predictions of insurmountable informational asymmetries contributed to another system flaw: the over-allocation of EUAs. This caused their price to crash after April 2006 for the rest of Phase 1. It also contributed to the UK exceeding its Phase 1 cap by 30 million tons of CO₂, because low EUA prices provided the wholesale electricity market with no incentive to continue burning costly gas, reverting to coal instead.³³ Setting national EU ETS caps was challenged by significant informational asymmetry for gathering data on actual emissions of regulated installations.³⁴ It also provided incentives for member states to protect national industries by over-allocating EUAs.³⁵ This rent-seeking venue shopping dynamic, was a common feature of the EU ETS lobbying process. Prompted by powerful domestic lobbies, Germany and UK were critical of auctioning and a centralized allocation method in the original EU Commission proposal, which resulted in the

³⁰ Ellerman and Joskow 2008:37.

³¹ Michaelowa 1998b:253.

³² Wettestad 2007:3.

³³ Euractiv.com 2009.

³⁴ Betz and Sato 2006:354; Grubb and Ferrario 2006:498.

³⁵ Svendsen 2005:157; Skjærseth and Wettestad 2008:188.

abandonment of these methods for Phase I.³⁶ For Phase I, the electricity sector was required to do the heavy abatement lifting but received free permits and expected windfall profits, while the number of energy intensive industries covered by the EU ETS was narrow. Free permits and over-allocation helped ease the adjustment to an unstable carbon price for all these firms.³⁷

³⁶ Skjaerseth & Wettestad, 2010:67.

³⁷ Drew 2010.

The Ugly: Policies prompted by EU ETS failures

Carbon price instability is a major feature of the EU ETS. For MBIs to efficiently drive decarbonisation of the economy, carbon prices need to be much higher than EU ETS policymakers, who suffer from informational asymmetry, have been able to provide. This failure has spawned a number of ancillary policies designed primarily to drive renewable energy and energy efficiency. The so-called 20-20-20 programme was launched by the EU in January 2008. Its policy goal is for the EU to achieve by 2020: (1) a 20 per cent greenhouse gas (GHG) reductions according to 1990 levels; (2) source 20 per cent of its energy from renewables; and (3) achieve a 20 per cent improvement in energy efficiency. These rather arbitrary matching targets were highly motivated by the politics of EU climate leadership for Copenhagen COP-15. The target has much less to do with what is achievable, cost-effective or a proportionate response to the problem of climate change.³⁸

Aside from the political motivations for ancillary policies, it is curious from a theoretical standpoint, why renewable and energy efficiency targets are necessary if the EU ETS can be optimized. In theory, a high enough carbon price could drive sufficient investment in renewables. Also, as a market-mechanism, ET is more efficient than a renewable target because the price mechanism more effectively discovers the relative costs between renewable and non-renewable technologies. A renewables target, instead assumes that policy-makers have overcome the Hayekian “knowledge problem” and have magically discovered the relative costs to be precisely 20 per cent.³⁹

Aside from the definitional problem of whether the term “renewable” includes nuclear energy, the justification for renewables targets - if one assumes they are not purely

³⁸ Helm 2009a:227.

³⁹ Helm, 2009a:233-37.

political - must rest on other market failures. The argument is advanced that renewables are “infant industries” and that there are “non-carbon” problems and advantages with their deployment. For example, the transmission and distribution networks for a decentralized, bottom-up generating system do not exist and renewable energy provides the co-benefit of security of supply. Both these arguments are subject to criticism. In the UK for example, the Renewables Obligation and Feed-in-Tariffs have primarily been targets for mass deployment of known technologies not infant industries. It is also clear that the result has been much less efficient than if renewable energy were driven by a high carbon price. For instance, the prioritization of wind energy has driven up the renewables costs significantly and may artificially bias against non-renewable low carbon technology like nuclear energy.⁴⁰

Energy efficiency targets have similar justifications. There are significant market failures which inhibit the take-up of energy efficiency investments. However this is only justified if the EU ETS price of carbon does not accurately represent the social marginal cost of carbon - i.e. permits prices are too low - which indeed they are. Other arguments have been advanced to explain why rational consumers and firms ignore the high positive net present value of energy efficiency measures.⁴¹ Explanations for this phenomenon are complex but can be briefly summarized as: (1) there are hidden costs associated with energy efficient improvements; and (2) rebound effects of energy efficiency improvements lead to less energy savings than anticipated.⁴²

In terms of hidden costs, the literature of transaction costs economics warns that individuals make satisfactory rather than optimal decisions. There are costs associated with information gathering, transacting and agency costs typified by the landlord-tenant

⁴⁰ Ibid; McIlveen 2010:8.

