carbon limited

exploring personal carbon trading

Personal Carbon Trading

The idea, its development and design

RSA Carbon*Limited*

Interim Recommendations

September 2007

RSA

www.theRSA.org/**carbon**

Preface

The RSA is founded on the idea that small groups of committed people can change the world in big ways. Indeed, we believe that many of the most pressing problems we face today are so complex that they can only be addressed if we as citizens tackle them collectively. I see the RSA's job as inspiring and supporting civic innovation, helping people see how they can bring their passion and expertise to bring progressive change. We do this through a portfolio of projects and a lecture programme consisting of well over one hundred events a year. We are a progressive, wholly independent, multidisciplinary body supported by 26,000 Fellows worldwide.

Working together people can make a huge difference to their local environment, applying their collective skills and creativity to address issues from ecology, to waste and resource use, to greenhouse gas emissions. The task of tackling climate change requires mass participation but, at the same time, must allow local innovation to drive creative and practical solutions. A wind turbine may be a preferred energy solution for people in one location, a fleet of vehicles powered by chip fat in another.

We need a framework to bind people's actions and frame shared responsibility between people, government and industry. Carbon*Limited,* the RSA's project on personal carbon trading, whose interim findings are contained in this report, sets out a powerful idea for how these linkages can be made, binding the efforts of disparate communities together and encouraging a new shared duty.

The devolution of responsibility for environmental problem solving, given the right government level supporting framework, is precisely what is needed in the 21st century to avoid a tragedy of the global atmospheric commons. It could simultaneously encourage stronger community relationships, including citizens, public and private sector organisations in the process of adapting to a changing climate, and link them together in a modern carbon marketplace focussed on achieving our shared emissions reduction needs. The personal carbon trading approach, mixing a strong society-level framework for action with increased involvement of citizens and communities in tackling emissions, exemplifies the RSA's model of social change. As well as pointing the way towards effective action on carbon reduction, it gives concrete expression to the Society's commitment to help us be the people we need to be to build the collective future we want.

Matthew Taylor, Chief Executive, RSA

Executive summary

Personal carbon trading (PCT) is a market-based policy option for controlling carbon emissions from the direct use of energy by individuals. It is based on the principle of equal access to a shared resource and allows people to make their own choices about actions which are directly responsible for emissions, such as driving a car, whilst creating a financial incentive to reduce those emissions. It provides individuals with their own 'right to pollute', in the form of a tradable personal carbon allowance. If individuals need to, or wish to, carry out activities which lead to more emissions than are covered by their allowance, they must pay for additional carbon credits.

Implemented across a whole population, PCT would create a clear framework of shared responsibility and collective action. It reflects the political times, being simultaneously pro-market, but also progressive and redistributive. As a result, the idea for personal carbon trading is attracting interest across national and political boundaries, from civil society and from industry.

This paper clarifies what personal carbon trading is and what the practical options for its development are. Issued at the mid-point of RSA Carbon*Limited*'s exploration of a system of personal carbon trading, it sets out our findings to date and sketches a route map for the research, debate, design and public acceptability testing that still needs to take place.

If we are to have a strong public debate about the initial design and acceptability of personal carbon trading, consensus needs to be built about what it is, how it could work and how it relates to the other policies currently in operation. This paper proposes that personal carbon trading should initially be developed as a voluntary scheme, so that there can be a strong public conversation around its design and impact, including issues of rights, responsibilities, fairness and agency.

If the voluntary trial was successful, personal carbon trading could then be made mandatory. It would help the UK achieve its emissions reduction targets by making individuals responsible for a share of those reductions. This is entirely achievable. The technical infrastructure already exists and would cost relatively little to reuse, with potentially no 'point of sale' delays. The existence of other policy instruments affecting carbon emissions associated with energy production should not pose a problem for PCT – their existence simply implies that a number of different measures are required to bring about emissions reductions. Involving individuals in that process will be vitally important to its success, but the extent to which the UK is able to use PCT to deliver its required emissions cuts will depend upon how successful it is in its early stages. Great care therefore needs to be taken to establish a fair and flexible design for the scheme.

Key recommendations

- Personal carbon trading (PCT) should initially be developed, as a voluntary scheme, so that there can be a strong public conversation around its design, fairness and impact.

- It should evolve into a mandatory scheme to deliver a percentage of the UK's emissions reduction targets set out in the Draft Climate Change Bill.

- An independent Committee on Climate Change, described by the Draft Climate Change Bill, will begin carbon budgeting for the UK in 2013. It would be the appropriate body to set the cap.

- PCT could operate in tandem with the 3rd phase of the European Union Emissions Trading Scheme, also in 2013. Other European nations may wish to adopt it.

- The technical operation of PCT should utilise existing infrastructure, negating the requirement for a central government database, and enabling operation roles for accredited private and public sector providers.

- The cost of implementation needs to be considered in the context of efficiency at emissions reduction and additional social benefits of decentralising decision-making.

- There should be a role for intermediaries to manage personal carbon accounts on behalf of those unwilling or unable to do so themselves, or those seeking to act at a community scale, thus helping ensure vulnerable individuals are not unfairly disadvantaged.

About Carbon*Limited*

Carbon*Limited* was established in 2006 as a 3-year programme to analyse the effectiveness, feasibility and public acceptability of the concept of personal carbon trading (PCT). In line with the RSA's principles and utilising its influential network of Fellows, the project has not relied only on desk-based forms of policy research, but is testing ideas in the community and seeking the meaningful involvement of experts, businesses and the public.

The RSA recognises that tackling climate change is an issue of immeasurable importance. As a barrier to social progress, it is one of the greatest challenges we face. It is also a startlingly complex issue, complicated in the first instance by its physical science, which is unlikely ever to be perfectly understood, at least not in the near future. The result is that the nature of future climate changes remains unpredictable, which exacerbates the second set of complicating factors - the social sciences of climate change. With its impact varying geographically, people in different places will experience different sets of problems and opportunities. Perhaps the most unfortunate fact of climate change is that the developing south is already the hardest hit, with large areas being abandoned as they become inhospitable to human life. Compounded by cultural differences in the values placed on nature, differences of opinion in the media, and the common imperative for economic development, there is considerable difficulty in reaching international agreements to tackle this global issue. Community-scale action alone is insufficient. Unfortunately, the air does not recognise political boundaries. However, demonstrating how networks of active citizens can affect positive change is at the heart of the RSA's agenda. Carbon*Limited* therefore aims to help bridge the gap between individual action on climate change and wider policy frameworks.

For decades now, there has been a strengthening sustainable development movement, a movement focussed on enabling greater access to a good quality of life, whilst sustaining natural resources. Unfortunately, traditional economics don't account for the depletion of the natural resources of air, water and so on. These have been, and still are, often treated as inexhaustible. In 2005, long before the influential publication of the Stern Review, a small group of RSA fellows and advisors, with a long-standing interest in the environment, began to feel that the RSA, given its unique position as a catalyst for involving industry and commerce in tackling intractable social issues, had a responsibility to explore the future of sustainable development, in particular, how the prevailing unsustainable economic model could be remedied in a manner which could reconcile social and commercial progress. They were attracted by the theories underpinning the nascent markets in carbon, which place a value on carbon emissions *reductions* and hence alter the economics of resource depletion and greenhouse gas emissions in favour of greater environmental sustainability.

