



Personal Carbon Trading: An exploratory research & policy workshop

Workshop Summary Report
24th October 2006, UK Energy Research Centre
Headquarters, London

Edited by:
Catherine Bottrill, Oxford University

Event organised and sponsored by:



UK Energy Research Centre

THE UK ENERGY RESEARCH CENTRE MEETING PLACE

The UK Energy Research Centre's mission is to be the UK's pre-eminent centre of research, and source of authoritative information and leadership, on sustainable energy systems. UKERC undertakes world-class research addressing whole-systems aspects of energy supply and use, while developing and maintaining the means to enable cohesive UK research in energy.

A key supporting function of UKERC is the Meeting Place, based in Oxford, which aims to bring together members of the UK energy community and overseas experts from different disciplines, to learn, identify problems, develop solutions and further the energy debate.

CORE ORGANISING TEAM

Brenda Boardman, Environmental Change Institute, Oxford University

Catherine Bottrill, Environmental Change Institute, Oxford University

Susanna May, DEFRA

Jane Palmer, UKERC Meeting Place jane.palmer@ouce.ox.ac.uk

www.ukerc.ac.uk

Contents

Workshop Rationale	4
Workshop approach & outputs.....	4
SESSION 2: ARTICULATING THE ISSUE	5
SESSION 4: IDENTIFYING THE KEY ISSUES & RESEARCH GAPS	6
SESSION 5: IDENTIFYING A PRIORITISED LIST OF ACTIONS	6
Summary of key issues identified from sessions.....	7
Conclusions: Next steps - taking it forward	9
Appendices	10
APPENDIX A: BACKGROUND BRIEFING NOTE.....	10
APPENDIX B: PRE-EVENT WORK FOR PARTICIPANTS	14
APPENDIX C: ARTICULATING THE ISSUE - WHERE ARE WE NOW?	19
APPENDIX D: WHAT DOES THIS TELL US? IDENTIFYING THE KEY ISSUES & RESEARCH GAPS	22
APPENDIX E: WHAT ARE THE NEXT STEPS? IDENTIFYING A PRIORITISED LIST OF ACTIONS	23

Workshop rationale

Climate change abatement and the development of pathways towards a low carbon economy represent a serious challenge for government. The current policies are failing to significantly change personal energy behaviour and put the UK on a pathway to a low carbon economy. The workshop topic was proposed by Brenda Boardman, from the Environmental Change Institute, in light of the recent Energy Review which asks for a joint study by Government Departments on 'community level approaches to mobilising individuals', reporting to Ministers in 2007. In this context, the study is to consider new policy options, such as personal carbon allowances.

PCT research is still in relatively embryonic stages therefore it was thought to be useful to bring together the key researchers and organisations actively exploring personal carbon trading (PCT) as well as civil servant representatives from DEFRA, DTI, HM Treasury, and DfT to discuss some of the main issues and questions concerning the concept (representatives from DCLG were also expected at the workshop, but unfortunately were not able to attend).

The aim of the workshop was two-fold:

- first, to gain a better understanding of current Government thinking and objectives in relation to PCT and a greater awareness of the different perspectives and priorities;
- second, to establish the current evidence base for PCT and what further work would need to be done to enable an informed decision on implementation of PCT. The intended outcome of the workshop was to establish a new network and identify priority areas for research and further analysis.

The background briefing note (provided in Appendix A and which was circulated to all participants in advance of the workshop) outlines what personal carbon trading is and the two schemes commonly discussed in the literature – Domestic Tradable Quotas (DTQs) also known as Tradable Energy Quotas –TEQs) and Personal Carbon Allowances (PCAs).

Workshop approach and outputs

In preparation for the workshop, participants were asked to do some pre-event preparation. Civil servants were asked to give their top issues and questions on PCTs. The non-government participants were asked to complete a matrix indicating whether they agreed or disagreed on various aspects of personal carbon trading, or whether more research is required (Appendix B). The purpose of the matrix was to help non-government participants understand how each frames personal carbon trading and where there is commonality and differences in the theoretical conceptualisation of the policy. The civil servant representatives were asked for five key issues concerning PCT from the perspective of their government department.

The format of the workshop was a series of small self-managed sub-group discussions, which built upon each other during the course of the day.

The workshop focused around three key areas:

- Articulating the issue – where are we now? – Appendix C
- What does this tell us? Identifying the key issues and research gaps – Appendix D
- What are the next steps? Identifying a prioritised list of actions – Appendix E

Session 2: Articulating the issue – where are we now?

The first key area was approached by organising into two sub-groups – one group comprised of the civil servant representatives and the other of non-government participants.

