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1. INTRODUCTION

The European Union Emissions Trading Scheme (EU ETS), which has been up and running since 2005, involves large carbon emitters, including power plants and steel makers. More actors and sectors such as aviation are being brought within its ambit. At first glance, the proposition to also involve individuals in an EU-wide emissions trading scheme seems too academic to be seriously considered in boardrooms or government departments given its seemingly unresolvable economic and ethical problems. The suggestion may also appear to be quite invasive as it evokes thoughts on food rationing, an imposition of 'green' choices, and the potential failure of yet another market-based instrument. But there are also several developments that lend support to the idea of emissions trading for individuals.

First, individuals are already involved in climate-driven market transactions: there are currently dozens of 'carbon card programmes' offered by financial houses and companies in the EU, inviting people to offset their emissions by making 'green' investments.¹ For example, two companies based in Geneva offer a Christmas Offset Package, where, depending on the cost of cards purchased, 0,2 tonnes to 1,25 tonnes of carbon dioxide can be offset.² Second, individuals do already benefit from trading emissions: in some cases, for instance, it is now more profitable for farmers not to cut down trees than to sell wood,³ the financing of which is generated internationally through voluntary carbon markets.⁴ There have been several criticisms, though, directed against the recent inclusion of deforestation in the flexibility mechanisms of the Kyoto Protocol within the United Nations (UN) Framework, given their scope for misuse.⁵ Third, emissions trading for individuals has even entered the policy arena: the Environmental Audit Committee (EAC) of the House of Commons in the United Kingdom (UK), for example, has concluded that involving households is critical for reaching emissions reduction targets, and that a trading system is preferable to other available instruments, although it is seen as politically non-implementable at this moment.⁶

From the above, it is clear that individuals are already engaging in market-based approaches to climate change, and that formal institutions in some countries like the UK are of the opinion that such engagement is crucial for effective action to reduce emissions, if done in a rational manner under regulatory guidance. Therefore, the central question of this paper is: why is

¹ SANDRINE ROUSSEAU, 'An International Survey of Individual Carbon Card Programmes', Report for ADEME, 2010

² Ibid at p. 55

³ SUE NEALS, 'Emissions Trading Scheme: Take a Leaf out of Our Book', *The Australian*, October 12 2011

⁴ VALERIE VOLCOVICI, 'A Slow Start for the Carbon Credit Market', *The New York Times*, July 24 2011

⁵ See for instance ARIANA DENSHAM, ROMAN CZEBINIAK, DANIEL KESSLER, ROLF SKAR, 'Carbon Scam: Noel Kempff Climate Action Project and the Push for Sub-national Forest Offsets', Greenpeace 2010 [Available at: <http://www.greenpeace.org/usa/Global/usa/report/2010/1/carbon-scam-noel-kempff-clima.pdf>]

⁶ Environmental Audit Committee, House of Commons, UK, *Personal Carbon Trading: Government Response to the Committee's Fifth Report of Session 2007-2008*, London, May 26, 2008, 20

emissions trading for energy-end users desirable, how could such a scheme be designed and under what conditions could such a scheme be acceptable? This paper highlights some of the primary issues regarding the possibility of engaging the end-user in a pan-European emissions trading market under legal and regulatory supervision. The approach adopted is largely influenced by Behavioral Law and Economics,⁷ a discipline which maintains a focus on efficiency and incentives by analyzing the economic rationale for and consequences of laws and regulations, while including insights from behavioral sciences such as psychology in order to fine-tune legal design.

This paper is organized around four basic questions: what, why, how and when. Before answering the central question, we begin in Section 2 by defining what we mean when referring to end-user emissions trading ('what'). Section 3 then provides some arguments in support of end-user emissions trading ('why'). Section 4 analyzes various design variants of an end-user emissions trading scheme, including some economic trade-offs and legal problems ('how'). Section 5 centres on the prospects of an acceptable system of end-user emissions trading ('when'). Finally, in section 6, a conclusion is presented.

2. WHAT IS END-USER EMISSIONS TRADING?

In this section we introduce the concept of end-user emissions trading after taking stock of the conceptual variants that have already been articulated in the existing literature on the subject.

2.1 *Personal Carbon Trading*

Current research on emissions trading for energy end-users is focused largely on Personal Carbon Trading (PCT).⁸ The PCT concept is used to describe a set of schemes largely developed by researchers working in energy and environmental research institutes in the UK, a compilation of which has been published in a special edition of the journal *Climate Policy*.⁹ It is also the preferred terminology adopted by the House of Commons' Environmental Audit Committee of the UK Parliament in relation to proposals around end-user emissions trading.¹⁰ The core idea, derived from a combination of David Fleming's idea of conserving fuel by way of a Tradable Energy Quota (TEQ)¹¹ and the Hillman-Fawcett proposal of budgeting of allowances by individuals,¹² is captured by Brohé: "the scheme would be a mandatory cap-and-trade emissions trading system where allowances would be allocated directly to individuals on an equal per-capita basis".¹³ There have been some variations of the PCT proposed, for instance by

⁷ For an overview see CASS R. SUNSTEIN ed. *Behavioral Law and Economics*, Cambridge University Press, 2000

⁸ For a review of research on the subject see GILL SEYFANG *et al.*, 'Personal Carbon Trading: Notional concept or workable proposition? Exploring theoretical, ideological and practical underpinnings, (2007) *Working Paper - Centre for Social and Economic Research on the Global Environment* (1), pp. 1-31

⁹ YAEL PARAG and TINA FAWCETT ed., *Personal Carbon Trading*, Earthscan Climate Policy Series, Oxford 2010

¹⁰ Environmental Audit Committee, House of Commons, UK, *Personal Carbon Trading: Fifth Report of Session 2007-2008*, London, May 26, 2008

¹¹ DAVID FLEMING, *Energy and the Common Purpose: Descending the Energy Staircase with Tradable Energy Quotas*, The Lean Economy Connection, London 2005

¹² MAYER HILLMAN and TINA FAWCETT, 'Living in a low-carbon world: the policy implications of rationing', *Conference Proceedings, UKERC and PSI Seminar*, June 30, 2005

¹³ ARNAUD BROHE, 'Personal Carbon Trading in the context of the EU Emissions Trading Scheme', (2010) *Climate Policy* 10, 462-476 at 463

using an unequal allocation basis, but the central characteristics¹⁴ of setting a national carbon budget, allocating to individuals and requiring surrender of allowances are constant.

There are five features we would like to highlight in PCT schemes: (i) the objective is to reduce the *consumption* of energy and fuel; (ii) the preferred form of allocation and surrender of allowances happens *downstream*, i.e. the unit which gets, trades and surrenders these allowances is the individual; (iii) the *sectors* suggested for inclusion in a PCT scheme are the residential sector and the transport sector as the activities contemplated revolve around household energy consumption and fuel use for personal transport; (iv) the aspect of *cap-and-trade* is what allows this system to be environmentally effective and economically efficient, as an individual would reduce her consumption of energy or fuel to a level where the benefit derived from the final unit of consumption is equal to or greater than her marginal cost of sacrificing such units. This prompts a 'Willingness to Lose' rather than 'Willingness to Pay' framework of measuring utility: studies on 'loss aversion' have shown that people are more likely to pay more to prevent losing something than acquiring it.¹⁵ If she requires to consume more than a predetermined limit (or cap) of total permissible emissions, then additional allowances have to be bought; on the other hand, if she can limit her consumption, then she can sell her excess allowances. Finally, (v) the suggestions till now have been limited to *a national scheme*.

2.2 Other proposed schemes

While the aspects of design will be discussed in greater detail in Section 4, suffice it to say at this juncture that a PCT scheme would generally involve substantial administrative and transaction costs. With a view to reducing such costs integral to the 'downstream' component of the PCT, Sorrell offers an 'upstream alternative' where allowances are surrendered by fossil-fuel producers or suppliers for the carbon contained in their fuel sales instead of by consumers.¹⁶ The involvement of upstream actors is also found, albeit in a different way, in the *cap-and-dividend* and *cap-and-share* proposals. Originally articulated by Barnes,¹⁷ cap-and-dividend is a scheme where all emissions rights are auctioned by governments to fuel suppliers, and the revenue from such auctions are distributed to individuals on an equal per-capita basis. Two American senators have actually tabled a 'Carbon Limits and Energy for America's Renewal Act' based on such a cap-and-dividend system before the Senate, but there has been no progress in this regard.¹⁸ Unlike cap-and-dividend, under the cap-and-share variation individuals are given emission rights for free (or: 'grandfathered') on an equal per-capita basis, which they sell to fuel suppliers via agents such as banks and post offices, and they in turn surrender such allowances.¹⁹ Though in the cap-and-share scheme it is the final consumer who is allocated rights, a robust trading mechanism is not envisaged.²⁰ Woerdman and Bolderdijk have offered a combination of features of the PCT and upstream variants, advocating a 'downstream allocation' and 'upstream monitoring' mechanism, allowing for the involvement of individuals

¹⁴ CATHERINE BOTTRILL, 'Understanding Domestic Tradeable Quotas (DTQs) and Personal Carbon Allowances (PCAs) (2006), *Working Paper- Environmental Change Institute*, Oxford