⁴¹ Helm 2009a:237.

⁴² Sorrell 2009:341.

relationship that impede cost-effective energy efficient investments. For instance, a landlord has few incentives to invest in insulation if their tenants pay the energy bills. Regulating information disclosure such as appliance labelling or efficiency audits/ratings for rental properties or banning the sale of incandescent lighting can help individuals overcome these costs. Behavioural economics provides another perspective. This literature informs that human decision making is systematically biased in favour of the status quo and that individuals are fundamentally loss-averse. It may explain why consumers are reluctant to make large up-front capital investments for roof insulation or window replacements despite their high positive net present value. Introducing pay-as-you-save schemes could help overcome these behavioural biases.⁴³

Rebound effects are the behavioural responses to lower cost energy services such as replacing gas-guzzling SUVs with a more fuel efficient model only to drive further and more often. The extent to which rebound effects occur is still unclear, however a proposed solution is to ensure the cost of energy services remains relatively constant by adjusting ET to ensure carbon prices increase at a rate sufficient to accommodate both income growth and rebound effects.⁴⁴

Therefore, renewable energy and energy efficiency policies require at minimum a stronger price signal from the EU ETS and in some cases a policy instrument mix to overcome the multiple market failures at play. However, this strong role for the EU ETS cannot escape the Hayekian “knowledge problem” of adjusting for the marginal social cost of carbon to achieve desired policy objectives and overcoming the noise caused by rent-seeking interest groups in the process.

⁴³ Ibid.:342-351.

⁴⁴ Ibid.:355-361.

In practice, the combination of regulatory tools has often been clumsy and inefficient, largely because the EU ETS carbon price has had little teeth. For example, the UK's climate policy has been described as a "tangled web" rather than a coherently designed system because politicians have incrementally added elements over time.⁴⁵ Electricity generation is the main focus of this muddle and its regulatory framework is currently under review. In 2009, consumer prices incorporated the EU ETS, the Renewables Obligation and were also intended to internalise the Carbon Capture and Storage Levy and the costs of Feed-in-Tariffs for micro generation. Many businesses are also subject to a Climate Change Levy and a Carbon Reduction Commitment in addition to, of course, policies reflected in energy costs. This complexity has come at the price of efficiency. A 2010 report by the think tank Policy Exchange found that the Renewables Obligation and Feed-in-Tariffs are an order of magnitude more expensive per tonne of carbon saved than the EU ETS.⁴⁶

But the EU ETS in its current form appears to be no panacea. Indeed some commentators recommend abolishing it (along with feed-in-tariffs and the renewables obligation) and replacing it with a carbon tax. This is because a carbon tax appears to be less prone to rent-seeking, provides price stability, allows for tax shifting away from "goods" (like labour, capital) to "bads" (like pollution, carbon) and tax shifting from production to consumption of carbon. A carbon tax could also provide the co-benefit of an income source for deficit reduction. However, because of the strong vested interests created while institutionalizing the EU ETS, such a radical reform is impractical. Instead, a more realistic policy objective is to support the EU ETS with a tax that provides a floor for the carbon price. This more modest approach would avoid the political risks associated with replacing an unpopular EU ETS with a predictably more unpopular tax,

⁴⁵ McIlveen 2010:7.

⁴⁶ Helm 2010b; McIlveen 2010.

and minimize the inevitable rent-seeking which a carbon tax would also engender. For instance, there would inevitably be a search for rents in how the tax base is defined (who is excluded), what the tax rate is (who has a lower rate), and how the proceeds are spent (how revenues are hypothecated to benefit which lobby).⁴⁷

The UK government has recognized the cost and complexity challenges of its renewable energy policy. It is proposing a series of electricity market reforms that would replace many of the existing policies and could include: (1) a carbon floor price; (2) long-term contracts for low carbon generation through a “contract for difference” feed-in tariff; (3) additional payments to encourage the construction of reserve plants or demand reduction measures; and (4) an emissions performance standard that will reinforce the existing requirement that no new coal-fired station is built without carbon capture and storage.⁴⁸

Despite the multiple unintended consequences of the EU ETS, Phase 1 and 2 did lead to modest abatement.⁴⁹ The government failures of these phases provided the impetus for changing allocation rules in Phase 3 (2012-2020) and moving towards a cap-and-trade model with full auctioning. Policymakers appear to understand the rent-seeking dynamics of ET and are gradually optimizing the system. Rent-seeking is to a great extent controlled and strategically tolerated to further the goal of institutionalization.⁵⁰

It is clear from the above discussion, that the EU ETS's past failures have bred a number of sub-optimal support policies that in the presence of a high, and stable carbon price, are redundant. Shifting completely to a carbon tax is likely to be accompanied by its own host of unintended consequences, which could possibly be worse than policy results for EU ETS Phase 1 and 2. A hybrid system is not only practical, but is prudent given the

⁴⁷ Helm 2010b:54-64.