The civil servant group focused their session on identifying the main questions and issues, which were grouped around three areas:

1. Effectiveness
2. Feasibility
3. Public/Political Acceptance

The civil servants raised many issues about what work would need to be done to make the decision about whether to implement personal carbon trading. The group put further the suggestion that given there are potentially so many complexities that need to be considered before introducing a PCT scheme a starting point could be to trial personal carbon trading in an individual industry or sector, basing the allowance around the specific nature of that industry.

The non-government participant group focused their discussion on agrees, disagrees and issues to be tackled amongst the research community. An economy-wide emission trading scheme, such as DTQs, is an appealing policy instrument as 100% of energy users are involved so everyone contributes directly to the effort of reducing emissions. For the purpose of the workshop, researchers agreed PCT would cover all home energy use and private vehicle transport with aviation and public transport being optional to include in an allowance scheme. From this group's perspective they were interested in the potential of PCT as a viable framework to deliver the carbon emission reductions in the timescale required. However, the group recognise that the policy landscape is not empty and therefore PCT needs to be compatible with the existing and developing policy landscape. In this initial session, issues raised included the need for comparative analysis of different policy instruments, economic cost-benefit analysis and better understanding of logistics/administration requirements as well as public and political acceptability.

Session 4: What does this tell us? Identifying the key issues and research gaps

The sub-groups were reorganised so that each group had a mixture of civil servant representatives and researchers – there were four sub-groups in total. The task of the session was to identify the top priorities for investigating PCT having heard the feedback from the previous session.

The top issues and research gaps:

- Cost-benefit analysis of personal carbon trading and comparative analysis with other policy instrument – all four sub-groups identified this as an important issue
- Strategic policy fit – three sub-groups identified this as an issue, especially how PCT would fit with EUETS
- Public acceptability – three sub-groups identified this as a top issue, in particular mentioning the importance of timing and sequence of steps to full implementation
- Credibility, visibility, adaptability, and longevity were issues identified by one group as being important for delivering carbon reductions
- One group mentioned the need for better data in individuals' carbon profiles to analysis the effectiveness and impact of different carbon abatement policies.

Session 5: What are the next steps? Identifying a prioritised list of actions

The four subgroups reconvened for a more in-depth discussion on the priority issues and consequent research needs.

The list of research priorities that emerged:

- Development of a common framework for comparison of policy instruments – three sub-groups identified the need to have common criteria by which to assess PCT and other policy instruments
- Cost-benefit analysis – three sub-groups listed this as an important research priority, in particular in terms of setting up and administering a PCT scheme
- Studying political and public feasibility – this emerged as a priority for three sub-groups and this could include simulation exercises/modelling, surveying and trials of aspects of PCT
- In-depth analysis of personal carbon profiles – this was identified as a priority by two of the sub-groups.

Summary of key issues identified from sessions

The workshop was successful in bring together key people who are actively investigating and interested in personal carbon trading. The event initiated dialogue between government departments and non-government organisations. This was also the first time the civil servant representatives from different departments had come together to discuss personal carbon trading. The workshop provided an excellent forum for PCT researchers and interested organisations to gain a better understanding of government's current thinking and approach to personal carbon trading, a long-term carbon abatement strategy.

The workshop began a process towards identifying the key issues/questions and research priorities for making an informed decision about whether PCT could be a viable carbon abatement policy instrument. The questions could be grouped into one of six areas, which emerged as the major research themes from the day.

Major research themes & key questions

- Effectiveness in reducing carbon emissions
 - What problem are we trying to tackle?
 - Are we trying to change individual energy behaviour or internalise the environmental cost of polluting activities?
 - Will PCT actually produce behaviour changes necessary to reduce emissions?
- Fit with the policy landscape
 - The policy landscape is not empty, therefore how would PCT fit with that landscape and would it affect other policy decisions that are taken for reasons other than carbon abatement? For example, biofuel policies have been introduced not only for carbon saving but also to support rural livelihoods.
 - What is PCT's strategic fit with midstream and upstream emissions trading? Can PCT be combatable with future versions of EUETS?
 - A PCT scheme could not be implemented in isolation as a variety of supportive policies would be needed. What are these policies and do they already exist?
- Economics
 - How does the PCT approach compare with other policies in tackling personal carbon emissions?
 - What are the cost and benefits of the PCT approach?
 - What are the macro and micro economic consequences of PCT?
 - How will the carbon market function with millions of small carbon emitters participating?
 - Will there be unintended consequences of PCT?
 - How much will the system cost to set up and what impact will this have on public finances?

- Social and political acceptability
 - What will the response be of people and politicians towards PCT?
 - What do people think will be a fair scheme?
 - What steps are needed before implementing a full PCT system?
 - How might acceptability change with different emission boundaries?
 - What is the distributional impact of PCT? How will disadvantaged groups be impacted, for example, the fuel poor?
- Administratively and technological feasible
 - How administratively and technologically complex will the scheme be?
 - Is the scheme technologically feasible?
 - What existing administrative and technological systems can be used?
 - What new administrative and technological systems need to be created?
- Institutional structure and capacity
 - What existing and new institutional structures and capacity are needed to implement PCT?
 - How is there continuity in reducing the emission cap when times in office are short relative to the time scale of the scheme?