¹⁵ For a recent review see David L. Greene, 'Uncertainty, Loss Aversion and Markets for Energy Efficiency', *Energy Economics*, Volume 33, Issue 4, July 2011, 608–616

¹⁶ STEVE SORRELL, 'An Upstream Alternative to Personal Carbon Trading' (2010) *Climate Policy*, Volume 10, Number 4, 481-486

¹⁷ PETER BARNES, *Who Owns the Sky: Our Common Assets and the Future of Capitalism* (2001), Island Press, Washington DC

¹⁸ The World Resources Institute has a summary on the Bill [Available at: <http://www.wri.org/stories/2010/02/wri-summary-carbon-limits-and-energy-americas-renewal-act>]

¹⁹ The Cap and Share scheme was developed by Feasta, an Irish organisation. FEASTA, *Cap & Share: a fair way to cut greenhouse emissions*(2008), Feasta, Dublin

²⁰ Ibid

integral to a downstream system, and working towards reducing administrative costs at the same time.²¹

Another upstream model, which consciously distinguishes itself from the PCT model, is the one developed by a conglomeration of Finnish research institutes [hereinafter the “Finnish Proposal”] which involves collection of allowances at a retail level. However, what distinguishes the Finnish Proposal is its attempt to include sectors other than household energy and fuel use (as it refers to “meaningful coverage of products and product groups”²²), primarily foodstuffs. Further, although not expressly discussed in the Finnish Proposal, it has the potential to extend beyond national borders. Thus, although the research concentration till now has primarily been on PCT and its variants, changing some features can give way to different models.

2.3 Towards an End-user Emissions Trading Scheme

For the purposes of this paper, the phrase ‘End-user Emissions Trading’ (EET) will be adopted to prevent confusion with a PCT scheme incorporating the features discussed above. While we agree with the proponents of PCT variants that a cap-and-trade scheme incorporating downstream advantages would be a useful mechanism, we would like to extend the conceptualisation of the ‘end-user’ to introduce the possibility of including other activities within such a scheme. Should an emissions trading scheme for individuals be restricted only to reducing the release of greenhouse gases from energy and fuel consumption, or is there some scope for extending the scheme to include other ‘greener’ choices? Such ‘greener’ choices could well be related to *consumption* (for instance, changes in food habits), *production* (household production of green energy or installation of enabling infrastructure) or *utilization of resources* (changes in land-use or deforestation). This leads to the second possible distinction from PCT, following the objective of the Finnish Proposal, for a scheme to be more inclusive: under EET it is possible for other sectors, specifically agriculture, to be brought within its ambit. And-while we’re on the issue of expansion, we think it’s worthwhile to investigate the possibility of implementing such a scheme on a supranational level involving multiple countries.

Before we move on to the reasons why an EET should merit regulatory consideration, there is one aspect which needs to be discussed. That is *who* would be involved in such a scheme (or: who are the stakeholders)? As would appear from the discussion above, other than proposals to involve wholesalers and retailers, it is individuals who are the unit of concern, and it is their emissions that are meant to be curtailed. There has been debate about whether the allocations should be made to households, as electricity and gas consumption happens at the household level, invoking questions of intra-household distribution and whether children should also be allocated allowances. The case for and complexity in involving individuals goes deep as we will see in the next section, but we would like to note the possibility of involving communities and local governments.

²¹ EDWIN WOERDMAN and JAN WILEM BOLDERDIJK, ‘Emissions Trading for Households? A Behavioral Law and Economics Perspective’ (2010), University of Groningen, Working Paper Series in Law and Economics, http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1636637

²² Ibid at 728

The idea that private governance initiatives i.e. voluntary self-governing co-operative actions are helpful in relation to environmental problems is clear,²³ and in some cases, decentralised public governance such as by local governments could be better suited in terms of both informational advantages and physical infrastructure to motivate long-term behavioral changes among their constituencies.²⁴ In the UK, Community Rationing Action Groups (CRAGs) have also become popular.²⁵ CRAGs are premised on motivating and facilitating co-operative action among carbon conscious people whereby methods to rationally implement emissions reduction activities at an individual and household level are adopted. This is done by methods such as information sharing, appointing a common carbon accountant to price and monitor the emissions of participants and disincentivising emissions by requiring over-emitters to contribute towards a common fund.²⁶ What is especially interesting about the potential of local governments and communities is that they cover various sectors and activities with substantial emissions such as waste management and land-use. In such cases, local governments and communities could be the most effective unit of reducing downstream emissions owing to their economic and administrative proximity to such sectors. If that is so, then could allocating emissions and surrendering from local governments and communities be an option? We would like to argue that, if a system design which allocates to individuals has a certain amount of flexibility for collective action, then private governance initiatives could also be incentivized. The regulatory requirement would be to determine how a reduction of emissions from a whole range of activities could be included within a single scheme of allowance trade.

Thus, the EET as described above may be characterized as a variant of the PCT, but one that extends its geographical and sectoral scope, and makes space for community or collective participation. With the above background on the PCT, EET and related instruments, we can move on to understanding why they merit political, regulatory and legal consideration.

3. WHY DO WE NEED AN END-USER EMISSIONS TRADING SCHEME?

If one were to undertake a thought experiment as to whether end-user engagement with climate change by way of a trading system is a good idea, it would inevitably lead to very basic questions, the first one being, of course, whether climate change is something individuals should be bothered with. In this regard, while there is still some political debate about the extent and urgency of responding to human-induced climate change, a recent literature review shows that a sizable majority of scientists is convinced of such climate change as against natural climate variability, and of the need to respond quickly.²⁷ At the same time, there is no corresponding agreement on how to respond to climate change. Mike Hulme, a distinguished geologist and founder of the Tyndall Centre of Climate Change Research, puts it bluntly when

²³ TRACEY M. ROBERTS, 'Innovations in Governance: a functional typology of Private Governance Institutions' *Duke Environmental Law & Policy Forum*, [forthcoming]

²⁴ KATRINA FISCHER KUH, 'Using local knowledge to shrink the individual carbon footprint' (2009) *Hofstra Law Review*, Vol 37, 923-941

²⁵ RACHEL HOWELL, 'Living with a carbon allowance: the experiences of Carbon Rationing Action Groups and implications for policy' (2012) *Energy Policy*, 41: 250-258

²⁶ *Ibid* at pp. 3-4

²⁷ William Anderegg et. al., Expert Credibility in Climate Change, PNAS 2010 : 1003187107v1-201003187, June 2010. Available at: <http://www.pnas.org/content/early/2010/06/04/1003187107.full.pdf+html> [Accessed: August 5, 2010]

he says there is no economic and scientific consensus about dealing with climate change²⁸, thus rendering responses susceptible to being shaped by popular media²⁹ and social ties.³⁰ This brings us to the second basic question: why should individuals concern themselves with climate change, and, the corollary, is it more an institutional concern? Unfortunately, a rhetorical response to this question would lead to 'polar opposite' views, one being that it is imperative for individuals to 'kick the habit'³¹ to deal with climate change. The other view is that by putting the responsibility on consumers to be 'green', and confining responses to climate change within the sphere of consumption, the actual political and commercial culprits are warding off culpability and costs.³² Given the possibility of our selection-bias to present some opinions over others, a more systematic way of approaching divided opinions is by surveying attitudes, which is discussed further in Section 4. At this point, we would like to submit four reasons why there is need for regulatory attention to some form of an EET scheme: it allows for rational organisation of voluntary 'green' activities, facilitates rational participation in voluntary markets, has complementarities with the EU ETS, and may contribute to attaining energy efficiency.

3.1 Rationalising sustainable engagement

Climate change is now a popular cultural concern, as evidenced by its presence on the internet³³, in Hollywood blockbusters³⁴, and in literature³⁵. Apparently, climate change has even given rise to psychiatric illnesses.³⁶ There are also efforts by people across the world to 'do their bit', as portrayed in the popular documentary film *No-Impact Man*.³⁷ However, notwithstanding 'green' beliefs and attitudes, it is possible for such engagement to be both economically irrational and ecologically ineffective. In this regard, an American study found a negative correlation between general environmental knowledge and carbon offsets knowledge.³⁸ An example of environmentally harmful action is greywater re-use. Although considered to be good for the climate, it could alter soil properties, damage plants and contaminate groundwater.³⁹ What is effective engagement is a complex question, as the impact of individual activities on global emissions is difficult to conceptualise, but there is a solid economic case to be made for either individuals or communities to maximize emissions-reductions through minimum sacrifice.⁴⁰ Whitmarsh, Seyfang and O'Neill argue that a method for assessing

²⁸ Mike Hulme, *Why We Disagree About Climate Change: Understanding Controversy, Inaction and Opportunity*, Cambridge: Cambridge University Press (2009)

²⁹ Ibid, pp. 211-247

³⁰ Ibid, pp. 1-35

³¹ This is generally the preferred position by international organisations, such as the United Nations Environment Programme <<http://www.unep.org/publications/ebooks/kick-the-habit/>>

³² For a strong articulation of this position, see MICHAEL F. MANIATES, 'Individualization: Plant a Tree, Buy a Bike, Save the World?', *Global Environmental Politics* 1:3, August 2001

³³ NELYA KOTAYKO, 'Mining the Internet for Linguistic and Social Data: An analysis of 'carbon compounds in Web feeds' (2010) *Discourse Society* 21:655

³⁴ For a review, see MICHAEL D. JONES, *Heroes and Villains: cultural narratives, mass opinions and climate change* (2010), PhD Thesis, University of Oklahoma.