⁴⁸ UK Electricity Market Reform Consultation Document 2010:4-8.

⁴⁹ Ellerman and Buchner 2008:285; Skjærseth and Wettstad 2008:287; Ellerman et al. 2010:191.

⁵⁰ Drew 2010.

rent-seeking which has already occurred and the systemic “knowledge problem” faced by policymakers.

The Redemption: Optimizing MBI policies, phase 3 EU ETS improvements

In June 2009, the EU ETS Phase 3 legislative process concluded and made significant changes that may improve future EU ETS performance. For example, new rules require 100 per cent auctioning for electricity generators in most EU countries. This removes risks of windfall profits, but exceptions to auctioning were made for Baltic installations that are poorly integrated into the European electricity grid (and which fear leakage to Russian production) and for installations that individually provide more than 30 per cent of national electricity in countries with relatively low GDP, like Poland. However, these exceptions expire in 2020. Moreover, total auctioning levels will be ~50 per cent compared to a maximum of 5 per cent and 10 per cent in Phase 1 and 2 respectively. Cap levels and EUA allocations will no longer be left to member states. Instead, they will be centralized at the EU level and allocated on the basis of harmonized rules driven by an adjustable EU target of 20 per cent reductions by 2020 compared to 1990 levels. Also, industries that successfully lobbied for exclusion in Phase 1 (aluminium and chemicals) will be included, as will aviation and other transportation sectors. But Phase 3 rules did not escape the influence of special interests.⁵¹

Energy intensive industries successfully lobbied for free permits and a formula that identifies industries at risk of carbon leakage.⁵² Their case was supported by a number of key countries in which these industries are located, such as Germany.⁵³ These industries are concerned that carbon-pricing in the EU will encourage the displacement of energy intensive industries to countries with no similar regulation, and that such a policy will have

⁵¹ Directive EC/2009/29; Directive EC/2008/101; Commission MEMO/08/796; Drew 2010; Skjoerseth & Wettstad 2010:72.

⁵² Defined as the "relocating of GHG activities from the EU to third countries thereby increasing global emissions".

⁵³ Skjoerseth & Wettstad 2010:67.

no impact on global emissions. The new rules for these industries require strict benchmarking (best practices) for the initial free allocation. The threshold formula to qualify for free permits is also very onerous. Because these industries are exposed to global competition, they cannot in theory pass-on the nominal costs of EUAs to consumers as the electricity generators did in Phase 1 and 2. Emissions trading will still provide incentives for these industries to beat abatement targets and not exceed free allocations because they can buy and sell EUAs on the secondary market. Nevertheless, the current validity of carbon leakage arguments suggests energy intensive industries may have exaggerated the need for free allocations.⁵⁴

⁵⁴ EndsReport 2007:number 394:36-38; EndsReport 2008:number 400:32-35; Grubb & Droege 2010.

The Fallout: A second round of capture?

The debate on carbon leakage is very complex and briefly outlined below. Oxford Economics predicts that moving to 100 per cent auctioning with a carbon price of €25/ton will cut EU GDP by 0.5 per cent in the medium to long term.⁵⁵ However, a more moderate analysis by the Carbon Trust concludes that only the cement, steel and aluminium sectors are exposed.⁵⁶ Others such as Barker, Junankar et al. and the IPCC believe that carbon leakage will only have minimal effects, similar to variations in exchange rates.⁵⁷ Indeed Reinaud found no EU ETS impact on carbon leakage and a recent report by Climate Strategies warns of future regulatory failures with free allocations to energy intensive industries.⁵⁸ Quantifying carbon leakage is challenging, particularly because member states will push for protecting domestic industry and evidence is only certain once displacement occurs. This is confirmed by the final list of exposed industries, which contains more than conservative prescriptions recommend.⁵⁹ Other risks include the economic and political fallout of border taxes on the carbon footprints of imports to prevent carbon leakage.⁶⁰ Failure to conclude a robust global agreement at Copenhagen in 2009 did not trigger the review clause of this carbon leakage list as may have been intended by policymakers.