Conclusions: Next steps – taking it forward

The following actions were agreed by the group as a way to take things forward, building on the discussions and questions raised during the day:

- To keep a dynamic understanding of what government departments and research groups are doing. Catherine Bottrill, UKERC, will be the contact point for the research community and Chris Jacobs, DEFRA, for the government departments. Catherine will set up the facility for networking, collaboration and co-ordination of the group invited to the workshop. This will be virtual (e.g. a group list), but it might be appropriate at a future date to reconvene in some form. Through this group and via Chris and Catherine the government departments and the research community can exchange ideas relating to personal carbon policies.
- It would be a helpful starting point if the research community identified the key questions and priorities for research, building on progress made at the workshop. It would be useful if researchers shared what they are doing and how this work can be taken forward. ECI has the start of a matrix that can be built upon to track this information and process. Researchers could work together on developing a research agenda and write funding proposals to secure funding for a research programme.
- Government: currently there is no clear remit for departments to put resources into investigating personal carbon trading. The government departments need to have some internal discussions on how to take thinking forward. No significant resources are going to be allocated to personal carbon trading until there is confirmation that this policy concept meets the three pillars of equity, efficiency and effectiveness. Government only has a small amount of funds to explore new options like PCT and it is likely that, at present, departments will only be able to fund small discrete projects.
- It would be helpful to share perspectives on methodologies that could be developed to assess policy options. The Government has some methodologies developed for comparing different policy measures, refer to the Climate Change Programme, but these do not look at the implications for the political economy.
- There is a need for better data, especially on personal carbon footprints, to do the types of policy analysis that were discussed for PCT and other policy options. Data are expensive and therefore need to build support and funding for getting better data – e.g. a carbon expenditure survey.
- Kevin Anderson is willing to do a short note on relative carbon footprints of individuals in different income deciles, either for present day and/or a future year, e.g. 2012. Participants were invited to share any relevant, available data with Kevin for this purpose.

APPENDIX A: Background Briefing Note

Understanding DTQs and PCAs

Prepared by Catherine Bottrill, Environmental Change Institute/UKERC
13th October 2006

This paper is a synopsis of two similar new policy concepts: Domestic Tradable Quotas (DTQs) and Personal Carbon Allowances (PCAs). There is a lot of commonality between these two concepts but also some nuances, which are worth being aware of when discussing personal carbon trading concepts.

DTQs and PCAs were originally proposed and developed by David Fleming and Mayer Hillman respectively from the early 1990s. Researchers at the Environmental Change Institute and the Tyndall Centre are actively investigating the viability of both policy concepts. In addition, there are a number of other organisations with interests in examining personal carbon trading including the Sustainable Development Commission (SDC), the Royal Society for Arts (RSA), Centre for Sustainable Energy (CSE) and Institute for Public Policy Research (IPPR).

DTQ and PCA schemes would be quantity-based instruments in that a "cap and trade" system is established in order to achieve the environmental goal of stabilising carbon emission levels rather than a price-based instrument. The primary aim of both schemes would be to deliver guaranteed levels of carbon savings in successive years in an equitable way. Either scheme could be used to achieve the government's current target of a 60% carbon emission reduction by 2050 or other further targets.

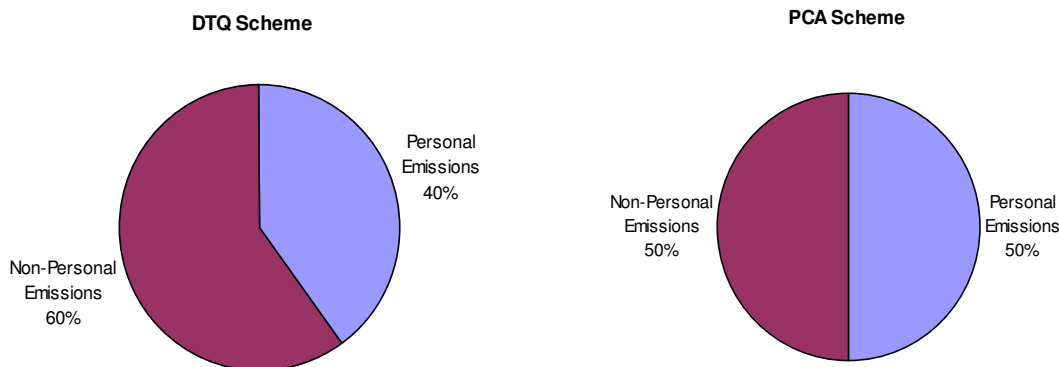
A DTQ or PCA scheme is a variant of downstream carbon trading going all the way down to directly involve individual energy end-users. The EUETS is an example of a downstream trading scheme, but because it only involves large energy-users and power companies it can be described as mid-stream carbon trading. In contrast to a downstream carbon trading scheme, an upstream scheme would be one that only involves the energy suppliers.