³⁵ The chief protagonists of the most recent works of two bestselling novelists writing in the English language focus are involved with climate change and related environmental issues. IAN McEWAN, *Solar* (2010), Waterstone Publishers, London; JONATHAN FRANZEN, *Freedom* (2010), Farrar, Strauss and Giroux, New York

³⁶ STEVEN MOFFIC, "Is Ecopsychiatry a speciality for the 21st century?", *Psychiatric News*, Apr 2008; 43 (7)

³⁷ Eden Wurmfilrd films, *No-Impact Man: the Documentary*, June 17, 2010

³⁸ MICHAEL POLONSKY, STACY GRAU and ROMANA GARMA, 'Exploring US Consumers Understanding of Carbon Offsets',

³⁹ R.F. MICHAEL SNODGRASS, 'Greywater-the Reuse of Household Water: A Small Step Towards Sustainability and Climate Change' (2010) 22 *Geo. Int'l Envtl. L. Rev.* 591

⁴⁰ W.J. MCKIBBIN, 'The role of economics in climate change policy' (2002) *Journal of Economic Perspectives*, Vol 16, No 2, 107-129

engagement is by examining the ‘carbon capability’ of individuals;⁴¹ i.e. “(...) the ability to make informed judgments and to take effective decisions regarding the use and management of carbon, through both individual change and collective action”.⁴² In their framework, carbon capability involves informed individual decision-making, translation of such decisions into practices and ability to participate effectively through collective action. Starkey and Anderson hypothesize that trading may cause people to be more aware of their personal emissions, more engaged with emissions reductions and more inclined to spend time and effort considering ways to reduce their emissions.⁴³ Consequently, it may be argued that the operation of a broad end-user carbon market will enhance the carbon capabilities of individuals and encourage more effective ‘green’ activities.

Some commentators have also warned us that the operation of a market to organise emissions reductions creates ‘carbon selves’ that require some budgeting and accounting skills, and hence a basic or even fairly sophisticated level of financial literacy.⁴⁴ This is why the subject of individual engagement with climate change has been a prime area of interest for behavioural economists, as they try to identify cognitive obstacles to such rational engagement. From a law and economics perspective, a cognitive obstacle may be viewed as a transaction cost, and as per Ronald Coase’s classic analysis,⁴⁵ the reduction of such costs by way of regulation would allow participants to make more efficient trading choices, notwithstanding the initial allocation of allowances. Thus, following this line of reasoning, the enhancement of carbon capabilities would be integral to reducing emissions in an efficient manner.

Vernon Smith, however, contests the argument that optimal market outcomes can be achieved only by ‘conscious cognition’.⁴⁶ Smith demonstrated through his laboratory experiments (where unlike his predecessors, he sought to mimic the rules of real-world institutions) that the level of information or intelligence is irrelevant for the purpose of arriving at rational economic decisions given a laboratory replication of actual institutional rules and design.⁴⁷ If Smith’s logic is to be applied to the EET, albeit with caution, then one could entertain the intuition that notwithstanding the levels of information or biases, a properly functioning market for individual carbon allowances would lead to efficient outcomes.

Obviously, we cannot comment on whether Smith’s view applies to end-user emissions trading without evidence, or at least without a specifically designed simulation. It would, however, be useful to gauge the level of end-user engagement required from the feedback and attitudes of those participating in CRAGs. From these interviews, there appears to be a positive attitude regarding a learning curve which develops due to continual engagement.⁴⁸ While some individuals prefer a common accountant to take care of calculations, choices and decisions are

⁴¹ LORRAINE WHITMARSH et. al., ‘Public Engagement with Carbon and Climate Change: to what extent is the public carbon capable?’ (2011) *Global Environment Change* 21, 56-65

⁴² Ibid at 59

⁴³ R. STARKEY and K. ANDERSON, ‘Domestic Tradable Quotas: A Policy Instrument for Reducing Greenhouse Gas Emissions from Energy Use’ (2005) *Tyndall Centre for Climate Change Research, Technical Report* 39

⁴⁴ MATTHEW PATERSON and JOHANNES STRPPLE, ‘My Space: governing individuals’ carbon emissions’ (2010) *Environment and Planning D: Society and Space*, Vol 28, 341-362

⁴⁵ RONALD COASE, ‘The Problem of Social Cost’ (1960) *Journal of Law and Economics*

⁴⁶ VERNON SMITH, ‘Rational Choice: the contrast between economics and psychology’ (1991) *Journal of Political Economy*, Vol. 99, No. 4, 877-897

⁴⁷ Ibid at 887

⁴⁸ RACHEL HOWELL, ‘Living with a carbon allowance: the experiences of Carbon Rationing Action Groups and implications for policy’ (2012) *Energy Policy*, 41, 250-258.

made by individuals. Interestingly, such engagement appears to stimulate effectiveness and efficiency as people undertake a more intensive search for emission reduction opportunities, which in turn may lead them to discovering and taking advantage of lower cost emissions opportunities. This line of reasoning provides an impetus for further research on both field and laboratory experiments on whether actual exposure to analogous markets or simulated exposure to carbon markets would lead to more effective engagement and an economically efficient system.

3.2 Regulating offset markets

The desire of people to contribute to mitigating climate change has been capitalized by a still relatively small, yet fast growing voluntary carbon market.⁴⁹ In this market, individuals voluntarily pay to offset their pollution, for instance by letting some entrepreneur planting trees for them. The participants in regulated (or compliance) markets have largely been firms; in the case of the EU ETS certain sectors have been identified and allocations have been done at a national level accordingly. The participants in these markets, however, have not been confined to those firms (or installations, however defined) that have been allocated allowances, but also non-account holding traders such as investment banks which have been transacting in the EU ETS. The reason could be that, given the transaction costs associated with the trading of such allowances, agents such as financial institutions are preferred. In addition, given that these markets are profitable for intermediaries such as brokers or investments banks, there may be incentives for firms to invest without being obligated to do so. This may explain why there are also several burgeoning voluntary carbon markets, where the participants are also individuals, in addition to firms.⁵⁰

However, such voluntary markets have been referred to as ‘cowboy markets’ due to the absence of common standards and regulations. There are also perverse incentives in the voluntary offset markets for producers and providers of climate-friendly goods and services that can lead to ineffective ‘green’ activities.⁵¹ A regulated EET scheme involving end-users may facilitate better engagement with such markets due to harmonized/standardised certification, provided there is an opportunity for such markets to be linked. In the event there is no framework which facilitates linking, then there would be no incentive for sellers and suppliers to follow such standardised technical, contractual and accounting certification. Further, standardized certification in the EET may also help overcome the problem of price volatility⁵² attached to credits generated from different offset programmes which makes fungibility (or interchangeability with other equivalent individual goods/assets of the same type) difficult. In addition to the benefits of standardised certification, linking has the potential to make the market thicker by enhancing liquidity and therefore introducing a higher potential for reducing costs.

⁴⁹ MOLLY PETERS-STANLEY et. al., *State of the Voluntary Carbon Market 2011*, Ecosystem Marketplace and Bloomberg Energy Finance, New York

⁵⁰ Ibid

⁵¹ There have been cases of misleading advertising and ‘greenwashing’ in the US and Australia. For example, see ERIC L. LANE, ‘Living with a carbon allowance: the experiences of Carbon Rationing Action Groups and implications for policy’ (2010) *J. Marshall Review of Intellectual Property Law*, 2415-2449

⁵² MARC N. CONTE and MATTHEW KOTCHEN, ‘Explaining the Price of Voluntary Carbon Offsets’ (2009) NBER Working Paper 15294 [Available at: <http://www.nber.org/papers/w15294.pdf>]

Theoretically, the issue of linking emissions credit markets is not new as even the EU ETS is linked to uncapped offset markets: certified emissions reduction (CERs) as offset credits generated through the Clean Development Mechanism (CDM)⁵³ and Emission Reduction Units (ERUs) from Joint Implementation projects can now be used by each installation subject to a country specific limit, to cover its emissions. However, by allowing offset-linking, there is the difficulty of a potential superfluity of allowances that depress carbon prices and encourage further emissions. In this regard, it may be noted that the primary reason behind setting limits to the number of offsets that can be traded in the EU ETS is to fulfill the ‘supplementarity condition’ laid down in Article 12 of the Kyoto Protocol⁵⁴ where CERs should only be used to achieve only part of the overall mitigation effort. The Linking Directive (2004/101/EC)⁵⁵ implements this condition as primary abatement should happen in the EU, i.e. there is an element of *regional effectiveness* of environmental policy. Unlike international offsets, an EET would satisfy the supplementarity condition as the reductions would be happening within the EU. This leaves us with the problem of the quantity and price effects that offsets from different sources may have on EU ETS allowances. In a recent paper, Vasa argues that CERs trade at a discount to allowances, and this price spread creates a ‘rent’ since such credits can be converted to allowances. This rent is, of course, higher for those countries with a higher limit for offset trading, the distribution or control of which must be guided by regulation.⁵⁶ The suggestion put forward for maintaining stability and reducing rents is by either auctioning CER usage certificates, or for the regulator to pre-sell allowances in the amount equal to the CDM limit (primarily because of the uncertainty inherent in CER project delivery relative to allowances) and subsequently buying CERs. With regard to controlling the quantity of offsets which can have a price effect on the EU ETS, a regulatory ‘ratchet’ could be developed whereby any over-allocation could be clawed back or retired. However, more research into its effects is needed.