Rent seeking may have also been enhanced by the requirement to earmark auctioning revenues for climate related purposes, which will create a large pork barrel to compete for. It could also potentially lead to what Hayek warned against in the “knowledge problem”; that insurmountable information asymmetries make any attempt to pick

⁵⁵ Oxford Economics 2007:4.

⁵⁶ Carbon Trust 2007:1.

⁵⁷ Barker, Junankar et al. 2007:6291; IPCC 2007:12; EndsReport 2007:number 394:37.

⁵⁸ Reinaud 2008:2; Droge 2009:6.

⁵⁹ Commission Decision 2010/2/EU.

⁶⁰ Economist 2009.

industrial winners a doomed strategy.⁶¹ The UK experience with its Renewables Obligation is illustrative of the problem of rent-seeking resulting from favouring one renewable technology over others and the cost implications of poorly designed decarbonisation policies.⁶²

The UK's Renewables Obligation is a subsidy to renewable energy because it places an obligation on suppliers to purchase a fixed quantity of electricity from a particular energy source. It provides a financial incentive to invest in renewables by placing an obligation on electricity suppliers to source a certain proportion of the electricity they sell to customers from renewable sources. Renewable energy generators receive certificates, known as Renewables Obligation Certificates (ROCs) for the renewable electricity they produce, and can then sell these to electricity suppliers, who use them to meet their obligations. They demonstrate this by submitting the ROCs they have bought. If electricity suppliers are unable to present ROCs for the whole of the specified amount of electricity, they have to pay a penalty. These payments are redistributed to suppliers who did present ROCs. It is this redistribution that provides the incentive for suppliers to present ROCs rather than simply paying the buy-out price. ROCs can be sold with or without the electricity they represent, meaning that they provide generators with financial support above what they receive from selling their electricity in the wholesale market. Different technologies receive different numbers of ROCs, to account for differences in technology costs.⁶³

The British Renewables Obligation has been severely criticized for being both inefficient and ineffective. It is inefficient because the definition of “renewable” involved picking winners and was a political decision that discriminated against non-renewable, low carbon

⁶¹ Helm 2009a:230; Helm 2010a:191.

⁶² Helm 2008.

⁶³ UK Low Carbon Transition Plan, 2009:59.

technologies like nuclear or carbon capture and storage (CCS). An alternative low carbon obligation, which would include nuclear, and CCS projects, would be much more cost-effective.⁶⁴ The lobbying winner was clearly the wind industry which secured receipt of cash for ROCs not on the basis of its costs, but based on the wholesale electricity price and the scarcity of renewables generation relative to the target (the gap between which the government guaranteed to perpetuate). This policy design has resulted in the most expensive renewable energy support scheme outside Italy. It is one order of magnitude more expensive than the EU ETS.⁶⁵ The renewables obligation has also been ineffective, because it has not provided the regulatory framework necessary for critical nuclear investment in the UK. The numbers speak for themselves, the renewables obligation came into effect in 2002 but in the UK's current level of renewable electricity use is 6 per cent. It is clear that relying on the renewables obligation to meet the UK's renewable energy target of 15 per cent (as part of the EU's 20-20-20 goal) will be very difficult and expensive.⁶⁶

Alternatives to the UK renewables obligation architecture do exist. The EU has found that well designed feed-in tariffs, where a generator receives a fixed price for each unit of output, have generally been both more effective and more efficient than obligation schemes as demonstrated in Germany's feed-in tariff for solar energy which has been effective in developing 3.6 GW of new capacity.⁶⁷ Any properly designed feed in tariff should offer a level playing field to all low carbon technologies. However, the UK's current attempt at a feed-in-tariff for microgeneration is very expensive and does not contribute significantly to GHG mitigation.⁶⁸ The recent energy market reform proposals which are likely to replace the renewables obligation with: (1) a feed-in-tariff; (2) carbon-price floor;

⁶⁴ Helm, 2008:50; Helm 2009b: 256.

⁶⁵ Helm 2010b:8; Helm 2010a:191.

⁶⁶ UK Renewable Energy Strategy 2009:9; Green 2009:285; Conservative Party 2010:3; Helm 2008:8.

⁶⁷ Green, 2009: 297-98.

⁶⁸ McIlveen 2010:11.

and (3) additional payments to encourage the construction of reserve plants, should be a significant improvement on the current policy muddle.⁶⁹

It is clear from the above discussion that the regulatory architecture of Phase 3 is an improvement to Phase 1 and 2, but that the risk of regulatory failure still looms. In particular, the risk of windfall profits in Phase 3 has not disappeared, and the potential for rent-seeking has been shifted from free-permit allocations to ring-fencing auctioning revenues for green technologies. The policy muddle resulting from the failure of the EU ETS to provide a high stable carbon price also lingers.