The most important distinguishing feature between DTQ and PCA scheme is that a DTQ policy scheme would cover all carbon emissions within the national economy (i.e. the Domestic means UK), whereas PCAs only cover personal carbon emissions. A DTQ scheme envisages a carbon trading system for all end use purchasers of fossil fuel based energy - individuals, firms, organisations, and government services (Fleming, 2005). A PCA scheme on the other hand does not stipulate what the policy framework would be for reducing non-personal carbon emissions, though a parallel scheme is assumed to exist.

In both a DTQ and PCA scheme carbon emissions within the national economy are identified as being either the result of personal or non-personal energy use. Personal carbon emissions are those generated from household energy and personal transport use. They account for 40% to 50% of all UK emissions depending on whether aviation

and public transport are included. Non-personal carbon emissions are all the other emissions related to fossil fuel use from business, industry, services and infrastructure. A DTQ scheme identifies public transport and aviation to be a non-personal emission whereas a PCA scheme identifies these to be personal emissions (refer to chart 1).

Chart 1: UK Total Carbon Emission Split in a DTQ and PCA Scheme



Personal Carbon Trading

A DTQ or PCA scheme would operate quite similarly for individuals. Both schemes are a "cap and trade" system whereby the carbon cap for total personal emissions becomes smaller over time and therefore the quota/allowance allocated to an individual also becomes smaller. The schemes would be mandatory and administered electronically. There are three key elements to personal carbon trading:

1) Setting a carbon budget

The carbon budget is the maximum quantity of carbon emissions that can be emitted from energy use in any given time period by a nation implementing the scheme. A time period for a carbon budget might be a year or it could, for example, be set for a 3-5 years period thereby allowing for variation in the yearly emission reduction. The carbon budget should be set well in advance thereby giving a long-term emissions reduction signal to society. Each budget is divided in carbon units. The budget is reduced for each time period set and in line with national and international emissions reduction targets. It is recommended that carbon budgets be set by an expert independent Carbon Policy Committee to de-politicize the process.

2) Acquiring carbon units

Emission rights are allocated to all adult individuals resident for free and on an equal per capita basis. For children it might be that they receive a partial allowance or that they receive no allowance because the existing tax/benefit system is used to compensate individuals with children. Furthermore, any other inequalities between individuals that the scheme throws up should be addressed through compensatory mechanisms rather than through the scheme itself.

3) Surrendering carbon units

Individuals are required to surrender carbon units when purchasing fossil fuel and electricity for personal uses. This may or may not include public transport and aviation.

Individuals who surrender less carbon units than they are allocated are entitled to sell their surplus on the national market. On the other hand, individuals who require rights additional to those they were allocated must purchase them on the market or buy them with products (Starkey and Anderson, 2005).

The personal emission boundaries vary between DTQs and PCAs (refer to table 1). Both cover emissions from home energy use the same however they vary in how they deal with personal transport. PCAs would include all personal transport use – private vehicles, public transport and air travel (Fawcett, 2005). PCAs cover all personal travel for ensuring an equitable scheme. For example, a recent Oxfordshire survey of nearly 500 people found that the upper 50% emitted 91% and the lower 50% emitted 9% of the total travel emissions (Brand, 2006). However, work done by the Environmental Change Institute does suggest that ground public transport be excluded in the initial stages of a personal allowance scheme for simplicity (Bottrill, 2006). DTQs on the other hand would only cover the fuel use for driving private vehicle(s). Other forms of transport would be included in the non-personal side of a DTQ scheme.

Table 1: Personal emission boundaries for DTQ and PCA schemes

	DTQ	PCA
Home energy		
Gas, coal, oil	✓	✓
Electricity (fossil fuel derived)	✓	✓
Transport		
Petrol/diesel for private vehicle use	✓	✓
Public transport (trains, light rail, underground, ferries, coaches, buses, taxis)	x	✓ (Perhaps excluded in the initial stages)
Personal air travel	x	✓

A major reason behind DTQ and PCA schemes allocating individuals emission rights for their personal emissions is to ensure equity. If a "cap and trade" scheme involving individuals only covered home energy use it would have a regressive impact by making some individuals disproportionately worst off than they would otherwise be. This is because although energy use and hence carbon emissions do rise across income deciles there can be significant variation within deciles. Research undertaken by the Policy Studies Institute indicates some 30% of households in the two lowest income deciles are above-average carbon emitters if the allowance covered only home energy. These

households are likely to be fuel poor therefore before introducing a personal carbon trading scheme fuel poverty programmes are needed to ensure all low-income households emit at average or below-average emissions levels. Furthermore, only a tiny minority of households in the lowest two deciles are above average emitters due to private transport use (Dresner and Ekins, 2004). For the equity of a personal carbon trading scheme it is important both transport and home energy be part of an individual's carbon allowance or quota. In an Oxfordshire survey, 20% of individuals neither flew nor drove themselves in the last year (Brand, 2006).