3.3 Capping uncapped sectors

In spite of the uncertainty regarding ways to deal with climate change, there has been a robust market-based regulatory reaction to mitigation internationally, with the EU ETS being the poster-boy for an effective response. While the EU ETS has also been criticised,⁵⁷ if only for the modest and short-term emission reduction targets it imposes, whereas some commentators have actually favoured a carbon tax,⁵⁸ it has nonetheless been quite a successful experiment as is evidenced by the absolute emission caps that have been imposed on major industries, the high compliance rates with those caps, and the acknowledgement by a majority of company managers that the EU ETS has caused them to reduce emissions.⁵⁹ The EU ETS (governed by Directive 2003/87/EC)⁶⁰, even with the revised rules as of 2013, has a limited number of sectors

⁵³ The legal basis for the Clean Development Mechanism and Joint Implementation is Article 12 of the Kyoto Protocol, operating under the United Nations Framework Convention on Climate Change, 1992.

⁵⁴ Kyoto Protocol to the United Nations Framework Convention on Climate Change, Dec. 10, 1997, 37 I.L.M. 22

⁵⁵ EU Linking Directive (EC) 2004/101, 2004 O.J. (L338) 18-19

⁵⁶ ALEXANDER VASA, ‘Implementing CDM Limits in the EU ETS: a Law and Economics approach’ (2011) *DIW Discussion Paper* 1032, Berlin

⁵⁷ See for example PAUL COLLIER, *The Plundered Planet: How to Reconcile Prosperity with Nature* (2010) Oxford: Oxford University Press, 177; THOMAS SPENCER and EMMANUEL GUÉRIN, ‘Time to Reform the EU Emissions Trading Scheme’, *European Energy Review* 23 January 2012.

⁵⁸ SHI-LING HSU, *The Case for Carbon Tax: Getting Past Our Hang-ups to Effective Climate Policy*, Washington DC: Island Press, 2011.

⁵⁹ Thomson Reuters Point Carbon (2011), *Carbon* 2011, http://www.pointcarbon.com/polopoly_fs/1.1545244!Carbon%202011_web.pdf

⁶⁰ Directive 2003/87/EC of the European Parliament and of the Council of 13 October 2003 establishing a scheme for greenhouse gas emission allowance trading within the Community and amending Council Directive 96/61/EC, 2003 O.J. (L 275) 32

within its scope, and approximately 12,000 installations (comprising combustion and energy-intensive manufacturing activities) within such sectors identified in Annex I of EU ETS. Thus, the percentage of total emissions covered under these sectors can certainly be enhanced if more sectors are included. From the table below, we can see the percentage distribution of emissions from different sectors within the EU:

Sector	%
1. Public Electricity and Heat Production	27.8
2. Transport	19.5
3. Manufacturing Industries and Construction	12.7
4. Agriculture	9.2
4. Industrial Processes	8.5
6. Residential	8.5
7. Commercial/Institutional	3.3
8. Waste	2.8
9. Petroleum Refining	2.7
10. Fugitive Emissions from Fuels	1.7
1.1. Agriculture/Forestry/Fisheries	1.5
12. Manufacture of Solid Fuels and Other Energy Industries	1.4
13. Solvent and Other Product Use	0.2
14. Other (Not elsewhere specified)	0.2
Total	100.0

Source: EEA (2010)

Though there is some flexibility under the amended ETS Directive (2009/29/EC)⁶¹ to include additional sectors, the emissions from some sectors such as agriculture, waste, residential and transport (other than aviation) are uncapped. For some of these sectors, the EU has set national targets (the so-called 'Effort Sharing Decision'),⁶² but cap-and-trade is not used as an instrument to implement these targets. The Commission has also expressed interest in pricing emissions in other sectors.⁶³ In a recent report, the European Environment Agency observes that if indirect emissions by households were to be included within total emissions, then the numbers presented in the table above would be significantly altered, to establish a substantially greater contribution of the residential sector to emissions.⁶⁴ However, requiring the end-user to be responsible for indirect emissions would require a calculation of embodied carbon in all purchases and activities, which is not an easy proposition. Even without the revised figures of indirect emissions, it is difficult to imagine how the EU and its member states can meet their emissions reduction targets if emissions would rise (or continue at the current rate) in the uncapped sectors.

The issue of expanding abatement opportunities is a contentious one, as the PCT variants cover household fuel and energy use within its scope. There have been debates in Australia recently about whether agriculture could be brought within the ambit of its national ETS. There are

⁶¹ Directive 2009/29/EC of the European Parliament and of the Council of 23 April 2009 amending Directive 2003/87/EC so as to improve and extend the greenhouse gas emission allowance trading scheme of the Community, OJ L 140, 5.6.2009

⁶² This is done by the Effort Sharing Decision. Decision No. 406/2009/EC of the European Parliament and of the Council of 23 April 2009 on the effort of Member States to reduce their greenhouse gas emissions to meet the Community's greenhouse gas emission reduction commitments up to 2020, OJ L 140/136. It is the successor to the so-called Burden sharing decision (Council Decision 2002/358/EC, OJ L 130/1).

⁶³ Council of the European Union, 'Council conclusions on review of the European Union emissions trading scheme' (2007) 12th Environment Council meeting, Luxembourg, 28 June 2007.

⁶⁴ European Environment Agency, 'End-user GHG emissions from Energy: Reallocation of emissions from energy industries to end users 2005–2009', EEA Technical Report Number 19, December 2011

several activities which could be undertaken by farmers to facilitate a large amount of reductions: cropland management, grazing land management, the restoration of degraded soils, and sink enhancement (carbon sequestration). Further, agriculture has the interesting problem of being affected by climate change, which has prompted substantial funding of adaptation activities.⁶⁵ While the economic relationship between mitigation and adaptation is a complex yet interesting question, in some circumstances, a single activity could yield complementary benefits for both purposes. The primary reason given for not including agriculture in an ETS is the uncertainty involved in the measurement of emissions of methane (from cattle) and nitrous oxide (direct and indirect soil emission) due to the changing parameters of biological processes.⁶⁶ Brandt and Svensen interestingly argue that it is not necessary to measure such emissions directly to incentivize reduction in emissions by farmers; what is necessary is to calculate the (average) change in emission from a baseline practice to a new practice with respect to agricultural activities.⁶⁷ Given that not all farming practices and activities may be effective, a regulator could either exhaustively specify what practices should be accepted as valid reduction measures, or alternatively exclude practices that yield uncertain results.⁶⁸

In the Brandt and Svensen system, such reduction from a particular activity or practice can be calculated annually and would be the basis of a trading system in which farmers could choose those activities where marginal reduction cost would be lowest. It is suggested that 'permits' could be grandfathered to farmers by calculating emission levels from 'a source' at the beginning of a year and an excess or deficit of allowances can be sold or bought respectively before surrendering.⁶⁹ Although making this trading system part of the EU ETS has been suggested, the mechanism for doing so is not clear. The difficulty may arise in (a) identifying all these non-point sources, (b) choosing a method of allocation that would not be equal allowance per capita (given the uneven distribution of resources for different sectors) while also the (c) price effect on the ETS must be taken into account. However, it may be noted that the awarding of credits on an incremental basis according to abatement, as discussed in relation to agriculture above, has been mentioned in the literature as a general solution for non-point sources of emissions.⁷⁰ Here the problem is that this could amount to a 'credit trading' system based on (relative) emission standards for polluters which is known to be less effective and less efficient than a 'permit trading' scheme with (absolute) emission caps for the emitters.⁷¹ However, what is clear is that there is certainly a qualified case to be made for engaging end-user farmers in an emissions trading system as it would incentivize 'green' investments and stimulate cost-effectiveness.

It would be incorrect to say that emissions from transport are not priced in the EU. It is done mostly by way of a tax. Almost all European countries are characterized by high gasoline taxes

⁶⁵ Jørgen E. Olesen and Marco Bindi, 'Consequences of climate change for European agricultural productivity, land use and policy' (2002) *European Journal of Agronomy*, Vol 16, Issue 4, 239-262

⁶⁶ JANE M.F. JOHNSON et. al., 'Agricultural Opportunities to mitigate greenhouse gas emissions' (2007) *Environmental Pollution* 150, 107-124

⁶⁷ URS STEINER BRANDT and GERT TINGGAARD SVENSEN, 'A Project-based system for including farmers in the ETS', (2011) *Journal of Environmental Management*, V. 17-19-10

⁶⁸ *ibid*

⁶⁹ *Ibid* at 17

⁷⁰ YACOV TSUR and HARRY de GORTER, 'On the Regulation of Unobserved Emissions' (2011), Discussion Paper No. 2.11, the Center for Agricultural Economic Research, Hebrew University of Jerusalem

⁷¹ ANDRIES NENTJES and EDWIN WOERDMAN (2012), 'Tradable Permits versus Tradable Credits: A Survey and Analysis', *International Review of Environmental and Resource Economics* 6(1), 1-78

ranging from 0.60 €/l (Luxembourg) to 1.25 €/l (Hungary).⁷² Further, EU emissions standards for vehicles have been adopted.⁷³ However, emissions from road transport are increasing at an increasing rate and for that reason they are a major area of concern. Both the taxes and the standards apparently do not bite enough: emission caps could improve environmental effectiveness here.