⁶⁹ UK Electricity Market Reform Consultation Document 2010:4-8.

The Reconciliation: Lessons from phase 3

Public choice presents a bleak picture of public policy prospects. If regulation is always a function of the “original sin” what explains the movement towards potentially improved emissions trading policy from Phase 1 to Phase 3? Some of the answers to this question are found in a small body of literature that explains policy reform; and which match the phenomenon witnessed in the EU ETS. Patashnick surveys this literature and outlines three conditions for policy reform to benefit a broad constituency at the expense of narrow special interests.⁷⁰ Firstly, policy entrepreneurs must lower the information costs to mass publics by linking reform solutions to salient issues. In Phase 1, the commission and member states pursued this strategy by linking emissions trading with GHG mitigation policy to institutionalize the EU ETS. It was also a strategy to empire build from Brussels and establish global European leadership on climate change.⁷¹ In Phase 3, NGOs, energy intensive industries and the media acted as policy entrepreneurs when they explained the link between higher energy prices and windfall profits to a very receptive public. The second condition is that reform proponents must adopt procedural strategies to weaken the organizational advantages of narrow groups. In Phase 1, energy generators held a Hayekian informational advantage, because some (such as BP and EURELECTRIC) had experience with emissions trading and advised the commission on the EU ETS design.⁷² This provided them with an insider status *vis a vis* other regulated industries and helped them hide (or overlook) the risk of windfall profits. In Phase 3, however, energy intensive industries dominated the agenda, by providing the commission with information about risks of carbon leakage and setting up the High Level Group on Competitiveness, Energy and the Environment which facilitated the dialogue between energy intensive industries and policymakers. They also dominated the European Climate Change Program meetings,

⁷⁰ Patashnick 2008: chapter 2.

⁷¹ Egenhofer 2007; Braun 2008.

⁷² Ibid.

which was the primary institution for stakeholder input; outnumbering energy generators by three to one in Phase 3.⁷³ The last condition was also satisfied: reform advocates must use tactical concessions to neutralize political opposition and disrupt coalitional patterns to stimulate the emergence of new vested interests and political alliances. In Phase 1, the commission secured the support of the largest emitting group (electricity generators) through permit allocations that gave them short-term windfall profits and turned carbon into a commodity they now own. In Phase 3, it developed free EUA allocation formulas for a broader scope of energy intensive industries to be regulated and included provisions to compensate them for higher energy costs. This secured the continued support of these industries for the EU ETS. In addition, as discussed above, the regulatory framework supporting the carbon market has created a large new political constituency of financial services and green technology firms with incentives to lobby for the retention and development of the EU ETS. Although this three pronged approach appears straightforward, it too is necessarily subject to the risks of government failure.

⁷³ Gullberg 2008; Wettestad 2008.

Avoiding the Ugly: Hayekian lessons for policy reform

The Hayekian “knowledge problem” is highly relevant to any government strategy for policy reform. The first condition (policy entrepreneurs lowering information costs to mass publics and linking policy reform to salient issues) is uncontroversial, particularly since governments hold no monopoly on policy entrepreneur activity. However, the second and third conditions (adopting procedural strategies and paying-off political opposition), resembles the failed strategy of picking winners in industrial policy caused by the Hayekian “knowledge problem”.⁷⁴ It also - as EU ETS Phase 1 and 2 demonstrate - can lead to government failures with significant unintended consequences. Procedural strategies should therefore weaken any one group’s grip on government policy, not empower one group over another. Paying-off political opposition faces another “knowledge problem”: identifying credible opponents that have the most to lose with new reforms - which justifies some compensation in the transition to a low carbon economy. The EU ETS demonstrates this conundrum. Energy generators in Phase 1 were the largest emitters, securing their support was crucial, but these industries can pass-on permit costs to consumers and can therefore manage carbon pricing regulation. Many energy intensive industries, on the other hand, cannot. These industries should have been “paid-off” in Phase 1, not the electricity generators.

While the EU ETS is an excellent case study for how to lock-in and optimize ET, which is a significant political advantage over a carbon tax, this potential must be assessed in light of broader policy complexity that has resulted from its lacklustre performance. There is undoubtedly a Hayekian “knowledge problem” with institutionalizing and optimizing the EU ETS, but these appear to be manageable. What appears to be less manageable is

⁷⁴ Robinson 2008:59.

controlling the proliferation of less efficient regulatory tools to compensate for the low carbon price, which the gradual ratchet optimization approach described above entails.