Personal carbon trading whether it is as in DTQs or PCAs requires the introduction of a number of other measures to make it easier for individuals to be aware of their carbon impact and be able to make informed purchasing decisions to live within their carbon allowance. Such measures would include: smart meters, informative electricity and gas billing, greater emphasis on electricity disclosure (of fuel mix and carbon content) energy labelling on appliances and electronics, energy-rated homes, enhanced petrol pumps, and carbon responsible advertising (Hillman et al., 2004).

References

Bottrill, C (2006) *Excluding ground public transport in personal carbon trading*, Environmental Change Institute, Oxford University, Oxford

Brand, C. (2006) *Personal Travel and Climate Change: Exploring climate change emissions from personal travel activity of individuals and households*, Unpublished Doctoral Thesis, Environmental Change Institute, Oxford University, Oxford

Ekins, P and Dresner, S (2004) *Green taxes and charges: reducing their impact on low income households*, Joseph Rowntree Foundation, York

Fawcett, T. (2005) *Investigating carbon rationing as a policy for reducing carbon emissions from UK household energy use*, Unpublished Doctoral Thesis, University College London, London

Fleming, D. (October 2005) *Energy and the common purpose: descending the energy staircase with tradable energy quotas (TEQs)*, The Lean Economy Connection, London
<http://www.teqs.net/download.htm>

Hillman, M. & Fawcett, T. (2004) *How we can save the planet*, Penguin, London

Starkey, R. and Anderson, K. (December 2005) *Tyndall Technical Paper 39: Domestic Tradable Quotas: a policy instrument for reducing greenhouse gas emissions from energy use*, Tyndall Centre for Climate Change Research, Manchester
http://www.tyndall.ac.uk/research/theme2/final_reports/t3_22.pdf
(Date accessed: 13/10/2006)

Other useful references

Hillman, M. (June 2006) *What we must do to save the planet*. RSA Journal, London
<http://www.thersa.org/journal/article.asp?articleID=755#>
(Date accessed: 13/10/2006)

Starkey, R. and Anderson, K. (September 2005). A summary on DTQs from Tyndall's *Decarbonising the UK Report*
http://www.tyndall.ac.uk/research/theme2/dtqs_summary.pdf
(Date accessed: 13/10/2006)

APPENDIX B: Pre-event work for participants

Issues and questions identified by government departments

Key Issues

1. Political / public acceptability
2. Cost and technical feasibility
3. Relative benefits over other policy mechanisms (eg taxation, offsetting at point of purchase)
4. How would fit alongside or in conjunction with other existing / envisaged policies (such as EU ETS, Supplier Obligation)
5. How far voluntary / community-based schemes could take you
6. practicability
7. value for money compared to other options
8. transaction costs
9. impact on public finances
10. It is clear that a considerable element of a DTQ/PCA scheme would be transport, so DfT naturally has an interest in learning more about how such schemes would operate, practical issues around implementation, necessary technologies, possible timescales for delivery etc. Furthermore, we are currently considering emissions trading options for surface transport and will be considering all options, both upstream and downstream. Downstream options, for example getting individual drivers to surrender allowances for the carbon emissions emitted as a result of their travel, would seem to be a subset of a wider PCA measure.

Key Questions

1. How would compliance work and at what cost? What would we do about people who don't purchase sufficient allowances?
2. If PCA allocations are based on contraction and convergence towards national targets (e.g. 60% by 2050), what would this mean in terms of annual allocations of allowances for transport purposes? Presumably it would be possible to work back from such a target to derive what an individual's allocation would equal in terms of transport choices, for different years (e.g. in 2010, an annual allocation would = one flight to New York, or 60 car journeys from London to Newcastle. In 2020, an annual allocation would = one flight to Paris, or 20 journeys from London to Newcastle). Furthermore, what assumptions would be made about such targets, which are national targets? Would that target be distributed evenly across sectors? Or should it be done on the basis of cost of carbon abatement?
3. What, if any, allowances would be made for essential journeys (or other services if looking at PCAs more widely)? From a moral point of view, can we deny people essential services (i.e. heating) if they refuse to/cannot pay for allowances? What allowance would be made for people in rural areas for whom cars are important?
4. There would seem to be many similarities between PCAs and carbon offsetting. How might offsetting be used as a natural later introduction to PCAs?
5. Why does ECA believe that surface public transport would be too complex? Is this because of issues around loading factors?
6. Would double counting issues mean that a DTQ/PCA scheme could not run in parallel with an upstream system?