In considering these policies, a relatively recent idea appealed to the RSA, one which appears to contain the pro-social and pro-business elements that would be required to advance the climate debate substantially, that of 'domestic tradable quotas' (DTQs). First developed by David Fleming in 1996, as a means to ensure fair access to energy during times of shortage, DTQs also appear to be a fair way to allocate responsibility for using energy efficiently, and hence limit greenhouse gas emissions. This insight was not lost on the Tyndall Centre, where Richard Starkey took up an interest in DTQs and both he and David Fleming joined Carbon*Limited*'s advisory group to help the RSA to dig deeper into the feasibility of this idea.

Policies designed to control or reduce greenhouse gas emissions are increasingly numerous and not especially tidy. DTQs apply to a whole national economy, which would, to a great extent, require a considerable reduction in 'policy clutter'. Any 'double-counting', where the end-user pays twice for the same unit of energy, represents one of the toughest hurdles for DTQs. And despite offering equal shares of emissions rights to individuals, practical concerns flourish – about privacy, appropriate education, awareness, capacity to take part, carbon literacy and what many perceive to be a likely interruption to people's busy lives. And if the UK alone were to adopt such a scheme, would it be anti-competitive, or would the UK experience first-mover advantage, keen as it is to dominate the carbon trading market?

DTQs were the source of the idea for personal carbon trading (PCT), but the two are not the same. The 'whole economy' system described by DTQs contains within it an equal distribution of emission rights to every individual in the country. It is this aspect of DTQs that is personal carbon trading, and as this paper concludes, PCT could therefore exist as part of a DTQ system, but also and, we think, more practicably, in conjunction with the existing and planned basket of policy measures aimed at tackling climate change. It would function as a more 'visible' policy that might therefore be expected to result in greater changes in the behaviour of individuals. Against this fluid backdrop and with the ultimate aim of developing workable proposals for PCT, Carbon*Limited* developed a necessarily complex and interdisciplinary work programme.

Carbon*Limited's* interdisciplinary advisory group met on several occasions during 2006 to help to shape the initial programme of research and development, resulting in the current programme and it will soon reconvene to assess progress. A consensus developed that whilst the big unknowns were those of social acceptability and economic impact, a certain amount of detail about the scheme would need to be set out for this analysis to take place. For example, a number of commentators have suggested that the technical infrastructure to support PCT is relatively obvious, with banking and currency systems offering a clear parallel. Similarly there is a question about which personal emissions to include in the scheme. Public transport emissions are generally thought to be excluded, because the data would be less accurate and those emissions look likely, ultimately, to be captured via a scheme for industry. However, both of these examples, whilst simple questions, raise considerable further complications. Through Carbon*Limited*'s research it has become clear, for example, that appropriate IT infrastructures do exist, but that there is considerable cultural resistance to increasing customer time at the checkout, raising doubts about the role of the additional 'personal carbon credit card' that has often been talked about. The exclusion of public transport journeys from the scheme might make good sense in emissions trading terms, with other instruments better placed to control these emissions, but feedback from the public suggests that people understand that a whole host of their actions have an impact on climate change. A scheme which affects car use, but not train use, raises suspicions about its accuracy.

This thorough review of the task in hand resulted in the prioritisation of research into the technical design of the scheme, analysis of its likely structure and operation as well as its scope, particularly with respect to transport. These aspects, except the transport question, are described in more detail in this report. The issues of public acceptability and economic impact are touched upon, but research is ongoing and a full report due in 2008. A description of what exactly PCT is, and what the options are for its development, is an essential first step to completing an analysis of likely social or economic impact. This report therefore

aims to set out what personal carbon trading is and how we suggest it would work, before Carbon*Limited* later reports more fully on its likely impact and acceptability.

The work programme is staggered, but overlapping, with the following elements ordered sequentially according to start date.

Technical options
We researched the technological options for PCT through a series of expert workshops with technologists, identity and privacy companies, academics and policy makers. A published paper on these findings is now being refined by a technology pilot that will test some of the issues the paper raised around transaction costs and the potential for private sector operation. The pilot is being delivered in partnership with Atos Origin and a revised paper will be published when it is completed next year.

Market and scheme design
Expert seminars and interviews with market operators and traders have helped inform our analysis of the options for the PCT market. This is being turned into an online pilot of a PCT market, developed for the project by *Moneyswap*, an online currency exchange platform.

Economic efficiency
To assess the economic efficiency of PCT, we have been working with Green Alliance and E3 consultancy to understand comparative economic effects by conducting a literature review and analysis of existing policy instruments. Alongside this we have run a series of seminars and interviews with experts from the financial sector, policy makers, government officials, carbon market traders, economists and academics. We will publish our findings from this work later in 2007, reviewed by our expert steering group (details below).

The next stage of this work, which will involve modelling the economic impacts of PCT, is described in the last chapter of this report and will overlap with the work programme focussed on transport questions.

Public dialogue and debate
Our website has been a key portal for discussing and demonstrating the concept of PCT. So far participation has mainly come from experts, researchers, policy makers and RSA Fellows. This has given us useful additional information and feedback during our research. We have been working over the past 6 months to re-launch this as a platform for broader public dialogue with the trading element necessary for a voluntary pilot (for more information see the final chapter).

Thus at the mid-point of the project, Carbon*Limited* is turning its focus from research-intensive intellectual development of personal carbon trading as an idea to more practical field-based research and development. Final recommendations to government will be published in 2008.

The core team of Matt Prescott, Lucy Stone and Ben Castle at the RSA is advised by a group of key stakeholders, and all of our research is peer-reviewed by leading experts in the relevant fields.

Advisory group UK

Richard Starkey, Tyndall Centre for Climate Change Research
Kevin Anderson, Tyndall Centre for Climate Change Research
David Fleming, The Lean Economy Connection
Mayer Hillman, Policy Studies Institute
Catherine Bottrill, Environmental Change Institute
Peter Jones, Biffa
David Quarmby, Independent Transport Commission
James Cameron, Climate Change Capital
Derek Osborn, European Economic and Social Committee
Colin Challen MP
Ed Gillespie and Sarah Perry, Futerra
Malcolm Cahill, Poseco Ltd

Advisory Group US

Branko Terzic, Deloitte Services LP (Chair)
Roger Cooper, American Gas Association
Michael Eckhart, American Council on Renewable Energy
David Owens, Edison Electric Institute
Christine Tezak, Women's Council on Energy and Environment
Maria Vargas, US Environmental Protection Agency
Barry Worthington, United States Energy Association

Expert steering group – Economic and Market Research

James Cameron, Climate Change Capital
Kevin Anderson, Tyndall Centre
Michael Roberts, CBI
Ed Mayo, National Consumer Council
David Green, BCSE

Expert steering group – Transport Research

David Quarmby, Chair of the Independent Transport Commission (Chair)
Abigail Bristow, Transport Group, Loughborough University
Jillian Anable, Centre for Transport Policy, Robert Gordon University
Miles Tight, Institute for Transport Studies, Leeds University
Sheri Markose, Centre for Computational Finance and Economic Agents, University of Essex
Steve Stradling, Transport Research Institute, Napier University

Special thanks to Richard Starkey (Tyndall Centre for Climate Change Research), Chris Jacobs and Helen Champion (Department for Environment, Food and Rural Affairs), David Quarmby (Independent Transport Commission) and Rebekah Phillips and Russell Marsh (Green Alliance) for their intellectual input.