3.4 Energy efficiency through the backdoor?

Intuitively, saving energy and fuel at the residential level doubles up as both mitigation and energy-efficiency. While no comprehensive EU-wide study has been conducted to verify this relationship, national studies do point to co-benefits, especially with regard to the schemes adopted in Britain.⁷⁴ End-users would receive a more direct, visible and 'hands-on' incentive to reduce energy consumption. This is likely to have an impact on climate policy acceptance and energy conservation behavior: recent research suggests that law, via instrument choice and its institutional design, is actually able to change the 'environmental mind'.⁷⁵ However, the institutional interaction between the two may not be that simple. An example of a possible conflict in institutional interaction was observed⁷⁶ in 2011 when the Directorate General of Climate Action and the Directorate General of Energy Savings appeared to have different opinions about the efficacy of emissions reductions by way of mitigation through the EU ETS Directive and energy efficiency through a proposed Energy Efficiency Directive⁷⁷ respectively. The issue was that efficiency measures may cancel out the need for as many pollution permits, thus lowering the price of carbon in the EU ETS market, which was suffering from an excess of allowances brought about primarily by the recession. While this issue is not resolved, and goes back to the question of how to control the number of allowances in the EU ETS, another way of examining this institutional interaction is by analysing the instruments that facilitate such interaction at a micro-level.

An earlier edition of *European Energy Law Report* looked at energy efficiency measures in the EU, concentrating primarily on white certificates.⁷⁸ White certificates are records of energy-efficiency and may be traded nationally in countries that have them (currently Italy, France and the UK). They are used in combination with an obligation scheme whereby market actors (retail energy suppliers or distributors for France and Italy, households in the UK) are obliged to achieve a certain amount of end-use energy saving among customers (usually a percentage of the sales measured in physical terms).⁷⁹ In order to be eligible for receiving white certificates, obligated parties need to demonstrate that there are savings in energy end-use beyond a baseline, or additional to business-as-usual. The relationship of white certificates with the EU ETS is complex, with regard to both schemes operating in parallel as well as with respect to the

⁷² T. STERNER, 'Fuel Taxes: An Important Instrument for Climate Policy' (2007) *Energy Policy* 35, 3194-3202

⁷³ Council Directive 80/1268/EEC of 16 December 1980 on the approximation of the laws of the Member States relating to the fuel consumption of motor vehicles, OJ L 375, 31.12.1980, p. 36-45

⁷⁴ LUIS MUNDACA and LENA NEJI, 'A multi-criteria evaluation framework for tradable white certificate schemes' (2009) *Energy Policy*, Volume 37, Issue 11, 4557-4573

⁷⁵ Y. FELDMAN and O. PEREZ (2009), 'How Law Changes the Environmental Mind: An Experimental Study of the Effect of Legal Norms on Moral Perceptions and Civic Enforcement', *Journal of Law and Society* 36 (4), 501-535.

⁷⁶ http://www.euractiv.com/energy-efficiency/brussels-disarray-energy-directive-news-505654?utm_source=EurActiv%20Newsletter&utm_campaign=3e98b1508emy_google_analytics_key&utm_medium=email

⁷⁷ [Proposal for a Directive on energy efficiency and repealing Directives 2004/8/EC and 2006/32/EC \[COM\(2011\)370, 22/06/2011\]](#)

⁷⁸ MARTHA ROGGENKAMP and ULF HAMMER (eds), *European Energy Law Report IV* (2007) Intersentia, Antwerpen-Oxford

⁷⁹ NICOLA LABANCA and ADRIAAN PERRELS, 'Editorial: Tradable White Certificates—a promising but tricky policy instrument' (2008) *Energy Efficiency* 1:233-236

fungibility of allowances and certificates. Sorrell and a couple of other economists have been rather skeptical of such interaction, arguing that their co-existence would not result in an efficient reduction in emissions from electricity use, unless there is a tightening of the EU ETS cap.⁸⁰ In view of this difficulty, it is tempting to argue that, given energy-saving targets in the EU, a pan-EU EET system could be the preferred alternative incentive mechanism to white certificates for achieving energy efficiency by engaging the end-user. However, without discounting the role which an EET could play in energy savings, it is necessary to chart out the conditions where allowances and certificates could be fungible, without causing a problematic price effect due to an over-supply of units .

Keeping the above purposes that an EET may serve in mind, we now proceed to examine some principles that could provide guidance on how such a scheme could be put into effect.

4. HOW IS SUCH A SCHEME TO BE DESIGNED?

Given that the market is supposed to govern the prices of allowances and correct mis-allocation in the EU ETS, the establishment and operation of the scheme is nonetheless heavily dependent on regulation. Thus, the EU ETS has been characterised as creature of design⁸¹ with aspects such as emission cap, time period, interaction with other schemes and instruments, eligibility to trade, registration, monitoring, verification, enforcement, and penalties all specified by way of regulation. Similar design facets would characterize an EET scheme as well, but we concentrate below on the principles that would inform the design of such a scheme. Normally, assessment of an environmental policy is done by examining whether it is equitable, efficient and effective. While these factors will be touched upon, we would also like to address the issue of integration with the EU ETS and the legal framework for such a system.

4.1 Allocation and distributional equity

Institutional mechanisms for dealing with climate change have always raised questions of equity and justice. The question who-pays-how-much and whether per-capita allocation is the best way forward has been at the heart of international and regional climate negotiations.⁸² Given that the success of an EET system would depend on the engagement of people and communities, such questions attain even greater prominence. For example, Starkey assesses design variants of PCT schemes and its alternatives against the yardsticks of equity, efficiency and effectiveness. In this regard, an equal per-capita allocation (which schemes such as cap-and-share or the Finnish proposal do not afford) is a favourable option owing to the long-term benefits of engaged individual participation as well as the reduction of implementation and participation costs owing to such engagement.

⁸⁰ STEVE SORRELL et. al., 'White certificate schemes: Economic analysis and interactions with the EU ETS' (2009) *Energy Policy*, Volume 37, Issue 1, 29–42

⁸¹ For an overview of the regulatory aspects of the ETS please see MARTHA M. ROGGENKAMP and ULF HAMMER ed. *European Energy Law Report VII* (2010), Intersentia, Oxford

⁸² ERIC A. POSNER and CASS R. SUSNSTEIN, 'Should greenhouse gas permits be allocated on a per-capita basis?' (2009) *California Law Review*, 97:51-93

Interestingly, the effectiveness and efficiency of the system, such as the lowering of abatement costs by continuous rational engagement depends on whether the system is perceived as fair.⁸³ In an online survey conducted by the Institute for Public Policy Research (IPPR), around 70% believed that an equal per capita allocation under the PCT “would be unfair because some people need more carbon credits than others”.⁸⁴ Such need in relation to household and transport energy use may arise from a host of circumstances: old people may have to use motorised transport and; people living in colder climates may require more heating, for instance. Hyams argues that the best way of dealing with this situation is to initially distribute allowances equally, and to subsequently allocate more to successful applicants “on the grounds of their unchosen exceptional circumstances”.⁸⁵ The problem with this suggestion is the requirement to determine criteria for ‘unchosen exceptional circumstances’ and to assess applications filed thereunder on a case-by-case basis. Modifying allowance allocations to correct for distributional inequities is also an approach that has been contrasted against financial compensation (a subsidy) to low-income households in the UK by researchers at the Centre for Science and Environment.⁸⁶ The conclusion reached was two-fold. First, the method of modification by way of exception is preferable and correcting to a certain extent as it reduces the deficit of allowances by households having certain ‘losing’ characteristics (rurality, number of children, age of allottees, built form, central heating type). Second, the method is information intensive and may also encourage perverse incentives to increase emissions as applicants could inflate their emissions to obtain additional allowances.

Due to the proposed scope of the EET, additional questions may be raised about distribution across sectors and locations. With respect to the latter, Fawcett raises the question as to whether the acceptability and success of the PCT would be influenced by national characteristics.⁸⁷ With regard to distributional effects, she argues that the importance given to equity in policy-making may be less considerable in countries with lower income inequality and concerns about fuel poverty.⁸⁸ Further, lower regional variation in energy demand, access to greener transport modes and wide access to less carbon-intensive fuels are seen as national characteristics favourable to a PCT.⁸⁹ From the discussion above, it could be argued that notwithstanding income levels and fuel poverty, an EU level modified distribution system could identify and correct for characteristics that result in inequitable allowance deficits/surpluses.