Pre-work matrix to researchers actively investigating PCT

	Researcher	Researcher	Researcher
<i>Please complete the following table for your organisation/yourself. For each item indicate if you (A)gree or (D)isagree with the statement. In addition, indicate if more (R)esearch is needed for a particular item.</i>			
Emission boundaries for personal carbon			
Home energy included - i.e. coal, gas, oil and electricity			
Ground public transport excluded initially, accounted for in the non-personal carbon trading			
Domestic and international aviation included			
Domestic aviation included			
The carbon budget			
The budget is for the year and decided well in advance			
The budget will decrease annually			
The budget is given in carbon units			
Emissions calculated in terms of tonnes:			
C			
CO ₂			
CO ₂ equivalent			
Allocation of allowance			
Equal per capita allowance to all adult UK residents			
Individuals with children receive some allowance, which may be graduated by age and/or number of children in the family			
Carbon units are allocated yearly to individuals, not households			
The allowance could be distributed several times/ 12 months			
Individuals could have different months for the end of year			
Personal carbon accounts			
Can sell carbon from this year			
Across years can save carbon			
Never need to buy because included in the products if you are a short-term visitor to the UK or you have used all of your allowance			

Participants receive regular carbon statements			
Carbon literacy & public acceptability			
A pilot of a personal carbon scheme is required			
More information about carbon emissions needs to be made accessible - e.g. at the petrol pump and on energy bills.			
An accurate personal carbon calculator is needed - should be available online & offline			
Other			
Scheme needs to be mandatory			
First year may be mandatory but no penalties for excess use			
First year may be generous (above average) allowance to give individuals learning time			
Scheme needs to be administered electronically - transactions happen electronically			
There is one carbon market - covering all personal and non-personal emissions			
The UK could introduce the scheme unilaterally			
The personal carbon scheme has to be made to dovetail with EUETS and other future international carbon trading regimes			
Revenue for the personal carbon allowance scheme comes from auctioning emission rights to non-personal energy users (i.e. industry, government, business)			

Summary of PCT researchers' responses to pre-work matrix

Emission Boundaries

- Home Energy: Clear agreement that electricity and gas should be included in an individual's personal carbon allowance. Brenda – need to make sure it will be simple for people who use delivered coal, oil or pre-paid meters to easily surrender carbon units from their allowance.
- Ground Public Transport (GPT): Generally there is agreement that GPT should be excluded from a personal allowance, at least initially. Some think it should eventually be included whereas others think it should remain in the non-personal side of a trading scheme.
- Aviation: More research is needed. ECI and Mayer think research should be within the personal side of the scheme for equity reasons.

The Carbon Budget

- There is full agreement that the carbon budget decreases over time and is set well in advance to give people and organisations clean signals. Need for clarification and research on the time scale of interim budgets – do they run on an annual cycle? Or do they run on a multi-year cycle to allow for variations (e.g. a cold winter)?
- Units – need clarification and agreement. Government uses carbon as its accounting unit. People typically use carbon dioxide for personal carbon counting. Aviation requires using carbon or carbon dioxide equivalent. TEQs says 1 carbon unit= 1 Kg CO₂.

Personal Carbon Allocation

- Full agreement that allowances should be allocated on an equal per capita basis.
- Generally there is a preference that allowances are only allocated to adults. Adults with dependent children are compensated through other means rather than receiving a child allowance, i.e. through the child benefits system.

Personal Carbon Accounts

- Full agreement that individuals are able to sell their carbon allowance from any previous year and that they can also save their carbon for use in future years. Seems to be agreement that individuals do not have to top up their allowance, as they will be able to buy carbon at the point of purchase once their allowance is used up (short term visitors will also buy carbon at the point of sale).
- Full agreement that individual carbon statements are required, but further research is need on how this should be organised.

Carbon literacy and public acceptability

- There are various opinions about whether a PCT pilot is necessary. There is the feeling that it will not be possible to fully test the scheme, but it might be valuable to trial certain aspects of the scheme.
- All agree that information about carbon needs to be accessible for goods and services covered by PCT
- An accurate personal carbon calculator could be beneficial in helping people understand and manage their carbon allowance.