Policy Background

At present, climate and energy policy is largely focused on international agreements, governmental action and the role of business. The role of citizens is restricted: they are either seen as voters, or as consumers. This focus misses the opportunity to give people the power and responsibility to play a more active role in addressing climate change both as individual citizens and as communities.

In his first policy announcement as prime minister, Gordon Brown outlined bold plans to define a new relationship between people and their government that hands more power to the citizen and engenders a sense of 'common purpose' (Ministry of Justice 2007). This is a reform agenda that applies above all to environmental challenges. The collective problem of climate change requires shared agency between government and the citizen. A 'cap and trade' scheme like Personal Carbon Trading (PCT) would place the emphasis on individuals to 'do their bit' in cutting carbon emissions whilst making sure that government sets an overall carbon budget, reserving a proportion of it for individuals' use.

With a legally enforced target for emissions reductions expected to come into force this year through the Climate Change Bill (Defra 2007), giving citizens responsibility for a share of an overall carbon reduction budget would form a binding contract between government and citizens to achieve a common goal. Citizens will need to live within their 'carbon allowances' while government and business will need to provide the infrastructure that allows them to do so. In this way, a more symbiotic relationship should develop between the major stakeholders in climate change: the people, and their elected representatives, the government, and through the market, business.

A good democratic response to the problem of climate change should enable collective decisions to be made fairly and transparently, and mobilise support for the hard decisions that governments will have to make: in this case setting mandatory limits on personal emissions. PCT could provide this transparency and fairness. Given meaningful and structured involvement in designing the frameworks for action, people are more likely to feel ownership of them and support their introduction. By creating individual ownership of an entitlement to emit carbon, carbon allowances could become an asset rather than a burden, a tool to support collective action and an independently owned resource for climate change mitigation.

Awareness of and concern about climate change amongst the UK public is exceptionally high (Anable, 2006). Campaign groups and government policy on citizen engagement both currently aim to influence behaviour change by providing information (most recently the *Act on CO2* campaign, Defra 2007), advertising and carbon calculators, all of which assumes that with the right information and motivation, the public will shift their behaviour towards lower carbon choices.

However, this heightened awareness is not yet translating into action and emissions directly attributable to individuals continue to rise (through home energy use and transport choices). Evidence is emerging that campaigns which highlight the scale and urgency of the climate change problem but which advocate small scale actions (such as changing light-bulbs) do not create a coherent picture, and actually contribute to inertia and a lack of trust (Retallack, Lawrence et al. 2007). Climate change can feel disempowering when

individuals contrast the enormity of another nation's growing emissions with the triviality of changing a light bulb. And with attitudes varying from person to person, it is hard to appreciate that you may be part of a collective effort, which does, in fact, have a real impact. Moreover, there is little reward for reducing emissions, aside from a small saving in energy bills, unnoticed by the majority, who pay estimated bills by direct debit.

Aside from information campaigns, government policy has relied on attempting to drive behaviour change through price signals, such as subsidies, grants, VAT reductions, fuel tax and air passenger duty, emissions trading for industry across the European Union, the EU ETS, and the carbon reduction commitment. However, these are little understood and do not send a coherent message to the citizen, especially when they simultaneously see increases in public spending on road networks, train fare increases and the building of new air terminals.

Information, campaigning and price signals all doubtless have a role, but there is little evidence that they will achieve the level of behaviour change required to meet emission targets. They rely too heavily on the public's ability to make rational choices in the face of ingrained habits and social norms. Without a strong framework for action, there is a real danger that society will veer toward inertia, frustration, cynicism and carbon footprint fatigue, making it increasingly hard for policymakers to deliver the necessary frameworks in the future, and undermining technological advances.

Giving every citizen the same carbon allowance should help people to readily understand their emissions profile and to place it within context. The current trend to describe carbon footprints in tonnes of CO_2 is opaque to many people. Carbon allowances should bring it to life with a tangible reminder that it assumes a financial, as well as a carbon value.

Some argue that the public don't want responsibility, consultation or involvement, they just want to see their elected representatives solve the issues that concern them and reconcile conflicting interests on their behalf. The message for PCT is that it needs to be simultaneously simple as well as adequately visible to influence behaviours. However, the evidence suggests that citizen participation, whether through consultation or in more tangible ways, is not only important for democratic reasons, but can deliver better policy making and greater support from the public for hard choices. Much of the apparent contradiction between the high level of public concern about climate change and the low level of action to address it can be attributed to a lack of clarity in the way the issue is represented and a failure to properly engage the public in the development of climate-related policy. The way in which public debate about policy is constructed and the degree of public involvement in it can be critical to the success of its implementation, both in terms of its efficacy and acceptability. The introduction of the European Union Emissions Trading Scheme, for example, was communicated to industry as a climate change solution, but not to the public. So even if it is successful at delivering emissions reductions, most people will be unaware of it. By contrast, the million or so signatures on the road user charging petition showed an appetite to engage in the debate, but the opportunity to harness this enthusiasm to help form alternative design suggestions to the common problem of traffic congestion was missed and the petition remained a crude vote for or against the policy.

So public engagement is crucial to effective policy development and implementation, but it also forms part of a broader political climate in which people increasingly reject top-down modes of management in favour

of freedom of choice and autonomy of action. Research shows that there is increasing support for individual rather than governmental responsibility in public services (HCHLV 2007). The UK public largely ask for leadership on tough decisions, such as a cap on emissions, but choice and control over how this impacts on their lives. In this context the principles of PCT could offer an appropriate climate policy solution for the 21st century.

What is Personal Carbon Trading?

Personal carbon trading (PCT) is a policy instrument whereby each UK citizen is given the same carbon allowance. Credits from this allowance are surrendered when purchasing goods that lead directly to carbon emissions – domestic energy use from gas or electricity and fuel for private transport. Carbon*Limited* argues that aviation emissions, and possibly public transport also need to be included in this scheme. The allowance is tradable and people who do not need to use their full entitlement can sell their surplus to those who need or want more. Extra credits can also be purchased at point of sale by people who have run out or who do not have an allowance – such as foreign nationals.

It is important that the debate about personal carbon trading is not confused with calls for rationing. Rationing describes how each individual would be completely limited, subject to a *personal* cap. This is not true of a personal carbon trading scheme which describes a national cap on emissions within which there is an open market for individuals to buy and sell emissions rights. Although *carbon* is being limited, *energy* use is not. Energy with low or zero carbon emissions can be used in abundance since this will not attract the use of people's carbon allowances.