In relation to other sectors under the EET, countries with larger potential for deforestation, land-use changes, and community or municipality waste treatment may benefit more, provided the system of allocation is addressed. As discussed in Section 3.3, such sectors may be capped, EU approved national targets set, and, taking a cue from the TEQ proposal of combining grandfathering and auctioning, allowances could perhaps be auctioned in such sectors. We hypothesise that such a system for sectors such as agriculture and waste treatment would

⁸³ RICHARD STARKEY, ‘Personal Carbon Trading: a critical survey. Part 2: efficiency and effectiveness’ (2012) *Ecological Economics* 73, 19-28, 23

⁸⁴ J. BIRD and MARK LOCKWOOD, ‘Plan B? The prospects for personal carbon trading’ (2009), *Report by Institute for Public Policy Research*, Oxford

⁸⁵ KEITH HYAMS, ‘A Just Response to Climate Change: personal carbon allowances and the normal-functioning approach’ (Summer 2009) *Journal of Social Philosophy* 40.2, 237-256, 248

⁸⁶ VICKI WHITE and JOSHUA THUMIM, ‘Moderating the distributional impacts of personal carbon trading’ (2009), *Report to the Institute of Public Policy Research*, CSE, Oxford

⁸⁷ TINA FAWCETT, ‘Personal Carbon Trading in different national contexts’ (2010) *Climate Policy* 10

⁸⁸ *Ibid* at 5

⁸⁹ *Ibid* at 8

incentivise collective action, whether through community engagement such as CRAGs or even local government institutions such as municipalities. Overall this system appears to be efficient and effective. Following Starkey, a TEQ-equivalent auctioning component has low implementation costs as the revenue from the auctions can be easily allocated by making adjustments to pre-existing distortionary taxes. The difficulty could be high participation costs, such as a substantial investment of time and upfront resources for the auctioning.⁹⁰ The agency costs which are normally incurred to reduce such participation costs may be moderated by way of collective action. Further research needs to be conducted to confirm whether this proposal might work, in terms of economic feasibility, political acceptability and assessments (simulated or otherwise) of public engagement.

The next question that needs to be settled is whether an EET would be integrated into the ETS or would be a separate scheme in itself.

4.2 The issue of integration

A pan-European EET scheme would require policy intervention at an EU level, thus requiring collective action by member states. From an economic point of view, integrating it with the EU ETS would avoid the risk of unpopularity which may arise in a parallel system where allowance prices could exceed those paid by businesses in the EU ETS.⁹¹ The effectiveness of the EU ETS by adding additional sectors as it stands now may increase, not only by imposing emission caps, but also by reducing price instabilities caused by the concentration on fewer sectors. Lockwood observes that the benefit that a PCT scheme can confer upon the EU ETS may be contested in areas where they both cover the same sector ('double counting'), such as electricity, due to the possibility of encouraging higher emissions in the EU ETS if the PCT is successful and exerts a downward pressure on the EU ETS carbon price.⁹² He suggests that the way around this problem is to identify abatement opportunities not captured by the EU ETS such as those in other sectors. We would like to add that an EET scheme which is wide in geographical and sectoral scope would deal more effectively with this problem by way of a single cap and monitoring system. Multiple national prices in sectors that fall under different policy schemes would only add to the uncertainty. What needs to be explored, as was evident in the discussions around voluntary offsets and white certificates in sections 3.2 and 3.4 respectively, is whether (and, if so, how) to effectively introduce a 'soft price cap (and/or floor)' by allowing for a contingent addition or retirement of permits, and possibly even regulating their flow. Some authors have suggested that an EU ETS 'Central Bank' is the best way to deal with this situation,⁹³ while others caution against the short-run inefficiencies that will arise from carbon price interventions.⁹⁴

⁹⁰ Supra n. 72, 19-20

⁹¹ MATTHEW LOCKWOOD, 'The Economics of Personal Carbon Trading' (2010) *Climate Policy* 10, 447-461

⁹² Ibid at 449

⁹³ CHRISTIAN de PERTHUIS, 'Carbon Markets Regulation: the case for a CO2 Central Bank' (2011) *Information and Debate Series, Carbon Markets and Prices Research Initiative, CDC Climat* [Available at: <http://www.chaireeconomieduclimat.org/wp-content/uploads/2011/09/11-09-12-Cahier-ID-n10-De-Perthuis-market-regulation.pdf>]

⁹⁴ CHRISTIAN EGERHOFER et al, 'The EU Emissions Trading System and Climate Policy towards 2050: Real incentives to reduce emissions and drive innovation?' (2011) *CEPS Special Report*, Centre for European Policy Studies, Brussels

4.3 Choosing an enforcement mechanism

Eyre argues that one of the key issues related to design of a PCT scheme is enforcement.⁹⁵ Enforcement includes aspects of implementation such as surrender, monitoring and verification which are the key determinants of efficiency and effectiveness of a proposed scheme, and in this context, was a major reason (in addition to public acceptability) why discussions around the PCT were halted in the UK.⁹⁶ For a downstream approach, the administration costs are considered to be too high as every end-user would need to be monitored, and enforcing surrender of allowances would be difficult. Individual carbon accounts would need to be monitored, and a penalty imposed where such accounts contain inadequate allowances, thus 'turning half the world's population into carbon police.'⁹⁷ Contrary to an exclusively downstream approach, in relation to household and personal transport fuel consumption, a downstream system which directly incorporates firms as well as households and car drivers can be administratively feasible by concentrating the monitoring activities as much as possible on the level of fossil fuel producers and importers (upstream) and by using a generic allocation criterion and chipcard technology for households and car drivers (downstream).

The proposed upstream-downstream hybrid model for households has been discussed in detail by one of the authors in more detail elsewhere,⁹⁸ and it may be briefly described as follows: For every unit of fossil fuel a firm or household purchases from distributors, it has to hand over a corresponding number of carbon allowances. Distributors, in turn, can only obtain fuels from their suppliers in exchange for carbon allowances. In this way, all allowances will end up in the hands of producers and importers of fuel, including the allowances purchased by distributors to cover their fuel supply to consumers and other small users. Producers and importers of fuel are placed under the obligation to turn over to the environmental authorities carbon allowances for the carbon contained in the fossil fuels they have sold on the market.

Although the above is mostly self-enforcing, it may not be applicable to all sectors. A similar system with slight variations may be adopted for other sectors such as agriculture. As per the Finnish Proposal discussed in Section 2, it is at the retailer level at which enforcement takes place. The same logic could be extended for the agricultural sector. Monitoring and enforcement can take place upstream, perhaps at a retail level, or even at the point of taxation of the goods and land under question. However, agriculture may entail more administrative costs owing to the determination of criteria eligible for allowances. It could also be argued that for sectors such as waste, it is municipalities that could be the point of enforcement, thus reducing heavy administrative costs.

While it is possible to reduce implementation costs by way of the downstream trading and upstream monitoring, the issue of penalty still remains unclear. The EU ETS functions under the pain of a penalty in the event that the number of allowances that need to be surrendered are not enough. For an EET scheme, while a penalty on the upstream intermediaries may be imposed, an opt-out into a taxation system may be a better alternative. Although the debate between the

⁹⁵ NICK EYRE, 'Policing Carbon: design and enforcement options for personal carbon trading' (2010) *Climate Policy* 10, 432-446

⁹⁶ DEFRA, 'Synthesis Report on the findings from Defra's pre-feasibility study into personal carbon trading' (2008), Department for Environment, Food and Rural Affairs, London

⁹⁷ EYRE (2010) *supra* at 439

⁹⁸ EDWIN WOERDMAN and JAN WILEM BOLDERDIJK, 'Emissions Trading for Households? A Behavioral Law and Economics Perspective' (2010), University of Groningen, Working Paper Series in Law and Economics, http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1636637

suitability of an emission tax and that of an emissions trading system is an old one, it is not spent, and not clearly resolved. Raux and Marlot, in their study on methods of reducing fuel consumption used for personal transport, suggest that consumers should be allowed to choose their preferred policy.⁹⁹ Thus, the suggestion is to allow a 'tradable fuel permit' scheme and a carbon tax to be introduced simultaneously, where anyone owning a vehicle could opt into the permit scheme, receive free allowances and avoid paying the carbon tax till the permits are used up. To continue refraining from paying a tax, additional permits would need to be purchased. Unfortunately, as far as we know, there is no precedent for an opt-in market mechanism to avoid paying a tax but it has the potential to be tested in a long-term field experiment. Following from the success of policies such as default organ donation, a variation on the 'opt-in' model for the EET scheme could be an 'opt-out' system where individuals would be allocated allowances by default, and would be given the choice to opt out of them by paying a tax.

4.4 Legal framework

While this paper examines the possibility of an EET scheme largely from a regulatory perspective and considers issues which are pertinent to its general framework, this section concentrates more on the rights that may be available to the end-user participant in such a scheme.