The UK's energy policy is a clear example of the downside risks associated with a low carbon price in the context of a very ambitious decarbonisation programme. Policymakers still do not fully understand the efficiency dynamics of multiple policy interactions, and are ill equipped to control the rent-seeking endemic in the more C&C target based programmes for renewable energy. Earmarking auctioning revenues for green technologies in Phase 3 risks proliferating more of these policies, particularly if earmarking is poorly designed.

To minimize the Hayekian "knowledge problem" and resulting capture of any ancillary support policies to the EU ETS, their implementation should be: (1) sanctioned by an independent body to provide expert credibility like the UK Climate Change Committee; (2) use MBIs to reduce information asymmetry and capture, in this case a carbon tax is highly suitable; and (3) avoid complexity to reduce the information asymmetry between government and vested interests that make the system easier to game.⁷⁵ It appears that the UK may adopt this approach with its proposed energy market reform.

Countries considering and attracted to ET because of its implementability and potential for optimization should aim for a hybrid system where a carbon tax provides a floor price to permits. This would provide simplicity, credibility and commitment, particularly if the tax is set according to the recommendations of an independent body of experts with a strong indication of the direction and levels of future carbon taxes. While independent experts will never completely overcome the "knowledge problem" a policy designed in

⁷⁵ Helm 2010a: 193-95.

this way would minimize capture and appears, at present, to be the least worst available option.⁷⁶

⁷⁶ Helm 2010b:55.

Conclusion

Phase 3 EU ETS EUA allocation rules are cause for optimism because they demonstrate that MBIs can be improved over time. Specifically, the level of rent seeking, to which emissions trading is so disposed can be incrementally reduced in the medium-term. This provides an example of where public choice fails to predict policy change. However, the evaluation of Phase 3 performance requires attention to how these new rules will work in practice, particularly the policies for industries at risk of carbon leakage. Final judgment cannot be made until Phase 3 evidence is gathered and analyzed. This potential allocation rule improvement will strengthen arguments against returning to the failed industrial policies and top-down C&C approaches of the past and provides a case study for how ET can deliver the co-benefit of implementability. But, the irony of proliferating sub-optimal EU ETS support policies, is not lost on reformers with preferences for ET. The practical effect of paying-off opponents with permits and gradually tightening the rules to reach a sufficient carbon price is a risky rent-seeking proposition, particularly if decarbonisation targets in the near term are very ambitious. In some cases this ET strategy for climate policy lock-in may be highly counterproductive.

In addition, any approach to policy reform must pay careful attention to the Hayekian “knowledge problem”, because attempts at procedural reforms or payoffs to neutralize vested interests to avoid “the bad” and the “ugly” of ET policy may do more harm than good which would further discredit the use of this potentially optimal regulatory instrument.

Bibliography

- Baldwin, R. and Cave M. (1999). *Understanding regulation : theory, strategy, and practice*. Oxford ; New York, Oxford University Press.
- Baldwin, R. (2008). "Regulation Lite: The Rise of Emissions Trading." *Law and Financial Markets Review* 2(3): 262-278.
- Barker, T., Junankar, S. et al. (2007). "Carbon leakage from unilateral Environmental Tax Reforms in Europe, 1995–2005." *Energy Policy* 35: 6281-6292.
- Betz, R. and Sato, M. (2006). "Emissions trading: lessons learned from the 1st phase of the EU ETS and prospects for the 2nd phase." *Climate Policy* 6: 351-359.
- Bohm, P. and Russel, C. (1985). "Comparative analysis of alternative policy instruments" in Kneese, A. and Sweeney, J. (eds) *Handbook of natural resource and energy economics*. Amsterdam, Netherlands, Elsevier. 1: 395-460.
- Braun, M. (2008). "The evolution of emissions trading in the European Union-The role of policy networks, knowledge and policy entrepreneurs." *Accounting, Organizations and Society* doi:10.1016/j.aos.2008.06.002: 1-19.
- Breyer, S. G. (1982). *Regulation and its reform*. Cambridge, Mass.; London, Harvard University Press.
- Carbon Trust (2007). *EU ETS impacts on profitability and trade: A sector by sector analysis*. London, Carbon Trust: 1-9.
- Conservative Party (2010). *Rebuilding Security: Conservative Energy Policy for an Uncertain World*. London, Conservative Party.
- Driesen D.M. (2007). "Design, Trading, and Innovation", in Freeman J. and Kolstad C.D. (eds.), *Moving to Markets in Environmental Protection: Lessons from Twenty Years of Experience*. Oxford: Oxford University Press: 436-469.
- Droge, S. (2009). "Tackling Leakage in a World of Unequal Carbon Prices". *Climate Strategies Working Paper*: Cambridge, UK, Climate Strategies: 1-93.
- Drew, A. (2010). "New rules, new politics, same actors: Explaining policy change in the EU ETS". *LSE Grantham Research Institute on Climate Change and the Environment Working Paper* No. 29.
- Economist (19 March 2009). "Green with Envy: The Tension Between Free Trade and Capping Emissions" *The Economist*.
- Egenhofer, C. (2007). "The Making of the EU Emissions Trading: Scheme: Status, Prospects and Implications for Business." *European Management Journal* 25(6): 453-463.