Domestic Tradable Quotas – the starting point

The idea for a system of domestic tradable quotas (DTQs) was originally described by independent policy analyst David Fleming (who has more recently used the name Tradable Energy Quotas) and developed by the Tyndall Centre for Climate Change Research. DTQs are a whole economy 'cap and trade' scheme in which a total carbon budget is set for the nation and ratcheted down over time to achieve long term climate stabilisation. Part of the nation's emission budget (60%) is auctioned to industry and the remainder (40%) is allocated on an equal per capita basis, for free, to every adult individual in the country in the form of tradable emission rights. The 60/40 split is based on the proportion of the nation's emissions directly attributable to individuals through fuel and electricity purchases (40%). DTQs require a central government database from which each individual would be allocated their emission rights into personal accounts. These emission rights would be surrendered at the point of purchase for domestic energy and vehicle fuel and the units would find their way back to the issuing authority, thus completing the system.

Personal Carbon Trading

PCT was inspired by, but is not a form of, Domestic Tradable Quotas. It is an emission trading scheme designed for the citizen only and it does not assume the rest of the nation's emissions are covered by the same policy instrument. Given a changing policy landscape in which there are a number of other existing and carbon trading schemes, most notably the EU Emissions Trading Scheme, the UK Carbon Reduction Commitment and the Energy Efficiency Commitment (Carbon Emissions Reduction Target), the most likely scenario in the near-term would involve PCT being deployed alongside, but separately to, these other instruments. It is important to recognise, that no single policy tool will address all issues and that policies are introduced in a complex setting that targets different sectors and reflects the changing political and economic, national and international context.

Even before the possible introduction of PCT there are already a number of overlapping policies targeting the same carbon emissions and giving rise to different carbon prices. The fact that these policies co-exist more or less harmoniously implies that the introduction of another policy is not, in itself, problematic. The question is of efficiency – which combination of policy instruments will most effectively and efficiently reduce carbon emissions to the level required nationally? We will report separately on our detailed analysis of this issue, but our work so far demonstrates the importance of developing the idea of PCT within the existing policy context, rather than in isolation or as a replacement for all other national carbon trading schemes. There is a compelling logic to introducing emissions trading for industry at the EU level to prevent competitive disadvantage, and so it would be both politically undesirable and economically unfeasible to replace the EU Emissions Trading Scheme with a national scheme.

There is also an economic efficiency argument in favour of multiple policy instruments, given that individuals and organisations do not always respond rationally to price signals. Introducing a cap and trade scheme for individuals should complement other policy instruments aimed at controlling carbon emissions by matching industry compliance
with consumer demand (RSA, forthcoming).

We know that carbon taxes cannot guarantee emission reductions that will meet a specific target. As analysts have noted, economic instruments applied 'upstream' to industry, whether trading scheme or tax, appear to be a tax from the perspective of an individual (Roberts and Thumim 2006). The use of taxes to try to change people's behaviour assumes that people will make rational choices based on a price signal, but this is often not the case. While PCT might technically be considered a tax, in that individuals pay for emitting carbon after using their free allowance, it has the potential to deliver greater behavioural change than the pure price signal of carbon tax because it provides a more tangible interface between emission reduction and lifestyle choices. Perhaps most importantly, the national cap gives a certainty about the level of emissions reduction that taxes cannot provide.

Simon Dresner has proposed an alternative way of incorporating these beneficial elements of PCT into a carbon tax in the form of an 'ecobonus', a payment of equal size given to each individual to redistribute the revenue from a carbon tax (Dresner 2005). Dresner's main argument in favour of this is that it would be more cost effective than PCT because it utilises existing tax and benefit systems; however this overlooks many of the potential behaviour change impacts that PCT provides and makes assumptions about how much it would cost. Starkey (2005) argues that it might be worth accepting the extra costs of a PCT scheme because of the additional benefits over an ecobonus, such as the level of engagement and education it would achieve. However, both assume that PCT is more costly than a tax, even an ecobonus. This is not necessarily the case. A more detailed analysis on the potential costs of PCT in comparison with other instruments will be published by Carbon*Limited* later this year.

Deployed as the 'downstream' element of a package of trading and taxation measures covering the whole economy, PCT could be used to cover any given percentage of emissions reductions. The public may not be willing in the first instance to assume full responsibility for their share of emissions reductions and a compromise deal may be needed in which only certain sectors fall within the scheme, though this could of course be extended over time.

How would it work?

Personal Carbon Trading (PCT) is a cap and trade scheme for individuals. How the cap is to be set and what percentage of the UK's emissions are to be cut through PCT are fundamental questions for the operation of the scheme.

Equal per capita allocations

David Fleming argues that an equal per capita allocation is the only way to guarantee fair and equal access to a scarce supply of energy. In their 2005 report (Starkey 2005), the Tyndall Centre also elaborate on an equal per capita allocation as the most appropriate way to ensure fairness when restricting carbon emissions. Of course there is a profound difference between procedural fairness, in which everyone is treated in the same way, and an equal distribution of a public good. Many would argue that true equality pays attention to differentiated needs. Some will have greater need to cause carbon emissions, due to circumstance rather than choice. This is an important distinction. Allocating every UK citizen the same carbon allowance would not then mean that every UK citizen would start from the same point in utilising this right. There are those who require large amounts of energy to heat their home, and so are responsible for high emissions, but who have no choice over their accommodation or any ability to rectify the situation. It will be crucial to address issues like fuel poverty as we reduce carbon emissions as a nation, whether we use PCT scheme or not. However, there are a number of design options for addressing these concerns within a PCT scheme:

- a relationship with existing benefit support targeted at home energy use and travel
- exempting individuals through means-testing and adjusting the cap accordingly
- supplying additional support for those needing assistance in living within their carbon allowance

Given the potential difficulties of means-testing according to carbon emission needs, it may be more feasible to build a relationship with other policies targeted at home energy. We recommend that there should be a national assessment of carbon emissions according to housing condition and location. Whichever carbon emission reduction policies are adopted, any that involve the citizen directly will have to consider this equity issue.

There is already support in place to help those in fuel poverty, as well as those seeking to invest in renewable energy or energy efficiency in the home, and this provision could be adapted to support a PCT scheme. In an ideal scenario, PCT could ultimately result in government needing to spend *less* on supporting individual households, as an improved low carbon marketplace responds to the demand for a low carbon infrastructure.

Equity issues do cause some difficulties in the design of PCT. Overall though personal carbon trading is far more progressive than other instruments. Broadly speaking, those responsible for higher levels of emissions will be on higher incomes and will be better able to purchase additional carbon credits that could be sold to them by those responsible for lower emissions, including many of those with below average income. If aviation is included in the emissions covered by PCT, it would be even more clearly redistributive.

Moreover, since the majority of the population lives in a household of more than one person, personal carbon allowances will often be budgeted at household scale or above. (See page 13, 'community scale participation').

It is often stated that the problem with PCT is that 'the rich can just buy their way out of it'. It is true, of course, that it would be possible to buy extra credits to cover excess emissions, but equally the wealthy will be more easily able to pay carbon taxes or higher prices for carbon intensive goods. No matter what mechanisms are used to control emissions, the wealthy are in a stronger position to cope, but PCT still offers a more progressive response than alternative policies. It ensures the polluter pays, but in proportion to lifestyle.