4.4.1 Defining different instruments

Though there is a temptation to use the terms 'credits', 'permits' and allowances' interchangeably, the literature on the EU ETS has identified distinctions between them, often from an efficiency perspective.¹⁰⁰ From a legal point of view, a clear identification of property rights embedded in and derived from such instruments is imperative, given the various commercial uses of emissions allowances and the existence of secondary, derivatives and futures markets around them. Romania, for instance, created a stir in this regard by characterizing a carbon allowance as a financial instrument.¹⁰¹ This sparked off an inquiry by the European Commission as to whether an allowance under the EU ETS can be considered as such,¹⁰² with the conclusion that allowance derivatives are recognized as financial instruments under the EU Markets in Financial Instruments Directive (MiFID).¹⁰³ However, the legal status of allowances in primary markets, spot markets and as security instruments is not fully clear. Some commentators have argued that an EU ETS allowance is an 'investment credit' under international law, raising questions about fair and equitable treatment of investors.¹⁰⁴ It appears that the characterization of a carbon unit is related to its functionality, and given that the functionality of carbon units has been determined largely by the markets in which they are traded, they tend towards being viewed as commodities. On the other hand, a carbon unit does

⁹⁹ CHARLES RAUX and GREGORIE MARLOT, 'A system of tradable CO₂ permits applied to fuel consumption by motorists,' (2005) *Transport Policy*, Elsevier, vol. 12(3), 255-265

¹⁰⁰ A. NENTJES and E.WOERDMAN, 'Tradable Permits versus Tradable Credits: A Survey and Analysis', (2012) *International Review of Environmental and Resource Economics* 6(1), 1-78

¹⁰¹ "Romania has classified carbon allowances as financial instruments, threatening over-the-counter carbon trade in the country", *Carbon Market News*, February 24, 2010

¹⁰² http://ec.europa.eu/clima/news/docs/discussion_paper_en.pdf

¹⁰³ "Review of the Markets in Financial Instruments Directive (MiFID) and Proposals for a Regulation on Market Abuse and for a Directive on Criminal Sanctions for Market Abuse: Frequently Asked Questions on Emission Allowances", EU MEMO/11/719, October 20, 2011 [Available at: <http://europa.eu/rapid/pressReleasesAction.do?reference=MEMO/11/719>]

¹⁰⁴ LISA BENNETT, 'Are Tradable Carbon Emissions Credit Investments? Characterizations and Ramifications under International Investment Law', (2010) *New York University Law Review* 85, 1581-1617

contain certain facets of a currency, the primary one being that unlike a commodity, its value is derived only from its use to meet an obligation.¹⁰⁵ Further, the implementation of a PCT has been envisaged as a currency where 'carbon points' are sacrificed along with normal currency for fuel and energy use. However, Brohe criticizes characterizing a carbon unit as currency as it does not assist with the proper identification of the property rights therein.¹⁰⁶ Button, on the other hand, argues that a 'currency model' is preferable to a 'commodity model' for international carbon markets, as governments could then maintain control on price volatility, promote transparency and have an international supervisory body.¹⁰⁷ We have observed earlier that for an EET scheme, there may be a need for central supervision (by way of a carbon central bank, for example) of allowances, and in a pan-EU system, there is certainly a need to maintain exchange arrangements. However, a standard commodity standing-in for a certain amount of carbon with clearly defined rights as to how it may be traded is also advantageous. Thus, a hybrid-system appears to be the way forward. A broader legal perspective would require additional consideration such as which instrument is more equitable, or where there would be lesser scope for misuse, thus rendering it more effective.

4.4.2 *Voluntary markets and ex-post enforcement*

In relation to voluntary markets discussed in section 3.2, some commentators have pointed out that it is incorrect to group all voluntary markets as unregulated markets, as some of them are regulated to a certain extent by way of the investment rules set forth by the different trading platforms.¹⁰⁸ However, the suggestion that those actors investing in the voluntary market and the agents facilitating such investment would transpose such behaviour onto a regulated EET market requires careful deliberation. From a Behavioral Law and Economics perspective, there is the possibility of a motivational and regulatory crowding-out. Regulatory crowding-out involves a regulation crowding-out other more effective governance structures (private or otherwise), while motivational crowding-out refers to a situation where an external incentive may crowd-out internal motives (usually moral) for certain behaviour. If this problem of 'dual crowding out' can be corrected, or may not prove to be insurmountable, then there is the possibility that sustainably inclined individuals and stakeholders of voluntary markets may benefit from an EET scheme.

In addition to an ex-ante regulatory framework, there is also a need for recourse to a legal mechanism for settlement of disputes. However, this suggestion is not axiomatic; if an allowance is characterized as currency, there may not arise any need for a specific framework for settlement of disputes or protection of property rights. Again if it is characterized as a commodity, then regulations at an EU and national level dealing with commodity trade may be considered sufficient. At any event, it is submitted that there is scope for unfair trade practices and application of consumer law in general to protect the interests of the end-user. This may be especially relevant in the context of the EU ETS as the European Court of Justice (ECJ) has ruled that private parties have no standing before it to challenge allocations of allowances, which is a

¹⁰⁵ JILLIAN BUTTON, 'Carbon: Commodity or Currency? The Case for an International Carbon Market Based on the Currency Model' (2008) 32 *Harvard Environmental Law Review* 571, 580

¹⁰⁶ ARNAUD BROHE, 'Personal Carbon Trading in the context of the EU Emissions Trading Scheme', (2010) *Climate Policy* 10, 462-476 at 471

¹⁰⁷ *Supra* n. 108

¹⁰⁸ RICHARD BENWELL, 'Voluntary Aspects of Carbon Emissions Trading', (2009) *International Journal of Environmental Studies*, 66:5, 605-618

matter of executive and national prerogative.¹⁰⁹ While it is unclear whether private parties have *locus standi* under Article 230 (4) of the Treaty on the European Community (EC) to challenge any other aspect of the EU ETS, it appears that private parties cannot voice their grievances before any forum in relation to the EU ETS market. It is submitted that the absence of an ex-post enforcement mechanism would lead to uncertainty and a lack of trust in such a system. Following some cases on eco-labelling¹¹⁰ and misleading offset information¹¹¹ in common law countries, an argument could be made for the private enforcement of environmental law within the EU by way of consumer protection against carbon goods and services. Eyre observes that a PCT scheme would involve vulnerable consumers who may be taken advantage of by financial intermediaries, such as being led into selling allowances at below their market value.¹¹² The issue of perverse incentives is a considerable economic problem (as discussed in Section 4.4.) and consumer law would therefore be equally applicable to an EET scheme as it is to voluntary carbon markets and energy-efficiency markets.

5. WHEN COULD WE SEE SUCH A SCHEME BEING TRANSLATED TO POLICY?

Political and public acceptability would be vital if an EET scheme of the type we call for is to be implemented and to become established as a mechanism for responding to risks of climate change. Insights from Behavioral Law and Economics may help to identify the proper conditions.

5.1 Political acceptability

As indicated earlier, the UK has been quite interested in a PCT system at a policy level. David Miliband had expressed his interest in 2006, and this has been followed by work conducted and commissioned by DEFRA. While both DEFRA as well as the House of Commons' Environmental Audit Committee have considered the proposal positively and found it technically feasible, they have deferred implementation till there is further research on acceptability and lowering of costs.¹¹³ To our knowledge, no other member state of the EU has expressed a clear political will to extend emissions trading to the end-user. The reasons for the same are not clear, and we are currently in the process of consolidating the opinions of policy makers in the EU in relation to such a scheme. The intention is to consolidate the considered opinions of member-state representatives on the feasibility of the EET scheme, and views on public acceptability.

Other than national acceptability, there is the issue of acceptability at the EU level. Drawing from the historical difficulties in the EU member-states with arriving at an agreement about a common carbon tax, Fawcett opines that a uniform personal carbon allowance system for all EU citizens would be unlikely. Instead a system of national allocation of emission rights within EU-

¹⁰⁹ GC March 2, 2010, Case T-16/04 *Arcelor SA v European Parliament and Council of the European Union* [2004/C 71/64]

¹¹⁰ For a review of American cases see ERIC L. LANE, 'Consumer Protection in the Eco-mark era: a preliminary survey and assessment of anti-greenwashing activity and eco-mark enforcement' (2010) *John Marshall Review of Intellectual Property Law* 742

¹¹¹ *Australian Competition and Consumer Commission v GM Holden Ltd* (2008) FCA 1428 is the most notable case in this regard; for a short review, see GLEN WRIGHT, 'Carbon Offsets and Consumer Protection' (2010) 90 *IMPACT!* 12

¹¹² EYRE (2010) *supra*

¹¹³ Environmental Audit Committee, House of Commons, UK, *Personal Carbon Trading: Government Response to the Committee's Fifth Report of Session 2007-2008*, London, May 26, 2008

agreed national carbon budgets may be accepted¹¹⁴. She further suggests that the issue of tradability may not be viewed favourably. Picking up from Fawcett, it could be argued that a policy option which may be politically acceptable would be a national sectoral budget may be decided for different sectors that may come under the ambit of the EET, and the setting of caps on such sectors. In addition, an EU limit on offsets from 'soft-capped' sectors may be permitted within such a scheme. In this way, the EET could be aligned with the ETS, and may not require significant policy changes. The issue of consensus on allocation of allowances requires consideration of some other factors. Parag and Eyre map some of the institutional, social and political factors that would be brought into play for the PCT to become policy. They argue, which is common in political science or policy science, that the policy-making process is not only one of rational problem-solving, but also one of agenda-setting, problem definition and technical-institutional feasibility.¹¹⁵ The other variations discussed in this paper would depend on other factors; for example, the Finnish Proposal could be contingent on the lobbying power of retailers. The EET is more ambitious than the PCT in scope, and would be subject to the EU policy making process. Further, the same institutional factors that led to the political acceptability of the EU ETS, including improved learning about what emissions trading entails, the lobbying power of companies¹¹⁶ such as British Petroleum and Shell, and a lowering of cultural resistance against 'pollution rights'¹¹⁷, may not fully apply to the EET. In fact, it could work the other way around. Acceptance for the EET could be undermined by the fact that the EU ETS and the CDM, for instance, are occasionally appearing in the media as partially failing systems, for instance due to over-allocation, windfall profits, too low carbon prices and environmentally unsound mitigation projects.¹¹⁸ Thus, it appears that political acceptability partly or perhaps largely depends on public acceptability, including the favour of influential agents and institutions.