- Elleman, A. D. and Buchner, B. K. (2008). "Over-allocation or Abatement: A Preliminary Analysis of the EU ETS base on the 2005-06 Emissions Data." *Environment and Resource Economics* 39: 267-287.
- Elleman, A.D. and Joskow, P.L. (2008). *The European Union's Emissions Trading System in Perspective*, Pew Center on Global Climate Change (May), Washington, D.C.:1-54.
- Ellmerman, A.D., Convery, F.J., Perthuis C D et al. (2010). *Pricing Carbon: The European Union Emissions Trading Scheme*. Cambridge, Cambridge University Press.
- EndsReport (2007). What price the cost of carbon? *Ends Report*. 394: 36-39.
- EndsReport (2008). Weighing the carbon cost to heavy industry. *Ends Report*. 400: 32-35.
- Euractiv.com. (2009). "EU Emissions Trading Scheme." EU Emissions Trading Scheme Retrieved September 17, 2009, from <http://www.euractiv.com/en/climate-change/eu-emissions-trading-scheme/article-133629>
- Gurría, A. (5 November 2009). "Carbon Has No Place in Global Trade Rules" *The Financial Times*.
- Green, R. (2009). "Climate-change Mitigation from Renewable Energy: Its Contribution and Cost" in Helm, D. and Hepburn, C. (eds). *The Economics and Politics of Climate Change*. Oxford, Oxford University Press: 284-302.
- Grubb, M. and Ferrario, F. (2006). "False confidences: forecasting errors and emission caps in CO2 trading systems." *Climate Policy* 6: 495-501.
- Grubb, M. and Droege, S. (July 14 2010). "A Carbon Giveaway Europe Cannot Afford". *The Financial Times*.
- Gullberg, A. T. (2008). "The European electricity sector and the EU ETS review". *CICERO Working Paper* 2008:01. Oslo, Center for International Climate and Environmental Research: 1-14.
- Hayek, F. A. v. (1945). "The Use of Knowledge in Society." *The American Economic Review* 35(4): 519-530.
- Helm, D. (2006). "Regulatory Reform, Capture and the Regulatory Burden." *Oxford Review of Economic Policy* 22(2): 169-185.
- Helm, D. (2008). *Credible Energy Policy: Meeting the Challenges of Security of Supply and Climate Change*. London, Policy Exchange.
- Helm, D. (2009a). "EU Climate-change Policy—A Critique." in Helm, D. and Hepburn, C. (eds). *The Economics and Politics of Climate Change*. Oxford, Oxford University Press. 222-244.
- Helm, D. (2009b). "Nuclear Power, Climate Change, and Energy Policy"" in Helm, D. and Hepburn, C. (eds). *The Economics and Politics of Climate Change*. Oxford, Oxford University Press. 247-262.
- Helm, D. (2010a). "Government failure, rent-seeking, and capture: the design of climate change policy" *Oxford Review of Economic Policy* 26(2): 182-196.

Helm, D. (2010b). "The Case for Carbon Taxes" in Less, S. (ed) *Greener, Cheaper*: Policy Exchange, London.

IPCC (2007). Summary for Policymakers. Climate Change 2007: Mitigation. Contribution of Working Group III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. B. Metz, O. R. Davidson, P. R. Bosch, R. Dave and L. A. Meyer. Cambridge, UK, Cambridge University Press: 1-24.

Lizza, R. (2010). "As the World Burns: How the Senate and the White House missed their best chance to deal with climate change". *The New Yorker* (October 11)

Mcllveen, R. (2010). "Cutting the Cost of Cutting Carbon" in Less, S. (ed) *Greener, Cheaper*: Policy Exchange, London.