Independent 'cap' setting

The UK Draft Climate Change Bill 2007 proposes establishing an independent Committee on Climate Change (CCC) to set the budget (the cap) for Britain's emissions reduction targets by 2050. The CCC will also be tasked with reviewing the government's emission reduction pathways, deciding on the appropriate mix of policy instruments to achieve that target and publishing a series of 5 year carbon budgets covering the next 15 years. It would be a logical extension for the CCC to set the PCT cap as one of its instruments to achieve this target.

Independence from government will be important to maintain the scheme's distinctive value, its ownership by citizens. As the one proposed policy instrument which would channel revenue from citizen to citizen, rather than to the Treasury or the private sector, heavy government involvement would feel inappropriate and may negatively impact on public acceptability of the scheme.

In order to provide some reassurance to the consumer about the costs of PCT and to limit the unpredictability of these costs, there will need to be a 'safety valve' mechanism to ensure allowance prices do not reach unacceptable levels. To ensure policies are co-ordinated across the economy and to depoliticise the process, the CCC should decide where this price threshold is set and what measures would come into play should it be breached.

The question of what to do if allowance prices reach this threshold has huge implications for the effectiveness and credibility of PCT as a policy. It is therefore essential that the decision adheres to some basic principles. The purpose of introducing any PCT scheme would be to achieve emission reductions *in the UK,* to give credibility to UK international leadership on climate change, to exemplify a shift towards a low carbon economy and to meet legal targets effectively.

Therefore, there is no compelling argument for limiting costs by relying on linkages with Kyoto flexible mechanisms such as the Clean Development Mechanism (CDM) and Joint Implementation (JI). These mechanisms are useful for accessing the most efficient international emission reductions and can bolster mitigation investment in industrialising nations, but their objectives would be outside the remit of a PCT scheme. The effectiveness of the EU Emissions Trading Scheme (EU ETS) as a national and Europe-wide mitigation tool has already been significantly undermined by an over reliance on international credits (*The Guardian*, 2007). As a result the majority of emission reductions attributed to sectors covered by the EU ETS in Phase II will be made from 'offsets' bought from outside the EU[i]. Linking a PCT scheme with EU ETS

would therefore also be an inadequate way of limiting costs. The same argument can be made about the planned trading scheme for large non energy-intensive businesses, the Carbon Reduction Commitment (CRC), because of its proposed link with the EU ETS.

Ultimately, the development of an international network of personal carbon trading markets could provide a more satisfactory solution. However, this would raise a number of complex design questions that we have so far avoided by considering PCT purely as a domestic instrument. In the shorter term we need alternative ways of limiting costs to the user while, as far as possible, ensuring that emission reductions are achieved within the UK.

One option may be for new allowances to be introduced to the market at the price threshold set by the regulatory body. This would mean that the scheme would no longer guarantee a set quantity of emissions reductions and these new allowances would effectively act as a carbon tax levied on carbon usage above the allowance. However, the revenue could then be hypothecated for a new 'domestic offset' fund from which UK emission reduction projects could be supported[ii]. Such projects could include public transport schemes, home efficiency improvements or other initiatives which would support individuals in reducing their footprints. Alternatively, the fund could support initiatives in other sectors such as small and medium sized businesses which are not already covered by emissions trading schemes such as the EU ETS or CRC. The best use of this revenue will depend on which projects can offer the most cost efficient emissions reductions in the UK.

Verification and entitlement

Once the cap has been set, each individual needs to be allocated their credits. To do this it will be necessary to verify both their identity and their current entitlement. Our research indicates that there will be no need for a new central government database and associated IT infrastructure to deliver each individual's allowance. The track record of large government IT provision suggests that it may be more efficient to let the private sector bid to operate the service, rather than to try and implement a new national government IT system. This would involve either the national lottery model of contracting one national operator to have a limited monopoly, or it could involve multiple private and public sector bodies competing to provide the operation. Both these options remove the need for a large central database and could dramatically reduce the cost of implementing PCT.

Of these two options, the multiple provider alternative would be the most privacy friendly. Licensed service providers (which might include banks, businesses or even NGOs) could use the Passport Verification Service (PVS) to verify identity and entitlement. The service provider would need only to verify the unique identity of the individual and affirm the allocation they had previously received. The ways in which allowances are used, home addresses, or any other private information would be held within a personal carbon account accessible only to the individual or their appointed agents. Faced with a choice of service provider, individuals could choose which one they prefer, based on a number of factors, including trust. It would, of course, be necessary to secure the system so that multiple accounts are not fraudulently opened by a single individual.

Account service

The private sector already uses many of the technologies that PCT would need. Credit cards, loyalty and pre-pay cards all rely on the sort of devolved databases and technical infrastructure that would be needed to record direct purchases of energy whilst providing sufficient privacy and identity security.

To a large extent, detail on the account management service must be left to the scheme operators. This will allow competition as providers seek to differentiate their services in order to attract customers. For example, overdrafts could be offered, free, or at a fee, in much the same way that we are used to in commercial banking. It would be these kinds of income opportunity that may enable organisations to operate the scheme at a profit.

Allocation

The Draft Climate Change Bill proposes five year carbon budgets to allow for flexibility, but provide stability. Rather than allocate each individual with five years worth of credit all at once, it could be allocated automatically on a weekly or monthly basis. This would better ensure fluidity in the market and help manage peak demands. It would also prevent people going on a carbon 'binge' and causing a deficit before the end of the carbon budget period. Moreover, research into tax and benefit systems show that allocating a lump sum for an annual period can cause considerable problems with over-allocation and fraud, resulting in penalisation of the most vulnerable as their circumstances often fluctuate over a period of a year (Davies, 2007). There would have to be an element of flexibility for individuals to specify how frequently they receive this allocation, but most people are used to weekly or monthly budgeting as salaries are generally paid at these intervals.

Non-participation

Research into financial literacy (CSE 2007) shows that there will always be some people who are unable or unwilling to manage their carbon accounts. Those who do not take part would effectively expose themselves to what would feel like a carbon tax (Starkey 2005). On receipt of their carbon allowance, they would retire or sell the total back to the market. When they needed to buy carbon allowance associated goods, the energy or fuel retailer would purchase credit on the customer's behalf, probably with a fee attached. Non-participation is not in and of itself an obstacle to the successful operation of PCT. The problems it might cause are equity related: it is the socially and economically disadvantaged who are most likely to sell their allowance at the outset; they will then be further penalised by having to pay a premium price to the retailer at the point of sale.

To make sure the scheme is truly progressive, therefore, we need to move the model of PCT as a simple owner-operated account and explore the development of systems that would manage carbon on behalf of individuals, in particular vulnerable individuals. These services could be offered on a not-for-profit basis by social landlords or by local authorities as part of their expanding role in climate change mitigation and the promotion of climate-friendly behaviour[iii], indicators for which are to be included in the new local government performance framework[iv]. These intermediaries could effectively perform the role of 'independent carbon advisors', providing simple advice on purchasing and lifestyle options through which individuals can minimise their carbon footprints as well as trading credits on their behalf, perhaps ploughing profits from the carbon market into community-scale energy efficiency schemes. In this way, PCT would still be highly visible to individuals, but it would not rely on them having strong 'carbon literacy' skills. These

institutions may already be well placed to perform this role, as they can assess the capacity of local people to reduce their carbon footprints, as well as to design information and advice services for residents which resonate with them.