5.2 Public acceptability

Unlike political acceptability which is crystallised by way of regulation, legislation and even ex-post enforcement, public acceptability is more dynamic and is difficult to generalise across both time and space. For example, in an effort to incentivize switching from personal transport to public transport in Denmark, free one-month travel cards for public transport were provided to 500 car drivers.¹¹⁹ For the duration of this experiment, there was an increase in the usage of public transport and as soon as the coupons (or subsidy) stopped flowing, so did the sudden increase in using public transport. In addition for an EET scheme providing a long-term incentive, to be truly acceptable, it needs to be perceived by the public as fair and equitable in order to invoke a change in behaviour and attitudes.¹²⁰ Indications towards public acceptability of the EET may be gleaned from studies that have already been conducted.

¹¹⁴ Fawcett (2010) at 9-10

¹¹⁵ YAEL PARAG and NICK EYRE, 'Barriers to Personal Carbon Trading in the Policy Arena' (2010) *Climate Policy* 10, 353-368

¹¹⁶ MARCEL BRAUN, 'The evolution of emissions trading in the European Union-the role of policy networks, knowledge and policy entrepreneurs' (2009) *Accounting, Organizations and Society* 34, 479-481

¹¹⁷ EDWIN WOERDMAN, 'Path-Dependent Climate Policy: The History and Future of Emissions Trading in Europe' (2004) *European Environment* 14 (5), 261-275

¹¹⁸ See for instance: 'Europe Tries to Stem a Plunge in Carbon Prices', *The New York Times*, January 8, 2012, <http://www.nytimes.com/2012/01/09/business/global/09iht-green09.html>

¹¹⁹ JOHN THØGERSEN AND BERIT MØLLER, 'Breaking car use habits: the effectiveness of a free one-month travelcard' (2008) *Transportation* 35, 329-345

¹²⁰ S. BAMBERG and D. RÖLLE (2003), 'Determinants of People's Acceptability of Pricing Measures - Replication and Extension of a Causal Model', in: J. Schade and B. Schlag (eds.), *Acceptability of Transport Pricing Strategies*, Oxford: Elsevier, pp. 235-248

Andersson, Lofgren and Widerberg have assessed the attitudes towards a personal carbon allowance scheme, and have arrived at a tentative conclusion that the perceived complexity of such a scheme may be the primary obstruction to acceptability.¹²¹ The study on attitudes, however, does not shed any light on whether a pan-European trading system would be acceptable, given that people may have different opinions on the emissions of individuals belonging to other countries within the EU, and may have strong attitudes in favour of or against the EU ETS. It may also be interesting to map the geographical location and professional profile of people corresponding to the attitudes expressed. For example, people involved in the agricultural sector may have differing views from those who use public transport in the city. Further, there is also no study as to whether the public views a carbon allowance or carbon credit as any different from a financial product. An extension of this endeavour to gather the attitudes of different stakeholders systematically would be to assess its acceptability among agents already involved in existing emissions trading markets, such as investment houses which trade in the EU ETS and the brokers who participate in any of the voluntary markets. We hypothesise that there is likely to be an asymmetry in the views of different stakeholders in a proposed EET scheme.

As is clear from the above, more nuanced research may be required to gauge the attitudes of different prospective stakeholders. However, even if we were to conduct surveys to capture such factors, we come across the general problem that expressed attitudes are not always a robust indicator of actual behaviour. To this end, Capstick and Lewis have combined a carbon footprint calculator (including electricity consumption, personal car use and flights taken) and follow-up questionnaire on energy choices by way of a computer-based simulation to assess people's engagement with a constructed Personal Carbon Allowance system.¹²² Their results show that people with a high footprint were less inclined to support such a system, though the processing of one's footprint and the desire not to run out of allowances seems to show that there is an overall carbon-conserving behaviour. This study also suffers from a self-reporting bias. A majority of the sample was in a relatively high income bracket (£40 000 or more)¹²³, and the assessment of engagement with an allowance system was based on answers to questions provided after providing information on such a system. The other issue which is missing from this study is the aspect of tradability.

Simulated experiments in both economics and psychology have shortcomings regarding their applicability in the real world, and this begs for field experiments. Given that the implementation of such a scheme would require the observation of energy saving and trading behaviour rather than the consolidation of stated preferences of participants, a trial pilot project appears to be the best way to assess acceptability. When Roberts and Thumim prepared one of the first reports on downstream carbon trading systems, they suggested that at that stage pilot testing is "not a good idea",¹²⁴ arguing that a pilot was unlikely to be representative of the real world without accounting for a system of "leakage (by annexing the Isle of Wight as some have suggested!) with decent transaction systems and with no sense of 'free riders'".¹²⁵ Subsequently,

¹²¹ D. ANDERSSON, ASA LOFGREN and ANNA WIDERGERG, 'Attitudes to Personal Carbon Allowances' (2011), No. 505, *Working Papers in Economics, School of Business, Economics and Law, University of Gothenburg*

¹²² STUART CAPSTICK and ALAN LEWIS, 'Personal Carbon Allowances: A Pilot Simulation and a Questionnaire' (2009), *UK-ERC Report*, Environmental Change Institute, University of Oxford [Available at: <http://www.eci.ox.ac.uk/research/energy/downloads/capstick09-pcasimulation.pdf>]

¹²³ *Ibid* at 6

¹²⁴ *Supra* p. 35

¹²⁵ *Ibid* at 36

a group of researchers at the Environmental Change Institute have considered in detail the possibility of conducting a trial for personal carbon allowances.¹²⁶ Interestingly, while the suggestion of annexing the Isle of Wight is said in jest, such an approach is being used in Australia where the 13-square mile Norfolk Island with approximately 2500 inhabitants is now a three-year test site for trying out a trading scheme for reducing individual emissions.

Although the CRAG is not really the same thing as an EET scheme, the former may be viewed as a field experiment of some relevance for the latter. It is clear from the members of such groups that the perception of fairness is probably the most important motivator for participation.¹²⁷

6. CONCLUSION

End-user Emissions Trading (EET) refers to an emissions trading scheme for individuals, preferably on an EU-wide scale. Such a personal carbon trading scheme is targeted towards (a) reducing the release of greenhouse gases from energy and fuel consumption and (b) towards incentivizing climate-friendly choices, related to *consumption* (for instance, changes in food habits), *production* (household production of 'green' energy or installation of enabling infrastructure) or *utilization of resources* (changes in land-use or deforestation).

The central question that we have answered in this paper is three-fold: Why would such an emissions trading scheme for individuals be desirable, how could such a scheme be designed and under what conditions could it be acceptable?

First, EET is desirable so as to rationalise sustainable engagement by individuals, regulate voluntary offset markets, place an emission cap on yet uncapped sectors and stimulate energy efficiency by households 'through their backdoor'. It would make the carbon incentive explicit, visible and manageable for energy consumers.

Second, EET can be designed, for instance, by allocating allowances 'downstream' and concentrating the monitoring 'upstream' at the level of fossil fuel producers and importers, allowing for the involvement of individuals while working towards reducing administrative costs at the same time. Integrating such a scheme into the existing legal framework will be a challenge and begs the unavoidable question of policy interactions and resulting inefficiencies that may arise.

Third, EET may be acceptable if people come to understand that they get an additional (carbon) bank account that will help them to improve the environment, as long as the allowance allocation is perceived to be fair. Although the European Union Emissions Trading Scheme (EU ETS) for big companies is a success in the sense that absolute emission caps have been imposed on firms and that their trading of allowances to save costs is undisputed, the current criticism on the EU ETS (e.g. over-allocation, windfall profits, too low carbon prices) may actually spill-over to the EET debate and diminish its prospects.

¹²⁶ TINA FAWCETT, CATHERINE BOTTRILL, BRENDA BOARDMAN, GEOFF LYE, 'Trialling Personal Carbon Allowances' (2007) UKERC Report No. UKERC/RR/DR/2007/002

¹²⁷ RACHEL HOWELL, 'Living with a carbon allowance: the experiences of Carbon Rationing Action Groups and implications for policy' (2012) *Energy Policy*, 41: 250-258

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