Other

- There is full agreement that PCT is a mandatory scheme and it should be so from the first year.
- Agreement that allowances should be generous in the first year, but more research is needed on how to do this.
- There is full agreement that PCT would be managed electronically.
- All agree that the UK could introduce PCT unilaterally.
- Some argue there should be a single carbon market - covering both personal and non-personal carbon emissions. Several think more research is needed on this as could see a case to keep PCT in its own market.
- Agreement that PCT would need to dovetail with emissions reduction schemes for non-personal emissions (e.g. EUETS).
- Revenue for a PCT scheme could be raised through auctioning, as outlined by TEQs or the scheme could be paid for from the general tax pot.

APPENDIX C: Articulating the issue – Where are we now?

Researchers' perspectives

The current policy framework is failing if the UK wants to achieve its relative emission reduction target of 60 per cent or more to stabilise global atmospheric CO₂ concentrations at 550ppm by 2050. Reducing carbon emissions by 60 per cent will require a 6-9% year on year reduction starting by 2012. Therefore, the policy instruments being used need to be pushed much further and new ones need to be considered and implemented. In this context it is useful to examine personal carbon trading, which based on Richard Starkey and Kevin Anderson's work at the Tyndall Centre on domestic tradable quotas (DTQs) could be an equitable, efficient, and effective approach to achieving significant emission reductions. An economy-wide emission trading scheme, such as DTQs, is an appealing policy instrument as 100% of energy users are involved so everyone contributes directly to the effort of reducing emissions.

For the purpose of today's workshop the focus is on discussing a trading scheme to cover personal emissions, which is at a minimum 40 per cent of the UK's total annual carbon emissions. The remaining 60 per cent of UK carbon emissions is attributable to non-personal activities and therefore would be tackled through a policy mechanism complementing personal carbon trading.

The researchers agreed a personal carbon trading scheme would definitively cover those emissions from home energy and private transport use and there could be the option of extending the scheme to public transport and aviation.

The emission rights for personal emissions will be allocated on a free and equal per capita basis. A personal carbon trading scheme would need to be a mandatory and would operate electronically.

A PCT scheme could not be implemented in isolation as a variety of supportive policies would be needed to ensure its smooth introduction and running. Supportive policies might also help increase the political and social acceptability of the scheme.

Areas of research

- Comparative analysis of policy instruments that might be able to meet the scale of the problem
- Economics cost-benefit analysis
 - What is the relative economic efficiency of upstream vs. downstream trading schemes?
 - What are the macro economic impacts of a personal trading scheme? How would it effect innovation and investment?
 - How would a personal carbon allowance affect household expenditure? What are the equity implications?

- Logistics
 - What is the potential for using existing systems for - registering people, allocating allowances, banking, carbon accounting, transaction processing?
 - What is the pathway for introducing personal carbon trading? Are policies that if introduced mean the door is closed for introducing personal carbon trading? Are their precursor policies that could lay the groundwork for bringing in personal carbon trading at a later stage?
- Public acceptability
 - Develop a better understanding of what people might think about having a carbon allowance
 - What will be their reaction to the scheme?
 - What might be their response to the scheme and how might they evolve with the system?
 - How might the public acceptability be affected by having different boundaries? E.g. maybe people might consider it fairer if aviation emissions had to be covered by a personal carbon allowance
- Political acceptability
 - What institutional set up is needed?
 - What type of delivery systems is needed?

Government's perspectives

Will it be effective?

- What is the problem we are seeking to tackle? Are we trying to change behaviour or internalise the costs of environmental impacts?
- Will it actually produce behavioural change?
- Will it have unintended consequences?
- How does this approach compare with other approaches to tackling the problem (i.e. relative effectiveness, relative costs and benefits)

What will the public and ministers' attitude towards this approach?

- What is the political feasibility?
- Can you sell it to the public? Would you want to?
- Would politicians be willing to (a) set a tight cap and (b) ratchet it down overtime?
- Will there be the option for an exit strategy if it doesn't work?

Is it practical?

- Coverage
 - What emissions are including? Is it worth doing alone...could other countries participate? How are children involved?
- Allocation
 - What would an annual allocation be? How should allocation be done? Will it take into account geography?
- Administration
 - Is it going to be administratively complex? What impact will the scheme have on public finances? How many people/resources will be needed? Are

ID cards and smart meters a pre-requisite for introducing PCT? If yes, it will be prohibitively expensive to introduce

- Carbon price
 - Would the carbon price be equal to EUETS? If yes, will this be a sufficient price signal to encourage a carbon reduction by individuals? Can government resist intervention if the carbon price gets high?
- IT/Fraud/Trading
 - Is it technically feasible? Will someone buy up allowances on the cheap at the expense of pensioners?
- Other policies/interactions
 - Will there be links with other trading schemes? What types of complementary measures would be needed? What is the strategic fit with the UK's other policy initiatives, e.g. extension of the EUETS?
- Equity
 - What is the impact on the fuel poor? Most disadvantaged groups? What will be the distributional impacts?