Domestic energy services, insulation of lofts and water tanks, for example, could also be offered in partnership with energy utilities as part of a widened supplier obligation[v]. The incentives provided by PCT could ultimately support the transition towards an energy services model of business across the energy supply sector. Under this model, profits would not be determined primarily via the quantities of energy sold. Instead, greater commercial opportunities would emerge in the provision of efficiency measures, low carbon technologies and environmental advice. Further analysis is required to assess the full range of options for how PCT could interact and fit with a reformed supplier obligation.

Community-scale participation

PCT would provide people with an incentive to reduce their emissions and should lead to a greater use of simple energy efficiency measures in the home, such as ceiling and wall insulation. People's energy consumption habits should also change as they become more conscious of energy use. However, if the domestic sector is to make its contribution to the UK achieving or exceeding the government's target of a 60% CO2 emissions reduction by 2050, there will also be a need for low carbon energy generation technologies such as combined heat and power (CHP) and renewable energy[vi]. While micro-generation options are available for individual homes, the benefits of low carbon technologies are likely to be greatest at the community scale, where the most cost-effective carbon savings can be achieved.

One of the benefits of a PCT scheme would be to make community scale energy initiatives more attractive. Communities would take up these projects in order to 'decarbonise' their energy supplies, enabling individuals to save on their personal carbon allowances. They could club together and invest in projects through independent community initiatives, or through housing associations, who could help 'pool together' multiple individual allowances and manage community energy projects. Such a service would also enable greater efficiency in multi-occupancy dwellings, whether in social or private rented accommodation, where householders either do not have control of key energy related choices, or have no existing financial incentive to make them, for example where they pay a communal heating bill.

If designed with sufficient flexibility and with the scope to include non-commercial account management services, PCT would not only engage individuals, it would also help exploit the expertise within communities, empowering citizens to take positive collective action. Carbon credits could become a major local asset if managed well, tackling climate change and supporting a pro-social agenda which encourages and facilitates communities to respond more forcefully to environmental challenges.

The collective value of personal carbon allowances could also provide much needed funding to make community-scale low carbon technology investments viable. While initiatives such as the Low Carbon Housing Programme[vii] have made progress in supporting low carbon technologies, such funding is not currently at the required scale and relevant government budgets remain under pressure.

The PCT interface

David Miliband, former Secretary of State for the Environment, has talked about the possibility that every Briton might one day carry their own carbon credit card[viii]. Once a personal carbon account has been set-up, a card-based system seems the most obvious way to arrange carbon transactions for travel-related purchases, whether they are done online, over the phone, or in person.

The PCT system could be easily "plugged in" to the existing banking infrastructure. Accounts currently handle multiple currencies and individuals manage multiple accounts; so in theory they could easily deal with a carbon account. This seems a sensible approach and is the one that has usually been outlined (CSE 2007, Tyndall 2005). Having a new carbon card with its own identity may also help drive behaviour change – it would be a tactile, visible reminder that an individual is enrolled in the scheme. However, this sort of card would exclude the 8% of the population who do not currently have a bank account (DWP, 2007) and would therefore need to be employed alongside one or more of the following options:

Utilising existing card-based schemes
A plethora of credit cards and loyalty card schemes already exist. Both technically and from a user perspective, sharing the platform of existing cards is an attractive prospect. It is essentially a 'back-end' data capture process which should require no 'front-end' changes at the point of sale. Purchases are made in the usual way and a flagging system captures the appropriate data. It would communicate this to an individual's personal carbon account from which the appropriate carbon credits would then be deducted. Removing the need for an additional card would also reduce inconvenience and delays for consumer-participants.

The pre-pay card
This card would have carbon credits downloaded to it from an individual's personal carbon account which would then be debited at point of sale. A contactless card (a swipe card without a pin) can be connected to an online account, from which direct debit could also be made, allowing flexible ways in which to spend and manage carbon allowances. Technology is fast evolving away from cash accounts towards pre-pay cards, thought to be the most efficient and user friendly option for fast payments. It would be possible to have both cash and carbon allowances loaded onto the same pre-pay card, as implied by the multifunctional use of Transport for London's *Oyster* card. Contactless cards could be used for public transport and petrol purchases, but not for utility bill payments; these would have to be conducted through an online interface.

ATMs
It is easier to visualise cash machines working as part of the account management process, for example balance checking, than as part of the carbon credit transaction process, although one can imagine how carbon credits could be traded through such an interface and bills paid.

Mobile phones
Mobile phone SIM cards are being used in some parts of the world to store cash and it is not inconceivable that they could store carbon credit. How mobile phones would transact at relevant points of sale for the

surrender of carbon credits is hard to visualise at this stage, but it is a technology worth considering when conducting a full sweep of the options.

The trading interface

Trading options for carbon credits could include person to person transactions through a web interface, or account providers could make transactions on behalf of their customers. Holding a personal carbon account could cause minimal disruption, if individuals so wish, with text, email or other updates available as desired. Equally, the interface would allow for frequent engagement with the scheme, for instance in an eBay-style person to person auction market.

As we can see there is a whole gamut of technological options that could support a PCT system and advances in technology will add further to it. The choice of technologies to employ and expenditure on them will ultimately be a political decision and a mixture of technologies may be needed to allow for the many ways people will wish to interact with PCT. Carbon*Limited* is exploring the best opportunities to reuse existing infrastructure and thus minimise potential costs.

Phases for introduction

If it is to build public confidence and generate political support, PCT needs to be introduced in phases, beginning with a voluntary scheme. Development of this voluntary scheme could lead to greater international interest, or even involvement, and would provide important lessons for the development of a subsequent mandatory scheme.

Carbon labelling

Earlier this year Tesco announced their intention to carbon rate every product in their stores as part of a move to a comprehensive carbon labelling scheme. The availability of this data raises the prospect of extending PCT to cover all purchases. After all, people understand that their environmental impact extends beyond their direct purchases of energy. The impact of emissions from food purchases alone is considerable. The idea of a carbon credit applied to all purchases warrants further research. However, such a model would require more resources to be put into verification than a version of PCT which just covers direct fuel consumption and aviation. Moreover, unless they were co-ordinated and based upon standardised information, different carbon labelling initiatives might simply end up confusing the consumer. It is vital therefore that the Carbon Trust's important work in this area is supported by the government and companies interested in carbon labelling their goods. (Carbon Trust 2007)

The introduction of a voluntary scheme

A voluntary PCT scheme should be offered as soon as we are able to measure and audit an individual's relevant carbon emissions in real time, without needing them to input data themselves. An allowance can be issued and incentives provided to stay within that allowance. The incentives might be funded by grants, or by corporate sponsors. Participants might even be prepared to be penalised for exceeding their allocation. The new version of RSA Carbondaq, (the project's online voluntary scheme)[ix] currently under construction, will provide a basis for operating a trial scheme according to these principles. The lessons learned from this will inform the next steps.

In the early stages, PCT will need to be deployed as a voluntary measure, if only in order to build consensus. A large-scale voluntary scheme which was economically viable and had sufficient incentives built in could deliver considerable value in terms of citizen engagement and emissions reductions. It could also operate with even less government involvement than the scheme we have described in this report and could be developed quickly, beginning within the lifetime of Carbon*Limited's* exploration of PCT, due to end in December 2008.