Michaelowa, A. (1998a). "Impact of Interest Groups on EU Climate Policy." *European Environment* 8: 152-160.

Michaelowa, A. (1998b). "Climate Policy and Interest Groups-A Public Choice Analysis." *Intereconomics* (November/December): 251-259.

Oxford_Economics (2007). *Report on modelling the macroeconomic competitiveness impacts of EU climate change policy*. London, Oxford Economics: 1-54.

Patashnik, E. M. (2008). *Reforms at risk: what happens after major policy changes are enacted*. Princeton, NJ., Princeton University Press.

Pennington, M. (2000). *Planning and the political market: public choice and the politics of government failure*. London, Athlone.

Reinaud, J. (2008). "Issues behind Competitiveness and Carbon Leakage: Focus on Heavy Industry". *IEA Information paper*. Paris, International Energy Association: 1-122.

Robinson, C. (ed.) (2008). *Climate Change, Centralized Action and Markets. Climate Change Policy: Challenging the Activists*. London, The Institute of Economic Affairs: 42-67.

Skjærseth, J. B. and Wetttestad, J. (2008). *EU emissions trading: initiation, decision-making and implementation*. Aldershot UK, Ashgate.

Skjærseth, J. B. and Wetttestad J. (2010). "EU Emissions Trading System Revised (Directive 2009/29/EC)" in Oberthur S. and Pallemaerts, M. (eds). *The New Climate Policies of the European Union*. Brussels, VUB Press. 65-93.

Sorrell, S. (2009). "Improving Energy Efficiency: Hidden Costs and Unintended Consequences" in D. Helm and Hepburn, C. (eds). *The Economics and Politics of Climate Change*. Oxford, OUP. 340-361.

Stavins, R. N. (2002). "Experience with Market-Based Environmental Policy Instruments". *Kennedy School of Government Working Paper* No. 00-004. Cambridge, Mass., Harvard: 1-99.

Stavins, R. N. (2005). "Implications of the US experience with market-based environment strategies for future climate policy" in Hansjürgens, B. (ed). *Emissions trading for climate policy: US and European perspectives*. Cambridge, U.K., Cambridge University Press: 63-77.

Stavins, R.N. (2009). "A Comprehensive US Cap-and-trade System" in Helm D. and Hepburn C. (eds). *The Economics and Politics of Climate Change*. Oxford, OUP. 198-221.

Stern, N. (2009). *A Blueprint for a Safer Planet: How to Manage Climate Change and Create a New Era of Progress and Prosperity*. London, The Bodley Head.

Sunstein, C. (1990). "Paradoxes of the Regulatory State." *University of Chicago Law Review* 57: 407-441.

Svendsen, G. T. (2005). "Lobbying and CO2 trade in the EU". in Hansjürgens, B. (ed). *Emissions trading for climate policy: US and European perspectives*. Cambridge, UK, Cambridge University Press: 150-162.

Tullock, G. (1967). "The Welfare Costs of Tariffs, Monopolies, and Theft." *Western Economic Journal* 5: 224-32.

UK Low Carbon Transition Plan: National strategy for climate and energy. (2009). London, HM Government.

UK Renewable Energy Strategy. (2009). London, HM Government.

UK Electricity Market Reform Consultation Document. (2010). London, HM Government.

Wettestad, J. (2007). EU Emissions Trading and Windfall Profits: Unexpected Redistribution about to become History? Memo for CANES meeting. Oslo, Fridtjof Nansen Institute: 1-5.

Wettestad, J. (2008). "EU Energy-intensive Industries and Emissions trading: Losers becoming Winners". *FNI Report 10/2008*, Fridtjof Nansen Institute: 1-21.

Other Sources

Parliament and Council Directive (EC) 2008/101 amending Directive 2003/87/EC so as to include aviation activities in the scheme for greenhouse gas emission allowance trading within the Community [2009] OJ L8/3

Parliament and Council Directive (EC) 2009/29 amending Directive 2003/87/EC so as to improve and extend the greenhouse gas emission allowance trading scheme of the Community [2009] OJ L140/63

Commission (EC), "Questions and Answers on the revised EU Emissions Trading System" (Memorandum) MEMO/08/796, 17 December 2008.

Commission (EC), "Decision Determining, Pursuant to Directive 2003/87/EC of the European Parliament and of the Council, a List of Sectors and Subsectors Which are Deemed to be Exposed to a Significant Risk of Carbon Leakage" (Decision) 2010/2/EU, 24 December 2009.