Given that there are potentially so many complexities that need to be considered before introducing a PCT scheme a starting point could be to trial personal carbon trading in an individual industry or sector, basing the allowance around the specific nature of that industry.

APPENDIX D: What does this tell us? Identify the key issues and research gaps

- Relative benefits of different policy instruments
 - There is a narrative to analyse – what are the advantages and disadvantages of the schemes? Upstream vs. downstream – implications for PCAs and C taxes.
 - Identify the criteria for analysing the range of approaches possible - policy instruments need to have credibility, visibility, adaptability, and longevity – assessment criteria needs to address these.
- Public acceptability
 - Steps to implement full system. What is the sequence towards PCT? Starts with voluntary offsets? Likely to see carbon reduction loyalty schemes from the commercial world.
 - Communication – do we wait for public acceptability before acting, or do we act and try to build acceptability. The choice is not PCT or nothing, it is not PCT or something else.
 - Do we want a system that is obtuse to energy users (e.g. EUETS) or one that is transparent (e.g. PCT)?
- Better data on personal carbon profiles
 - Need for data collection and analysis of personal/household carbon profiles
 - Need for social profiling to assess the impact of PCT scheme
- The strategic policy fit
 - The policy landscape is not empty therefore PCT will need to fit with existing schemes (i.e. EUETS)
 - How does PCT fit within the policy landscape? (domestically and internationally)
 - How does downstream trading fit with midstream and upstream trading?
- Assess the economic rationale
 - Establish the aim of the scheme first or public debate first
 - Do the objectives come before the details or vice versa?

APPENDIX E: What are the next steps? Identifying a prioritised list of actions

1. A common framework is needed to compare different policy instruments - identify criteria for policy assessment
2. Examine how PCT might fit within the policy landscape
 - Need mapping of planned and possible policies and where PCT fits – e.g. EUETS phase 3 negotiations – will it preclude/ prevent PCT from being implemented
 - Assessment of the existing systems and institutional structures for introducing PCT
3. Cost/Benefit analysis needed on:
 - The costs of developing and running the IT, banking, database systems
 - The transaction costs at the macro and micro level
 - The response of people to the scheme
 - The equity distribution
4. Collect and analysis individual carbon footprints by different socio-economic groupings in order to develop an in-depth understanding of the distribution of carbon footprints
 - Have a common methodology for carbon profiling
 - With better data would be able to examine the cost-abatement curve for individuals to reduce their carbon emissions under different policy options. In addition, be able to assess the balance of effort for individuals to reduce their emissions.
5. Social and political feasibility
 - Run some simulation exercises (real and virtual), focus groups and surveys to learn about how people might respond to the scheme
 - Understand the timescales: is it possible to implement something soon even if it is not perfect? Then develop the scheme further over time. Politicians need quick options so if you have to have everything in place and this will take 10 years then it is likely to fail before it can get started. What precursors are important to introduce as stepping stones? In addition, the terminology used can evoke positive associations or not cogitations that are not easy to change.

Next steps – taking it forward

- Keep a dynamic understanding of what government departments and research groups are doing.
- Catherine Bottrill, UKERC, will be the contact point for the research community and Chris Jacobs, DEFRA, for the government departments.
- Catherine will set up the facility for networking, collaboration and co-ordination of the group invited today. This will be virtually (e.g. a group list), but it might be that it is appropriate at a future date to reconvene in some form.
- Through this group there is a window to the government departments and the research community interested in personal carbon policies.
- It would be helpful as a starting point if the research community identified the key questions and priorities for research, which today has made some progress towards. It would be useful if researchers shared what they are doing and how this work can be taken forward. ECI has the start of a matrix that can be built upon to track this information and process. Researchers could work together on developing a research agenda and write a funding proposal to secure funding for a research programme.
- Government: currently there is not a clear remit for departments to put many resources into investigating personal carbon trading. The government departments need to go away from today and have some internal discussions on how to take thinking forward. No significant resources are going to be allocated to personal carbon trading until there is confirmation that this policy concept meets the 3 pillars of equity, efficiency and effectiveness. Government only has small amount of funds to explore new options like PCT and it is likely that departments will only fund small discrete projects.
- It would be helpful to share perspectives on methodologies that could be developed to assess policy options. The Government has some methodologies developed, refer to the Climate Change Programme, but these do not look at the implications for the political economy.
- There is need for better data, especially on personal carbon footprints, to do the types of policy analysis that has been discussed today for PCT and other policy options. Data is expensive therefore need to build support for getting better data – e.g. a carbon expenditure survey.
- Kevin Anderson – is willing to do a short note on relative carbon footprints of individuals in different income deciles. Can this for now and/or a future year, e.g. 2012. Any data people have that might help Kevin would be welcomed. The note will give some indication of individual's carbon footprints and the quantity of carbon given in a personal carbon allowance.