An evolution towards a mandatory scheme

In the long run, voluntary incentives are unlikely to be adequate, although this depends on the level of emissions reductions being achieved elsewhere in the economy. To make the right choices, people will need clear boundaries and price signals, just like industry does, and they will need room to exercise freedom of choice within those parameters. The role of government in such a system will be twofold: to ensure compliance, or to create or appoint a body to do so, 'OfCarb' for example, and to provide an infrastructure which enables everyone to live within their allowance with minimal disruption. This will

necessarily involve investment and support for emerging low carbon products and services, but, as this report has demonstrated, enough of the key elements are already in place for this to be a realistic possibility.

The international agenda

In our opening remarks, we alluded to the apparent logic of rolling out PCT alongside phase III of the EU Emissions Trading Scheme (EU ETS). Although it would have impacts on the regulation of the scheme, it is conceivable that PCT could be adopted across Europe, with trading taking place between the different national markets. Indeed there is scope to explore relationships further a field with interested parties like the State of California.

Successful piloting at regional or city level, combined with adequate local or regional law-making powers, would raise the possibility of a PCT scheme which goes beyond national boundaries to form a network of cities and regions serious about demonstrating their willingness to make emissions cuts and perhaps wishing to capitalise on the 'early mover advantage' that engagement in a new carbon market might bring.

Conclusion

A new relationship between government, business and citizens is essential if we are to solve the complex and collective problem of climate change. PCT symbolically transfers accountability for a body of emissions reductions from government to the people via an independent body. The government then assumes a share of responsibility for ensuring that its people are able to live within the cap.

A decrease in carbon emissions cannot be achieved without the comprehensive involvement of the public. Lower carbon choices need to become mainstream so that economies of scale can prevail. PCT appears to be the most likely policy option to bring this change about. It would set a clear limit on society's total emissions and would support a broad cultural change to enable people to live within that limit.

The currency of PCT, the carbon credit, has a number of merits. As a fixed unit of measurement, carbon credits enable direct comparisons of the impact of different choices and hence serve as an educational tool – the next generation carbon calculator. The need to live within a limited number of carbon credits, and the potential to find solutions at community level, both offer the likelihood of greater creativity and action to reduce emissions.

This report emphasises the need to view PCT as a scheme which will fit into, and enhance, an existing landscape of policy instruments targeted at cutting emissions. This may means that some carbon emissions are 'double-counted', but this is not a serious problem for the policy. It is true to say, however, that by seeking to give individuals some share of responsibility for emissions cuts, there may be an opportunity to increase the efficiency and effectiveness of this whole group of policies. Until now, it has been assumed that PCT would work as part of a single whole-economy emissions trading system. We do not think this is viable in the near-term and we propose that it should be designed to work alongside other policies.

PCT is no panacea and should not operate in a policy vacuum. It should not be expected to deliver all the emission reductions that we need, but it could encourage individuals to play a substantial role alongside industry and government. A progressive measure, with a strong focus on individuals and devolved responsibility, PCT is a climate change solution fit for the 21st century.

The UK has a responsibility to demonstrate leadership on climate change. The introduction of a PCT scheme following the Olympic Games in 2012 would be a significant step towards discharging that responsibility. Subject to further public acceptability research and scheme testing, this could be a very real option.

RSA Carbon*Limited*'s next steps

Our research to date suggests that PCT could well form part of the UK's response to the challenge of climate change mitigation and adaptation. There are no obvious technical barriers to the introduction of such a scheme, and although this initiative must be legislated for by government, it need not be run by government. However, there are still a number of social, practical and economic issues which need to be assessed in the evaluation of PCT as a policy tool.

Carbon*Limited*'s wider work programme is addressing these questions in the following ways:

Equity

One of the great attractions of PCT is that in principle it could be a highly progressive way of achieving emission reductions, especially when compared to alternatives such as carbon taxes, which would disproportionately affect the least wealthy. This is because, in general, higher income groups tend to be responsible for more emissions than lower income groups. People on low incomes could therefore expect to benefit by selling off their surplus allowance. However, the true relationship between income and emissions is highly complex, especially in the housing sector, where some low income individuals and households reside in poor quality homes which are hard to heat and therefore emit more carbon (Ekins, 2004). It will therefore be important to consider any regressive impacts PCT is likely to have on those in, or at risk of, fuel poverty and what supportive measures will be needed to protect them.

How fair people perceive PCT to be will depend to a large extend on how 'in control' of their emission footprint they are (and, crucially, how 'in control' they feel). Some people may lack the ability to make the necessary changes to deliver reductions in their footprints, for example because they live in an old building with limited efficiency improvement potential. In contrast, others may have large carbon footprints mostly as the result of lifestyle choices. It will therefore be important to identify why people are not reducing their emissions: is capacity limited by physical constraints, by a lack of information and financial resources, or by a reluctance to change lifestyles? How fair PCT is perceived to be will depend upon these factors.

Similarly, the fairness of a PCT scheme will be compromised if low carbon technologies such as combined heat and power and solar thermal heating are too expensive. The wealthy would be able to reduce their emissions substantially, while those on lower income would struggle both to reduce their personal emissions and to buy additional credits. A fair PCT scheme would therefore need some way of ensuring that those in low income groups have the opportunity to reduce their footprints.

We need to know more about how easy it is for different groups in society to reduce their carbon emissions. And we need to know whether people fail to reduce their emissions because they are unable or because they are unwilling. This requires new information on individual emissions according to demographic, household type, lifestyle and attitudinal profiling. We will gather this data through our online trialling and using Cardiff as a pilot area, collecting data at household level. Building on this quantitative mapping of carbon profiles, we will investigate the distributional impacts of a tradable allowance. Through focus groups and the citizens fora described below we will gather qualitative evidence on whether people

think that the principles of a personal carbon allowances are fair. We can then begin to understand the relationship between procedural and distributional equity in PCT.

Economic Efficiency

In order to understand whether a tradable personal carbon allowance should be introduced for each UK citizen, we need a sophisticated analysis of the value that this policy would add to the current and emerging policy landscape. Do PCT's many potential benefits, both social and economic, justify the cost of implementing it?

To answer this question we are reviewing existing evidence for behavioural change through response to price signals and quantity signals (scarcity) and then working with a team of economists to model likely behavioural responses to a PCT scheme under different scenarios. To model the likely behavioural responses, we need to include social and psychological factors, rather than relying on classical economic 'rational choice' assumptions.

To complement this modelling work we plan to hold a series of public trials of PCT. These trials will add to our understanding of how individuals may respond to the concept of PCT, in comparison with its likely alternative, a systematic carbon tax. Trials will take place through public events, 'citizen fora', and online participation, to gather a rich evidence base and to encourage as wide a public debate as possible.

Public Opinion and PCT

The RSA will be holding a series of citizens' fora across the UK to engage the public with the detail of the PCT scheme. The fora are being designed to ensure this important policy idea is developed through a genuinely open process of citizen involvement. Rather than going to the public with a completed policy proposal, the RSA wants to involve the public at the earliest stages of discussion, analysis and design.

Given a current lack of trust in government institutions and the potentially sensitive nature of this topic, the RSA is well placed to conduct these events. The RSA has an established history of free and open public debate and a network of influential Fellows around the world who are keen to take a more participative role in the development of projects and policy recommendations. As an independent charity, we are not aligned with any one political party or organisation, enabling us to act as trusted facilitators.

At these for a, demographically representative groups will use their own carbon profiles as the basis for a trading simulation. Following the interactive demonstrations, there will be facilitated discussions about various aspects of PCT. Not only will this provide people with a voice in the formation of the RSA's policy recommendations, it will also give them access to the information and experts they need to help them inform policy in a structured manner. The fora will be supported by online activity, so that anyone interested in the policy can also benefit from their results. Through these events we will build a stronger picture of what sort if future citizens want and how they can help bring it about. This will provide essential evidence to policy-makers.

Online Voluntary Trial

Carbondaq is the RSA's online demonstration and trial of PCT. This will soon have the trading elements necessary to provide a more comprehensive picture of how people would respond to the concept. In time,

we will be able to analyse the level of engagement, how people respond to a carbon account, and how they might trade. This data will be segmented in relation to carbon profile and demographic group.

Carbondaq will incorporate social networking features to promote idea sharing and project development. Supported by a 'personal carbon dashboard', carbondaq will be a central place for participants to manage their carbon footprint, and will signpost relevant information and campaigns.

Carbondaq's social networking aspect will makes it a tool for groups of individuals to join together to reduce their carbon emissions, trading credits and even volunteering to buy surplus carbon. Carbondaq will offer carbon trading options for participants, enabling groups to form around communities of choice, such as employees of an organisation, residential neighbours, or groups of friends. This recognises that people do not always identify with their geographic neighbourhood and have different identities at work and at home.

The new version of carbondaq will feed into the research process by providing information about potential carbon price fluctuation and the volume of trade within a user group. It will also enable the RSA to provide a tool for community groups looking to reduce their carbon emissions voluntarily, in advance of a fully mandated PCT scheme.

Later development of Carbondaq will enable real-time collection of carbon emissions data, removing the need for users to update information manually. Eventually, it will become a voluntary pilot scheme for personal carbon trading. Participants will be able to trade their carbon credits, receiving cash for credit.

Carbon Card pilot

We are working with Atos Origin to develop a personal carbon card to be attached to a carbon account. The card will capture the carbon emissions from car use, and users will have carbon points automatically deducted from their account. RSA fellows are keen to participate in this trial. With the help of fellows and others, we will test aspects of technical infrastructure, transaction costs, and user experience.

Connecting this card pilot to Carbondaq will enable participants to view the carbon credits expended by their vehicle use in the context of their domestic energy use and use of aviation. Alongside the wider on-line and trial events, the carbon card pilot will contribute to a more detailed understanding of how the scheme might operate and how people may respond.

For further details of Carbon*Limited*'s research programme please visit www.rsacarbonlimited.org.uk.

Acknowledgements

Partner organisations helping to deliver our programme

Atos Origin *Technology infrastructure testing and piloting*
Underwired *Construction of the new Carbondaq*
Moneyswap *Person to Person trading platform for Carbondaq*
Green Alliance *Economic analysis*
E3 *Economic analysis*

Participants in seminars and interviews

Mitch Feierstein, Cheyne Capital Management (UK) LLP
Toby Stevens, Enterprise Privacy Group
Anthony Young, ECA
Dr Gus Hosein, London School of Economics
Neil Ellis, Royal United Services Institute
Nigel Hodgson, Transport for London
Neil Fisher, VP Identity Management
Philip Chalmers, Business Development Director, Atos Origin
Jude Thorne, Climate Change Capital
Kate Hampton, Climate Change Capital
Brian Howells, URU, GB Group
Malcolm Cahill, Transaction Network Services (formerly)
James Stacey, Standard Chartered Bank, Group Public Affairs
Michael Bradley, Oyster Card, Transport for London
Helen Champion, DEFRA
Chris Jacobs, DEFRA
Ralph Hazell, MoneySwap Limited
Alex Veys, Fidelity Investments International
Ian O'Gara, Accenture
Rebekah Phillips, Green Alliance
Mike Kelly, KPMG
Susan Davies, Quality of Life Review
Peter Jones, BIFFA
Peter Sparrow, Oracle Corporation
Brian Howells, GB Group
Dr. Emil Lupu, Imperial College London
Paul Brennan, Morgan Cole
Stephen Geldart, UK Petroleum Industry Association
Mark Brett, Socitm Learning
Debra Charles, Novacroft
Alex Clare, independent IT developer
Eric Lounsbury, ICF International
Steve Sorrell, SPRU
William Davies, Sociologist

References

Anable J, Lane B & Kelay T (2006) Review of public attitudes to climate change and transport: Summary report, DfT

Blair, T (2007) Prime Minister's email reply on road pricing petition, http://www.pm.gov.uk/output/Page10961.asp

DEFRA (2007a)"Act on CO2." from www.direct.gov.uk/ActOnCO2

DEFRA (2007b) *Draft Climate Change Bill,* London: DEFRA

Dresner S *(2005) Distributional, practical and political implications of carbon taxes and trading UKERC Taxing and Trading Workshop Paper*, Policy Studies Institute

Fleming, D (2005) *Energy and the Common Purpose: Descending the Energy Staircase with Tradable Energy Quotas* (TEQs)

HCHLV (2007) Planning for Consumer Change, Henley Centre

Ministry of Justice (2007) *Governance of Britain*, the Stationary Office.

Retallack, S., T. Lawrence, et al. (2007) *Positive Energy: Harnessing people power to prevent climate change*, Institute for Public Policy Research

Roberts and Thumim (2006) *A Rough Guide to Individual Carbon Trading*, London: DEFRA
Starkey, R. & Anderson, K (2005) Domestic Tradable Quotas: A policy instrument for reducing greenhouse gas emissions from energy use. Technical Report 39. Manchester, Tyndall Centre for Climate Change Research.

---

[i] Additionally there are concerns over the reliability and 'additionality' of CDM credits

[ii] This has close parallels with recent debates concerning the enforcement of emission targets to be enshrined by the Climate Change Bill, as the question of what remediation action should be required for breeching national targets can be equated with what to do should PCT allowances reach an uncomfortable price. See for example the evidence on compliance and enforcement submitted by the Environment Agency to Defra's consultation on the Draft Climate Change Bill.

[iii] See for example Local Government White Paper, http://www.communities.gov.uk/index.asp?id=1503999 and speech by Secretary of State for Communities, http://www.communities.gov.uk/index.asp?id=1002882&PressNoticeID=2404

[iv] Defra proposals for the new local government performance framework, July 2007, www.defra.gov.uk/environment/localgovindicators/index.htm

[v] The Household Energy Supplier Obligation from 2011: A Call for Evidence, http://www.defra.gov.uk/environment/climatechange/uk/household/supplier/pdf/evidence-call.pdf

[vi] See for example ECI (2005) 40% House, http://www.40percent.org.uk/

[vii] www.lowcarbonbuildingsphase2.org.uk/

[viii] http://politics.guardian.co.uk/green/story/0,,1969164,00.html

[ix] www.theRSA.org/carbondaq